



ICTS

INTERNATIONAL
CENTRE *for*
THEORETICAL
SCIENCES

TATA INSTITUTE OF FUNDAMENTAL RESEARCH

National Research Foundation of India (NRF)

India's National Education Policy (HE) Seminar
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Origin of the NRF

The Draft National Education Policy 2019 recommended that the **National Research Foundation (NRF)**

be set up to catalyse, facilitate, coordinate, seed, grow, and mentor research in higher education institutions in the country.

https://www.education.gov.in/sites/upload_files/mhrd/files/Draft_NEP_2019_EN_Revised.pdf

Present Status: Awaiting final approval from the Govt of India. It is being steered by the Office of the Principal Scientific Advisor.

Here is a conception that has been worked upon by several people since early 2018.

Why NRF?

- The idea of the National Research Foundation (NRF) is based on the firm conviction that the creation of new scientific and social knowledge, based on a methodological assessment of the idea of truth, is at the foundation of human well-being and progress.
- It plans to do this by supporting, mentoring, rejuvenating and creating a culture of free inquiry in the multitude of India's universities and institutions of higher education and research. It addresses the profound need to scale up the research and educational ecosystem commensurate with its large population.

Research in India: Current Status

Current Status of R&D Investment

- India's GERD (Gross Expenditure of Research and Development) as a percentage of GDP dropped from 0.84% in 2008 to around 0.65% in 2020.
- In 2018, GERD as a proportion of GDP was 2.8% in the USA, 2.1% in China, 4.3% in Israel, and 4.2% in South Korea.
- The small proportion of GDP that India invests in R&D annually is correlated with the relatively small number of researchers in India.
- The number of researchers per million population is just 253 in India in 2018, relative to 1200+ in China, nearly 4200+ in the USA, and well over 8200+ in Israel, as per the Economic Survey of India, 2019-20.
- This results in severe underperformance in India's research-output metrics.

Impediments to Research in India

- The absence of an integrated and comprehensive approach towards seeding, funding, coordinating, and monitoring R&I initiatives in the country and their linkages with Central and State governmental bodies and with industry and societal needs.
- The lack of research culture and mindset and the lack of research infrastructure in most educational institutions, further compounds the problem.
- The artificial separation between research and education that was created post-independence, with research being conducted at relatively well-funded standalone research institutions while universities were largely starved of research funds, has evidently hurt the country considerably - both in research and in teaching. The union of education and research must be restored.

Research: Higher Education; Societal Impact

Higher Education and Research

- High quality higher education (HE) goes hand in hand with high quality knowledge creation.
- Those who impart higher education should be participant in the process of knowledge creation.
- Hence, it is critical for the success and vibrancy of India's higher education system to cultivate research within the HE system.
- However, less than 1% of India's approximately 40,000 higher education institutions engage in research!

Research for Societal Impact

- Access to air quality, clean drinking water, sanitation etc.
- Quality education, healthcare, social equity and inclusion.
- Clean energy, climate change and its impact on the ecosystem.
- Sustainable infrastructure and improved transportation.
- Solutions to these challenges require *not only* science and technology but also an understanding of the social sciences, history and various socio-cultural dimensions of the nation.

NRF Objectives

NRF Objectives

Fund peer-reviewed grant proposals

Seed, grow, and facilitate research at universities and colleges

Fund research infrastructure that can be shared across multiple institutions

Increase India's role and participation in international collaborations, large-scale mission projects and megaprojects

Act as a liaison between researchers, relevant government bodies, and industry

Support the preparation of the next generation of researchers through innovative initiatives in education

Serve as a think tank for the planning of research in the country and recommending key policy initiatives to Government

Support initiatives for increasing the participation of women and other underrepresented groups in research

Create a central clearinghouse for the collection, interpretation, and analysis of information and data surrounding all research

Recognise outstanding research and progress achieved through NRF funding/mentoring

NRF Funding and Capacity Building Activities

Scope of Activities - 3 Pillars

- Capacity building at Universities and Colleges
 - Through mentoring institutions, their faculty, and students, to take up research.
 - Mentoring will be done by established researchers – both retired and practising (Capacity Builders).
 - Instituting Doctoral and Postdoctoral programmes.
 - Creating 'Centres of Excellence' in universities, and funding shared infrastructure.
- Grow and nurture excellence in cutting-edge research across disciplines
 - Recognising, foreseeing and promoting outstanding research across disciplines.
Curiosity driven research creates a knowledge repository for possible future applications.
("Usefulness of Useless Knowledge"...in the words of Abraham Flexner
 - Engaging in international collaborations, mega-science projects across disciplines.
- Research with impact on Society
 - Establishing linkages across Academia, Government and Industry.
 - Ensuring that national priorities are funded and well researched, and breakthroughs are implemented for the public good.

