Class X - Social Science

Water Resources

CBSE NOTES

Water Resources - Practice Worksheet

Strengthen your foundation with key concepts and basic applications.

Practice Questions

1. Explain the concept of water scarcity and discuss its main causes.

Hint: Consider the factors that lead to both physical and economic water scarcity.

Solution: Water scarcity refers to the lack of sufficient available water resources to meet the demands within a region. It affects every continent and around 2.8 billion people globally at least one month out of every year. The main causes include over-exploitation of water resources, excessive use, and unequal access to water among different social groups. Large and growing populations require more water for domestic use and to produce more food, leading to over-exploitation of water resources. Industrialisation and urbanisation have also increased the pressure on freshwater resources. Moreover, the quality of water is deteriorating due to pollution from domestic and industrial wastes, making it hazardous for human use. Climate change is exacerbating the situation by altering precipitation patterns, leading to more frequent droughts and floods. Water scarcity is not just about physical scarcity but also about economic scarcity, where lack of investment in water infrastructure or inadequate human capacity to satisfy water demand affects water availability.

2. Describe the hydrological cycle and its importance in renewing water resources.

Hint: Think about how water moves through different states and locations on Earth.

Solution: The hydrological cycle, also known as the water cycle, describes the continuous movement of water on, above, and below the surface of the Earth. It involves processes such as evaporation, condensation, precipitation, infiltration, runoff, and subsurface flow. Water evaporates from the Earth's surface, forms clouds, and returns to the Earth as precipitation. This cycle ensures that water is a renewable resource by constantly replenishing freshwater supplies through surface runoff and groundwater recharge. The hydrological cycle is crucial for maintaining ecosystems, supporting agriculture, and supplying drinking water. It also plays a key role in regulating the Earth's temperature and climate. Human activities, however, can disrupt the natural flow of the hydrological cycle, leading to water scarcity and pollution. Understanding the hydrological cycle is essential for effective water resource management and conservation strategies.

3. Discuss the advantages and disadvantages of multi-purpose river projects.

Hint: Consider both the benefits to human society and the impacts on the environment.

Solution: Multi-purpose river projects are designed to serve several purposes simultaneously, such as irrigation, electricity generation, flood control, and water supply. Advantages include providing a reliable water supply for agriculture, generating hydroelectric power, and controlling floods. They also support inland navigation and fish breeding. However, these projects have several disadvantages. They can lead to large-scale displacement of communities, loss of livelihoods, and ecological imbalances. Dams disrupt the natural flow of rivers, affecting aquatic life and leading to sedimentation. The construction of large dams can also induce earthquakes and cause water-borne diseases. Additionally, inter-state water disputes often arise over the sharing of water resources. While multi-purpose projects aim to integrate water resources management, their environmental and social costs must be carefully considered.

4. How is rooftop rainwater harvesting carried out in semi-arid regions of Rajasthan?

Hint: Focus on the traditional and modern techniques used in Rajasthan.

Solution: In semi-arid regions of Rajasthan, rooftop rainwater harvesting is a traditional method to collect and store drinking water. Houses have underground tanks or 'tankas' connected to the sloping roofs through pipes. The first spell of rain is not collected to clean the roofs and pipes. Subsequent rainwater is then stored in the tankas. These tanks can be as large as a room and provide a reliable source of drinking water during dry periods. The stored water, known as 'palar pani', is considered pure. This system is particularly effective in areas with low rainfall, as it maximizes the use of available water. Modern adaptations include using PVC pipes for collection and filters to purify the water. This method has been revived in many parts of Rajasthan and other regions to combat water scarcity. It is a sustainable practice that reduces dependence on groundwater and promotes water conservation.

5. What are the traditional methods of water conservation in India?

Hint: Think about the diversity of methods across different regions of India.

Solution: India has a rich tradition of water conservation methods tailored to local ecological conditions. In the Western Himalayas, diversion channels like 'guls' and 'kuls' are used for irrigation. In Rajasthan, 'khadins' and 'johads' are rain-fed storage structures that allow water to stand and moisten the soil. 'Rooftop rainwater harvesting' is common in Rajasthan for storing drinking water. In Bengal, inundation channels irrigate fields during floods. In Meghalaya, bamboo pipes are used to tap stream and spring water for irrigation. These traditional methods reflect an in-depth understanding of rainfall patterns and soil types. They are sustainable and environmentally friendly, promoting efficient water use. Many of these practices are being revived and adapted to modern

needs to address water scarcity. They serve as excellent examples of community-based water management systems.

