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1. Why the Union Budget's plans for deep tech and research funding are significant

In her Interim Budget speech, Finance Minister Nirmala Sitharaman announced a Rs 1 lakh crore fund to provide long-term, low-cost or zero-interest loans for research and development. She also promised to launch a new scheme to strengthen deep-tech capabilities in the defence sector — an announcement that is likely to be followed up later in the year with a larger policy to promote deep tech startups across all sectors, not just defence.

The separate announcements on the fund and defence deep tech are intricately linked, and must be seen together with the government's other plans for the R&D sector.

ALLOCATIONS IN INTERIM BUDGET 2024-25				(incr)
	2023-24 BE	2023-24 RE	2024-25 IB	Change*
Department of Atomic Energy	25,078.49	26,799.78	24,968.98	-0.41%
Department of Space	12,543.91	11,070.07	13,042.75	4.51%
Department of Science & Technology	7,931.05	4,891.78	8,029.01	2.00%
Department of Biotechnology	2,683.86	1,607.32	2,251.52	-26.90%
CSIR	5,746.51	6,202.53	6,323.41	9.30%
Ministry of Earth Sciences	3,319.88	2,879.02	2,521.83	-27.72%
Department of Agriculture Research	9,504.00	9,876.60	9,941.09	4.43%
Department of Medical Research	2,980.00	2,892.83	3,001.73	0.75%
Department of Defence Research	12,850.00	12,942.85	13,208.00	2.77%

BE: Budget Estimates, RE: Revised Estimates, IB: Interim Budget *2023-24 BE to Interim Budget
Source: Budget documents

Allocations for Science research in the Union Budget 2024-25.

Why deep tech matters

Deep tech refers to advanced and disruptive technologies, many of which are still under development, that have the potential to trigger transformative change, and provide solutions for the future.

The term is used to describe cutting-edge research in nanotechnology, biotechnology, material sciences, quantum technologies, semiconductors, artificial intelligence, data sciences, robotics, 3D printing, etc. These technologies are expected to play a key role to address complex global challenges like climate change, hunger, epidemics, energy access, mobility, physical and digital infrastructure, and cyber security.

Building an ecosystem

Over the past few years, the government has tried to incentivise research in some of these areas by setting up a National Mission on Transformative Mobility and Battery Storage and, more recently, a National Quantum Mission.

Last year, a policy framework to create an enabling environment for companies working in these technology areas was finalised. The National Deep Tech Startup Policy (NDTSP), piloted by the Department for Promotion of Industry and Internal Trade and the Office of the Principal Scientific Adviser, is currently awaiting government approval.

The policy seeks to address specific challenges faced by technology startups, and to provide them with a platform to compete and collaborate with the best in the world. The idea is to create a deep tech startup ecosystem by offering the right incentives to companies that invest time and money in innovation and research. More than 10,000 startups working in these technology domains were identified as part of the effort.

The NDTSP talks about some of the things that need to be done in this regard: create opportunities for long-term funding; a simplified but stronger intellectual property rights regime; tax incentives; a conducive regulatory framework; development of standards and certifications; nurturing of talent; and linkages between industry, research centres, and educational institutions.

The challenge of funding

One of the key policy recommendations in the NDTSP is to open up opportunities for long-term funding of research projects. It acknowledges that most deep tech projects are time- and money-intensive, with relatively high funding requirements.

Lack of adequate research funding has been a major complaint of the scientific community. India's expenditure on research is far below the global average, and significantly lower than the scientifically advanced countries with which India competes.

For more than two decades now, the Indian government's stated objective has been to allocate at least 2% of GDP for research and development. Absolute spending has increased, but expenditure on research as a share of GDP has come down in the last few years. India currently spends just about 0.65% of its national GDP on research and development activities. The global average is about 1.8%.

Going by recent decisions, the thinking in the government seems to be that R&D spends cannot rise substantially without partnering with the private sector. Efforts are being made to create better synergies between industry, research labs, and educational institutions in order to broad-base both research activity and the funds to support it. The National Research Foundation (NRF), which became operational recently, seeks to do this — about 70% of the Rs 50,000 allocation for NRF over the next five years is supposed to come from private industry.

The 1 lakh crore corpus

It is here that the Rs 1 lakh crore corpus to finance research and development becomes important. Startups and other private sector ventures who can obtain seed money for their

projects are expected to be the main beneficiaries. The idea is to start the flow of money in the research ecosystem — and the hope is that as projects take off, industry would be encouraged to invest its own money, and the pool would grow, benefiting everyone in the research community.

Relevance: GS Prelims & Mains Paper III; Economics

Source: Indian Express

2. National Research Foundation

Why in News?

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.



What is the National Research Foundation (NRF)?

NRF is a proposed entity that will replace the Science and Engineering Research Board of India (SERB) and catalyse and channel interdisciplinary research.

The NRF's Goals:

1. Promote interdisciplinary research that will address India's most pressing development challenges.
2. Minimize duplication of research efforts.
3. Promote the translation of research into policy and practice.

Composition of NRF

1. 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.
2. The NRF will have an 18-member board with eminent Indian and international scientists, senior government functionaries and industry leaders.
3. The NRF will be registered as a society and have an independent secretariat.

Expectations from NRF

1. Increasing India's investment in R&D from 0.7% of GDP to 2% of GDP by 2030
2. Enhancing India's share of global scientific publications from about 5% to 7% by 2030
3. Creating a pool of talented researchers across disciplines and sectors
4. Developing innovative solutions for India's development challenges
5. Translating scientific knowledge into social and economic benefits

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%).

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

1. 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.

2. 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.

3. State governments and state level institutions are vital for enhancing India's capacity for conducting locally relevant scientific research.

