

Innovative Technologies for Sound Decision Making in Water Resources Management, Including the Water-Energy Nexus

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Dr. Pradeep Aggarwal, Manager for Water Resources at the Isotope Hydrology Section of the IAEA, gave an overview of the role of the IAEA. The Water Resources Programme of IAEA has provided Member States with science-based information and technical skills to improve understanding and management of their water resources. Natural Water was described as being composed of oxygen and hydrogen isotopes. There were other isotopes in rainwater such as tritium and carbon-14. An analysis showed that tritium was mostly present in the North Atmosphere because of nuclear testing.

According to Dr. Aggarwal, it was important to identify the linkages between groundwater and surface water. Isotopic investigation enabled the mapping of the extent and age of groundwater, determined its flow rate and its sources. In addition, isotopic investigation permits to understand and evaluate groundwater interaction with other aquifers, rivers, lakes and wetlands and helps to provide a sound scientific basis for water resources planning and protection. Isotopes allowed us to determine how fast groundwater has moved and how old it was. It was noted that groundwater moves much slower than river water. This implied that it was even possible to find water underneath deserts. However, it also meant that groundwater was old, therefore the reservoir or aquifer was likely not to be refilled or renewable.

An example was given of the arsenic crisis in Bangladesh. The instructor pointed out that the depth of well was not a reliable indicator to identify arsenic free water. Isotopes enabled to identify arsenic free water, to mitigate arsenic contamination of groundwater and to improve the quality of life. The conclusion of the analysis was that young water contained arsenic whereas old water did not. Isotopes therefore helped to better define a hydrological model and to reduce the cost of developing arsenic-free water supply. Early use of isotopes could significantly reduce investigation costs by avoiding unnecessary drilling.

Niel Plummer, Senior Scientist for the US Geological Survey, outlined the objectives of energy analysis and planning. He explained how to measure the energy demand, the supply, the financial aspect and the impacts of electricity generation, as well as energy link to water issue.