5th WORLD WATER SUMMIT 2021

Water Management Locally - Globally

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Background Paper

Water Security For Sustainable Development

Global Foundation for Advancement of Environment & Human Wellness

“Water is life’s matter and matrix, mother and medium. There is no life without water”

– Albert Szent-Gyorgyi, M.D.

Discoverer of Vitamin C

Today, availability and demand for water is becoming indirectly proportional with sources of fresh water diminishing really fast and our consumption getting increased manifold over time.

Humankind works towards increasing the supply of materials that are in high demand and essential for our survival such as food, but it is not the case with water since water can only be recycled and reused and not produced afresh. It is believed that it is the same water that's been travelling through various stages of the water cycle for close to 4 billion years now. Though it's a debatable issue, there is no denying that the finite source of water is under tremendous pressure due to factors such as over-use and pollution besides changing climate and as a result both quality and quantity of water is irreversibly compromised. Celebrated marine explorer, filmmaker, and conservationist Jacques Yves Cousteau once lamented "we forget that the water cycle and the life cycle are one".

The devastating impact is already evident and there is probability and potential for the water scarcity to become worse sooner. The IPCC 6th Assessment Report, 2021 has clearly indicated - Continued global warming is projected to further intensify the global water cycle, including its variability, global monsoon precipitation and the severity of wet and dry events.[1]

Way back in 1987, Brundtland Report highlighted the concerns around water availability particularly rising pollution and decreasing ground water level due to increased human exploits including irrigation and heavy use of pesticides and fertiliser in agriculture.[2] After more than 30 years down the line, things have hardly changed, we continue to face the same problem just that the challenges have now multiplied having caused far-reaching damage overall.

Availability and access to adequate quality water is key to human, environmental, ecological, social and economic wellbeing, which is getting negatively affected as increasing water scarcity is being reported from across geographies and political boundaries resulting in an insecure water future.

The future adequacy of freshwater resources at the global scale is however difficult to assess, owing to a complex and rapidly changing geography of water supply, demand and use. While climate change presents formidable challenges to global water systems, water problems are primarily the result of the failure of societal institutions to manage the resource and meet the needs of current residents, the economy and the environment, and future generations. Water security is not only a question of the physical scarcity of water; it is deeply rooted in power, poverty and inequality. There is therefore a major difference between these two concepts. On one hand, one must consider the actual, physical scarcity of water, and on the other, a widespread lack of access to water caused by economic, political, social and environmental factors. Beyond the challenges related to the management of resource scarcity, there are hydro-political and transboundary considerations. The cycling of water exerts important control on climate variability as a result of its complex feedbacks and interactions with other components of the climate system (Salim, 2006).[3]

Water challenges are increasingly impacting every region around the world facing the effects of climate change, urbanization, as well as natural disasters. Confronted with the on-going

1. IPCC, 2021: Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press. In Press.
2. http://www.un-documents.net/our-common-future.pdf
3. UNESCO and UNESCO i-WSSM. 2019. Water Security and the Sustainable Development Goals (Series l). Global Water Security Issues (GWSI) Series, UNESCO Publishing, Paris.

water-related challenges, addressing water security can be a practical approach to deal with the complex and interconnected challenges and enhance sustainability (Figure 02), development and human welfare (Kim, 2019).[4]

UN-Water, the United Nations' inter-agency coordination mechanism for all water-related defines water security as "The capacity of a population to safeguard sustainable access to adequate quantities and acceptable quality of

