



Poor Performance of India in Science Nobel Prizes

For Prelims: [Nobel Prize](#), [CV Raman](#), [Government e-Marketplace \(GeM\)](#), [Padma Shri](#), [Bharat Ratna](#), [Nuclear Fusion Projects](#), [Wireless Communication](#), [Raman Scattering Effect](#), [Homi Bhabha](#), [Satyendra Nath Bose](#), [Ribosome](#), [White Dwarf](#), [Anusandhan National Research Foundation](#), [VAIBHAV Fellowship](#).

For Mains: Research funding and state of scientific development in India.

[Source: IE](#)

Why in News?

It has been 94 years since an Indian won a [Nobel Prize](#) in the sciences — **Physics, Chemistry or Medicine** — while working in India.

- India's limited success at the Nobel Prizes is often viewed as an **indicator** of the state of its science, though other factors also contribute.
- The last Indian to receive a Nobel Prize in science was [CV Raman](#) for [scattering of light](#) in Physics in **1930**.

What are the Reasons for Poor Performance of India in Science Nobel Prizes?

- Low Public Funding for Research:** The Indian government provides **insufficient funding** for scientific research, which hinders the development of **groundbreaking work**.
 - In India, direct funding for basic research has remained at a low of **0.6-0.8% of GDP** over the last decade, much lower than that of other [BRICS](#) nations.
 - India's **total expenditure on R&D** has, in fact, fallen from **0.82% to 0.64%** of the GDP between **2005 and 2023**.
- Excessive Bureaucracy:** Bureaucratic **red tape** within India's research institutions stifles innovation and slows down scientific progress. Eg.
 - To order **equipment** in IIT Delhi, it takes **11 months**.
 - Rs 150 crore GST notice served to IIT Delhi** is an example of how tax policies create financial strain on academic institutions.
 - [Government e-Marketplace \(GeM\)](#) places a burden for mandatory procurement platforms for government institutions.
- Small Researcher Pool:** India has a **disproportionately low** number of researchers relative to its population.
 - The number of researchers in India is **five times lower than the global average**, shrinking the pool of potential **Nobel contenders**.
- Dependence on Individual Brilliance:** In the absence of a strong research ecosystem, India's chances of winning **future Nobel Prizes** are largely dependent on the **individual brilliance** of its scientists, rather than systematic support or infrastructure.
- Discretion in Research Institutions:** Instead of focusing on breakthrough research, many heads of research institutions allegedly use these powers for **personal career growth**, such as securing

prestigious awards like the [Padma Shri](#) or [Bharat Ratna](#), or extending their post-retirement tenures.

