

IAEA/RCA Project: RAS 7030, Assessing Deep Groundwater Resources for Sustainable Management Through the Utilization of Isotopic Techniques

Lead Country/LCC: Pakistan/ Dr. M. Azam Tasneem

Period: Jan 2016 – Dec 2019

Participating GPs: Australia, Bangladesh, Cambodia, China, India, Indonesia, Japan, PDR Lao, Malaysia, Myanmar, Mongolia, Nepal, New Zealand, Pakistan, Palau, Philippines, Sri Lanka, Thailand, Vietnam.

Objective: To improve the capability for efficient and effective planning for sustainable management of deeper groundwater resources and establish sustainable teams in each participating GP.

Activities:

- First Project Coordination/planning meeting, 06-10 June 2016, Ho Chi Minh City, Vietnam.
- Mid-Term Project Progress Review meeting, 06-10 Nov 2017, Colombo, Sri Lanka.
- Technical Workshop, 19-23 Sep 2018, Beijing, China.
- Final Meeting was held 23-27 Sep 2019, Ulaanbaatar, Mongolia.
- RTC on the use of isotopic and related techniques in the assessment of groundwater resources and address hydrological problems, 14-25 November, Xi'an China.
- RTC on the use of isotope techniques for groundwater dating, 14-18 Aug 2017, Sydney, Australia.
- RTC on the use of isotope techniques for assessing groundwater quality, 06-10 Aug 2018, Jakarta, Indonesia.
- RTC on isotopic data processing and interpretation – hands on exercises, 18-22 March 2019, Tsukuba, Japan.

Expert Missions: Malaysia, Mongolia, Myanmar, Palau, Pakistan, Philippines and Sri Lanka availed expert missions.

Analytical Services: Pakistan as RRU provided analytical services to BGD, MAL MON and PHI.

Implementation Status: Completed successfully, the implementation is 100%.

Achievements: Based on the results, GPs have come up with their achievements at national level:

1. **Australia:** Fresh water lens on Rottnest Island has decreased in volume by 20% which has prompted Authority to cease using groundwater resources.
2. **Bangladesh:** End-users have positive recognitions of results of the study carried out in framework of this project.
3. **Cambodia:** Participation in the regional events has increased the awareness in the field of water resources management.
4. **China:** Improved understanding of connections between deep and shallow groundwater as well as the lake systems in Erdos Plateau. A number of national standards on deep groundwater as an energy source have been established incorporating isotope techniques.
5. **India:** Based on the results achieved through this project, proper planning for groundwater development will be carried out with end user department in near future.
6. **Indonesia:** Jakarta Groundwater Conservation Board (JGCB) and deep groundwater well owners have been informed about rejuvenation of deep groundwater based on groundwater age in Jakarta. The JGCB will take necessary measures for sustainable supply of fresh water.
7. **Japan:** The basic plan of water cycle will be revised in 2020 as per policy of Japanese Government on water cycle, focusing on the importance of the groundwater and advanced investigation techniques. Additionally, Japanese Government is promoting a research program “National Resilience - Disaster Prevention - Groundwater as an alternative water resource in disaster/drought”.
8. **Malaysia:** Relevant isotopic, chemical and hydrogeological data of the study area will be associated with the prediction of aquifer potential for sustainable groundwater resource management. The findings of the project may help in developing guideline documents to address water resources security issues.
9. **Mongolia:** The National Water Association and Ministry of Environment and Tourism and other water enterprises will use created isotope data base for the development of water policy to solve issues for sustainable groundwater resources in south Gobi region of Mongolia.
10. **Myanmar:** The knowledge gained through this project will help in establishing infrastructure for application of isotopic techniques.
11. **Nepal:** The knowledge gained through this project will help in establishing infrastructure for application of isotopic techniques.

12. **New Zealand:** The combination of age tracers, water and nitrate stable isotopes, nutrients and major ions enabled us to understand recharge source and rate, interaction between surface and groundwater, lag times, discharge pathways and denitrification processes.
13. **Pakistan:** Demarcation of good quality deep groundwater zones with high replenishment rate/shorter residence time has been made. The findings have been transmitted to national water management authorities to cope with the fresh water demand for domestic, agriculture and industrial sectors.
14. **Philippines:** Partnership established with the research institution which enabled the user agency to improve their regulation through formulation of policy using the data and analysis.
15. **Sri Lanka:** Water Sector institutions/organizations are looking for potential resources of clean water other than the poor quality groundwater to provide drinking water for the dry zone areas in Sri Lanka.
16. **Thailand:** Groundwater dynamics were identified with isotopic techniques for sustainable groundwater abstraction in the study area. The national water management agency will take care of the findings for development of ground water in future.
17. **Vietnam:** The Vietnam Water Resources Management Department and Division for Water Resources Planning and Investigation for the South of Vietnam use the achieved results and new relevant information, for planning of investigations of groundwater resources in the Nambo Plain.

Publications: Australia: 07, Bangladesh: 02, China: 08, India: 02, Japan: 05, Mongolia: 06, Myanmar: 02, New Zealand: 03, Sri Lanka: 01, Thailand: 01, Vietnam: 02