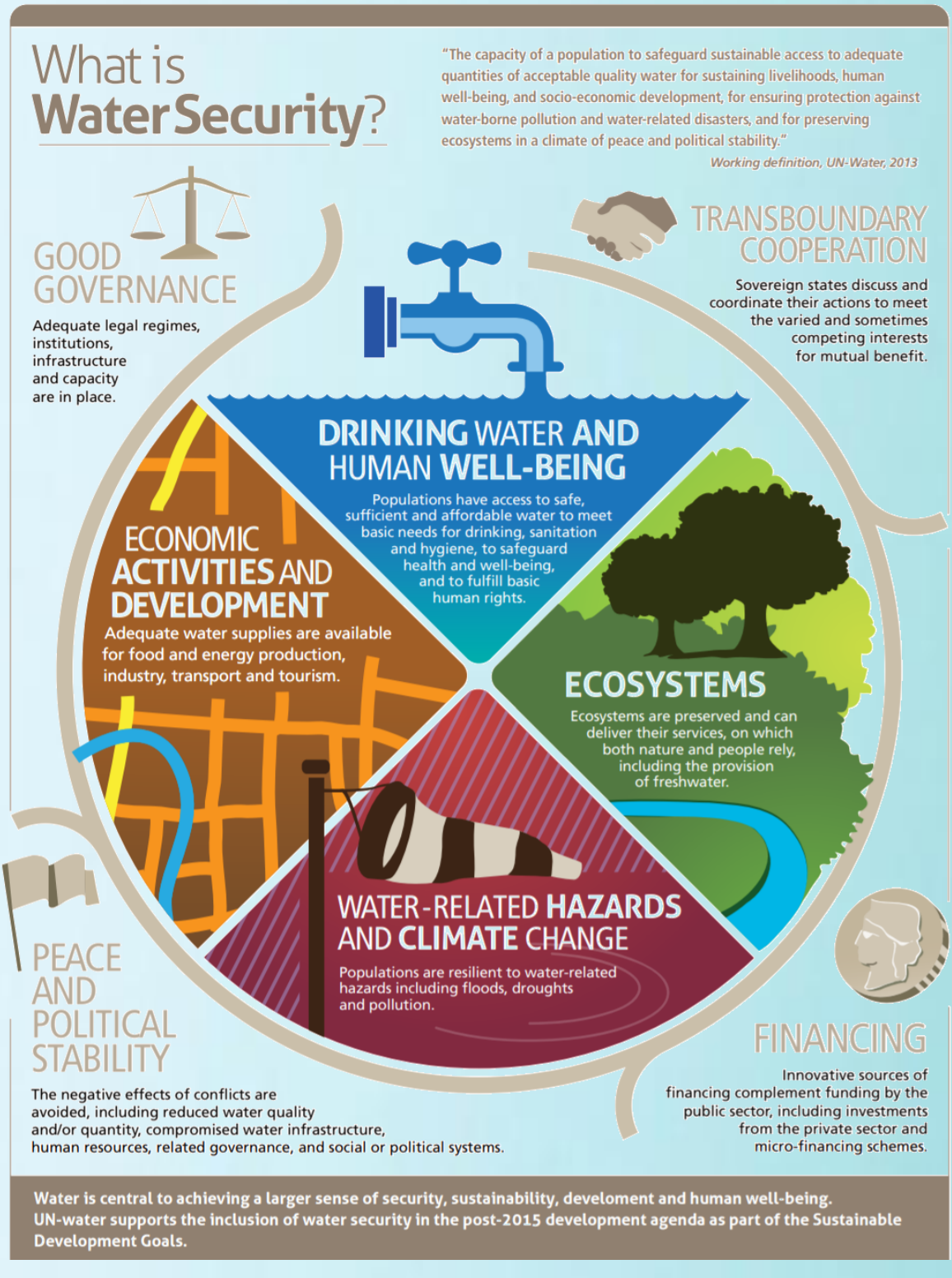

Figure 01: Water Security And Cross Cutting Sectors [5]

4. https://reliefweb.int/sites/reliefweb.int/files/resources/i-WSSM_GWSI_Case_Studies_%28small_size%29_final.pdf
5. UNESCO and UNESCO i-WSSM. 2019. Water Security and the Sustainable Development Goals (Series I). Global Water Security Issues (GWSI) Series, UNESCO Publishing, Paris.

water for sustaining livelihoods, human wellbeing, and socio-economic development, for ensuring protection against waterborne pollution and water related disasters, and for preserving ecosystems in a climate of peace and political stability".[6]

Freshwater sustainability stands out as the most important sustainable development challenge because it deals with the most precious and finite resource on our planet. When water resources in one community become scarce or threatened, the economic, social and environmental risks increase.[7]

Country of India's size and stature, which is a designated mega-diverse nation and is home to a large number of aquatic ecosystems, currently faces the worst ever water crisis in the history. According to a FAO report, India finds itself in the list of top 10 water rich nations[8], however the irony is, India also appears in another list of most water stressed countries prepared by World Resources Institute[9] and is the only country from the FAO list to have found a place here.

We witness, our lakes, ponds and wetlands are getting disappeared at a rate faster than one can imagine and on the other hand, increased pollution too is crippling the remnant sources of

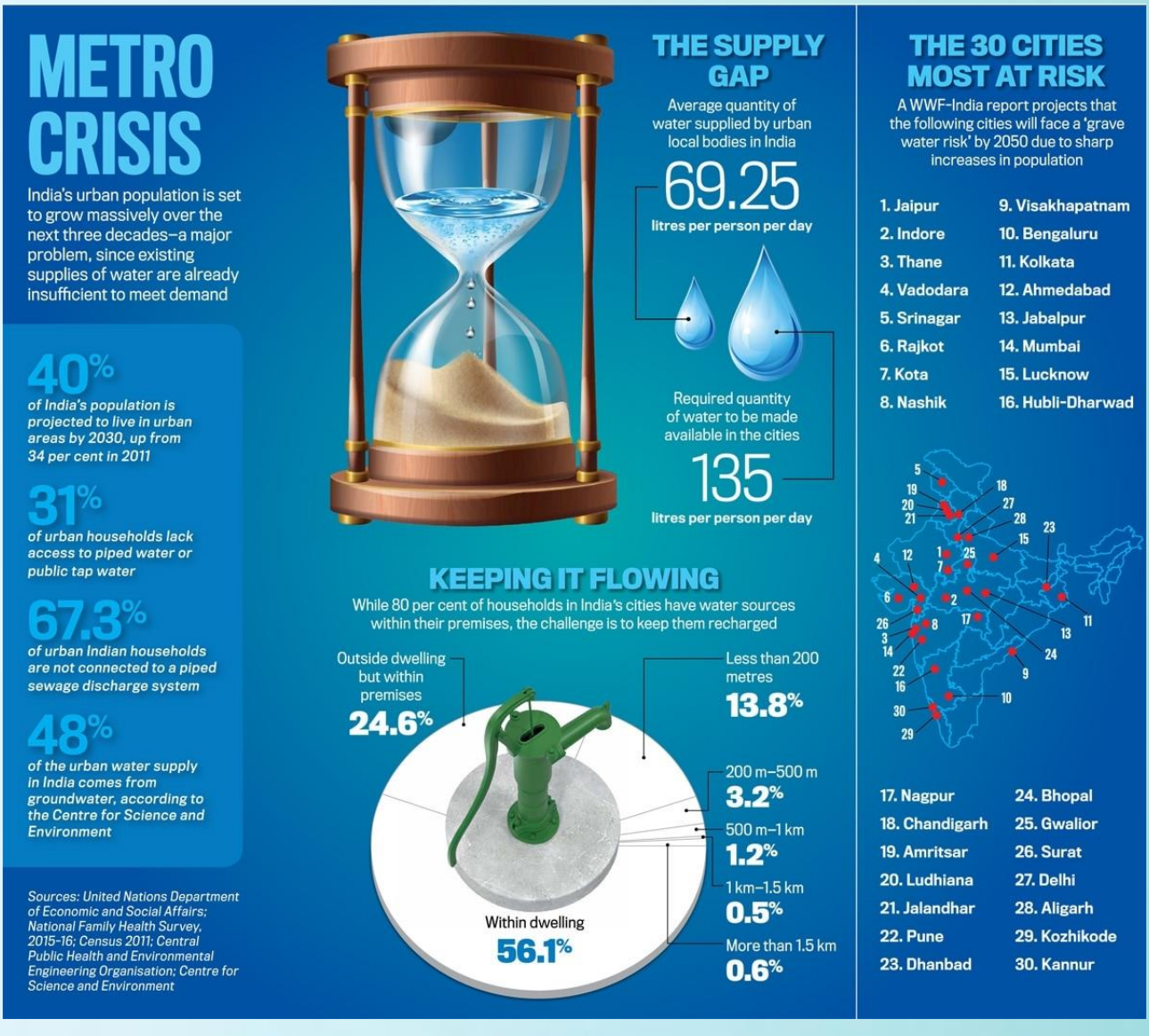

Figure 02: Urban Water Crisis[10]

