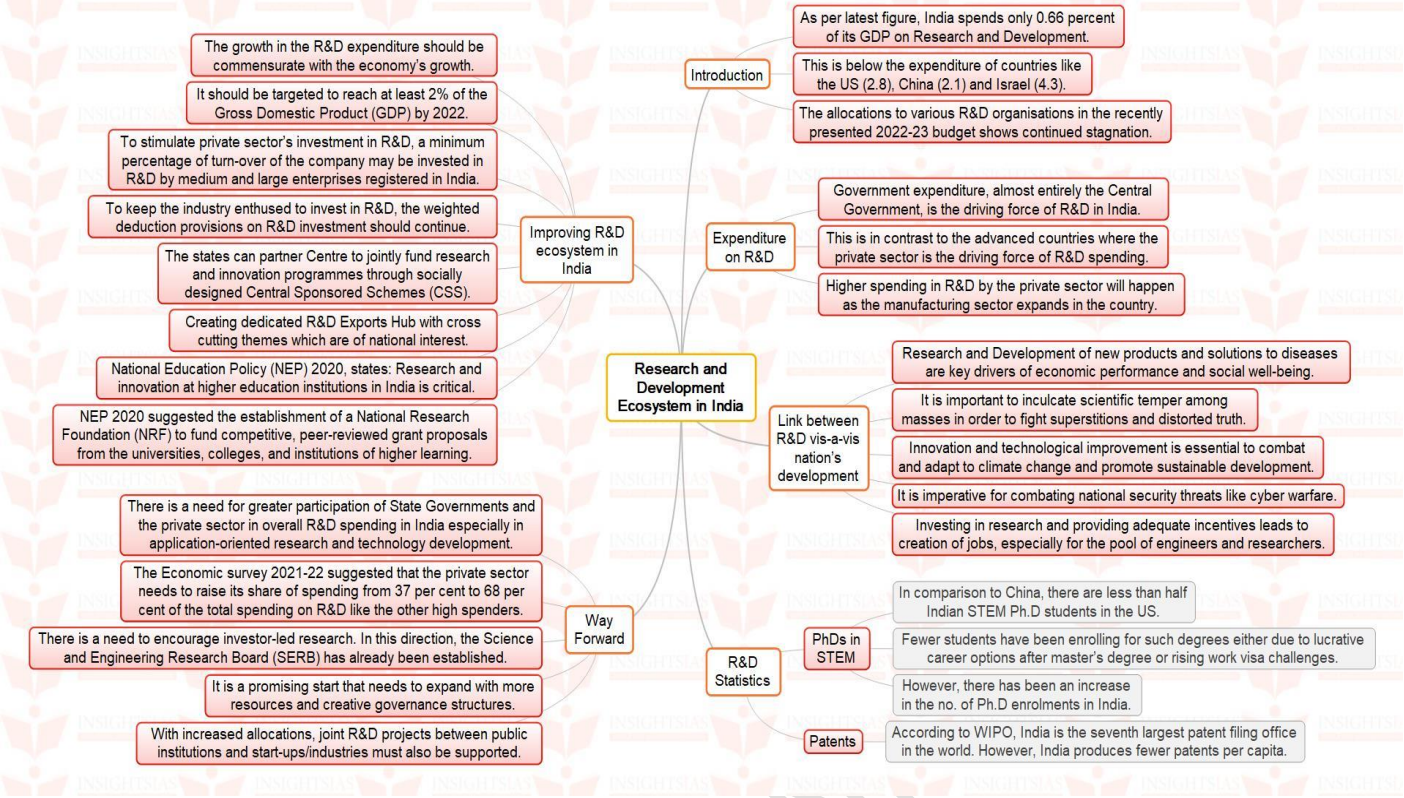

General Studies-2; Topic: Government policies and interventions for development in various sectors and issues arising out of their design and implementation.

Research and Development Ecosystem in India

Introduction

- **As per latest figure, India spends only 0.66 percent of its GDP** on Research and Development.
- This is below the expenditure of countries like the US (2.8), China (2.1) and Israel (4.3).
- The allocations to various R&D organisations in the recently presented 2022-23 budget shows continued stagnation.

Expenditure on R&D

- Government expenditure, almost entirely the Central Government, is the driving force of R&D in India.
- This is in contrast to the advanced countries where the private sector is the driving force of R&D spending.
- Higher spending in R&D by the private sector will happen as the manufacturing sector expands in the country.

Link between R&D vis-a-vis nation's development

- Research and Development of new products and **solutions to diseases** are **key drivers of economic performance and social well-being.**
- It is important to **inculcate scientific temper among masses** in order to **fight superstitions and distorted truth**.
- **Innovation** and technological improvement is essential to **combat and adapt to climate change and promote sustainable development.**
- It is imperative for **combating national security threats** like **cyber warfare.**

- Investing in research and providing adequate incentives **leads to creation of jobs, especially for the pool of engineers and researchers**.

R&D Statistics

- **PhDs in STEM**
  - In comparison to China, there are less than half Indian STEM Ph.D students in the US.
  - Fewer students have been enrolling for such degrees either due to lucrative career options after master's degree or rising work visa challenges.
  - However, there has been an increase in the no. of Ph.D enrolments in India.
- **Patents**
  - According to WIPO, India is the seventh largest patent filing office in the world. However, India produces fewer patents per capita.

Improving R&D ecosystem in India

- The growth in the R&D expenditure should be commensurate with the economy's growth.
- It **should be targeted to reach at least 2% of the Gross Domestic Product (GDP) by 2022.**
- To stimulate **private sector's investment in R&D,** a minimum percentage of turn-over of the company may be invested in R&D by medium and large enterprises registered in India.
- To keep the industry enthused to invest in R&D, the **weighted deduction provisions on R&D investment should continue.**
- The **states can partner Centre** to jointly fund research and innovation programmes through socially designed **Central Sponsored Schemes (CSS).**
- **Creating dedicated R&D Exports Hub** with cross cutting themes which are of national interest.
- National Education Policy (NEP) 2020, states: Research and innovation at higher education institutions in India is critical.
- NEP 2020 suggested the establishment of a National Research Foundation (NRF) to fund competitive, peer-reviewed grant proposals from the universities, colleges, and institutions of higher learning.

Way Forward

- There is a need for greater participation of State Governments and the private sector in overall R&D spending in India especially in application-oriented research and technology development.
- The Economic survey 2021-22 suggested that the private sector needs to raise its share of spending from 37 per cent to 68 per cent of the total spending on R&D like the other high spenders.
- There is a need to encourage investor-led research. In this direction, the Science and Engineering Research Board (SERB) has already been established.
- It is a promising start that needs to expand with more resources and creative governance structures.
- With increased allocations, joint R&D projects between public institutions and start-ups/industries must also be supported.