Department of Biotechnology
Ministry of Science and Technology
Government of India

Implementation Plan for Biomanufacturing and Biofoundry component of the BioRIDE scheme of Department of Biotechnology for '*Fostering High-Performance Biomanufacturing*'

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1. Background

Bharat is on a transformative journey to harness the immense potential of *biomanufacturing* to offer sustainable solutions to pressing global challenges, including climate change and unsustainable resource consumption. By leveraging the regenerative capabilities of biological systems, biomanufacturing can drive innovation across various sectors, contributing to the vision of a sustainable and prosperous *Viksit Bharat*.

Biomanufacturing enables the production of a diverse range of high-value, bio-based products, such as chemicals, enzymes, biopolymers, regenerative medicines, and other bio-based products. Additionally, it supports plant growth, crop protection, green industrial processes, reduced carbon emissions, carbon capture, and the substitution of non-renewable resources. These advancements will be critical in moving India towards a sustainable and innovative future.

However, a significant barrier to realizing this potential is the limited domestic capacity to translate research breakthroughs into commercially viable bio-based products. The transition from the lab to the market is often hindered by the lack of infrastructure required for scaling innovations from pilot projects to pre-commercial manufacturing. Consequently, many startups and small-to-medium enterprises (SMEs) are unable to progress beyond the proof-of-concept stage within incubation centers or laboratories.

Globally, this gap has been addressed through public-sector investments in infrastructure and capacity building. Countries that have successfully developed biomanufacturing ecosystems have done so by establishing biotech infrastructure and funding pipelines for innovative projects. These efforts, coupled with conducive public-private partnership (PPP) policies, have created vibrant local ecosystems that sustain themselves over time.

To enable bio-innovation and build a thriving biomanufacturing sector in India, it is imperative to focus on developing advanced tools and technologies while setting up shared pilot and pre-commercial manufacturing facilities. These resources will be crucial for researchers, startups, SMEs, and industries, ensuring the translation of cutting-edge research and development (R&D) into commercially viable bio-based products.

2. The Implementation Plan

To realize this vision, the Department of Biotechnology (DBT), Government of India, has developed an Implementation Plan under the BioRIDE scheme for *Fostering High-Performance Biomanufacturing*. This strategic roadmap outlines six thematic sectors that will drive India's biomanufacturing revolution:

1. **Bio-based chemicals and enzymes**
2. **Functional food and smart proteins**
3. **Precision biotherapeutics**
4. **Climate-resilient agriculture**
5. **Carbon capture and it's Utilization**
6. **Futuristic marine and space research**

At the heart of this initiative are the **DBT-BIRAC '*मूलांकुर*' BioEnablers**, a network of cutting-edge *Bio-Artificial Intelligence Hubs*, *Biofoundries*, and *Biomanufacturing Hubs*. These cross-cutting technology platforms will act as the backbone for innovation, empowering all six thematic sectors and accelerating India's progress toward becoming a global biomanufacturing leader.

By fostering collaboration between the public and private sectors, establishing world-class infrastructure, and nurturing innovation ecosystems, India is poised to unlock the full potential of biomanufacturing. This will not only address pressing global challenges but also propel India into a leadership role in the bioeconomy, supporting sustainable growth and employment for decades to come.

3. **Objective:**

To create, nurture and foster high-performance biomanufacturing ecosystem for discovery and innovative research and bridging the gap between *'lab-to-pilot'* and '*pre-commercial*'' scale manufacturing of commercially viable bio-based products. This will:

3.1 Foster discovery and innovative research to develop commercially viable bio-based products;

3.2 Enable Startups, SMEs, industries and academia with access to shared infrastructure/facilities and resources for pilot and pre-commercial scale biomanufacturing of viable commercial bio-based products;

3.3 Provide otherwise missing exposure and access to process development & optimization, pilot & pre-commercial scale testing, and validation facilities;

3.4 Enable nucleation of stakeholder engagements such as Industries, Private investors, Regulators, Service Providers, Global talents, required to yield a globally competitive innovation ecosystem;

3.5 Build local vendors and supply chain, strengthen mentorship; attract private investments to expand state of art infrastructure footprint in a public-private partnership (PPP) mode;

3.6 Impart forward pull to scalability and sustainability of bio-entrepreneurial system;

3.7 Provide training and internship for building human resources with the required interdisciplinary, cross functional technical skills to foster biomanufacturing.

