

Editorials - 19th Sep 2026

1. A homegrown innovation ecosystem is taking root (GS Paper III Science and Technology)

This editorial ‘A homegrown innovation ecosystem is taking root’ was published in **The Hindu** on 19th Sep 2026, highlights India’s **emerging** innovation ecosystem driven by **public research**, **corporate R&D**, and deep-tech **entrepreneurship**.

Innovation Progress and Structural Gaps

- Domestic development of **Gallium Nitride** technologies and affordable **immunotherapies** reflects India’s growing strategic and biomedical innovation capacity.
- **Patent filings** rose 30.2%, from over 1.10 lakh in 2024-25 to 1.43 lakh in 2025-26, with **domestic applicants** contributing nearly 70%.
- India had only 2.4 lakh **patents in force** in 2025, far below China’s 5.7 million, the United States’ 3.5 million, and Japan’s 2.1 million.
- Low grants, high abandonment, weak commercialisation, and **R&D expenditure** below 1% of GDP constrain India’s transition towards an **innovation-led economy**.

Emerging Institutional Pillars

- India’s innovation ecosystem increasingly integrates **public research**, corporate R&D, and deep-tech enterprises across long-gestation research and commercial applications.
- **Private R&D** surpassed combined government expenditure in 2024 and is expected to contribute **55%** of total spending during 2025-26.
- DRDO developed indigenous **GaN-based MMICs** for defence and transferred the technology for telecommunications, electric vehicles, and

renewable-energy systems, while **AGNIT Semiconductors** pursued commercial applications.

From Technology User to Innovator

- The **Bharat 6G Alliance** targets 10% of global 6G patents by 2030; members filed over 7,700 applications, including 4,400 abroad, though grants and standard-essential status remain uncertain.
- Nearly 3,000 Indian contributions to **3GPP** in 2025, alongside Jio's 19th position among international patent filers, indicate movement towards **standard-setting** and digital infrastructure ownership.
- Government-backed RDI and over \$2.5 billion in **deep-tech commitments** support ventures such as Pixxel, Skyroot Aerospace, and Agnikul Cosmos in **space technology**.
- IIT Bombay-incubated ImmunoACT developed indigenous **CAR-T cell therapy** at one-tenth of typical costs, while BIRAC-supported Remidio applies **AI-enabled imaging** against preventable blindness.

Remaining Policy Requirements

- The innovation pipeline requires standardised **technology-transfer terms**, greater patent-examiner capacity, and funding to bridge the gap between granted patents and **commercial customers**.

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Democratising India's Innovation Ecosystem

- **Regional inclusion:** Atal Community Innovation Centres target underserved regions; their first cohort covered 35 centres across 15 States and Union Territories.
- **Institutional access:** NIDHI Inclusive Technology Business Incubators support Tier-2 and Tier-3 institutions through incubation, mentoring, networking, and prototype grants.

- **MSME participation:** The MSME Innovative Scheme combines incubation, design assistance, and intellectual property support to help smaller enterprises commercialise new products.
- **Social diversity:** NIDHI Inclusive Technology Business Incubators prioritise geographical, gender, and disability inclusion, while PRAYAS 2.0 gives preference to women and young innovators.
- **Patient capital:** NIDHI-PRAYAS 2.0 provides prototype grants up to ₹20 lakh and deep-tech support up to ₹40 lakh, addressing early-stage funding shortages.
- **Knowledge access:** One Nation One Subscription provides journals from 32 international publishers to nearly 1.8 crore researchers, including those in Tier-2 and Tier-3 cities.
- **Grassroots innovation:** The National Innovation Foundation has documented over 3.75 lakh ideas from more than 730 districts and supported their validation, patenting, and commercialisation.

2. Deep-sea discovery, environmental responsibility (GS Paper III Environment)

This editorial ‘**Deep-sea discovery, environmental responsibility**’ was published in **The Hindu** on 19th Sep 2026, highlights the need to **balance** India’s deep-sea technological **ambitions** with ecological **responsibility** and scientific **restraint**.

India’s Deep-Sea Capabilities

- India holds three **International Seabed Authority** exploration contracts covering nearly 95,000 square kilometres across the **Indian Ocean seabed**.
- Exploration has identified 366 million tonnes of **polymetallic nodules** containing nickel, copper, cobalt, and manganese, alongside extensive **biodiversity studies**.

- The **Deep Ocean Mission** is developing underwater robotics and MATSYA-6000, while a domestic **mining machine** has been tested at 5,270 metres.
- Surveys across 19 seamounts recorded nearly 1,300 organisms, including 23 potentially new species, revealing the deep ocean's limited **scientific understanding** and rich **biodiversity**.