Building Research Capacity in Universities and Colleges

- NRF professorships that provide funding and support to serving or retired outstanding researchers from premier research institutions and universities will be instituted, to mentor universities and colleges.
- Existing research efforts at universities and colleges will also be strengthened and grown as an important priority of the NRF.
- New researchers and institutions will be mentored for setting-up local research infrastructure and grant administration.
- A large proportion of existing faculty members at universities and colleges do not have PhD degrees. Fellowships for them as well as doctoral and post-doctoral fellowships for outstanding young researchers will be instituted.

NRF Activities at a Glance

Research leading
to societal
impact

NRF
Professorships

Growing existing
research in
Universities

NRF Doctoral
and Postdoctoral
Fellowships

Mentoring for
grant
applications and
outcomes

Capacity
building for
teachers and
researchers

Focus on under
represented
groups

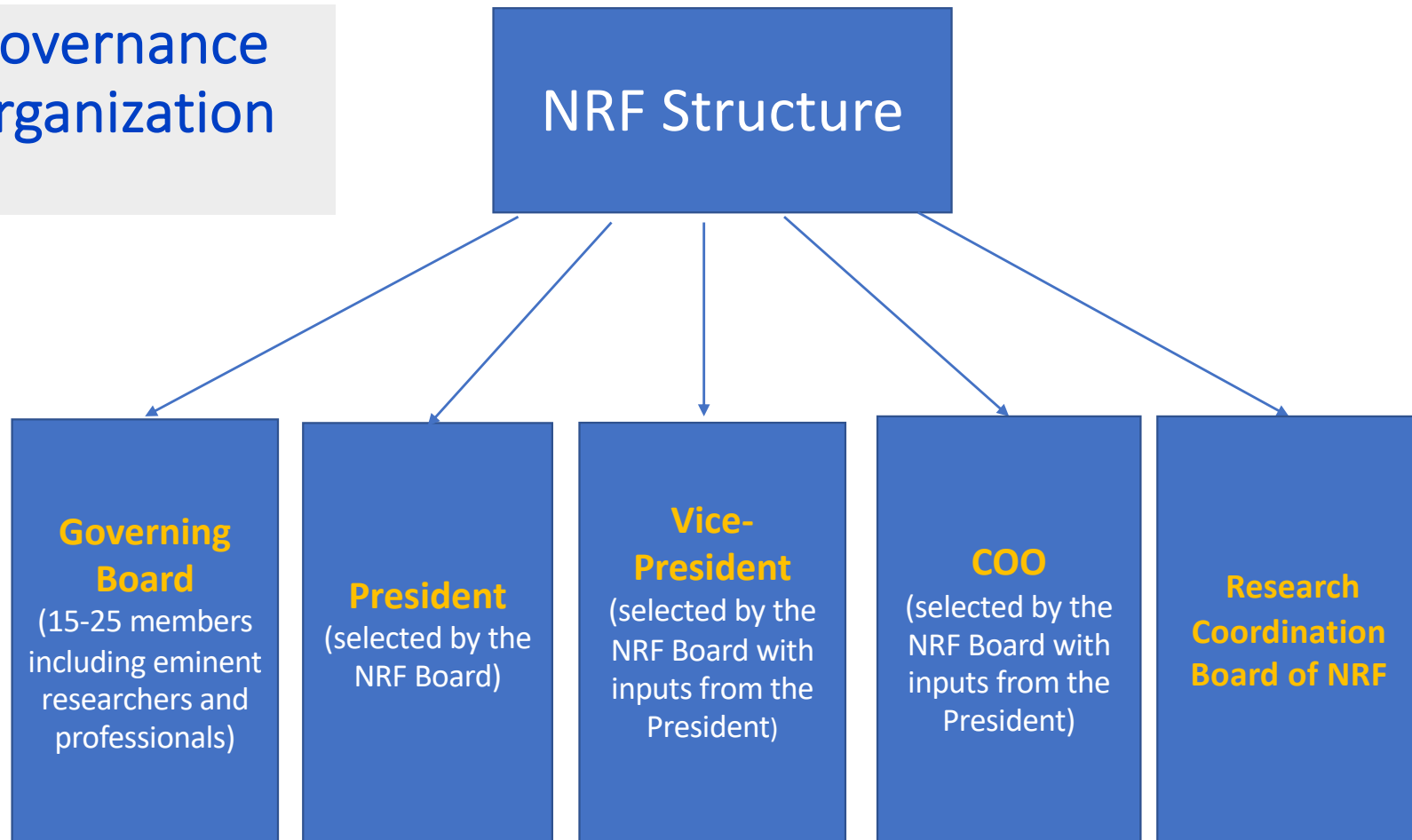
Missions or
megaprojects

Funding
international
collaborations

Foreseeing and
Promoting
outstanding
research

NRF Organisation and Governance

NRF Governance and Organization



**NRF
Academic
Structure:10
Directorates**

Natural Sciences

Mathematical Sciences

Engineering

Environmental and Earth Sciences

Social Sciences

Arts and Humanities

**Indian Knowledge
Systems**

Health

Agriculture

**Innovation and
Entrepreneurship**
(Cross cutting theme)

NRF Administrative Structure

Administrative
Offices with their
Chair, Vice-Chair,
and staff will
work in
collaboration
with the
Directorates.

