

Press Release
Indus River System Authority (IRSA)
Training Workshops on Water Apportionment Accord (WAA) Tool

IRSA HQs, Islamabad, the 10th of December, 2022

Pakistan operates the world's largest continuous irrigation system, the Indus Basin Irrigation System (IBIS), which supports food production and produces cheap hydel energy for the domestic and industrial supply. IBIS spans all the 4 provinces of Pakistan. The River Indus catchment area (about 1,165,000 Km²) falls in 4 countries, including: Pakistan; India; Afghanistan and China. This system, which is under increasing pressure from population growth and climate change, provides water, energy and food security for the whole nation. Since 1993, water resources of the Indus River System are being shared among four provinces of Pakistan according to the Water Apportionment Accord (WAA) 1991 by the Indus River System Authority (IRSA). The WAA 1991 describes the broad water-sharing principles but not the precise mechanism / steps of how these principles are to be executed. There are 6 distinct steps in the water allocation process which are performed in a systematic and orderly manner. The process is a complex set of procedures which takes considerable time and person hours to fully accomplish at the start of each cropping season. For different scenarios, the process is oftenly repeated adding even much more time and efforts on the part of IRSA technical personnel. Although common computer software like MS Excel is used as a tool to carry out the different steps but the whole process is disjointed and not automated.

2. Through a joint collaborative historic effort - conducted under the Australia-Pakistan Memorandum of Understanding (MoU) on water management - by Pakistani and Australian Governments through the Pakistan Ministry of Water Resources (MoWR), IRSA, WAPDA, Provincial Irrigation Departments (PIDs) and Australia's national science agency, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the Water Apportionment Accord (WAA) Tool was developed over a 4-year period from 2018 to 2022. The pre-season planning prototype was developed into the WAA Tool in 2020 with financial support from the Government of Australia through its Australian High Commission in Islamabad and CSIRO. The recent improvements and documentation were supported through a small research and development activity by the Australian Centre for International Agricultural Research (ACIAR). The basic aims of the software Tool are to: -

- capture undocumented pre-season planning procedures in a repeatable process;
- provide transparency and consistency in seasonal water allocation planning processes;
- enable more equitable and efficient sharing of water resources;
- provide capability to explore alternate system operational scenarios / rules.

3. The Tool has been in operation since December 2020 by the stakeholders in Pakistan, being the Tool of choice, and have been actively employed to aid in informed decision making for advance seasonal planning, operation of reservoir and river network and distribution of the water resources of the Indus River System between the provinces as per policies of WAA 1991. Before its formal operationalization, the Tool was successfully tested and used for Kharif 2020 and Rabi 2020-21 pre-season planning. Tool assessments matched almost exactly with the assessments of IRSA with more accurate assessment of provincial shares.

4. The Tool captures the complete 10-day pre-season allocation processes as implemented by IRSA. The Tool forecasts Rim-Station inflows, accounts for losses / gains in the Jhelum-Chenab and Indus Zones based on the previous years reported data and decisions taken by Advisory

Committee, operates the reservoirs on set rules, allocates shares to the provinces using different sharing options and allows for any excess water to be released downstream of Kotri Barrage. It follows the same statistical and analytical techniques as manually adopted by IRSA. The Tool also allows for the use of externally prepared flow forecasts for any/all of the Rim-Stations. With this ease of fast computing, the Tool has the capacity to calculate and present different system operational scenarios, which previously consumed considerable effort and time.

5. During the utilization of the software Tool, IRSA and the stakeholders identified the next steps required to sustain the investment: (1) consolidating and expanding the skill base (in using the Tool and in the details of the allocation process) through continued and more intensive training of a wider audience; and (2) expanding its use to capture the mid-season allocation planning process.

6. The Tool has been designed to run at start of Kharif and Rabi seasons for advance system planning by inputting the actual hydrological parameters ending March or September. However, during actual operation of the system, it is often required to revise the system operational parameters due to changed inflows, storages, demands, etc. This is known as Mid-Seasonal review of IRSA which is regularly carried out during the season if forecasted parameters differ significantly as compared to actual ones. CSIRO held separate meetings with SID, IRSA and PID to understand how they are doing mid-season planning, to assist with a future possible project development on this aspect.