Need for Ecological Restraint

- Technological capability must not automatically justify **seabed mining**, whose large-scale and potentially irreversible ecological consequences remain **unpredictable**.
- Deep-sea minerals support renewable energy, electric mobility, and advanced manufacturing, but **strategic importance** cannot become automatic **ecological permission**.
- Extraction must demonstrate necessity after assessing alternatives such as **recycling**, efficiency, substitution, and a **circular economy**.
- **Scientific exploration** can strengthen knowledge, environmental baselines, and technology without requiring subsequent **commercial mining**.
- Since India's activities remain exploratory, it should establish a high **ecological threshold** by first asking whether mining is necessary, rather than merely minimising damage.

Sustainable Deep-Sea Governance

- Extending industry into poorly understood ecosystems may relocate the **environmental costs** of consumption and contradict genuine **sustainable development**.
- **Mission LiFE** supports reduced demand, resource efficiency, recycling, and substitution, enabling science to identify frontiers best left **untouched**.
- India can lead **deep-sea governance** by treating oceans as ecological assets whose **natural capital** may exceed their mineral value.

- Nature-based Solutions, the Sustainable Development Goals, Circular Economy, and Mission LiFE require **ecosystem conservation** and responsible use of **science and technology**.

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Legal Architecture for Deep-Sea Mining

- **Regulatory clarity:** The International Seabed Authority has exploration regulations, but exploitation rules remain under negotiation, showing the need for a clear domestic framework.
- **Precautionary approach:** International Seabed Authority work on environmental thresholds demonstrates how scientific uncertainty can justify withholding approval until ecological safety is established.
- **Impact assessment:** India submitted an environmental impact statement in 2020 for a pre-prototype nodule collector trial, providing a model for mandatory future assessments.
- **Cumulative evaluation:** International Seabed Authority initiatives now examine cumulative impacts because multiple mining projects may collectively damage habitats beyond individual contract areas.
- **Liability mechanism:** The framework should make operators finance monitoring, restoration, and compensation, applying the polluter-pays principle to potentially irreversible seabed damage.
- **Benefit sharing:** The International Seabed Authority has developed models for distributing royalties from future mining, reflecting the common-heritage principle under the United Nations Convention on the Law of the Sea.
- **Public transparency:** India's 2020 environmental statement underwent public consultation, illustrating how mining data, impact studies, and regulatory decisions can receive independent scrutiny.

3. Ensure dignity, way back for Manipur's displaced (GS Paper I Society)

This editorial '**Ensure dignity, way back for Manipur's displaced**' was published in **The Indian Express** on 19th Sep 2026, highlights the healthcare vulnerabilities of Manipur's displaced people and the need for secure, dignified rehabilitation.

Displacement and Healthcare Crisis

- The **Supreme Court's concern** over deaths in relief camps exposes how prolonged displacement has intensified the healthcare vulnerabilities of **internally displaced persons**.
- Manipur's two tertiary government hospitals are concentrated in **Imphal**, while ethnic segregation prevents **Kuki-Zo communities** from accessing treatment in the Valley.
- Hill healthcare facilities lack **specialists and equipment**, forcing some patients to travel over 12 hours to Aizawl for essential treatment.
- Persistent **blockades** obstruct patients, medicines, and medical personnel, while nutritionally deficient camp food further damages **public health**.

Rehabilitation and Political Resolution

- The number of displaced people in camps and temporary locations declined from nearly 60,000 to **28,899**, but thousands remain dependent on an inadequate **healthcare system**.
- The State must provide **staffed medical facilities**, medicines, nutritious food, and essential services within or near relief camps.
- Safe rehabilitation requires resolving the **Meitei-Kuki conflict**, including its emerging Naga-Kuki dimension, through dialogue and **confidence-building measures**.

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Rights-Based Framework for Internal Displacement

- **Legal recognition:** The African Union's Kampala Convention provides a binding regional model defining State duties towards internally displaced persons across different causes of displacement.
- **Equal protection:** The Kampala Convention requires humane treatment, non-discrimination, equality, and equal legal protection regardless of displaced persons' social or political identities.
- **Voluntary return:** Article XI protects free and informed choice among return, local integration, and relocation under conditions of safety and dignity.
- **Document restoration:** Article XIII requires replacement of identification, birth, marriage, and civil documents without forcing displaced persons to return to unsafe home areas.
- **Livelihood recovery:** The Kampala Convention requires sustainable livelihoods, while International Labour Organization principles emphasise decent work, skills recognition, and social protection for displaced populations.
- **Property remedies:** Article XI supports simplified settlement of property disputes and restoration of lands belonging to communities with special attachment to them.
- **Participatory rehabilitation:** Articles IX and XI require consultation with displaced communities and their participation in protection measures and durable rehabilitation decisions.