



Sustainable Funding for Research and Development

For Prelims: Sustainable Funding for Science, [Raman Effect](#), [Nobel Prize in Physics](#), [GDP \(Gross Domestic Product\)](#)

For Mains: Sustainable Funding for Science, Government Policies & Interventions, Growth & Development.

[Source: TH](#)

Why in News?

[National Science Day](#), celebrated annually on **28th February**, honours the discovery of the Raman Effect and acknowledges scientists' contributions to India's development.

- It highlights the importance of Science in Fostering Sustainable Development.

What is National Science Day?

▪ About:

- **National Science Day** is observed on the day Indian Physicist Chandrasekhara Venkata Raman discovered the [Raman Effect](#).
 - The Raman Effect is the phenomenon where **light gets scattered when passed through a transparent material**, leading to changes in wavelength and energy.
- In 1928, on 28th February CV Raman discovered the Raman Effect.
- He also received the [Nobel Prize in Physics](#) in 1930 due to his significant contribution to the field of Physics.

▪ Theme: Indigenous Technologies for Viksit Bharat

▪ Significance:

- The day is observed to **raise awareness about the importance of scientific applications** in our daily lives.
- The day also aims to celebrate and acknowledge the efforts and achievements of scientists in human welfare.
- The best **way to observe National Science Day** is by understanding the way science and technology have progressed and exploring the spaces where more efforts need to be made.

How much is India Spending on Research and Development (R&D)?

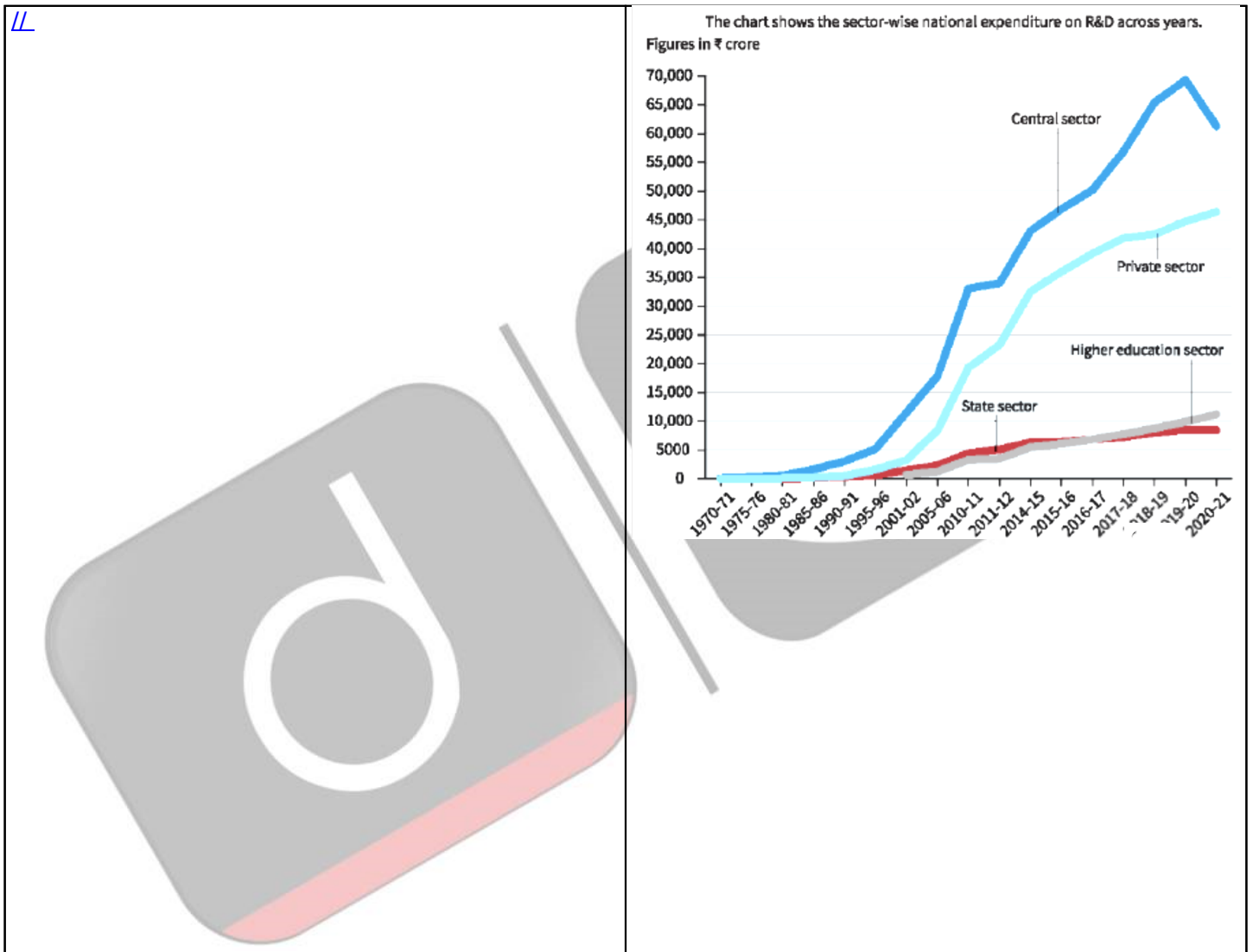
▪ India's Declined R&D Expenditure:

