



Mains Practice Question

Q. Explain cloud seeding, along with its applications, challenges, and concerns.(150 words)

08 Dec, 2018 GS Paper 1 Geography

Approach:

- Explain Cloud seeding.
- State its applications.
- List the challenges and suggest ways in which they can be tackled.

Introduction

- **Cloud Seeding:** Cloud seeding is the process of spreading either dry ice, or more commonly, silver iodide aerosols, into the upper part of clouds to try to stimulate the precipitation process and form rain.
- There are **three cloud seeding methods-**
 - **Hygroscopic cloud seeding** disperses salts through flares or explosives in the lower portions of clouds. The salts grow in size as water joins with them.
 - **Static cloud seeding** involves spreading a chemical like silver iodide into clouds. The silver iodide provides a crystal around which moisture can condense.
 - **Dynamic cloud seeding** aims to boost vertical air currents, which encourages more water to pass through the clouds, translating into more rain.

Body

Applications

- **Agriculture:** It creates rain, providing relief to drought-stricken areas. E.g.: 'Project Varshadhari' in Karnataka in 2017..
- **Power Generation:** Cloud seeding experiments have shown to augment production of hydroelectric during the last 40 years in Tasmania, Australia.
- **Water Pollution Control:** Cloud seeding can help to maintain minimum summer flows of the rivers and dilute the impact of treated waste water discharges from municipalities and industries.
- **Fog Dispersal, Hail Suppression, and Cyclone Modification:** "Project Sky Water" of U.S.A. in 1962 for weather modification through cloud seeding aimed at fog dispersal, hail suppression, and cyclone modification. During the winter the cloud seeding programme is used to increase the mountain snowpack so that additional runoff is received during the spring melt season. The seeding of cumulus clouds is to provide increased annual rainfall directly on the land.
- **Tackle Air Pollution:** Cloud seeding can potentially be used to settle down toxic air pollutants through the rain. E.g.: Recently, Central Pollution Control Board along with other researchers were mulling use of cloud seeding to tackle Delhi's air pollution.
- **Tourism:** Cloud seeding can transform typically dry areas much more hospitable to enhance tourism.

Challenges

- **Potential Side-effects:** The chemicals used in cloud seeding might be potentially harmful. It does have the potential to harm plants, animals and people, or the environment as a whole.
- **Abnormal Weather Patterns:** it might ultimately change climatic patterns on the planet. Places that normally receive moisture might start experiencing drought due to the artificial process of adding chemicals to the atmosphere to stimulate rain.
- **Costly:** It involves processes such as delivering chemicals to the sky and releasing them into the air by flare shots or airplanes, which involves huge costs and logistic preparation.
- **Pollution:** As the artificial rain falls, seeding agents like silver iodide, dry ice or salt will also fall. Residual silver discovered in places near cloud-seeding projects are considered toxic. As for dry ice, it can also be a source of greenhouse gas that contributes to global warming, as it is basically carbon dioxide.

Way Forward

- Despite several concerns and challenges, cloud seeding as a process is still into early developmental stages and therefore more research and study needs to be done. In the context of global warming, extreme climatic events, agricultural distress, cloud seeding as a solution cannot be rejected.

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