

## Water Mission: Replenishing nature's reservoirs to provide enough clean water for all with minimal pressure on ecosystems

Adequate access to good-quality water is a uniquely fundamental requirement for life, both for humans and other organisms. As well as being a SDG itself (SDG6), it cuts across all of the other SDGs. At present, about one-fifth of the global population lives under conditions of water insecurity. Water insecurity affects particularly those in the dry tropics, subtropics, the Middle East and Central Asia, typically the world's poorest who are also at great risk of displacement. The number of people affected is projected to rise in the future, as a result of climate change, intensification of land and water use and a growing and urbanizing population, particularly in the most affected areas. The increasing demand on freshwater resources, along with the return-flows of polluted water, are placing unsustainable pressure on water-dependent ecosystems, threatening not only their biodiversity and their capacity to continue to yield steady flows of good-quality water for human use, but also fisheries (riverine, lacustrine and coastal), recreation and cultural uses.

### Critical areas for scientific inquiry:

- Improving water-use efficiency (i.e. getting more product per unit water used), especially in irrigated agriculture, which currently consumes two-thirds of global freshwater;
- Advancing circular use in human water systems: recycling, repurposing and minimizing polluting waste in the water stream;
- Identifying ways to sustainably use unconventional water sources: energy-efficient desalination, grey water, cloud and atmospheric vapour harvesting, and groundwater, its recharge and use as a store;
- Improving understanding of the water needs of ecosystems: how much water, and in what pattern and quality, do water-dependent ecosystems need to remain functional?
- Undertaking integrated catchment studies: managing the whole resource at the scale at which it functions, climate land- and water-use projections, impacts of storage structures and engineered solutions, nature-based solutions to water quality, storage and flooding;
- Identifying equitable and functional water governance for access and supply protection, particularly between headwater regions that generate the bulk of the resource, the middle-river consumers where most is used and the coastal communities and ecosystems that need to survive on what is left;
- Assessing future social, economic and environmental value of water in the context of climate change, particularly in societies with current and future water stress;
- Analysing the social, economic, political and environmental cost of failure to find solutions to water stress in affected societies;
- Assessing competition for water among different water uses and water users in different geographical and temporal scales, considering its underlying causes and its social, economic, political and environmental consequences; and
- Identifying financial options to assist low- and middle-income countries finding alternatives to address their water stress problems.