- India's expenditure on Research and Development (R&D) has **declined to 0.64% in 2020-21 of [GDP \(Gross Domestic Product\)](#)**, down from 0.8% in 2008-2009 and 0.7% in 2017-2018.
 - This decrease is concerning, especially considering repeated calls from government agencies to double R&D spending.

- The **2013 Science, Technology, and Innovation Policy** aimed to increase **Gross Expenditure on R&D (GERD)** to 2% of GDP, a goal reiterated in the 2017-2018 [Economic Survey](#).
 - However, the reasons for the reduction in R&D spending are unclear. Potential factors may include **insufficient coordination among government agencies** and a **lack of strong political will** to prioritise R&D expenses.

▪ **Developed Countries' R&D Expenditure:**

- Comparatively, **most developed countries** allocate between **2% and 4% of their GDPs to R&D**.
- In 2021, [Organisation for Economic Co-operation and Development \(OECD\)](#) member-countries **averaged 2.7% of GDP on R&D**, with the U.S. and the U.K. consistently exceeding 2% over the past decade.
 - To drive meaningful development through science, experts advocate for India to allocate at **least 1%, ideally 3%, of its GDP annually to R&D until 2047**.



What are the Challenges in Sustainable Funding for R&D?

▪ **Under-utilisation of Budgets:**

- Despite allocations, departments such as the **Department of Biotechnology (DBT)**, **Department of Science and Technology (DST)**, and Department of Scientific and Industrial Research (**DSIR**) **have consistently under-utilised their budget allocations**.
 - In 2022-2023, **DBT used only 72% of its estimated budget allocation**, DST used only 61%, and DSIR spent 69% of its allocation.

▪ **Delays in Disbursements:**

- The **lack of capacity** also results in **delays in grant and salary disbursements**, impacting the progress of scientific research and development projects.
- The broader issue of India's under-spending on research and development exacerbates the impact of under-utilization, **indicating a need for both increased funding and improved efficiency in spending.**
- **Uncertain Government Budget Allocation:**
 - Government **funding for science is uncertain and subject to changes in political priorities**, economic conditions, and competing demands for resources across various sectors.
 - Non-prioritisation of R&D funding within government budgets, leading to insufficient allocations compared to other sectors.
 - This could be due to a lack of recognition of the importance of scientific research for national development and innovation.
- **Insufficient Private Sector Investment:**
 - In 2020-2021, the private sector industry contributed **36.4% of the GERD** whereas the **Union government's share was 43.7%.**
 - In economically developed countries, a major share (70% on average) of R&D investment comes from the private sector.
 - The **hesitancy of private-sector funding** may be because of the **poor capacity to evaluate R&D in India**, ambiguous regulatory roadmaps that can deter investors, **lack of clear exit options for investors in sectors** such as biotechnology, and fears of intellectual property rights theft.