6. https://www.unwater.org/publications/water-security-infographic/
7. UNESCO & UNESCO i-WSSM. 2019. Water Security & Sustainable Development Goals (Series I). Global Water Security Issues (GWSI) Series, UNESCO Publishing, Paris.
8. http://www.fao.org/3/y4473e/y4473e08.htm
9. https://www.wri.org/insights/17-countries-home-one-quarter-worlds-population-face-extremely-high-water-stress
10. https://www.indiatoday.in/magazine/nation/story/20210329-the-cities-of-woe-1781275-2021-03-20

of fresh water. It's a double whammy for India's renewable water resources. The recent reports of disappearing water bodies from every notable urban centre is alarming (Figure 02). With ever increasing population pressure and their escalating needs it is very likely that we will soon outgrow the water threshold locally as well as nationally and regionally.

Water is a complex subject, not only our survival or the survival of the natural ecosystems, but also the modern functions and industrial pursuits are directly dependent on water supply.

However, to understand sustainability of water resources and water security, we will have to understand the deeper nexus first, the factors affecting water quality and quantity and the water dependent areas/functions too.

Among the important inter-linkages involving water, Water - Energy - Food nexus is considered to be the most significant for humanity, where adequate water supply ensures that ample amount of food is produced to address hunger and enough electricity to power most of our utility functions (Figure 03). Former Administrator of Environmental Protection Agency of United States, Stephen Johnson once said "Water is the lifeblood of our bodies, our economy, our nation and our well-being."

Population growth, rapid urbanization, changing diets and economic development are just some of the factors driving increased demand for water, energy and food. Agriculture is the largest consumer of the world's freshwater resources that accounts for about 70% of water use, and more than one-quarter of the energy used globally is expended on food production and supply and withdrawal, transportation, and sewage treatment account for about 8% of energy use. Feeding a global population

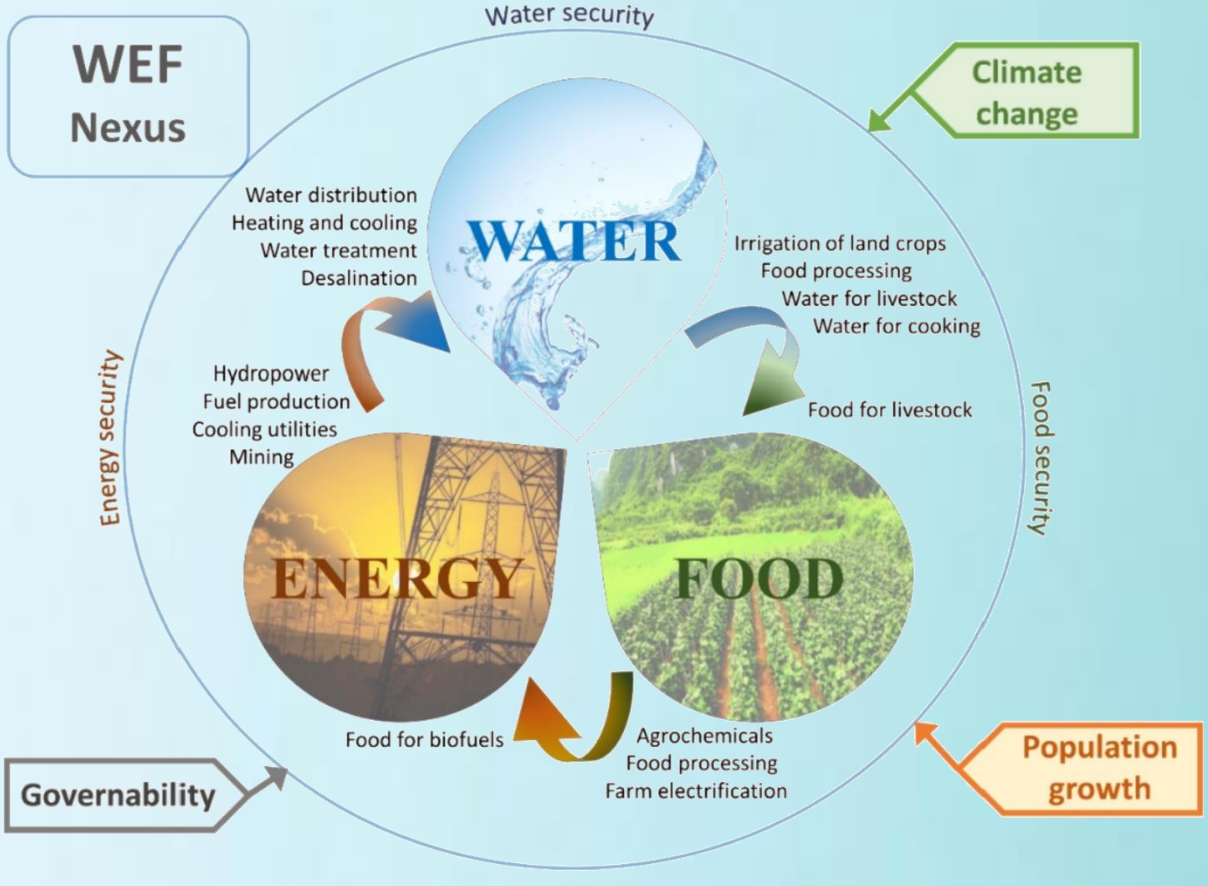

Figure 03 : Water - Energy and Food Nexus[11]

11. https://www.sciencedirect.com/science/article/pii/S0360544219325198

expected to reach 9 billion people by 2050 will require a 60 percent increase in food production.[12 & 13]

For this nexus to sustain itself and continue to operate in full capacity, water resources will have to be secured on a priority basis, which is going to a long drawn battle.

