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Key messages:

- 1- Importance of mathematical modelling for “sharing the benefits” in transboundary basins
- 2- Technical solutions to protect and improve water quality and quantity in transboundary waters
- 3- Awareness raising and change in habits to protect and improve water quality and quantity in transboundary waters

- *Efforts in Turkey for Adaptation to the EU and Water Management at Basin Level*

As a candidate country for EU membership, Turkey is obliged to adopt and implement the Water Framework Directive (WFD) and protect and control its water resources both quantitatively and qualitatively. In the last ten years, there has been a change in the understanding of water management in Turkey. With the EU accession process, there has been a shift from solely focusing on how to meet the ever increasing water demand to sustainable management of water resources at basin level that takes into account both water quality and quantity.

In Turkey, the annual drinking water potential is 1,600 cubic meters per capita. Without any plans and long-term measures to protect and improve water resources, water scarcity is likely to arise in the near future. To avoid this, water resources management at river basin level is gaining importance. We are therefore accelerating our national and international efforts for the conservation and management of river basins.

We are making serious efforts to improve our national water resources management and harmonize and streamline our existing water legislation with the WFD. We have created new institutions in the field of water management, namely the Directorate General for Water Management and Turkish Water Institute (SUEN). We are reforming our 86-years-old national water law. The new law will be more comprehensive and more considerate of water quality, sustainability and basin-level management. We have issued bylaws for basin planning, surface water quality and groundwater management. We have prepared a regulation for the protection and management of drinking water basins. In accordance with the Water Framework Directive, we have identified 25 river basins in Turkey for which we are willing to complete the preparation of River Basin Protection Action Plans by December 2013. This year we have also started working on River Basin Management Plans (RBMPs). Initially we will prepare four RBMPs for the Maritza/Ergene, Konya, Büyük Menderes and Susurluk River Basins. RBMPs for all basins will be completed by 2020. Flood management plans are also in progress. We started with the West Black Sea Basin, where we are making flood risk and damage maps and taking necessary measures.

We are also working on improving data related to water. We are creating an information system for water management. In compliance with the Water Framework Directive, we are building monitoring stations for each basin and standardizing the parameters and monitoring frequency.

We are putting efforts to halt water pollution through the construction of improved wastewater treatment plants and prohibition of the discharge of industrial wastes. We have prepared a River Basin Protection Action Plan for the heavily industrialized Ergene River Basin, (which is one of the main tributaries of the Maritza River that rises in Bulgaria and flows along the Turkish-Greek border into the Aegean Sea) to stop the pollution causing from the 2037 industrial plants around. We are making efforts to rehabilitate the river bed and construct domestic and industrial wastewater treatment plants.

Our other efforts are towards efficient use of water, wastewater reuse and prevention of water losses and leakages. Our target is to reach good ecological and chemical status for all ground and surface waters by 2027.

- *Cooperation in Transboundary Water Basins*

Turkey is not a country rich in water resources. In fact, it is expected to become a water-stressed country by 2030. Most of Turkey's territory is situated in a semi-arid region and the precipitation regime is irregular. Transboundary rivers constitute a substantial amount of Turkey's water resources. While only five of the 25 river basins in Turkey are of transboundary nature, transboundary rivers account for 40% of Turkey's water potential. The waters of the Euphrates-Tigris River basin represent 30% of Turkey's water resources.

We therefore put significant emphasis on transboundary water management. In Turkey, we see transboundary waters as a source of cooperation rather than a source of conflict and believe that transboundary waters should be utilized in an **equitable, reasonable and optimal manner** in the interest of all riparian countries.

We believe in the **importance of mathematical modelling** for the benefit of all riparians. Rather than the allocation of water itself, we believe in "**sharing the benefits**" which can be scientifically studied using economical modelling. Models for transboundary water resources (let them be rivers, lakes or aquifers) should ignore political boundaries and deal with the unified development of the basin to find the most economically optimum model. Taking into account parameters such as the position and quantity of water resources, vegetation, geography, etc. agricultural land use and product patterns should be identified. Thus, the most economical way of using available water should be established scientifically. Riparian countries can cooperate to build a system for energy-food exchange where mountainous upper riparians provide hydroelectricity to lower riparians for food in return. This may be a win-win situation for all.

Not only hydrological quantity modelling, but also quality modelling for transboundary water resources, is an essential practice to allow for predictions and future scenarios. Here riparian countries should cooperate for data exchange, calibration, verification and prediction processes.

Turkey is upper riparian in three river basins and lower riparian in two. We are aware of the fact that upstream countries have responsibility towards downstream countries to maintain both water quantity and quality. Here it is again important for riparian countries to cooperate. Quantity of water should be protected through practices like wastewater treatment and reuse. For example, wastewater reuse in agriculture can reduce 70% water allocation for

irrigation. Reduction of unaccounted for water (UFW) is also very important. For instance, there is no such thing as “unaccounted for petroleum” or “unaccounted for natural gas”, because they are very valuable commodities. But water is no less precious. Besides the technical solutions, changing our water consumption habits to conserve water is equally central. We should learn to make do with less water. According to the World Health Organization (WHO) about 20 litres per capita per day is enough to take care of basic hygiene needs and basic food hygiene. We should reconsider our daily water consumption accordingly. Similarly, the minimum daily water requirement for animals and plants should also be identified. We should take urgent measures to conserve water. Even if we take these measures today, we will experience water shortages in the future, and the countries that fail to take the necessary actions will be held responsible. Here technology transfer and awareness building are of great importance. Of course, we should also take measures to prevent waste of food and energy, for they also mean waste of water.

Finally, as regards to protecting and improving the quality of water in transboundary basins, I want to stress that research should be conducted on nitrate pollution from agricultural activities that flow into transboundary groundwaters and are then transported to the riparian countries. It is also important to decentralize the wastewater treatment plants in order to reduce point pollution loads and increase possibilities for reuse.