4. Implementation:

The implementation of the **Biomanufacturing** and **Biofoundries component** will be led by the Department of Biotechnology (DBT), which will provide support to academia, while the **Biotechnology Industry Research Assistance Council (BIRAC)** will cater to start ups, SMEs, industries and their academic collaborators. This collaboration aims to accelerate innovative research, pilot-scale production, and pre-commercial manufacturing of commercially viable bio-based products. Other relevant organizations may also be included in the future to enhance the speed, efficiency, and breadth of implementation, as well as to provide necessary business support services.

The **Biomanufacturing and Biofoundry Components** will be implemented under three core categories:

1. **Discovery and Application-oriented Integrated Network Research**
2. **Bridging the Gap for Scale up**
3. **Setting up of '*मूलांकुर*' BioEnabler Hubs**

4.1 Discovery and Application-oriented Integrated Network Research

In this category, targeted R&D projects will be supported, whether from individual researchers or teams of investigators from academia, Startups, SMEs and Industry. Network projects or Centers of Excellence will also be encouraged to develop *proof-of-concept* technologies through competitive proposal calls under the six thematic sectors. The goal is to foster cutting-edge innovation that drives forward technological development.

4.2 Bridging the Gap for Scale up

Under this category, individual researchers, collaborative projects, network projects, including Centres of Excellence, will receive support to early scale-up of bio-based technologies or products that have already achieved a *proof-of-concept*. The projects will target startups, SMEs, industries, and academia, enabling them to move from laboratory prototypes to pilot-scale production.

4.3 Setting up of '*मूलांकुर*' BioEnabler Hubs

This initiative focuses on establishing specialized Hubs that will facilitate research, innovation, and scale-up in six thematic sectors under the biomanufacturing initiative. These Hubs include:

1. **Bio-Artificial Intelligence (AI) Hubs**
2. **Biofoundries**
3. **Biomanufacturing Hubs**

4.3.1 Bio-AI Hubs: The Bio-AI Hubs will focus on interdisciplinary and inter-institutional collaborations. These Hubs will be anchored by institutions with established expertise in AI/ML, supported by robust infrastructure and advanced computational methodologies. Startups and other academic institutions can participate as spokes, contributing to the hub's research and innovation ecosystem. Bio-AI Hubs are expected to develop AI-guided closed loop platforms, in which predictions, experiments and analyses are integrated into the system to improve performance. All of these would be connected in a positive feedback loop leading to accelerate scientific discoveries, optimize processes and decision-making. Bio-AI hubs with state-of-art facilities in PPP mode will be established as a shared DBTL facility for scaling-up of various research activities in academia/ industrial or joint industry-academia settings.

4.3.2 Biofoundries:Biofoundries will be designed within the identified thematic sectors to foster innovation while incorporating integrated facilities for early scaling-up of proof-of-concept developments established by academia (both in-house and external),SMEs, and industries. While the platform is focused on supporting breakthrough innovations, preference will be given to proposals that demonstrate proven expertise, prior knowledge, and access to pre-existing infrastructure. Additionally, a comprehensive list of projects and programs that require scale-up should be provided. This approach ensures that innovative ideas are grounded in a strong foundation, facilitating a smoother, more efficient transition from concept to scalable, real-world applications.

4.3.3 Biomanufacturing Hubs: The establishment of Biomanufacturing Hubs will focus on creating shared pilot-scale and pre-commercial-scale facilities designed to bridge the gap between laboratory research and full-scale manufacturing. These Hubs will serve as critical infrastructure for startups, academic institutions, and small and medium enterprises (SMEs), allowing them to access the necessary resources to scale up their innovations without the high upfront costs typically associated with building independent facilities. To ensure the hub's sustainability and impact, the anchor stakeholder applicant—which could be an academic institution, industry leader, or public-private

partnership—must demonstrate an internal pipeline of commercially viable projects that are in the pilot or pre-product development stage.