Water scarce countries will find it far more difficult to address poverty and hunger issues, as for them, reducing the number of undernourished people may be limited because food production is directly dependent on water availability. But, it is not just water used to feed local populations that is adding to the increasing level of water scarcity, many severely water-stressed countries use huge amounts of water to produce products for export. In the ten largest net blue virtual water exporting countries, over half of the population experience severe water scarcity during at least one month per year (Chart 01).[14]

Ruth Mathews, Executive Director, Water Footprint Network in 2016 emphasizes, water scarcity can limit economic opportunities, degrade natural ecosystems, lead to loss of valuable ecosystems services and have negative impacts on subsistence uses, such as access to drinking water and loss of local fisheries.

A deeper look into the complexities of water resources availability, demand and supply, one would observe that there are several other equally important nexuses involving water. The UN Sustainable Development Goals (SDG) largely recognize such water linked dependencies and advocates for a well balanced approach as counties pursue their developmental goals (Figure 04).

Brundtland Report (Our Common Future) in the year 1987, defined Sustainable Development as the development that meets the needs of the present without compromising the ability of future generations to meet their own needs.[15] This definition puts an onus on all of us to be far more responsible in our production and consumption and at the same time makes it one of difficult tasks to achieve in order to secure

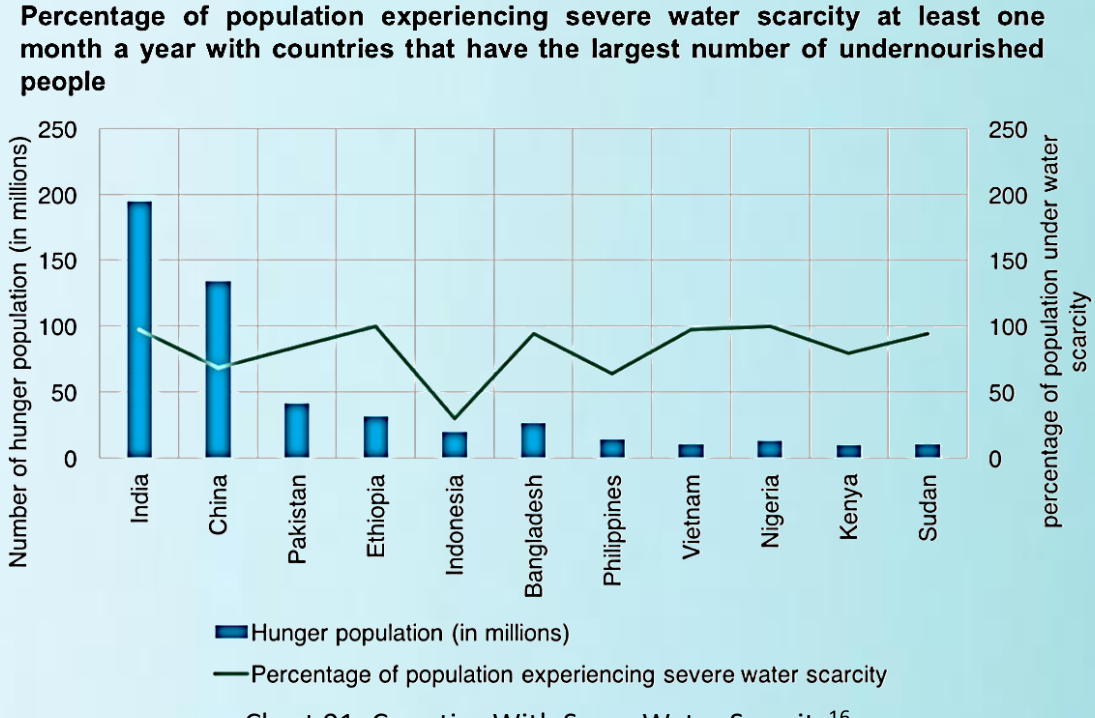

Chart 01: Counties With Sever Water Scarcity[16]

12. https://www.sciencedirect.com/science/article/pii/S0360544219325198
13. http://www.fao.org/land-water/water/watergovernance/waterfoodenergynexus/en/
14 & 16. https://waterfootprint.org/media/downloads/Blog_-_Water_scarcity_what_does_it_mean_for_sustainable_development.pdf
15. http://www.un-documents.net/our-common-future.pdf

enough resources for the coming generations.

Sustainable development requires that the adverse impacts on the quality of air, water, and other natural elements are minimized so as to sustain the ecosystem's overall integrity .[17]

Urban Centres today are struggling with increasing population load (mostly induced by migration) and its sky-rocketing demands for goods and services including access to safe water for drinking and other usage. If this is to