How can India Improve Its R&D Spending?

- **Consistent Investment:**
 - Science requires consistent, **large-scale investment to bear fruit.** For India to reach 'developed nation' status, **it needs to spend more to scale R&D** than developed countries spend to maintain that status.
- **Philanthropic Funding:**
 - Encouraging wealthy individuals, corporations, and foundations **to invest in R&D through philanthropy** can significantly boost funding.
 - Establishing dedicated **funds or grants for scientific research** can attract donations from those interested in contributing to societal progress.
- **Industry-Academic Collaboration:**
 - Facilitating **partnerships between academia and industry** can leverage resources and expertise from both sectors.
 - Industry can provide funding, equipment, and real-world problems for research, while academic institutions offer scientific knowledge and talent. Government incentives or tax breaks can incentivise such collaborations.
- **Venture Capital and Angel Investors:**
 - Encouraging venture capital firms and angel investors to invest in R&D projects with high potential for commercialisation can provide a significant source of funding.
 - Startups and small enterprises often drive innovation and can benefit from private investment to scale their research efforts.
- **Government Initiatives:**
 - It is important to accelerate the implementation of initiatives like the **Anusandhan National Research Foundation**, ensuring adequate funding and efficient utilization to support R&D activities.

What are the Government Initiatives related to R&D?

- Development of **Centres of Excellence.**
- Creation of **National Research Foundation**
- **VAIBHAV Fellowship**
- **Global Innovation Index 2023:** India secured the **40th position** in the latest GII 2023.
- **Atal New India Challenge 2.0**
- **Announcement of New Science Awards** (Vigyan Yuva-Shanti Swarup Bhatnagar).
- **Post-Doctoral Fellowships (PDFs):** The government has **increased the number of** Post-

Doctoral Fellowships (PDFs) from **300 annually to 1000.**

- In addition, the **SERB-Ramanujan Fellowship, SERB-Ramalingaswami re-entry Fellowship and SERB-Visiting Advanced Joint Research Faculty Scheme (VAJRA)** have been devised to promote brain gain by attracting bright researchers of Indian origin to work and contribute to STI (science, technology and innovation) ecosystem in India.

Conclusion

- Addressing challenges related to sustainable funding for science requires coordinated efforts from government agencies, policymakers, research institutions, and the private sector to streamline funding mechanisms, improve capacity-building initiatives, and foster a culture of innovation and research excellence.
- Additionally, there needs to be a sustained commitment to prioritizing science funding and recognizing its critical role in driving socioeconomic development and addressing global challenges.

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims:

Q.1 Which of the following statements is/are correct regarding National Innovation Foundation-India (NIF)? (2015)

1. NIF is an autonomous body of the Department of Science and Technology under the Central Government.
2. NIF is an initiative to strengthen the highly advanced scientific research in India's premier scientific institutions in collaboration with highly advanced foreign scientific institutions.

Select the correct answer using the code given below:

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Ans: (a)

Q.2 For outstanding contribution to which one of the following fields is Shanti Swarup Bhatnagar Prize given? (2009)

- (a) Literature
- (b) Performing Arts
- (c) Science
- (d) Social Service

Ans: (c)

Q.3 Atal Innovation Mission is set up under the (2019)

- (a) Department of Science and Technology
- (b) Ministry of Labour and Employment
- (c) NITI Aayog
- (d) Ministry of Skill Development and Entrepreneurship

Ans: (c)

Mains:

Q. Why is Public Private Partnership (PPP) required in infrastructural projects? Examine the role of PPP model in the redevelopment of Railway Stations in India. **(2022)**

Q. Examine the development of Airports in India through joint ventures under Public-Private Partnership (PPP) model. What are the challenges faced by the authorities in this regard? **(2017)**

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