

Q.1 What do you understand by the water stress? Which region of the country is most affected by water stress? Suggest some measures to address the issue of water stress.

Ans: Increased spells of drought, desertification, and inequitable access to water all around the world is posing dangers to the lives of people. Water stress is a situation where the demand of water for various uses exceeds the available amount during a certain period. It is also when the poor quality of water restricts its use for intended purpose like drinking, washing, irrigation etc.

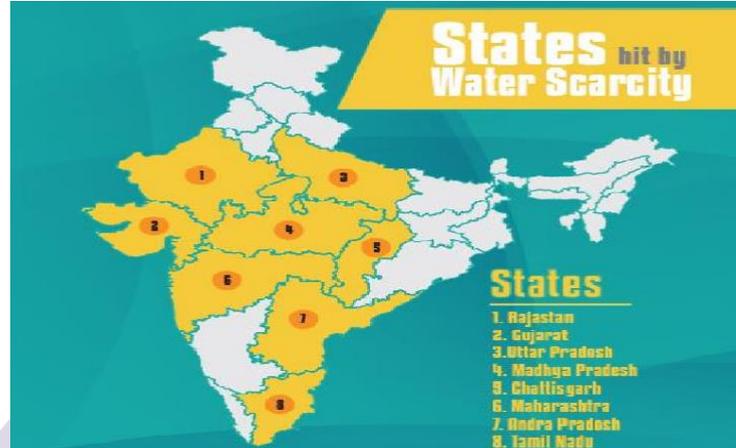
Sustainable Development Goal-6 talks of ensuring access to water and sanitation for all, involves reaching to people who lack basic services and improving accessibility.

Causes of water stress

1. **Overuse:** Per capita water consumption in developed countries is far more than the developing and poor ones. For example, an average US family wastes 60,000 litres of water every year.
2. **Pollution of Water:** About 80% of wastewater from human activities gets discharged into waterbodies without any treatment. For example, Bangalore water crisis was due to pollution in city's lakes and rapid urbanisation.
3. **Distance:** Desert areas or the areas that are distant from perennial water sources faces more water scarcity.
4. In Composite Water Management Index, the NITI Aayog said that women in many states of India collectively spend significant hours per year collecting water. This significantly impacts their employment opportunities.
5. **Drought:** A drought is an area which is not getting enough rainfall to be able to sustain the life that is residing there. Some areas are in perpetual drought, whereas other areas may be dealing with a drought on occasion. For examples, Vidarbha and Marathwada region in Maharashtra, Saurashtra in Gujarat.

6. **Climate Change:** Because of rising temperature there is change in global weather pattern as well as the monsoon. Drying up of rivers and reservoirs and floods as well affect water uses.

Region affected in India



The regions of Rajasthan (Jaisalmer, Barmer), Gujarat (Kutch, Saurashtra), Maharashtra (Vidarbha, Marathwada), MP (Chambal region), some areas of Andhra Pradesh, Karnataka and Chhattisgarh are marred by the scarcity of water.

Measures to arrest the water stress

1. Efficiency in Agriculture by using micro-irrigation, drip-irrigation, sprinkle etc.
2. By dealing with issues of urbanisation and the Climate Change by adopting various suggestions made by NITI Aayog in its Composite Water Management Index and by applying the suggestion of Mihir Shah report.
3. Traditional water conservation methods like Tanka, Ponds, Johad etc.
4. Rethink water management by creative and imaginative governance in the form of building larger storage dams, inter-linking of rivers etc.



Reduce, reuse, and recycle must be the watchwords if we have to handover a liveable planet to the future generations. Conscious efforts need to be made at the household level and by communities, institutions and local bodies to supplement the efforts of governments and non-governmental bodies in promoting water conservation.

Additional information

1. Mihir Shah Committee: The Mihir Shah Committee's report published in July 2016, titled "A 21st Century Institutional Architecture for India's Water Reforms," recommended the setting up of the National Water Commission (NWC) as the nation's apex organisation dealing with water policy, data and governance.
2. NITI Aayog Report on Water Crisis. The report titled "Composite Water Management Index", published by NITI Aayog in June 2018, mentions that India is undergoing the worst water crisis in its history and nearly 600 million people are facing high to extreme water

Sustained measures should be taken to prevent pollution of water bodies, contamination of groundwater and ensure proper treatment of domestic and industrial waste water.

Q.2 Women in India have suffered a lot in collection of drinking water for their families. How the government policies should be designed to reduce their miseries and enhance their role in water management?