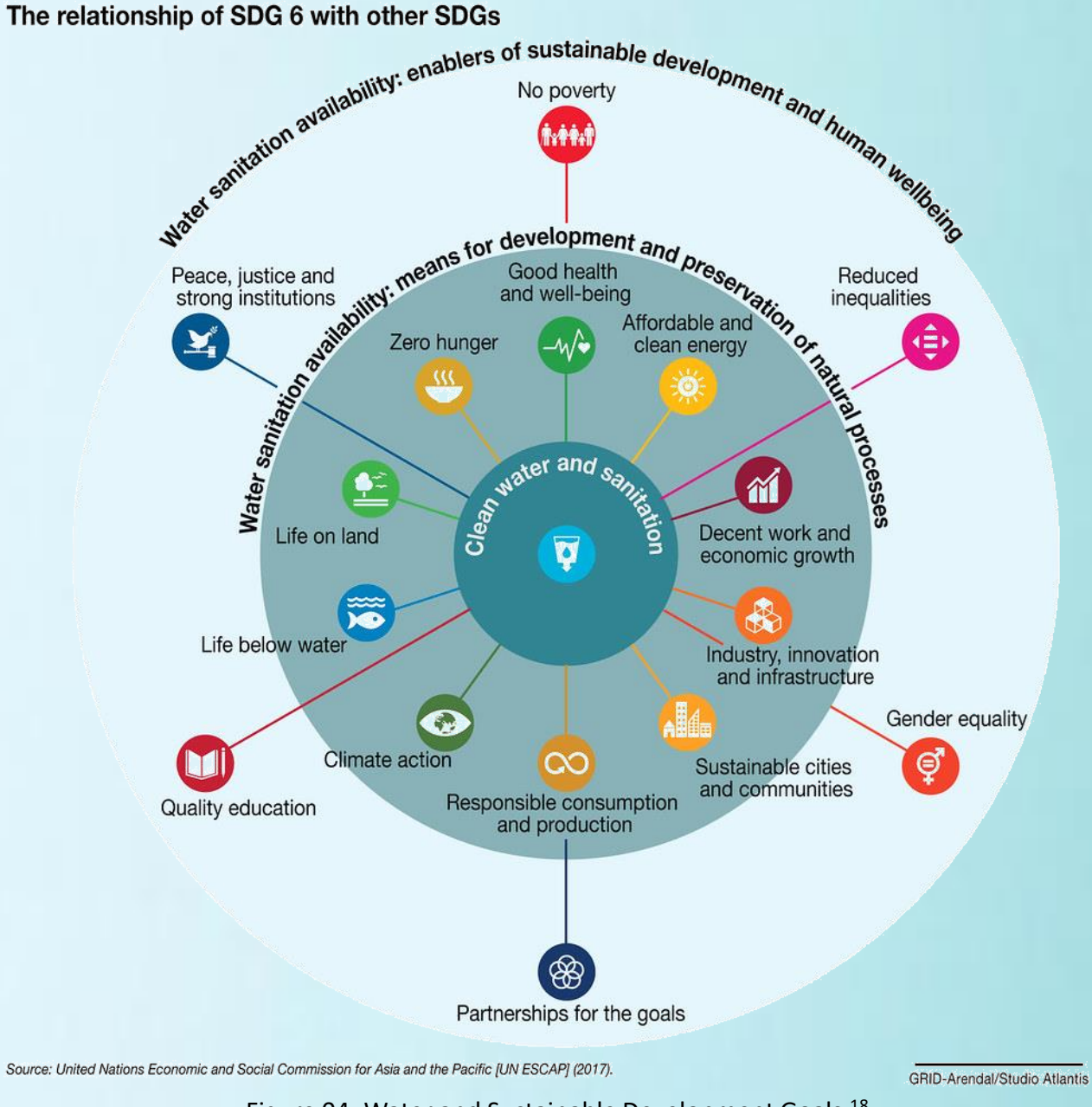

Figure 04: Water and Sustainable Development Goals [18]

continue further unabated, soon we will be facing a series of socio-economic, political as well cultural ramifications due to lack of water and other natural resources. Growing incidences of shortage of drinking water, internal water conflicts, erosion and landslides, increased water borne diseases, crop failure, urban flash floods, soil pollution, depleting air quality induced, to name a few, are some of the clear indications of a bleak future.

17. http://www.un-documents.net/our-common-future.pdf
18. https://www.grida.no/resources/13730

The damages recorded owing to loss of water ecosystem services are beyond comprehension – water bodies are home to a large number of flora and fauna, besides being one of the most potent carbon sinks and our best bet to build climate resilience. The economic losses arising from loss of blue spaces can hit us really bad; besides striping off the only source of livelihood from many, it can further dampen the already ravaging economic conditions of many counties due to Covid-19 pandemic.

Figure 05: Understanding SDG 6[20]

The SDG 6 i.e. Clean water and sanitation aims at addressing water scarcity, poor water quality and inadequate sanitation globally (Figure 05). It promotes increased investments in water management and sanitation, and international cooperation and capacity building in this respect. Water conservation and management are among the most critical issues facing humankind. Space technology can help analyze global water cycles, map water courses, and monitor and mitigate the effects of floods and droughts.[19]

It is often said, water is elixir of life, but this elixir is becoming rarer and an element available to only a few. UN Women estimates, in about 80 per cent households with water shortages, women and girls are responsible for water collection. Across many drier regions, the female members of the house require to travel long distance on foot to fetch water exposing them to potential violence among other crimes against women. Furthermore, the time required in this can pull girls out of school and leave women

19. https://www.unoosa.org/oosa/en/ourwork/space4sdgs/sdg6.html
20. https://www.semanticscholar.org/paper/Towards-a-more-sustainable-water-future%3A-water-and-Lindamood/2aee7ef7f48b01220f136b6fc00c125a6d37ed74

with fewer options to earn an income.[21]

SDG 6 further resolves to address far-reaching health consequences arising out of lacking safe drinking water access (Figure 06). It emphasizes on the sustainable management of water resources and access to safe water and sanitation for all. It recognizes the centrality of water resources to sustainable development and the vital role that improved drinking water, sanitation and hygiene play in progress in other areas, including health, education and poverty reduction.[21]