6. Explain the impact of over-exploitation of water resources.

Hint: Consider the environmental, social, and economic impacts.

Solution: Over-exploitation of water resources leads to several negative impacts, including depletion of groundwater levels, land subsidence, and reduced water quality. Excessive withdrawal of groundwater for irrigation and industrial use causes aquifers to dry up, making water scarcity worse. Land subsidence occurs when the ground sinks due to the removal of water from underground reservoirs. Over-exploitation also leads to saltwater intrusion in coastal areas, contaminating freshwater supplies. Ecosystems suffer as rivers and wetlands dry up, affecting biodiversity. Agriculture is impacted as farmers face water shortages for irrigation. Overuse of water resources exacerbates social inequalities, as marginalized communities often have less access to water. Sustainable water management practices are essential to prevent these consequences and ensure long-term water security.

7. Discuss the role of industries in water pollution.

Hint: Focus on the types of pollutants and their effects on water quality.

Solution: Industries are major contributors to water pollution through the discharge of untreated or partially treated effluents into water bodies. These effluents contain harmful chemicals, heavy metals, and organic pollutants that degrade water quality. Industrial activities such as mining, manufacturing, and power generation release toxic substances that can harm aquatic life and make water unsafe for human use. Thermal pollution from industries raises the temperature of water bodies, reducing oxygen levels and affecting ecosystems. The textile and leather industries are particularly notorious for releasing dyes and tannins that pollute water. Pollution from industries not only affects surface water but also contaminates groundwater through seepage. Strict regulations and treatment of industrial wastewater are necessary to mitigate these impacts. Public awareness and corporate responsibility are also crucial in reducing industrial water pollution.

8. What are the measures taken by the Indian government to conserve water resources?

Hint: Consider both policy-level initiatives and community-based programs.

Solution: The Indian government has implemented several measures to conserve water resources, including the Jal Jeevan Mission and Atal Bhujal Yojana. The Jal Jeevan Mission aims to provide piped water supply to every rural household, ensuring water security. Atal Bhujal Yojana focuses on

sustainable groundwater management in water-stressed areas. The government promotes rainwater harvesting and watershed development to recharge groundwater. Traditional water conservation practices are being revived and modernized. Regulations have been introduced to control industrial pollution and ensure wastewater treatment. Public awareness campaigns encourage water-saving practices among citizens. The National Water Policy emphasizes integrated water resources management to address water scarcity. These initiatives aim to improve water availability, quality, and accessibility for all sections of society. Collaborative efforts between the government, communities, and industries are essential for effective water conservation.

9. How does urbanization contribute to water scarcity?

Hint: Think about the direct and indirect effects of urban growth on water resources.

Solution: Urbanization contributes to water scarcity through increased demand, pollution, and over-exploitation of water resources. Growing urban populations require more water for domestic, industrial, and commercial use. Urban areas often rely on groundwater, leading to its depletion. Construction activities reduce groundwater recharge by covering the soil with impermeable surfaces. Urban runoff carries pollutants into water bodies, degrading water quality. Inefficient water supply systems and leakages result in significant water losses. Urban lifestyles increase per capita water consumption, exacerbating scarcity. Many cities face challenges in managing wastewater and ensuring its treatment before discharge. Sustainable urban planning and water management practices are needed to address these issues. Rainwater harvesting, water recycling, and efficient distribution systems can help mitigate water scarcity in urban areas.

10. Explain the significance of inter-state water disputes in India.

Hint: Consider the political, social, and economic dimensions of these disputes.

Solution: Inter-state water disputes in India arise due to conflicts over the sharing of river waters between states. These disputes often stem from competing demands for irrigation, drinking water, and industrial use. Examples include the Krishna-Godavari dispute and the Cauvery water dispute. Such conflicts can lead to political tensions and legal battles, affecting regional cooperation. They highlight the challenges of equitable water distribution in a federal system. Inter-state water disputes also underscore the need for integrated water resources management. The central government mediates through tribunals to resolve these conflicts. Sustainable and collaborative approaches are essential to ensure water security for all states. These disputes reflect the broader issues of water scarcity and the importance of cooperative governance in managing shared water resources.

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