

Terraforming

Prelims: Current events of national and international importance

Why in news?

Mars has become a target of terraforming, where space agencies and research groups have been working to turn the planet into a habitable land.

- **Terraforming** - It is the hypothetical process of **Deliberately manipulating** the atmosphere, temperature, topography and ecology of a planet or natural satellite to transform it into an Earth-like body, able to support living beings from our planet.
- **Core objectives** - To establish **3 fundamental conditions** for life - Water, Atmosphere and Temperature.
- **Based on** - Planetary engineering (the use of technology to change the conditions on a planet).
- **Origin** - The word 'terraforming' came from a golden-age science fiction series called the Seetee series, published in 1950.
- **First proposed by** - Astronomer Carl Sagan - terraforming in Venus - in a 'Science' journal in 1961.
- **Terraforming methods** -
 - Adjusting the average planetary temperature.
 - Adding atmospheric mass to allow water on the surface.
 - Adding water, perhaps by redirecting icy comets, to form oceans and lakes.
 - Biological terraforming by using genetically modified bacteria.
 - Removing toxic substances in the atmosphere.
 - Creating a biosphere on the planet's surface.
 - Creating areas of arable land, etc.
- **Terraforming in Venus** - With a **surface temperature of 450 °C** and a crushing atmosphere 90 times denser than Earth, Venus presents immense challenges.
- **Terraforming in Mars** - Over the years, Mars has become a prominent target of terraforming.
 - **Reason** - Mars was once full of water, which was observed through the presence of the Jezero Crater.

- **Challenges** - Very thin atmosphere, extremely cold temperatures, and lack of a global magnetic field to protect against solar winds.
- **Observations of MAVEN mission** - Mars once held an atmosphere that had been stripped away due to climate change.

References

1. [The Hindu | Terraforming](#)
2. [National Space Society | Terraforming](#)