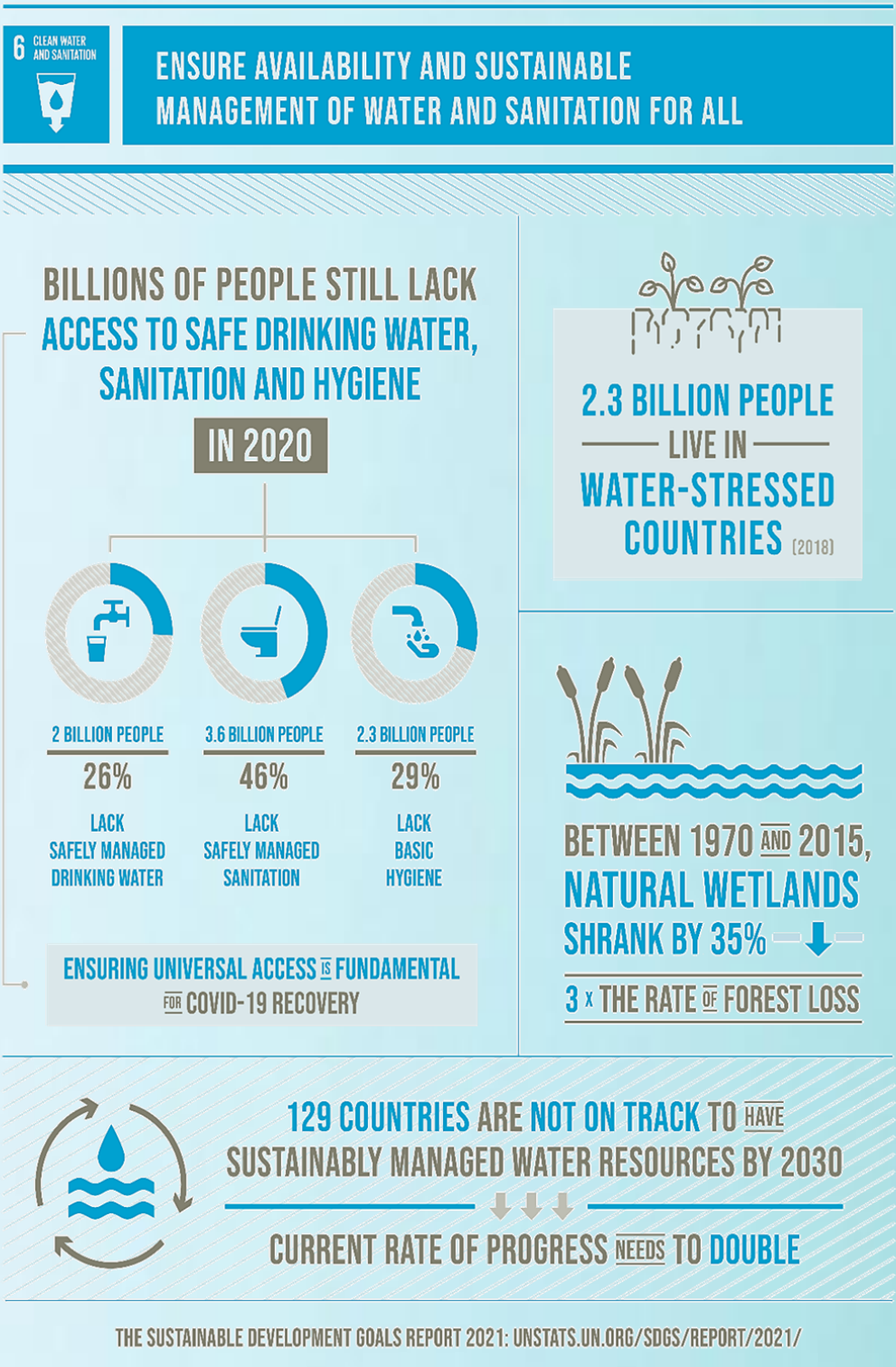

Figure 06: SDG stats[23]

21. https://www.unwomen.org/en/news/in-focus/women-and-the-sdgs/sdg-6-clean-water-sanitation
22. & 23. https://www.unep.org/explore-topics/sustainable-development-goals/why-do-sustainable-development-goals-matter/goal-6

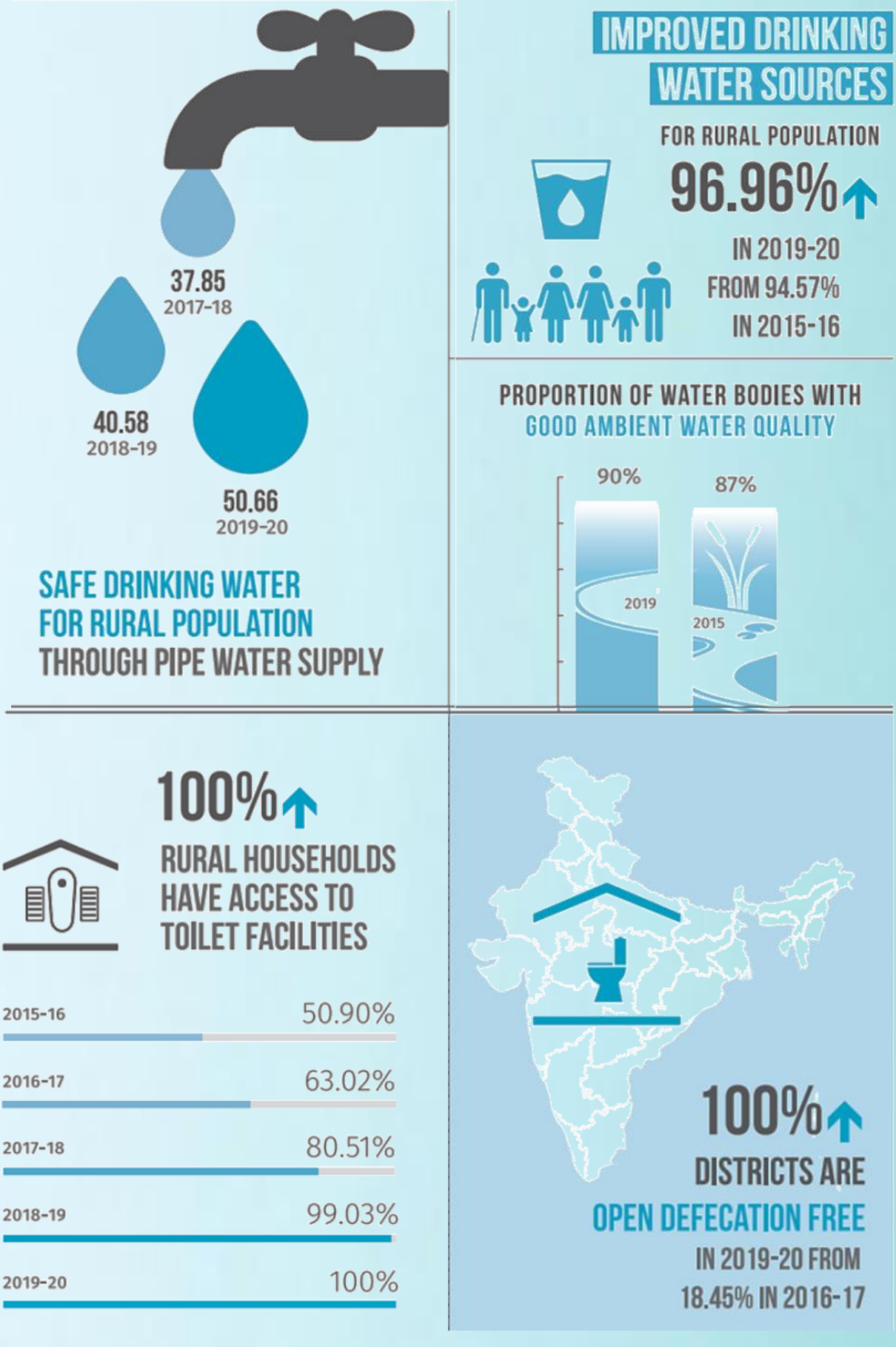

Figure 07: India and SDG 6[24]

24. http://mospi.nic.in/sites/default/files/publication_reports/SDG-NIF-Progress2021_March%2031.pdf

Every year millions of people, most of them children, die from diseases associated with inadequate water supply, sanitation, and hygiene. It is estimated that by 2050, more than half of the world's population will live in water stressed regions, as per researchers at MIT.

