

Desalination Plants

Why in News

Recently, Maharashtra announced the setting up of a desalination plant in Mumbai.

- The plant will process 200 million litres of water daily (MLD), and will help in overcoming the water shortage faced by Mumbai in the months of May and June.
- Maharashtra will be the fourth state to experiment with Desalination Plants.

Key Points

- Desalination Plants:
 - A desalination plant turns salt water into water that is fit to drink.
 - <u>Desalination</u> is the process of <u>removing salts from water</u> to produce water that meets the quality (salinity) requirements of different human uses.
 - Most commonly used technology for the process is reverse osmosis. //



- An external pressure is applied to push solvents from an area of high-solute concentration to an area of low-solute concentration through a semi-permeable membrane.
- The **microscopic pores** in the membranes allow water molecules through but leave salt and most other impurities behind, releasing clean water from the other side.
- These plants are mostly set up in areas that have access to sea water.
- Advantage of Desalination Plants:
 - It can extend water supplies beyond what is available from the hydrological cycle, providing an "unlimited", climate-independent and steady supply of high-quality water.
 - It can **provide drinking water** in areas where no natural supply of potable water exists.
 - As it generally meets or exceeds standards for water quality, water desalination plants
 can also reduce pressure on freshwater supplies that come from areas (over
 exploited water resources) that need protecting.
- Disadvantage of Desalination Plants:
 - Costly to build and operate desalination plants as the plants require huge amounts of energy.
 - Energy costs account for one-third to one-half of the total cost of producing

- desalinated water.
- Because energy is such a large portion of the total cost, the **cost is also greatly** affected by changes in the price of energy.
- **The environmental impact** is another disadvantage to water desalination plants. Disposal of the salt removed from the water is a major issue.
 - This discharge, known as **brine**, can change the salinity and lower the amount of oxygen (**Hypoxia**) in the water at the disposal site, stressing or killing animals not used to the higher levels of salt.
 - In addition, the desalination process uses or produces numerous chemicals including chlorine, carbon dioxide, hydrochloric acid and anti-scalents that can be harmful in high concentrations.
- **Opportunities:** The environmental problem can be changed into an economic opportunity as:
 - The discharge (brine) can also contain precious elements like uranium, strontium as well as sodium and magnesium which have the potential to be mined.
 - Brine has been used for aquaculture, with increases in fish biomass of 300%. It has
 also been successfully used to cultivate the dietary supplement Spirulina, and to
 irrigate forage shrubs and crops.
- Use of Desalination Plants in India:
 - It has largely been limited to countries in the Middle East and has recently started being used in parts of the United States and Australia.
 - In India, Tamil Nadu has been the pioneer in using this technology, setting up two
 desalination plants near Chennai in 2010 and then 2013.
 - The other states that have proposed these plants are Gujarat and Andhra Pradesh.

Way Forward

- There is a need to make desalination technologies more affordable, i.e. increasing the viability of desalination for addressing Sustainable Development Goal 6 (SDG-6: Ensure Access to water and Sanitation for All).
- To do this, technological refinement for low environmental impacts and economic costs, along with innovative financial mechanisms to support the sustainability of desalination schemes, will likely be required.

Source: IE

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