National Research Foundation

This editorial is based on **National Research Foundation: Energizing the sciences** which was published in The Indian Express on 10/07/2023. It talks about National Research Foundation that will catalyse and channel interdisciplinary research for accelerating India's ambitious development agenda.

For Prelims: Science and Engineering Research Board of India, Prime Minister, Climate Change, GDP

For Mains: **National Research Foundation**, and Challenges Faced by it.

By approving the **National Research Foundation (NRF)** Bill, the Indian Union Cabinet has taken **a major step to enhance scientific research** in the country. The NRF intends to address India's persistent gap in research and development investments and foster a strong research environment within higher education institutions. The **initiative is promising,** but it also faces challenges such as **ensuring fair allocation of funds**, promoting **interdisciplinary partnerships,** and maintaining international standards.

What is the National Research Foundation (NRF)?

- **About:**
  - NRF is a proposed entity that will replace the **Science and Engineering Research Board of India** (SERB) and catalyse and channel interdisciplinary research **for accelerating India's ambitious development agenda**, through impactful knowledge creation and translation.
- **The NRF's Goals:**
  - **Promote interdisciplinary research** that will address India's most pressing development challenges.
  - **Minimize duplication** of research efforts.
  - Promote the **translation of research** into policy and practice.
- **Features of NRF:**
  - The NRF will be **presided by the** Prime Minister and consist of **10 major directorates,** focusing on different domains of **science, arts, humanities, innovation and entrepreneurship.**
  - The NRF will **have an 18-member board** with eminent Indian and international scientists, senior government functionaries and industry leaders.
  - The NRF will be **registered as a society** and have an independent secretariat.
- **Expectations from NRF:**
  - Increasing India's investment in **R&D from 0.7% of** GDP **to 2% of GDP** by 2030
  - Enhancing India's share of global scientific publications from about 5% to 7% by 2030
  - Creating a pool of talented researchers across disciplines and sectors
  - Developing innovative solutions for India's development challenges
  - Translating scientific knowledge into social and economic benefits

What is the Need of NRF?

- **Declining Research Investment:**
  - India's **research and development (R&D) expenditure-GDP ratio of 0.7%** is very low when compared to major economies and is much below the world average of 1.8%, while it was much higher in countries like the **US (2.8%), China (2.1%), Israel (4.3%) and South Africa (4.2%).**
- **Low Research Output and Impact:**
  - India trails behind in the number of patents and publications generated.
    - **According to** WIPO, **China filed 1.538 million patent applications** (with only 10% from non-resident Chinese), the **US filed 605,571 applications, while India filed only 45,057, of which over 70% were from non-resident Indians.**
- **Limited Research Opportunities:**
  - Research funding is often restricted to elite institutions and researchers, leaving out those in marginalised areas.
    - For instance, DST officials said that **about 65 % of funds from SERB went to the IITs,** and only 11% to state universities.
- **Fragmentation of Research:**
  - Research in India is largely conducted in silos by different institutions, leading to wastage and duplication of resources.
- **Lower Private Sector Involvement:**
  - **About 56%** of R&D spending comes **from the government** and **35% from the private sector.**
    - In contrast, in technologically advanced countries, **the private sector leads R&D**, contributing as much as 88% in Israel.
- **Lack of Focus on Social Sciences and Humanities:**
  - Most of the research **funding is skewed towards natural sciences** and engineering, while social sciences and humanities are often neglected.

How will NRF Promote Inter-disciplinary and Problem-solving Research?

- **Provides Platform:**
  - The NRF will provide the **unifying platform for multi-disciplinary and multi-institutional collaborative research** that can address complex challenges that require solutions from different disciplines and sectors.
    - For example, **public health policy, child nutrition, air pollution and climate change** are some of the areas that **need inter- and trans- disciplinary research** that can provide evidence informed, context relevant, resource optimising, culturally compatible and equity promoting solutions.
  - The NRF will **support both commissioned task force research and investigator-initiated collaborative research** in prioritised areas of India's development.
  - The NRF will also create mindsets for engaging in multi-disciplinary research early in scientific careers, by inviting young researchers from different knowledge domains to collaborate on problem solving research.
- **Foster Collaboration:**
  - The NRF will **seek to involve different stakeholders** in the scientific enterprise, such as the **private sector, state governments, state level institutions and civil society organisations.**
    - The private sector is viewed as a key partner, to infuse corporate and philanthropic funding that can augment the government's own committed contribution and also to infuse new ideas and stimulate innovation.
  - State governments and state level institutions are **vital for enhancing India's capacity for conducting** locally relevant scientific research.
  - **Community participation is essential** for identifying people relevant priorities for the research agenda, engaging in participatory research, monitoring and evaluating implementation and its impact as well as supporting implementation through community mobilisation.
  - Only then can the scientific enterprise become a "Jan Andolon" or people's movement.

What are the Challenges Faced by NRF?

- **Lack of Mentorship and Career Development Support:**
  - Lack of formal or informal mentorship and career development support at the institutions.
    - This can make it difficult for researchers to develop their skills and advance their careers.
- **Inadequate Support for Research Management:**
  - Inadequate support for academic leadership, lab management, data management, research misconduct, and technology transfer.
    - This can lead to problems such as poor research quality, data breaches, and ethical violations.
- **Variable Quality of Periodic Assessments:**
  - The quality of periodic assessments is variable, often without a performance-driven system of reward or criticism.
    - This can breed complacency and discourage researchers from taking risks.
- **Underrepresentation of Women in Science:**
  - In India while the percentage of female enrolment to total enrolment has increased from 45% in 2014-15 to around 49% in 2020-21, **however female occupying faculty positions** in science departments is low.
  - This **can limit the pool of talented researchers** and create a hostile environment for women in science.
- **Equitable Funding Distribution:**
  - One of the biggest challenges facing the NRF is ensuring that funding is distributed equitably across institutions in various geographic locations.
  - The NRF will need to find ways to break pattern and ensure that funding is available to institutions in all parts of the country.
- **Encouraging Interdisciplinary Collaborations:**
  - Another challenge facing the NRF is encouraging interdisciplinary collaborations.
  - In the past, research in India has been **conducted in silos, with different disciplines working independently** of each other.
  - The NRF will need to find ways to promote collaboration between different disciplines, in order to address complex problems that require a multi-pronged approach.
- **Other Challenges:**
  - **Political Interference:**
    - There is a risk that the NRF will be subject to political interference.
    - The NRF will **need to establish clear guidelines and procedures** to ensure that its decisions are based on merit, rather than political considerations.
  - **Lack of Public Awareness:**
    - There is a lack of public awareness about the importance of research in India.
    - The NRF will need to raise public awareness about the benefits of research, in order to build support for its work.

What Should be the Way Forward?

- **Increasing R&D Spending:**
  - As India's R&D spending is low, the NRF should aim to increase the public and private investments in research and innovation and leverage the existing resources and infrastructure efficiently.
- **Ensuring International Competitiveness:**
  - The NRF should aim to enhance the quality and impact of India's research output and improve its ranking and visibility in the global scientific community.
  - It should also facilitate the mobility and exchange of researchers, both within India and abroad, and attract talent from across the world.

Drishti Mains Question:

"National Research Foundation will promote multi-institutional, inter-disciplinary research and funding to address prioritized areas of India's development". Comment