Office of Budgeting,
Accounting, and Grant
Management

Office of Mentoring

Office of Legislative and Public
Affairs

Office of Development

Office of Missions and
Megaprojects

Office of Data and Information
Management

Office of Diversity and Inclusion

Office of the Inspector General

Office of Integrative Research

Additional activities of the NRF

Large Inter-disciplinary Projects, Missions and Megaprojects

- High-impact, large-scale, multi-PI, multi-institution and, in some cases, interdisciplinary or multi-nation projects will also be pursued by the NRF to inspire and propel the country forward.
- Such interdisciplinary or large-scale projects will primarily be coordinated by the Research Offices of the NRF: the Office of Integrative Research and the Office of Missions and Megaprojects.

Instances of large, long-term missions & megaprojects

- Nationwide projects to clean rivers.
- Projects to bring clean energy to villages.
- Nationwide projects to eliminate diseases.
- Novel methods to teach literacy, or to preserve local languages, arts, or culture.
- Scientific megaprojects where many universities could participate in analysing and interpreting the large amounts of data produced
- Examples include LHC (Large Hadron Collider), LIGO (Laser Interferometer Gravitational Wave) and SKA (Square Kilometre Array), Deep Ocean Mission, Mission on Biodiversity and Human Well-being, etc

Beneficial Linkages among Government, Industry and Researchers

Linking researchers with government and industry

The NRF will stay in contact with relevant government entities and with industry. It will also stay in close touch with agencies that support the entrepreneurial, start-up, and commercialisation ecosystem.

Collaborations with Government and the Private Sector

NRF may receive additional funds from various government departments for funding research. The Public-Sector Units (PSUs), the private sector, and philanthropic organisations will also be encouraged to fund research.

Research requirements of ministries

Research of interest to various ministries will also be funded via the same mechanisms as those set up by the NRF.

Research requirements of State Governments

States may fund areas of research of special interest to their geography e.g., for health and disease control, or for the promotion and preservation of State languages, literature, arts, culture, artifacts, manuscripts, heritage sites, etc.

Thank you

NRF
Academic
Structure:10
Directorates

Natural Sciences
(Astronomy, Biology,
Chemistry, Physics etc.)

Mathematical Sciences
(Mathematics,
Quantitative Biology,
Quantum Information,
Statistics etc.)

Engineering
(Artificial Intelligence, Computer
Science, Electrical, Mechanical,
Chemical, Aerospace and Propulsion
Engineering etc)

Environmental and Earth Sciences
(Biodiversity, Climate and Weather, Climate Change,
Geology, Natural Resources Management etc.)

Social Sciences
(Anthropology,
Archaeology, Linguistics,
History, Psychology,
Sociology etc.)

Arts and Humanities
(Comparative Religion, Literature,
Languages and Writing, Performing
Arts, Philosophy etc.)

**Indian
Languages and
Knowledge
Systems**

Health
(Biomedical
Engineering, Biotechnology,
Epidemiology, Pharmacology,
Public Health, Virology etc.)

Agriculture

**Innovation and
Entrepreneurship**
(Research and Innovation in Science
and Technology, Entrepreneurial and
Commercialization Ecosystems etc.)

NRF Administrative Structure

Administrative
Offices with their
Chair, Vice-Chair,
and staff will work
in parallel and in
collaboration with
the Directorates.

Office of Budgeting, Accounting, and Grant Management (responsible for carefully revising, formulating, and implementing budgets, managing accounts, and administering grant funds)

Office of Mentoring (responsible for running research and innovation mentoring programs for students – such as Dhruv – as well as mentoring for faculty and institutions aiming to apply for NRF grants)

Office of Legislative and Public Affairs (responsible for communicating NRF's mission and research results to academia, government, industry, media, and the general public)

Office of Development (responsible for developing relationships with government, industry, and philanthropic bodies, and passing on relevant research needs and funds to Directorates and Research Offices)

Office of Missions and Megaprojects (responsible for soliciting, evaluating through peer review, arranging funding for, and overseeing the successful execution of outstanding proposals for large-scale transformational national and international missions and megaprojects)

Office of Data and Information Management (responsible for collecting names of research experts around the country and the world who may serve as Research Mentors / NRF Professors, Program Officers, members of Subject Committees, peer reviewers, etc., for collecting and analysing relevant data and information regarding NRF research grants and projects and on Central and State government and industry research needs)

Office of Diversity and Inclusion (responsible for monitoring and reporting that grants are well-distributed across different types of institutions and across geography, and across underrepresented groups)

Office of the Inspector General (responsible for promoting efficiency and effectiveness in running programs and for preventing and detecting fraud, waste, and abuse, through regular audits and direct reporting to the NRF Board twice a year)

Office of Integrative Research (responsible for collecting, suggesting, catalysing, incubating, and overseeing initiatives, in collaboration across Directorates, that capitalise on new interdisciplinary research ideas and projects)