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

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