Clean water is critical to our survival, and its absence can impact the health, food security, and livelihoods of families across the world.

Although our planet has sufficient fresh water to achieve a regular and clean water supply for all, bad economics and poor infrastructure can skew supply unfavourably. Drought afflicts some of the world's poorest countries, worsening hunger and malnutrition. Floods and other water-related disasters account for 70% of all deaths related to natural disasters.[25]

India for example, despite having a huge demand, with limited water resources, has committed to provide the population safe and adequate drinking water. Jal Jeevan Mission has played a significant role in ensuring adequate water and sanitation. And as on 2020, improved drinking water source are made available to over 96.96 per cent rural population. In addition, all districts in India have achieved the target of Open Defecation Free (ODF) under the Swachh Bharat Mission (Figure 07).[26]

The SDG is an effective solution oriented approach to ensure the we collectively move towards a water secure world and uniformly achieve the targets of aquatic sustainability (Figure 08). The United Nations recognizes that ending poverty must go hand-in-hand with strategies that build economic growth and address a range of social needs including education, health, social protection, and job opportunities, while tackling climate change and environmental protection.

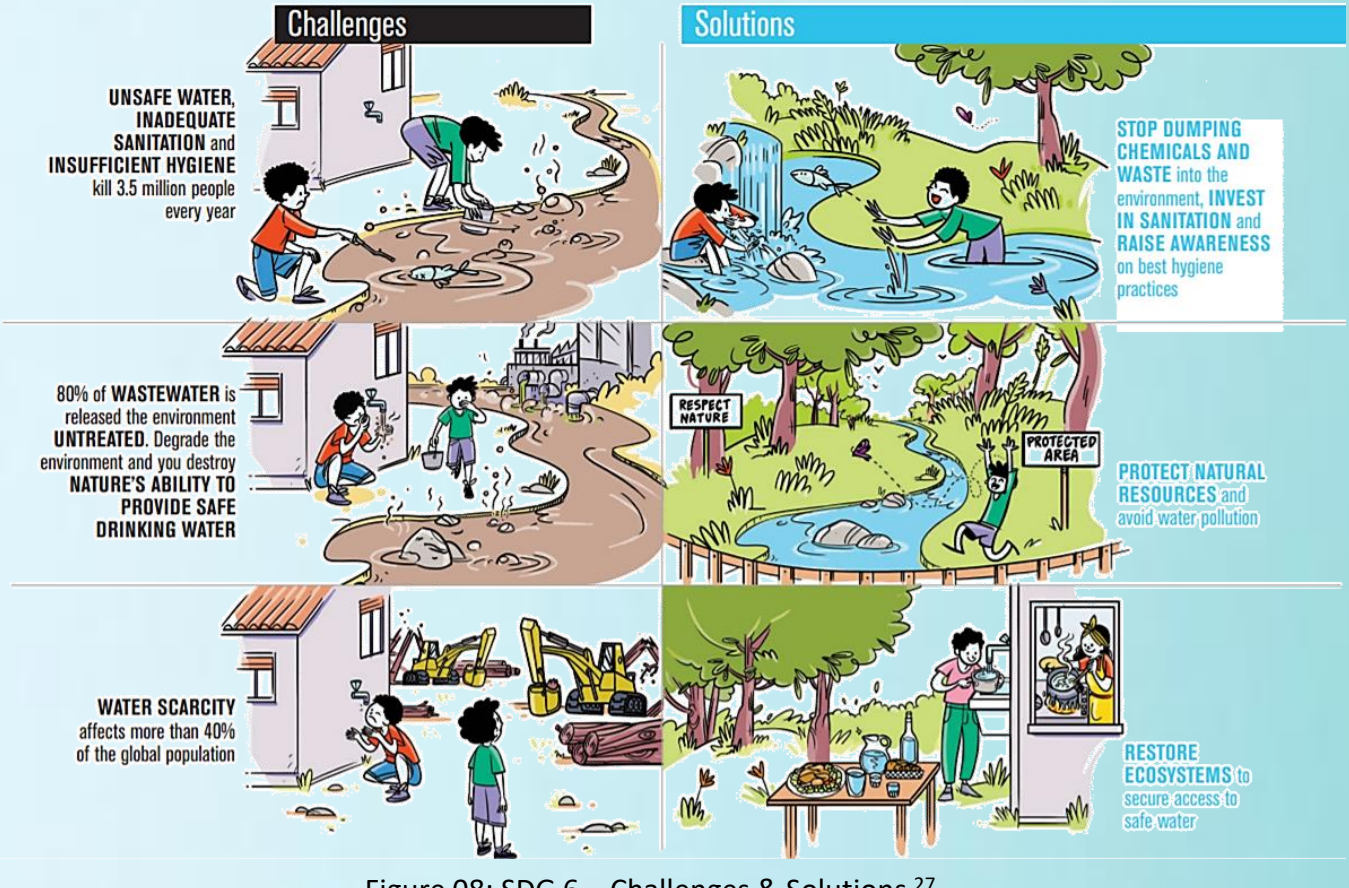

Figure 08: SDG 6 – Challenges & Solutions [27]

25. https://in.one.un.org/page/sustainable-development-goals/clean-water-sanitation-sdg-6/
26. http://mospi.nic.in/sites/default/files/publication_reports/SDG-NIF-Progress2021_March%2031.pdf
27. https://www.unep.org/explore-topics/sustainable-development-goals/why-do-sustainable-development-goals-matter/goal-6