7. Due to the importance of the training component, CSIRO Experts, namely, Dr. Mobin-ud-Din Ahmad as Team Leader and Ms Susan Cuddy as Senior Scientist, along with assistance rendered by technical personnel of IRSA, conducted a series of technical training workshops from 29th November to 8th December 2022. The first workshop was conducted for the lower riparian stakeholders of Sindh and Balochistan at Karachi on 29th and 30th November 2022, attended by concerned technical personnel of Sindh and Balochistan Irrigation Departments and Mehran University of Engineering and Technology (MUET). CSIRO Experts very much appreciated the enthusiasm and proactive interest of the lower riparian stakeholders, especially Sindh Irrigation Department (SID), during the Tool development period and the training sessions also. The attendees were initially introduced to the basic objectives and later run through the different system planning steps of the Tool in an interactive hands-on practice session with open discussion and queries in-between and afterwards.

8. In the second training workshop on 5th December at IRSA HQ Islamabad, technical personnel of IRSA, Khyber Pakhtunkhwa Irrigation Department (KPID) and Pakistan Council of Research in Water Resources (PCRWR) were likewise informed about the different aspects of the Tool and trained with hands-on practice lessons. CSIRO Experts said that the cooperation and technical advice rendered by the IRSA Members and Operation Section personnel during the development phase was indeed commendable and pivotal for comprehension of the complex system operational steps and procedures, which were then translated and coded into the Tool for efficient and time-saving automated operations.

9. On the next day on 6th December, 2022, the CSIRO Team formally met with IRSA Members and technical personnel to discuss about IRSA's proposed improvements in the Tool. CSIRO Experts also briefed the Authority about the progress and positive outcome of the on-going training workshops.

10. All IRSA Members appreciated the effort and collaboration of CSIRO through the Australian Government with the Pakistani stakeholders during the development of the software Tool and stressed upon the need to improve it as per realistic requirements of the users to make it more adaptable and robust to the system operational requirements of IRSA. They said that as water distribution is a very critical and sensitive issue, the introduction of a common analytical and

presentation framework, in the form of the latest version of the WAA Tool, enables greater clarity and transparency in the complex water planning processes and promotes inter-provincial harmony. Chief Engineering Advisor MoWR informed that effective implementation of the WAA 1991 was a major objective of the National Water Policy (NWP) 2018 and the inducting of the Tool to aid in regular system operations is an important step towards achieving the said NWP 2018 objective. It was also unanimously agreed that for the continued development / updating of the Tool, a local scientific software engineer would be preferable. In order to support CSIRO in further development of the Tool, ways and means would be explored and identified by MoWR, IRSA and CSIRO, including identification and engagement of interested local and international donors for financial assistance of CSIRO. To discuss the prospective developmental aspects of the Tool and other related matters, the CSIRO Experts met with Mr. Hasan Nasir Jamy, Secretary MoWR, and Mr. Syed Muhammad Mehar Ali Shah, Joint Secretary MoWR, on the same day in a conducive and cooperative environment. During this meeting, to further enhance consistency and transparency in water allocation planning, CSIRO Experts recommended a greater focus on improving river flow data for better accounting of loss/gain assessment. One improvement would be through automating river flow and withdrawals data collection at key gauging locations, including the possibility of establishment of a new gauging station at or near the border of Punjab and Sindh provinces with the consent of stakeholders.

11. The third and last training workshop was conducted in Lahore on 8th December for Punjab Irrigation Department (PID) and WAPDA. It was encouraging that senior officials from WAPDA and IRSA Members and IRSA Director Operations attended the workshop. Training at this workshop was largely conducted by IRSA personnel, with support from CSIRO Experts.



First Training workshop in Karachi, Nov 29-30, 2022.



CSIRO Expert with Sindh Provincial Irrigation Minister, Secretary and Chief Engineer of Sindh Irrigation Department during the first training workshop, Nov 29-30, 2022 at Karachi.



Second Training workshop at IRSA HQs, Islamabad on Dec 5, 2022



Dr. Mobin-ud-Din Ahmad, Team Leader CSIRO imparting training at IRSA HQs, Islamabad on Dec 5, 2022



Group Photo of CSIRO Experts with IRSA Members and technical personnel on Dec 6, 2022 at IRSA HQs, Islamabad



CSIRO Experts meeting IRSA Members on Dec 6, 2022 at IRSA HQs, Islamabad.



The 3rd and last training workshop on Dec 8, 2022 in Lahore.



Group Photo of Third Training workshop participants in Lahore on Dec 8, 2022

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