Syllabus subtopic: Science and Technology- developments and their applications and effects in everyday life Achievements of Indians in science & technology; indigenization of technology and developing new technology.

Prelims and Mains focus: about the Brahma brain template; its need and significance

News: A team of scientists led by senior scientist Pravat Mandal at the Nueroinaging and Nuerospectroscopy Laboratory (NINS) of the National Brain Research Center (NBRC), in Manesar, Haryana, has developed a brain template, Brahma, which will show intrinsic details about the anatomy of the Indian brain.

Background

This comes close on the heels of Mandal in December leading a team that had developed a technology that uses the brain’s stress levels and pH for early identification of brain disorders such as Alzheimer’s disease, Parkinson’s disease, depression and schizophrenia.

What is a brain template?

- Brain template is a gross representation from various brain images to understand brain functionality in diseased conditions.
- Studies have so far been conducted to develop a standard brain template that is compatible to different populations, though the human brain is highly different in shape and size between individuals and basic demographies, according to scientists. Research was focused to develop the population specific brain template to understand this variability.

Significance of Brahma

- Brahma will be a crucial guide for Indian brain scientists as doctors have so far relied solely on US and Canadian brain templates for anatomical details for surgery and treatment of Indian patients. However, the American template may differ from the Indian one.
About the Brahma project

- The project, **funded by the department of science and technology (DST)**, took more than two years to complete.
- The research was conducted taking volunteers from across India, from all states, for true representation of an Indian brain template. The critical data was generated at NBRC using the state-of-the-art magnetic resonance imaging (MRI) scans using 3T Philips Scanner.
- **Brahma can be used for research** and later can be validated for clinical use for surgical procedure. This template will be available for academic use free of charge.

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- How Brahma is important is simple to understand. If we want to go to any part of India, we use Google maps and we reach there. Similarly, for any brain study or surgical procedure in India, **scientists and clinicians previously used US or Canadian MNI (Montreal Neurological Institute) template** to analyse the data or plan surgery as there was no detailed template from Indian brains.

- The brain has huge complexity and brain functionality is not completely understood till date. It will be immensely important to conduct multimodal brain study to understand psychiatric disorders such as depression, schizophrenia and bipolar disorders. The development of the Indian brain template will be helpful to achieve more accurate and precise allocation of brain regions in neurosurgery.