These projects should have clear potential to transition to full-scale production, ensuring the hub can deliver on its mission to accelerate the commercialization of biomanufactured goods. Preference will be given to stakeholders that can demonstrate proven expertise, operational experience, and access to pre-existing infrastructure. This ensures that the Hubs are built on a strong foundation and can quickly deliver impactful results. Moreover, institutions that already have pre-commercial-scale equipment and experience in managing such facilities will be better equipped to lead these initiatives and provide immediate support to smaller stakeholders. By providing shared equipment and expertise, these Hubs will support multiple stakeholders in testing their products in a real-world manufacturing environment.

Proposals that have already secured the necessary regulatory clearances or are close to obtaining them will be prioritized.

Sustainability: Biofoundries and Biomanufacturing Hubs should have a clearly defined sustainability business plan using appropriate business models after the Government support is over.

5.Funding Mechanisms:

The Funding mechanisms under all the three categories will be as follows:

S. No	Category	Funding Mechanism
I. ***Discovery and Application oriented Integrated Network Research***		
A.	**Funding to Startups , SMEs and Industry** ***(The Startup should not be simultaneously in receipt of any grant from other Departments/Ministries funding start-ups including BIG grant of BIRAC for the same project)***	• **Upto *₹ 50 lakhs funding through Grant-in-aid***
B.	**Funding to Academia**	**Funding through Grant-in-aid as per the "Extramural Research (EMR) Guidelines of DBT. The maximum budgetary limit for the proposals (to be received under the call) will be** • **₹2.5 Crore (single –institute projects),**

		• ₹5 Crore (collaborative projects), and • ₹10 Crore (network projects including Centres of Excellence) Private Universities/ NGOs/ Trusts/ foundations etc. will be encouraged to share 25% of capital investment cost
II. Bridging the Gap for Scale up		
A.	Funding to Startups, *SMEs, and industry* *(The Startup should not be simultaneously in receipt of any grant from other Departments/Ministries funding start-ups including BIG grant of BIRAC for the same project)*	• *Up to ₹ 50 lakhs funding through Grant-in-aid*
B.	Funding to Startups, SMEs, and industry (beyond ₹ 50 lakhs)	Through 'Co-funding, equity financing, royalty sharing' either or in combination in the following manner: • Funding through '*Co-funding*' would involve the cost sharing of a minimum of 30% of total project cost by the grantee organisation in cash excluding land and construction costs. Following feasibility assessment, due weightage will be given to the company that will bring best value to the Government in terms of maximum percentage of cash contribution and having an upscaled technology. • '*Royalty Sharing*' would involve payment of royalty on Net sales of the product developed. Payment of 5% royalty of the Net sales (defined as ex-factory price of the product minus any sales commissions or discounts and does not include freight or insurance

		costs) till the grant-in-aid amount is paid off to BIRAC. The liability to pay royalty will terminate upon the first of any of the following events to occur: a) 5% royalty paid to BIRAC till the royalty amount paid becomes equal to the amount of the Grant-In-Aid disbursed and that was not returned to BIRAC as unutilized funds or b) in case of foreclosure or termination of project as per terms of Grant-in-aid letter agreement (GLA) c) Event such as technology or product out licensing/company merger or acquisition, a one-time payment, from the transaction deal, of up to an amount equivalent to the funds received by applicant. • Funding through *'Equity financing'* would involve taking equity stake through Convertible notes that gets compulsory converted at valuation of the first investment round raised by the grantee of ₹10 Cr or more within 5 years period; or mandatorily at the end of 5th year at a 20% discount of the latest valuation. Equity share will be based on the quantum of funding given to the project. Equity funding may be considered as per the discretion of the committee on a case-to-case basis.
C.	Funding to Academia	• Funding through *Grant-in-aid* to Mission Mode projects *as per DBT EMR Guidelines* Private Universities/ NGOs/ Trusts/ foundations etc. will be encouraged to share 25% of capital investment cost

