



ISSUES IN INDIA'S SCIENCE MANAGEMENT - GS III MAINS

Q. Critically analyze the key issues plaguing science administration, and suggest some policy reforms that can optimize governance of scientific establishments. (15 marks, 250 words)

News: *The problem with India's science management*

What's in the news?

- Sustained economic progress, aligned with national ambitions, relies on scientific advances translated into deployable technologies.

Key takeaways:

- India is currently undergoing an overhaul of its science establishment, with initiatives like the National Research Foundation (NRF) and the restructuring of the Defence Research and Development Organisation (DRDO).
- However, a critical examination of the existing administrative landscape is crucial to optimize efficiency and resilience in Indian science.
- As India remoulds its science establishment, the utility of scientists being given administrative tasks needs to be questioned

Issues in Indian Science Management:

1. Budget Constraints and Allocation:

- India's low expenditure on research and development, approximately **0.7% of GDP**, compared to 3.5% for the United States and 2.4% for China, poses a significant constraint.
- Given this limitation, effective allocation of funds becomes pivotal, necessitating a focus on high-impact projects.

2. Space Program Deterioration:

- Despite India's lauded space program, recent trends indicate a decline, with the **Indian Space Research Organisation (ISRO) ranking eighth globally in launch numbers in 2022.**
- Foreign startups outpace India in key technologies like reusable rockets, indicating a need for strategic innovation and adaptation.

3. Nuclear Energy Setbacks:

- India has **lost ground in nuclear energy, particularly in small modular reactors** and unrealized ambitions in thorium technology.
- Timely adaptation to emerging technologies is crucial to maintaining leadership in critical scientific domains.

4. Lagging in Key Technologies:

- Critical areas like genomics, robotics and artificial intelligence demand immediate attention, as India lags behind in global advancements.
- Inconsistency and inadequacy in the direction and organization of scientific efforts are evident.



5. Public Sector Dominance and Bureaucratic Hurdles:

- India's scientific landscape is predominantly controlled by the public sector, introducing generic bureaucratic issues like delayed funding approvals and inequitable decision-making.
- The **absence of a commitment to long-term steady funding** exacerbates the problem, hampering the resilience of critical projects in the face of occasional failures.

6. Role of Senior Scientists:

- The distinctive feature of India's science administration is the outsized role played by senior scientists. While the assumption that good scientists make good science administrators is prevalent, the actual performance of institutions challenges this paradigm.
- Senior scientists engage in a wide range of activities, from academic pursuits to micromanaging institutional accounts, leading to a **lack of effective administration**.

7. Lack of Administrative Skill Set:

- Administering complex organizations like national labs and universities demands a specific skill set, including resource allocation and time management.
- **Scientists, driven by individual attribution, often lack the organizational skills** required for effective administration.

8. Conflicts of Interest:

- The present system allows academics to hold administrative control within the same institution, leading to conflicts of interest and red tape.
- **Instances of plagiarism, paid publications and under-the-table dealings** tarnish the scientific culture.
- The culture of quid pro quo and compromised quality control poses challenges to the integrity of scientific endeavours.

9. Historical Roots of Dysfunction:

- The roots of dysfunction trace back to the post-independence era, where poverty concentrated high-end equipment in a few institutions, fostering a **system of gatekeepers**.
- Scientists' dependence on these gatekeepers for resources has perpetuated a culture of indebtedness, stifling genuine scientific outcomes.

10. Talent Management:

- Inadequate training for current administrators in scientific topics combined with a lack of focused career paths for scientists in administrative positions results in less-than-ideal management of grants and research resources.

Learning from International Models:

U.S. Administrative Model:

- Robust science establishments globally embrace the separation of administrators and scientists.
- In the U.S., scientists selected for administrative roles are trained exclusively for administrative tasks, contributing to a more efficient and streamlined system.

WAY FORWARD:

1. Need for Specialized Administrative Training:



- Administering science institutions requires a unique skill set that is distinct from scientific expertise.
- A middle-way approach, similar to the U.S. model, involving an **all-India pool of science administrators** receiving specialized training, could enhance efficiency.

2. Separation of Roles:

- The separation of scientists and administrators is imperative for a more effective science management system.
- The establishment of an all-India pool of science administrators can ensure that dedicated and trained professionals oversee administrative tasks.

3. Addressing Historical Issues:

- Acknowledging the historical roots of dysfunction, steps must be taken to break the cycle of dependency on gatekeepers and ensure a more meritocratic system.
- Implementing a system of all-India transfers can mitigate institutional capture and factionalism.

4. Core Reforms for Robust Science Management:

- Addressing the deep-rooted issues in the Indian science establishment is pivotal for economic and strategic aspirations.
- The need for core reforms, including administrative training, separation of roles and a systemic overhaul, cannot be overstated.

5. Rationalizing Funding Mechanisms:

- To foster innovation and tackle difficult problems, agencies should coordinate their funding priorities, create long-term funding plans and promote interdisciplinary cooperation.

6. Modernising Infrastructure:

- To improve research quality and draw in talent, it is essential to make investments in state-of-the-art research facilities, modernize labs and grant access to cutting-edge computing resources.

7. Increasing Oversight Mechanism:

- To foster trust and protect the integrity of scientific endeavours, strong ethical standards should be put into place, independent oversight committees should be established and research procedures should be made transparent.

8. Stopping Brain Drain:

- Scientists can be encouraged to remain in India and advance the country's scientific endeavours by creating a more conducive research environment, providing competitive pay and benefits, and creating avenues for professional advancement.

The centralization of administrative tasks in the hands of scientists has proven to be a hindrance to the efficient functioning of India's science establishment. To full fill economic and strategic aspirations, it is imperative to consider administrative reform. The separation of scientists and administrators, along with the establishment of a dedicated science administration central service, can pave the way for a more efficient, accountable and globally competitive scientific landscape in India. Without addressing these core concerns, the nation's science establishment may continue to fall short of its potential to drive economic and strategic progress.