Ans: On an average, a rural woman in Rajasthan walks over 2.5 km to reach a water source on a daily basis according to the National Commission for Women. This shows that our women and girls spend a significant proportion of their time on fetching water which impacts their health, educational opportunities and participation in family affairs.

This misery of walking miles to fetch water for their families and their leadership role in managing the water resources for their communities, necessitates the policy changes by the government. In this pursuit, the Jal Jeevan Mission (JJM) aims to provide policy changes to make them empower more so that they can undertake

water management on larger scale.

Women and water in India

- Women in India spend a considerable amount of time performing domestic chores. Collecting water for their families constitutes a major portion of it. This poses a major barrier to the enrolment of girls in schools, especially those belonging to poor households.
- Variability in water supply due to heavy dependence on monsoon rains and groundwater adds up to their miseries.
- It exacerbates gender inequality as the collection of water becomes sole activity of women.
- It is well known that extreme weather events like droughts have a devastating impact on weaker sections of society as they lose out on livestock and crop yield. Food prices gets increased which has crippling effect on their health and nutrition.
- Sometimes women have to collect water in the early or late hours because of the erratic supply. It concerns the women's safety also.

Design of policy in Functional Household Tap Connections

- 50% mandatory participation of women, especially those belonging to SCs/STs/OBCs in the Village Water and Sanitation Committee (VWSC).
- Elected women representatives should be given greater powers in all water related programs, schemes and separate training.
- They should be made empowered through training so that they could participate in the decision-making related to water management in their local area.
- Special recognition of VWSCs with women leaders or larger women's membership should be accorded.
- Gender sensitisation of the implementation team staff is essential for better inclusivity.
- Train at least five village women for the supervision of

implementation and later for a regular supply of water.

- Nominate and train women as Jal Doots and Bhu-Jaankaar if there is a cadre of water para-legal workers.
- Develop women entrepreneurs and SHG-led enterprises for water supply services like defluoridation treatment plants, water-testing kits etc.

To reduce the suffering and misery of women collecting drinking water in the country, women across the nation need to be engaged in rural drinking water supply schemes consciously for long-term water security in villages. It will also enable them to manage the water resources efficiently.

Q3. What is Inland Waterways Plan of India? Name major waterways of India. What are the scope and advantages of waterways over roadways or railways? Explain.

Ans: India created the Inland Waterways Authority of India (IWAI) in 1986 to help maintain and energise infrastructure around key inland waterways. Five such waterways were identified at that moment. These waterways have served India well for seven decades and in recent years, there has been renewed momentum to explore the full potential of the country's inland waterways.

This is especially because India has an elaborate network of inland waterways in the shape of rivers, canals, backwaters, and creeks. To transform this situation and make the best use of the inland waterways' potential of India, 106 additional inland waterways were declared as national waterways through The National Waterways Act, 2016.

Major Waterways of India

- Ganga-Bhagirathi-Hoogly river system between Haldia (Sagar) and Allahabad (1,620 km).
- Brahmaputra between Sadiya and the Bangladesh border (891 km).
- West coast canal (Kottapuram to Kollam), the Udyogmandal

canal, and the Champakara canal, a total of 205 kms.

- Kakinada-Puducherry stretch between - Rajahmundry stretch of River Godavari and Wazira - Vijayawada stretch of River Krishna (1,078 km).
- Talcher- Dhamra stretch of River Brahmani, Geonkhali-Charbatia stretch of the east coast canal, the Charbatia-Dhamra stretch of River Matai and the Mangalgadi-Paradip stretch of Mahanadi delta rivers (623 kms).

Scope and Advantages

- India has an elaborate network of inland waterways in the shape of rivers, canals, backwaters, and creeks.
- Of the total length of 20236 kms that can be navigated, 17980 kms of the river and 2256 kms of canals can be used by mechanized crafts.
- India is underutilizing its inland waterways potential as compared to USA, China or EU.
- Water transportation is safest mode free from accidents and casualties.
- Free from contentious issues like land acquisition.
- Huge tourist potential since many pilgrimage sites are located on river banks.
- Ideal for bulk and oversized cargo.
- Water transportation being the safest mode, can reduce road accidents and result in decreased casualties significantly. It also reduces treatment and rehabilitation costs to a great extent.
- There is a shortage of free land for road construction. It helps in reducing the conveyance time significantly which ultimately reduces the cost associated in the transportation.

Government initiative

- National Waterways Bill was passed in 2015 declaring 106 inland waterways as national waterways.

- In 2020, Ministry of Shipping waived off all usage charges for a period of 3 years to promote greater commercial and tourist exploration of inland waterways.