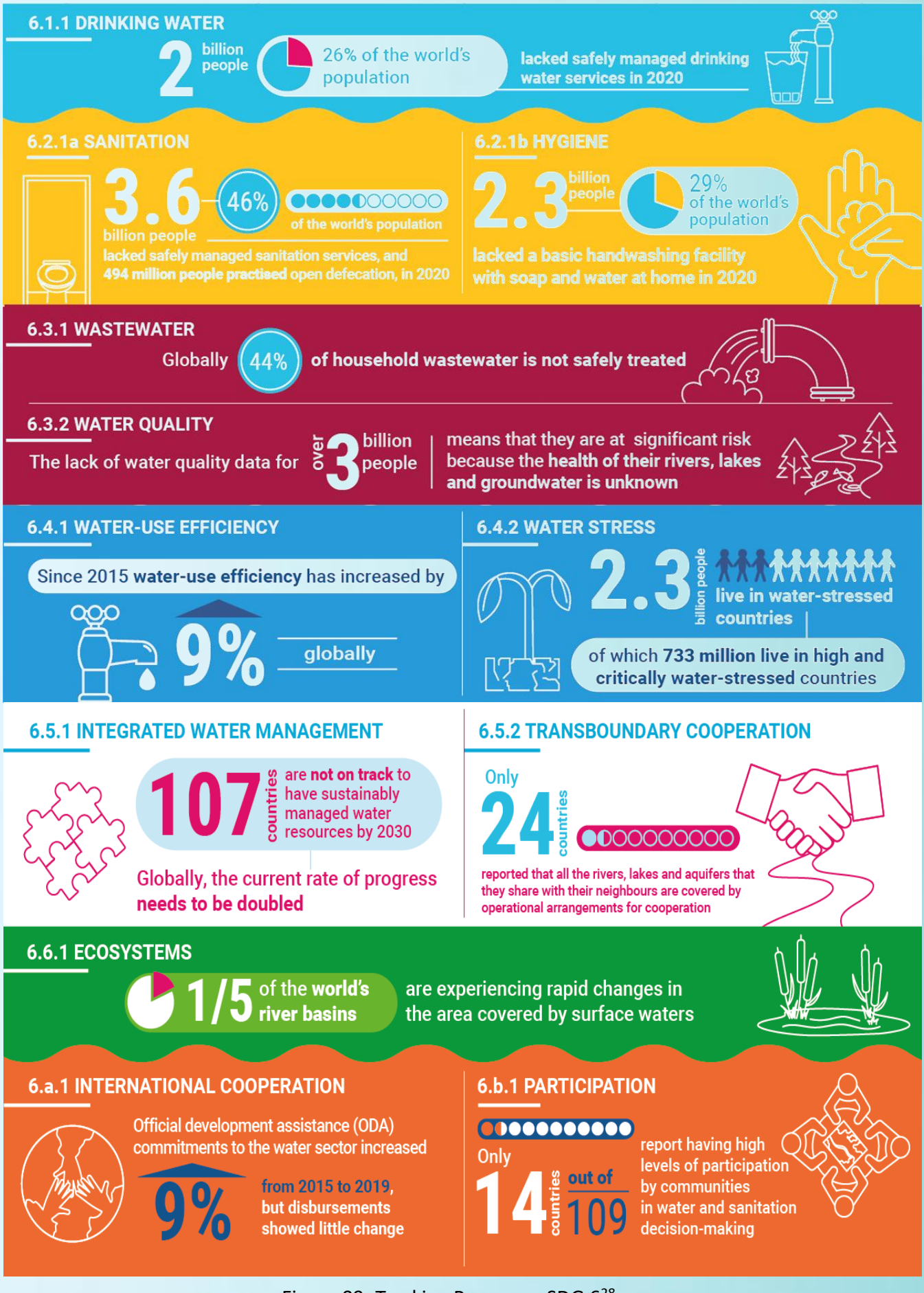

Figure 09: Tracking Progress - SDG 6[28]

28. https://www.unwater.org/publications/summary-progress-update-2021-sdg-6-water-and-sanitation-for-all/

While UN recognises water as a fundamental human right through an action plan approved in 1977 during the United Nations Water Conference, world continues to struggle with inadequate water availability and access.[29] Similarly, the Constitution of India too under Article 21 affirms our right on water but due too several factors people die every year from diseases associated with inadequate water supply, sanitation and hygiene.

Water scarcity, poor water quality and inadequate sanitation negatively impact food security, livelihood choices and educational opportunities for poor families across the world. At the current time, more than 2 billion people are living with the risk of reduced access to freshwater resources and by 2050, at least one in four people is likely to live in a country affected by chronic or recurring shortages of fresh water. Drought in specific afflicts some of the world's poorest countries, worsening hunger and malnutrition. Fortunately, there has been great progress made in the past decade regarding drinking sources and sanitation, whereby over 90% of the world's population now has access to improved sources of drinking water.[30]

It is expected that by 2030, the world will be able to overcome many challenges associated with water resources and will be able to put water at the heart of everything we do. It is encouraging to see, SDG 6 making significant progress across its 12 sub-targets starting with drinking water supply all the way to cooperation and participation in water conservation and management (Figure 09).

Water is vital for our survival and growth and an important vehicle towards fulfilling Agenda 2030 while ensuring everyone is well-nourished and every sector is hydrated. GWP/OECD Task Force on Water Security and Sustainable Growth earlier estimated that strategic investment in water security could contribute at least USD 500 billion to global growth annually.[31]

29. https://www.un.org/waterforlifedecade/pdf/human_right_to_water_and_sanitation_milestones.pdf
30. https://healthsciences.usask.ca/news-and-announcements/announcements/2019/sdg-spotlight-november-2019.php
31. https://www.unwater.org/publications/summary-progress-update-2021-sdg-6-water-and-sanitation-for-all/

Disclaimer

Though every effort has been made to make this background paper as accurate as possible, the information compiled here from various sources, should be used for general reference only and not as an ultimate guide.

Contact:

Dr Pranab J Patar, *Ph.D.*

Global Foundation for Advancement of Environment and Human Wellness

Vardhman Trade Centre, RWorkspaces, Unit 1, 3rd Floor

Nehru Place, New Delhi 110019

Email: pranab@globalfoundation.org.in | Mobile: +91- 9953048097