

## **2. Sequencing of Indian Species**

**Prelims Syllabus:** Science & Technology

**Mains Syllabus:** GS-II Issues relating to development and management of Social Sector or Services relating to Health, Education, Human Resources.

### **Why in News?**

- The Jawaharlal Nehru Tropical Botanic Garden and Research Institute (JNTBGRI) is gearing up to play an important role in a nationwide project to decode the genetic information of all known species of plants and animals in the country.

### **Highlights:**

- The Institute has been chosen as one of the Biological Knowledge and Resource Centres of the Indian Initiative on Earth Bio Genome Sequencing (IIEBS).
- It will join hands with other premier research institutes to utilise cutting edge technologies for genome sequencing.
- The Union Department of Biotechnology has allotted 143.89 lakh rupees for JNTBGRI to take up the project.
- With over 5,000 plant species in its field gene bank and conservatories, JNTBGRI has a major role in conserving the endemic flora of the Western Ghats.

### **Genome Sequencing:**

- A genome is an organism's complete set of DNA, including all its genes.
- It contains all the information needed to build and maintain that organism.
- By sequencing the genome, researchers can discover the functions of genes and identify which of them are critical for life.
- This entails sequencing all of an organism's chromosomal DNA as well as DNA contained in the mitochondria and, for plants, in the chloroplast.

### **Earth Bio Genome Project:**

- It is a moonshot for biology under which an international consortium of scientists aims to sequence, catalog and characterize the genomes of all of Earth's eukaryotic biodiversity over a period of ten years.
- It has 3 main Goals - Protecting biodiversity, understanding ecosystems and benefiting human life.
- **The Project was Officially Launched in November 2018. Indian Initiative on Earth Bio Genome Sequencing (IIEBS):**

- It has been undertaken to participate in the Earth Bio genome Project, a global effort that aims to sequence the genomes of all life forms on our planet.
- The main objective is to sequence about 1000 plants and animal species in the next five years.
- The National Institute of Plant Genome Research, New Delhi is the coordinating centre for the nationwide project involving a total of 24 institutes.

### **Significance of Project:**

- This will eventually lead to the generation of the genetic blueprint of all living forms.
- The digital repository of genome sequences is expected to provide the critical infrastructure for better understanding of ecosystems and conservation of biodiversity.
- It will also help in the development of new treatments for infectious and inherited diseases.
- Further new types of agricultural products, biomaterials and biological fuels can be made using this along with curbing evil practices like biopiracy.
- India's participation in the EBP would provide a boost for the field of genomics and bioinformatics within the country.

### **Human Genome Project:**

- It was an international scientific research project with the goal of determining the base pairs that make up human DNA, and of identifying and mapping all of the genes of the human genome from both a physical and a functional standpoint.
- It remains the world's largest collaborative biological project.
- After the idea was picked up in 1984 by the US government when the planning started, the project formally launched in 1990 and was declared complete on April 14, 2003.
- The project was not able to sequence all the DNA found in human cells.
- It sequenced only euchromatic regions of the genome, which make up 92.1% of the Human Genome.