As Indian economy grows in years to come it requires creative solutions to address its energy and transportation requirements. Inland waterways offer such a roadmap and we should fully utilize its potential. After the 2016 Act, the country now has a total of 111 inland waterways which are marked as national waterways and the total length of the national waterways is 20,275 kilometres spread across 24 states.

Q.4 Assess the idea of “One nation One Election” in the Indian context.

Ans : The idea of “**One nation one Election**” (ONOE) refers to the simultaneous holding of elections for the Lok Sabha and State Legislative Assembly. India had concurrent elections for the first two decades starting from the first general elections of free India in 1951.

Significance of simultaneous elections:

1. **Reduced cost and time:** Saving on transport, accommodation, storage arrangements, training, remuneration, on human resources, on electronic voting machines (EVMs) as well as on deployment of the Central Police Forces.
2. **Help reduce campaign expenses:** Simultaneous Lok Sabha and Assembly elections can bring considerable savings in the election propaganda campaign expenditure for the political parties.
3. **Addresses Instances of pause in governance:** If elections are conducted in one go instead of staggered elections, focus can be maintained upon governance rather than repeated political campaigning.



4. **Model Code of Conduct (MCC):** If all elections are held together, the restrictions under MCC like coming up with new schemes will be through in one go.
5. **Incentivize voter turnout:** A simultaneous nationwide election could push up the voter turnout since a once-in-five-year event is bound to attract more enthusiastic participation across all sections.

Challenges in ensuring simultaneous elections in India:

1. **Synchronising the Terms of the Houses:** Bringing the terms of all the Houses to sync with one another necessarily calls for either extending the terms of several of the Houses or curtailing of terms or a combination of both. This demands Constitutional amendment.
2. **Chances of midterm dissolution:** Even if the terms are synchronised as a one-time measure, there is a need of an adequate legal safeguard in place to avoid mid-term dissolution and protect the simultaneous elections cycle.
3. **EVM related expenses:** Considering that the incidental recurring expense in the storage and security of the EVMs will also be a considerable amount, the overall expenditure in holding elections may not see any substantial dip on account of simultaneous elections.

Recommendations:

- To avoid the threat of midterm dissolutions, legal provisions for a '**No-confidence motion**' to be brought up against the government in office should also contain a constructive '**Vote of confidence**' in an alternative government with a named leader to head it. This helps to maintain the fixed term of the House.

Additional information: Provisions related to ONOE

- **Legal provisions:** Sections 14 and 15 of the Representation of the People Act, 1951, empower the Election Commission to notify elections any time during the last six months of the term of the

House. Therefore, if the terms of the Houses are expiring within a window of three to four months, it would be legally possible to hold simultaneous elections.

- **Constitutional provisions:** Article 83 of the Constitution provides that “the House of the People, unless sooner dissolved, shall continue for five years from the date appointed for its first meeting and no longer and expiration of the said period of 5 years shall operate as dissolution of the House.”
- Identical provisions are present in Article 172(1) regarding the term of the Legislative Assemblies.
- Though houses can be dissolved ahead of the scheduled expiry of the term of five years (Articles 85(2) (b) and 174(2) (b)), there is no provision for extension of the term unless a proclamation of Emergency is in operation.

Q.5 Discuss the key aspects of recently released draft National Science, Technology and Innovation Policy 2020.

Ans : The Department of Science and Technology (DST) has released the draft fifth National Science, Technology, and Innovation Policy (STIP) with the objective to identify and address strengths and weaknesses of the Indian STI ecosystem to catalyse socioeconomic development of the country.

Broad vision:

1. **Aatmanirbhar Bharat:** To achieve technological self-reliance and position India among the top three scientific superpowers in the decade to come.
2. **Human Capital:** To attract, nurture, strengthen and retain critical human capital through a ‘people centric’ STI ecosystem.



3. **Investment:** To double the number of Full-Time Equivalent (FTE) researchers, Gross Domestic Expenditure on R&D (GERD) and private sector contribution to the GERD every 5 years.
4. **Globally Competitive:** To build individual and institutional excellence in STI with the aspiration to achieve the highest level of global recognitions and awards in the coming decade.

