

**18– 05 – 2022**

**News: Urban Heat Islands**

- Recently, several parts of India are experiencing severe heat waves. Urban areas and cities are the places which have higher temperatures than rural places. This phenomenon is referred to as "Urban Heat Island".

**Urban Heat Islands**

- Urban heat island may be defined as the local and temporary phenomenon in which certain pockets within a city are experiencing higher heat load than its surrounding area.
- This rise of heat basically happens due to buildings and houses of cities made up of concrete where the heat is trapped and not able to dissipate easily.
- Urban heat island is basically induced due to trapped heat between establishments made up of concrete.
- The temperature variation can range between 3 to 5 degrees Celsius.

**Reasons behind cities being hotter than Rural Areas**

- It has been observed that greener localities experienced lower temperatures than non-green localities.

- Green vegetation like plants, trees and forests are prominent factors to regulate the incidences of the urban heat islands.
- Rural areas are blessed with more green cover in the form of plantations, farmlands, forests, and trees than urban areas.
- Transpiration is the phenomena which the plants carry to regulate the temperature.
- Lack of green trees and shrubs in urban areas is the basic cause of Urban Heat Island in urban areas.
- Frequent construction of High rise structures, roads, parking spaces, pavements, and public transportation transit lines have accelerated the incidences of urban heat islands.
- It occurs by black or any dark colored material.
- Buildings in cities are often made of glass, bricks, cement, and concrete. All of them are dark-colored materials, which attract and absorb more heat.

### **Causes of Urban Heat Island**

- **Manifold increase in construction activities:** For building simple urban dwellings to complex infrastructures, carbon absorbing material like asphalt and concrete is needed for the expansion of cities. They trap huge amounts of heat which increases the mean surface temperatures of urban areas.

- **Dark surfaces:** Many buildings found in urban areas have dark surfaces, thereby decreasing albedo and increased absorption of heat.
- **Air conditioning:** Buildings with dark surfaces heat up more rapidly and require more cooling from air conditioning, which requires more energy from power plants, which causes more pollution. Also, air conditioners exchange heat with atmospheric air, causing further local heating. Thus, there is a cascade effect that contributes to the expansion of urban heat islands.
- **Urban Architecture:** Tall buildings, and often accompanying narrow streets, hinder the circulation of air, reduce the wind speed, and thus reduce any natural cooling effects. This is called the Urban Canyon Effect.
- **Need for mass transportation system:** Transportation systems and the unimpeded use of fossil fuels also add warmth to urban areas.
- **Lack of Trees and green areas** which impedes evaporation and transpiration, shade and removal of carbon dioxide, all the processes that help to cool the surrounding air.

### **Solution to the Urban Heat Islands**

- **Increase Area under Green Cover:** Plantation and effort to increase the area under green cover are the primary requirement to cut heat load within urban areas.

- **Passive Cooling to Reduce Urban Heat Islands:** Passive cooling technology, a widely-used strategy to create naturally ventilated buildings, can be a vital alternative to address the urban heat island for residential and commercial buildings.
- The IPCC report cites ancient Indian building designs that have used this technology, which could be adapted to modern facilities in the context of global warming.
- Other methods of heat mitigation include using appropriate construction materials.
- Roof and terraces should be painted in white or light colors to reflect heat and reduce the absorption.
- Terrace plantation and kitchen gardening should be promoted.

**News:** INS Surat and INS Udaygiri

- Recently, the Defence Minister launched the Indian Navy destroyer warship INS Surat under Project 15B and INS Udaygiri under Project 17A.

## **Project-15B**

- Project-15B is the Destroyer series of Vishakhapatnam class of stealth guided missile destroyers constructed using indigenous steel DMR 249A.

- It is amongst the largest destroyers constructed in India.
- India's indigenous Destroyer construction programme commenced in the late 1990s with the three Delhi class (P-15 class) warships and this was followed by three Kolkata class (P-15A) destroyers commissioned a decade later.
- Presently, under the P-15B (Visakhapatnam Class), a total of four warships are planned (Visakhapatnam, Mormugao, Imphal, and Surat).
- The Destroyers come next only to an Aircraft Carrier (INS Vikramaditya) in terms of their reach and endurance.

### **Project-15B**

- Four Guided missile Destroyers of Project 15B (P 15B) are under construction at M/s Mazagaon Dock Shipbuilders Limited, Mumbai. The contract for construction of these four ships was signed in 2011.
- These ships are amongst the most technologically advanced Guided Missile Destroyers of the world, with state-of-the-art weapon/sensor package, advanced stealth features and a high degree of automation.
- Of these, first ship of the class INS Vishakhapatnam has been commissioned to the Indian Navy on 21<sup>st</sup> November 2021.

## Features of the P-15B Ships

- These ships are equipped with BrahMos supersonic cruise missiles and long range Surface-to-Air Missiles (SAM).
- The ship has several indigenous weapons systems like medium range Surface-to-Air Missile (SAMs), indigenous torpedo tube launchers, anti-submarine indigenous rocket launchers and 76-mm super rapid gun mount.

## Other Three Ships of Project 15B

- The second ship of P15B Mormugao was launched in 2016 and is being readied for harbour trials.
- The third ship (Imphal) was launched in 2019, and is at an advanced stage of outfitting.
- The fourth ship (Surat) has been launched in 2022.

## Project 17 A Frigates

- Project 17A frigates are follow-on of the P17 Frigates (Shivalik Class) with improved stealth features, advanced weapons and sensors and platform management systems.

- A total of seven ships are being constructed, four at Mazagon Dock Shipbuilders (MDL), Mumbai and three at Garden Reach Ship Builders Limited (GRSE), Kolkata.

## Features

- The main advanced stealth features of P-17A pertain to the smaller Radar cross-section of the ship achieved through the use of a special super structure shape which reduces radar wave reflections.
- Another important feature is regarding the ship's low acoustic noise emanating from propellers, operating machinery like Diesel Generators etc., which hinders sonars on other ships to detect its presence.
- Such stealth features play an important role in improving the ship's survivability in any hostile environment during operations.
- Recently, third ship of the class INS Udaygiri was launched. First ships of the class INS Nilgiri (launched on September 2019) and INS Himgiri (launched on December 2020) is under sea trials.