

INDUS RIVER SYSTEM AUTHORITY (IRSA)
Ministry of Water Resources (MoWR)
Government of Pakistan

Islamabad, December the 8th, 2020

In a virtual ceremony held at Indus River System Authority (IRSA) HQs Islamabad on 08.12.2020, the Water Accord Apportionment Tool (WAA-Tool) was formally handed over to IRSA. Through a joint collaboration between Ministry of Water Resources (MoWR), IRSA, WAPDA, Provincial Irrigation Departments (PIDs) and the Australian Government through Commonwealth Scientific and Industrial Research Organization (CSIRO), the software Tool was developed over a 2 year period. The ceremony was attended by Chairman and Members IRSA, technical personnel of IRSA, representatives of PIDs, WAPDA, the Australian High Commission in Islamabad and CSIRO. Rao Irshad Ali Khan Chairman commended all those involved in the development process and thanked the Australian Government which through its leading national science agency of CSIRO provided the financial and technical resources to prepare the Tool. Members IRSA also appreciated the assistance and efforts in this regard. The representatives of PIDs and WAPDA expressed similar views, while the representatives of the Australian High Commission and CSIRO thanked the Pakistani stakeholders for their complete help and facilitation during the development process. Chairman IRSA, however, requested Australian Government and CSIRO to further enhance the Tool to accommodate the mid-season review process, if possible.

2. Since 1991, water resources in the Indus River System have been shared among the four provinces according to the Water Apportionment Accord (WAA) 1991. The Accord describes broad water-sharing principles but not the precise mechanism of how these principles are to be executed in the seasonal planning process. On request from Pakistani partners (IRSA, PIDs, WAPDA) to support their seasonal water planning, a collaborative project was established to develop a software product (called the WAA-Tool) that:-



- captures undocumented procedures in a repeatable process;
- provides transparency and consistency in seasonal water allocation;
- enables more equitable and efficient sharing of water resources;
- provides capability to explore alternate system operational rules;
- More transparency, efficiency and equity in water sharing
- Ability to quantify impacts of different interpretations
- Tool could explore the impacts of different inflow forecasts, reduced storages and climate change on provincial sharing
- Platform to support training of:
 - Federal and provincial water agencies
 - Next generation of staff
 - Academics, scientists and students

3. The development of the tool is in line with the objectives of “**National Water Policy (NWP)**”. The para 2.9 of NWP demands for upgrading water sector information systems for improved asset management & to derive evidence and data driven decision making. The para 22.1 of NWP also demands for improving the national information base by developing a National Planning Database to support an integrated information system in order to enable the planning & development of water and other related resources on sustainable basis.

4. The tool captures the complete 10-day allocation processes as elicited from all concerned. The process was agreed between the stakeholders and encoded in the WAA-Tool. The tool has been successfully tested and used for Kharif 2020 and Rabi 2020-21 which is now the tool of choice for Pakistani water agencies for seasonal planning and allocation of river water. The Tool forecasts Rim-Station inflows and performs system operation by running the reservoirs on set rules, routing the flows in the river network with accompanying losses / gains, allocating shares to the provinces on different sharing options and releasing excess water downstream Kotri, if available. It follows the same statistical and analytical techniques as manually adopted by IRSA and thus saves a lot of time by calculating alternative system operation in a matter of seconds. With this ease of fast computing, the Tool has the capacity to calculate and present with different system operation scenarios, which previously consumed a lot of time. Calculations of the Tool for Anticipated Criteria Rabi 2020-21 matched exactly with the assessments of IRSA and the shortage predicted by the Tool was also 10%.

5. The tool interface adopts a modern web-style interface. While the first release is designed to run on desktop computers, it can be enhanced to run on a central server or in the cloud. It replicates the entire water allocation process; allows discussion on alternate sharing options like reservoir storage carry forward; provides better data management; less experienced stakeholders can understand the allocation process quickly; **aids the building of consensus between the provinces**. Parameter settings, such as reservoir fill rates, can be easily changed to trial possible and potential combinations of climates, inflows and reservoir management. Results are stored using a database management system that guarantees its integrity, i.e., the data cannot be changed in the database. Print versions of reports are made available through Excel templates. These have re-used the historical report layouts of IRSA to mimic historical use and ease of interpretation and comparison. Importantly, the WAA Tool can be used as a training tool for next generation water managers and scientists (post-graduate students).

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