SUSTAINABLE FUNDING FOR SCIENCE - GS III MAINS

Q. India needs to enhance its R&D spending and promote innovation to accelerate its journey towards becoming a developed nation by 2047. Comment. (15 marks, 250 words)

News: *Why sustainable funding matters for India's 'science power' ambition | Explained*

What's in the news?

- The 2024 theme for National Science Day, which India celebrates every year on February 28, is "Science for Sustainable Development".

Key takeaways:

- Science and technological developments are key drivers of India's journey towards becoming a developed country by 2047.
- India is committed to making this progress through sustainable means, as evidenced by its commitments under the Paris Agreement, participation in global fora for sustainable development, and reinforced in this year's theme for Science Day.
- The role of science in driving sustainable development doesn't need emphasis, but any conversation on science is incomplete without setting one key expectation for science to transform India, it has to be sustainably and consistently funded.

Present Status:

- India's research and development (R&D) expenditure is around 0.64% of GDP. There has been a decline in science funding from 0.8% in 2008-2009 and 0.7% in 2017-2018 to 0.64 currently.
- This is despite the fact that both 2013 Science, Technology, and Innovation Policy and Economic survey have urged the government to take R&D spending to 2% GDP.

International Status:

- With respect to other countries, funding for fundamental research in India is amongst the world's lowest.
- In 2021, member-countries of the OECD on average spent 2.7% of their GDP on R&D.
- The U.S. and the U.K. have consistently spent more than 2% of their GDPs on R&D for the past decade.

Significance of Sustainable S&T Funding for India:

1. Innovation & Growth:

- Sustainable funding for science and technology (S&T) is crucial for India's knowledge-based economy, driving breakthroughs in healthcare, renewable energy, agriculture and IT.

2. National Challenges:

- Targeted S&T investments address national challenges such as climate change adaptation, sustainable agriculture, and healthcare accessibility, improving millions of lives.

3. Competitiveness:

- Consistent funding for S&T strengthens India's global competitiveness, fostering a skilled workforce, boosting domestic industries and solidifying its position as a technological hub.

4. Social Issues:

- S&T advancements tackle societal issues like poverty, illiteracy, and disease, promoting inclusive development through research in public health, education technology, and social innovation.

Challenges in Sustainable Funding for Research and Development:

1. Underutilization of Budget Allocations:

- Departments like the Department of Biotechnology (DBT), Department of Science and Technology (DST) and Department of Scientific and Industrial Research (DSIR) consistently under-utilize their budget allocations.
- In 2022-2023, DBT, DST and DSIR used only 72%, 61%, and 69% of their estimated budget allocations, respectively.

2. Capacity Issues and Delays:

- Insufficient capacity leads to delays in grant and salary disbursements, adversely affecting the progress of scientific research and development projects.

3. Broader Under-Spending Issue:

- India's overall under-spending on research and development exacerbates the impact of under-utilization, necessitating both increased funding and enhanced spending efficiency.

4. Uncertain Government Funding:

- Government funding for science is uncertain, susceptible to changes in political priorities, economic conditions and competing demands across sectors.
- Non-prioritization of R&D funding within government budgets results in inadequate allocations compared to other sectors, reflecting a lack of recognition of its importance for national development and innovation.

5. Private Sector Hesitancy:

- In 2020-2021, the private sector contributed 36.4% of Gross Expenditure on R&D (GERD), while the Union government's share was 43.7%.
- In economically developed countries, around 70% of R&D investment comes from the private sector.

6. Regulatory Issues:

- Issues like lack of clear exit options for investors in sectors such as biotechnology and fears of intellectual property rights theft discourage private investment in R&D in India.

WAY FORWARD:

1. Scaling Investment for Development:

- Recognize that sustained, substantial investment in science is crucial for progress.

- India needs to outspend developed countries in R&D to achieve 'developed nation' status.

2. Philanthropic Contributions:

- Encourage wealthy individuals, corporations and foundations to invest in R&D through philanthropy.
- Establish dedicated funds or grants for scientific research to attract donations from those committed to societal progress.

3. Academia-Industry Partnerships:

- Facilitate collaborations between academia and industry to harness resources and expertise from both sectors.
- Industry can provide funding, equipment and real-world problems, while academic institutions offer scientific knowledge and talent. Government incentives or tax breaks can encourage such partnerships.

4. Private Investment Initiatives:

- Encourage venture capital firms and angel investors to invest in R&D projects with high potential for commercialization.
- Recognize the role of startups and small enterprises in driving innovation and provide them with the necessary private investment to scale their research efforts.

5. Implementation of National Research Foundation:

- Expedite the implementation of initiatives like the Anusandhan National Research Foundation.
- Ensure adequate funding and efficient utilization to support R&D activities and promote scientific advancements.

6. Prioritization of R&D Spending:

- While advocating for fundamental research, India must strategically allocate funding to areas offering significant social and economic benefits.
- This may encompass clean energy, biotechnology, and artificial intelligence, all in alignment with India's developmental objectives.

7. Capacity Building:

- India also needs the bureaucratic capacity to evaluate science projects and, after allocations, monitor utilization.
- Building such capacity is a prerequisite for India to become a science power by 2047.

Sustainable funding for science and technology is imperative for driving India's economic growth, fostering innovation, and achieving sustainable development goals. By prioritizing R&D spending, engaging the private sector, and enhancing bureaucratic capacity, India can position itself as a global leader in science and technology by 2047.