4. 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 Andolan" or people's movement.

Relevance: GS Prelims & Mains Paper III; Economics

Source: Miscellaneous

3. Uttarakhand UCC Bill: What changes in marriage, divorce, guardianship, and adoption?

Why in news?

The Uttarakhand Uniform Civil Code (UCC) Bill, 2024 proposes some significant changes on marriage, adoption, and related aspects. Here's how the existing position changes.

What are the existing laws on marriage and divorce?

They are governed by the secular Special Marriage Act (SMA), 1954, and personal laws that include the Hindu Marriage Act, 1955, the Indian Christian Marriages Act, 1872, the Indian Divorce Act, 1869, the Parsi Marriage and Divorce Act, 1936, and uncodified (Shariat) and codified Muslim law through the Dissolution of Muslim Marriages Act, the Muslim Women (Protection of Rights on Marriage) Act, 2019, and the Muslim Women (Protection of Rights on Divorce) Act, 1986.

And what are the existing laws on parent-child relations?

Parent-child relations are regulated by laws on guardianship. While natural guardianship is governed by personal laws, court-appointed guardianship is covered by the secular Guardians and Wards Act (GWA), 1890.

All personal laws on guardianship follow the archaic common law principle wherein the father is deemed the guardian of the child, and has the right to take decisions in relation to the child and the child's property.

The mother is the custodian of the child, and is thus relegated to the role of a caretaker. Further, all personal laws treat children born out of wedlock as "illegitimate", and deny them certain rights, such as those pertaining to inheritance.

While the Supreme Court has attempted to correct this discrimination by stating that the mother can be appointed the guardian of the child if the father fails at discharging his functions as a guardian, and has granted inheritance rights in ancestral property to children born out of void and voidable marriages, these developments are limited to Hindu law.

As far as adoption is concerned, Hindus, Buddhists, Jains, and Sikhs can adopt under the Hindu Adoption and Maintenance Act (HAMA), 1956, and everyone irrespective of religion can adopt under the secular Juvenile Justice (JJ) Act, 2015.

What is the framework on registration of marriages proposed by the Uttarakhand UCC Bill?

The Bill has made the registration of marriage and a decree of divorce compulsory with retrospective application.

While there is no requirement of notice and objection for registration of marriage, upon registration, the Register of Marriages is open to public inspection. Although this may have been introduced with an intent to prevent bigamy and fraudulent marriages, it will likely disproportionately affect inter-caste and inter-faith couples by making them vulnerable to surveillance.

Under the Bill, while an unregistered marriage remains valid, the failure to register a marriage after issue of notice by the sub-registrar attracts a fine of Rs 25,000. Thus, the Bill uses a penal mechanism to nudge people towards compulsory registration of marriages.

In case of non-registration for live-in relationships, the punishment includes imprisonment.

What are some of the main features in the UCC Bill with regard to personal law and customs around marriage and divorce?

Marriages may be solemnised through any ceremonies or rituals applicable to the parties to the marriage. Prohibition on bigamy has been extended to all communities.

Enforcement of any customs imposing conditions on remarriage between divorced spouses is criminalised. Extrajudicial modes of divorce through modes not prescribed under the Code have been penalised. Local customs such as customary divorce deed or panchayat divorce are punishable under the Code.

Divorce in the form of talaq-us-sunnat (pronouncement of divorce by the husband during the period between menstruation followed by sexual abstinence), talaq-i-biddat (triple talaq), khula (divorce on the instance of the wife), maba'arat (divorce by mutual consent), zihar (availability of judicial divorce to wife if husband compares her to any woman within prohibited degrees of relationship) are all punishable with imprisonment.

Mehr and dower have been acknowledged as payable in addition to any maintenance payable under the provisions of the Bill.

What does the Uttarakhand UCC mean for guardianship?

The Bill is silent on the question of guardianship, which means that the position under personal laws will continue to prevail. Similarly, the GWA will continue to govern court-appointed guardians.

Consequently, under the Bill, the father will be the guardian of the child, while the mother will be the custodian. The provision on custody under the Bill reinforces this by stipulating that the custody of a child up to the age of five will ordinarily be with the mother, while failing to clarify whether the mother will also be an equal legal guardian.

The Law Commission in 2018 had recommended that guardianship laws must treat both parents on an equal footing to address the discrimination faced by mothers. This recommendation is not reflected in the Bill.

On a positive note, the Bill clarifies that all children born out of void and voidable marriages and live-in relationships will be deemed legitimate, and will have the same rights as children born within wedlock. However, since live-in relationships have been defined to be in the "nature of marriage", children born in relationships that fall short of this threshold may continue to be deemed illegitimate.

How does the UCC change the position on adoption?

The HAMA and the JJ Act will continue to prevail.

Adoption under HAMA involves the giving and taking of the child between the surrendering parent or guardian and the adoptive parents. Demands have been made for reforming HAMA, because there is no requirement of registration of adoption or institutional oversight to address concerns of misuse such as trafficking of children.

The JJ Act, on the other hand, provides sufficient safeguards to protect the safety and best interests of the child being adopted.

The Uttarakhand Bill encourages mandatory registration of marriages and live-in relationships, but it fails to do the same for adoptions made under Hindu law. This is a missed opportunity to reform Hindu adoption.

What are some of the concerns around criminalisation?

The Bill relies on criminalisation for enforcement. This is likely to disproportionately impact minority communities, as several religious and customary practices of religious minorities have been outlawed.

Further, the surveillance regime enabled by the Bill can be misused to harass inter-faith and inter-caste couples.

Relevance: GS Prelims & Mains Paper II; Governance

Source: The Indian Express