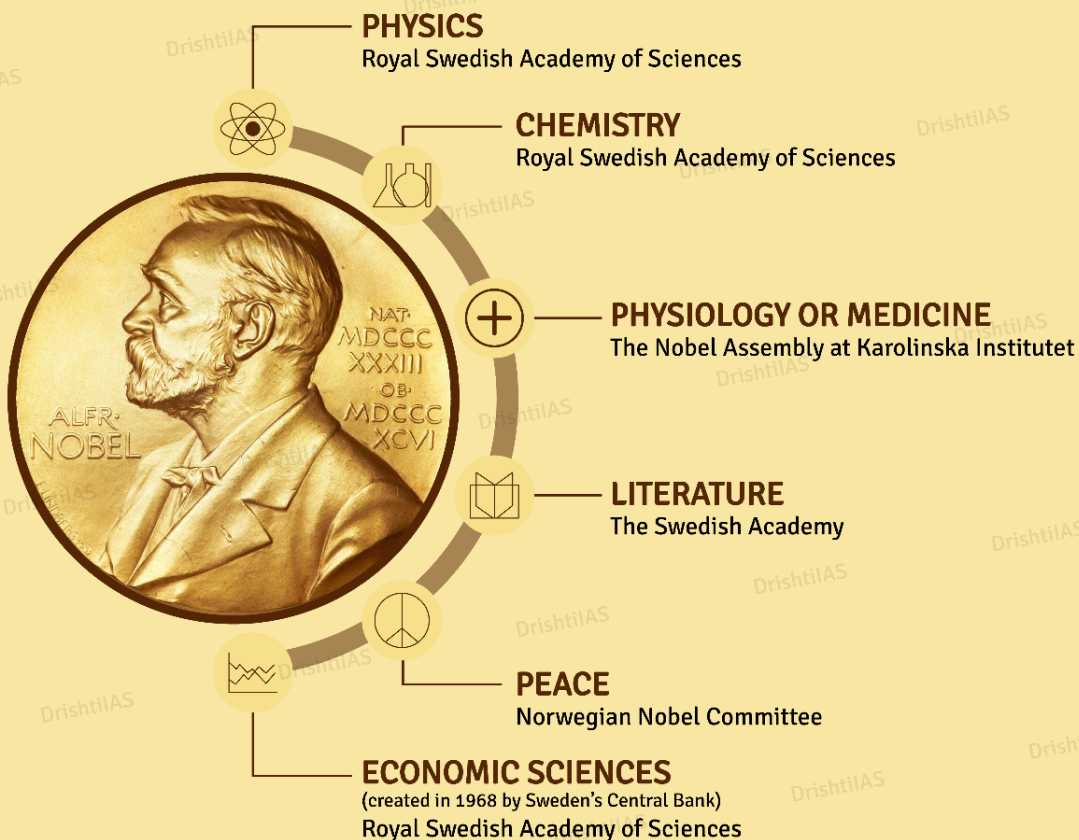
- **Lack of Clear Research Direction:** Many scientists pursue **outdated or irrelevant topics**, often based on failed experiments in the USA or EU, which have no practical applications in India.
 - E.g., Ignoring **water technologies and agricultural innovation** for high-energy particle accelerators or complex [nuclear fusion projects](#).
- **Focus on Quantity Over Quality:** Most of the research carried out in government-funded research institutions is geared towards generating **"number sake" publications** rather than producing meaningful innovations.
- **Dependence on Foreign Technologies:** Instead of developing original solutions, Indian scientists are often involved in merely **duplicating or adapting** technologies developed abroad, which does not require deep scientific innovation or merit.
- **Over Reliance on Private Sector Success:** Recent successes in **vaccine development** during the [Covid-19 pandemic](#) were primarily achieved by **private sector labs**, illustrating a disconnect between government-funded research institutions and successful scientific breakthroughs.
 - This reliance further **undermines the credibility and necessity** of government labs in significant scientific advancements.
- **Legacy of Mediocrity:** Even when foreign-trained scientists return to India, they often **fail to live up to their potential** due to the **unhealthy institutional environment**.
 - They become trapped in a **cycle of publishing irrelevant research and seeking promotions**, rather than pursuing excellence or tackling significant scientific challenges.
- **Historical Missed Opportunities:** Several notable Indian scientists produced groundbreaking work but were either **overlooked or not nominated** for a Nobel. For example.
 - **Jagdish Chandra Bose:** Demonstrated [wireless communication](#) in 1895 but was not nominated, while the Nobel was awarded to **Guglielmo Marconi and Ferdinand Braun** for the exact work in **1909**.
 - **K S Krishnan:** Co-discovered the [Raman scattering effect](#) with C.V. Raman, but was never nominated for the Nobel.
 - **ECG Sudarshan:** The Nobel Prizes in Physics, in **1979 and in 2005**, were given for work in which the most fundamental contributions had come from Sudarshan but he was overlooked for the prize.
 - ECG Sudarshan worked on **electromagnetic interaction** between elementary particles.
- **Nominations but No Wins:** Several Indian scientists, such as **Meghnad Saha**, [Homi Bhabha](#), [Satyendra Nath Bose](#), **G N Ramachandran**, and **T Seshadri**, were nominated multiple times for Nobel Prizes but did not win.
- **Western Dominance in Nobel Prizes:** Nobel Prizes have been dominated by scientists from the **US and Europe**, which have stronger scientific infrastructure and research ecosystems.
 - Of the **653 people** who have won the Nobel Prize for Physics, Chemistry or Medicine, more than **150 belong to the Jewish community**, an astoundingly high proportion. But **Israel** has won **only four Nobel Prizes in science**.