Key features of draft STIP are:

1. **STI Observatory and Centralised Database:** STIP will lead to the establishment of a National STI Observatory that will act as a central repository for all kinds of data related to and generated from the STI ecosystem.
2. **Open Science Framework:** A future-looking, all-encompassing Open Science Framework will be built to provide access to scientific data, information and resources to everyone in the country and all who are engaging with the Indian STI ecosystem on an equal partnership basis.
3. **STU Education to be made more inclusive:** With the help of Online learning platforms, Teaching-learning centres, Higher Education Research Centres and Collaborative Research Centres
4. **Increasing Investments:** With an aim to expand the financial landscape of the STI ecosystem, each department/ ministry in the central, the state and the local governments, PSUs, private sector companies and start-ups will set up an STI unit with a minimum earmarked budget to pursue STI activities.
5. **Translational Research and Promotion of Innovation:** The policy aims to create a fit for purpose research ecosystem promoting translational as well as foundational research in India in alignment with global standards.
6. **Technology self-reliance and indigenization:** A two-way approach of indigenous development of technology as well as technology

indigenization will be adopted and focused upon in alignment with national priorities, like sustainability and social benefit, and resources.

7. **Inclusivity an integral part of STIP:** An India-centric Equity & Inclusion charter will be developed for tackling all forms of discrimination, exclusions and inequalities in STI leading to the development of an institutional mechanism.
 8. **International Engagement:** Engagement with the Diaspora will be intensified through attracting the best talent back home through fellowships, internships schemes and research opportunities expanded and widely promoted across different ministries.
 9. **STI Policy Institute:** To serve all the aspects of STI policy governance and to provide the knowledge support to institutionalised governance mechanisms.
- The draft STIP looks good on paper and also has the potential to transform the entire science, technology and innovation in India. However the desired goals will become practical reality with government fulfilling its role as the primary funder of research and encourage the private participation.

Additional Information:

National Innovation Portal (NIP):

Ministry: Ministry of Science & Technology

Developed by: National Innovation Foundation (NIF)

Key takeaways

- The National Innovation Portal (NIP) is currently home to about 1.15 lakh innovations scouted from common people of the country, covering Engineering, Agriculture, Veterinary and Human Health.
- The innovations cover Energy, mechanical, automobile, electrical, electronics, household, chemical, civil, textiles, etc.

- Innovation Portal is a step towards Aatmanirbhar Bharat and an excellent resource for students, entrepreneurs, MSME's, Technology Business Incubators (TBI's) and common people engaged in a variety of occupations.

Q.6 How far is the Integrated Farming System (IFS) helpful in sustaining agricultural production?

Ans: Due to the ever-increasing population and decline in per capita availability of land in the country, the operational farm holding in India is declining and practically there is no scope for horizontal expansion of land for agriculture. Sustainable development in agriculture must include an **integrated farming system (IFS)** with efficient soil, water, crop and pest management practices, which are environmentally friendly and cost-effective.



Integrated Farming System (IFS) and its components:

- Integrated Farming Systems (IFS) approach **stabilises income streams through natural resource management and livelihood diversification.**
- An example of integrated farming could be fish and livestock cultivation along with general farming practices which support each other.



- In IFS, the **waste of one enterprise becomes the input of another** for making better use of resources.
- In the integrated crop-livestock farming system, crop residues can be used for animal feed, while manure from livestock can enhance agricultural productivity.

How can the Integrated Farming System help in sustainable agriculture production:

- **Sustainable agriculture production means an integrated approach to increasing farm yield and managing resources** in order to address all three critical aspects of sustainability: economic, environmental and social.
- Recycling of wastes being inbuilt in the system, this helps to **reduce dependence on external high-energy inputs** thus conserving natural and scarce resources.
- **Multiple uses of resources-** multiple uses of water for the household, irrigation, dairy, poultry etc reduces cost, making farming sustainable.
- **Soil health improvement through recycling-** residue recycling is an integral part of IFS. Thus Raising productivity and yields.
- IFS helps to reduce the risk involved in farming especially due to market price crash as well as natural calamities. For example, during Phalin cyclone which affected Odisha, paddy crop at the flowering stage was affected but a household with advanced agronomic management tools pld with livestock, jute, fishery suffered loss between 8 - 28% but households with only farming component had 100 % loss of crop.

IFS provides multiple benefits that are sustainable and can pave the way for climate-smart agriculture. India needs to adopt a "well designed" Integrated Farming System (IFS) to realise the vision of doubling farmers' income by 2022 and having sustainable agricultural practices.

Additional information

Steps for upscaling science-based integrated farming systems:



- Focus on market-oriented diversification and livelihood improvement
- Initiation of National Mission on Integrated Systems by converging schemes of crops, horticulture, livestock, fisheries etc
- Large scale spread of IFS concept
- Move from Soil Health card to Farm or Farming system cards
- Capacity building of stakeholders including skill development