Indian-Origin Scientists to Win Nobel Prize in Sciences:

- **Hargovind Khorana (in Medicine in 1968):** For interpretation of the **genetic code and its function in protein synthesis**.
- **Subrahmanyan Chandrasekhar (in Physics in 1983):** For his theoretical studies of the physical processes of importance to the **structure and evolution of the stars**.
 - He showed that when the [hydrogen fuel](#) of stars of a certain size begins to run out, it collapses into a compact, brilliant star known as a [white dwarf](#).
- **Venkatraman Ramakrishnan (in Chemistry 2009):** For studies of the structure and function of the [ribosome](#).

Nobel Prize

- ✦ Established by the will of Alfred Nobel (inventor of Dynamite)
- ✦ Awarded to those who have conferred the greatest benefit to humankind, during the preceding year
- ✦ First awards were handed out in 1901



- ✦ The Prize Ceremony is held in Stockholm, Sweden, in December every year
 - ▲ The Peace Prize is not awarded at Stockholm ceremony but presented annually in Oslo, Norway, on the same day
- ✦ Each Nobel laureate receives a gold medal, a diploma, and a monetary award
- ✦ Nobel Prize cannot be given posthumously (after death). Also, up to 3 people can share a Nobel Prize award between them

✦ **First Indian Nobel Laureate: Rabindranath Tagore for Literature, 1913**

▲ **First Indian Woman Nobel Laureate: Mother Teresa for Peace, 1979**



What are the Major Government Initiatives for Promotion of Research?

- [Anusandhan National Research Foundation \(ANRF\)](#)
- [Technology Incubation and Development of Entrepreneurs \(TIDE 2.0\)](#)
- [VAIBHAV Fellowship](#)
- [Information on Impacting Research Innovation and Technology \(IMPRINT - II\)](#)
- [Information on SERB Science and Technology Award for Research \(SERB-STAR\)](#)
- [Impactful Policy Research in Social Science \(IMPRESS\)](#)
- [Scheme for Promotion of Academic and Research Collaboration \(SPARC\)](#)

What can be Done to Improve the Performance of India in Science Nobel Prizes?

- **Increase Public Funding for R&D:** The Indian government should commit to increasing the percentage of GDP allocated to research and development, aiming to **reach at least 1.5% in the near term.**
- **Encouraging High-Impact Research:** Promote and fund **high-risk, high-reward research initiatives** that could lead to groundbreaking technologies.
- **Revamping Evaluation Processes:** Create **diverse panels of reviewers** with relevant expertise to evaluate research proposals.
 - This will help ensure that valuable ideas are not overlooked due to biases or misunderstandings.
- **Expand the Researcher Pool:** Promoting [STEM education](#) and investing in higher education can help cultivate a larger and more skilled pool of researchers.
- **Reform Research Institutions:** Ensure that funding and opportunities are allocated based on **merit and potential societal impact** rather than personal ambition.
- **Leverage Public-Private Partnerships:** Facilitate collaborations between government research institutions and private sector firms to enhance research capabilities and drive innovation.
- **Recognise Scientific Talent:** Establish national awards and recognition programs for outstanding scientific contributions to encourage more significant efforts toward groundbreaking work.
- **Strengthen Global Collaborations:** Encourage Indian scientists to collaborate with international research communities, sharing knowledge and resources to raise the profile of Indian research on the global stage.

Drishti Mains Question:

Discuss the reasons for the limited success of Indian scientists in winning Nobel Prizes in the fields of Physics, Chemistry, and Medicine.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims

Q. Who among the following scientists shared the Nobel Prize in Physics with his son? (2008)

- (a) Max Planck
- (b) Albert Einstein
- (c) William Henry Bragg
- (d) Enrico Fermi

Ans: (c)

Q. Nobel Prize winning scientist James D. Watson is known for his work in which area? (2008)

- (a) Metallurgy
- (b) Meteorology
- (c) Environmental protection
- (d) Genetics

Ans: (d)

Mains

Q. The Nobel Prize in Physics of 2014 was jointly awarded to Akasaki, Amano and Nakamura for the invention of Blue LEDs in 1990s. How has this invention impacted the everyday life of human beings? **(2021)**

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