III. Funding Mechanisms for Setting up of '*मूलांकुर*' BioEnabler Hubs

A. Setting up of '*मूलांकुर*' Bio-Artificial Intelligence Hubs (Bio AI-Hub)

- Bio-AI Hub will be supported up to ₹ 50 Crore
- Private Universities/ NGOs/ Trusts/ foundations etc. are encouraged to share 25% of capital investment cost
- Each Coordinating Hub may propose an annual budget of up to ₹ 50 lakhs to cover operational costs of several (>7) collaborating projects of all external users.
- Bio-AI hubs with state-of-art facilities in PPP mode will be established as a shared DBTL facility

B. Setting up of '*मूलांकुर*' Biofoundry

- Biofoundry can be set up with the budgetary support up to ₹ 65 Crore following the funding mechanism of Bioenablers (provided below).
- Biofoundry for academia will be set up with budgetary support as per DBTs norms.
- Private Universities/ NGOs/ Trusts/ foundations etc. are encouraged to share 25% of capital investment cost
- Each Coordinating Hub may propose an annual budget of up to 50 lakhs to cover operational costs of several (>7) collaborating projects of all external users.

C. Setting up of '*मूलांकुर*' Biomanufacturing Hubs

- Biomanufacturing Hub can be set up with the budgetary support up to ₹75 Crore, following the funding mechanism of Bioenablers (provided below)

Funding Mechanism for the Bioenablers under A, B and C (mentioned above) will be as follows: (Land and Building cost will not be considered)

1.	**Funding to Academia**	• Funding will be through *Grant-in-aid* to Mission Mode projects as per DBT EMR Guidelines. Private Universities/ NGOs/ Trusts/ foundations etc. will be encouraged to share 25% of capital investment cost
2.	**Funding to Startups, SMEs, and industry (beyond ₹50 lakh)**	A conditional grant through 'Co-funding': '***Co-funding'*** would involve the cost sharing of a minimum of 30% of total cost of the project by the grantee organisation • Complete repayment of the funds contributed by DBT/BIRAC is expected within 5 years starting from 2 years

		after the first release. • Expense incurred after the first release would be considered under the project. ● Repayment of the entire BIRAC contribution within 5 years (starting from 2 years after the first release) would involve payment at the rate of minimum 5% of the BIRAC contribution per annum. ● In case the company desires they may top-up the quantum of repayment. ● In case of foreclosure, the disbursed amount is to be refunded within 30 days from the date of foreclosure. • Following feasibility assessment, due weightage will be given to the company that will bring best value to the Government in terms of maximum percentage of cash contribution and having an upscaled technology. ● In case of termination of project the entire amount disbursed with 12% interest to be refunded within 30 days from the date of termination. Funding through ***'Equity financing'*** would involve taking equity stake through Convertible notes that gets compulsory converted at valuation of the first investment round raised by the grantee of ₹10 Cr or more within 5 years period; or mandatorily at the end of 5th year at a 20% discount of the latest valuation. Equity share will be based on the quantum of funding given to the project. Equity funding may be considered as per the discretion of the committee on a case-to-case basis.
3.	**Incubators/ companies established by Central or State Government (Only for Biofoundry)**	● Funding to Central Government supported/ Private university supported incubators/companies will include co-funding of minimum of 30% of total project cost ● Funding to State Government supported

		incubators/companies will include co-funding of minimum of 50% of total project cost *(Repayment of BIRAC contribution would follow point 2)*

The condition of grantees being debarred from receiving any grants in future from the DBT/BIRAC in case of failure to adhere to the terms and conditions of the grant agreement shall be incorporated in the grant agreement and this shall be mentioned in the call for proposals guidelines.

4. International Collaboration:

Under Biomanufacturing and Biofoundry component, both bilateral and multilateral international collaborations will be as per the existing norms of the Department of Biotechnology, Government of India.

5. Quantum and Nature of Financial Assistance for Biomanufacturing Hubs:

a. Number of Biomanufacturing Hubs may vary depending upon the nature of facilities required for Pilot and Pre-commercial scale biomanufacturing.

b. Quantum and nature of financial assistance would depend on the type of bio-based products (microbial/mammalian), size and scale, geographical location, equipment size, infrastructure and compliance level requirements of pilot versus pre-product scale, regulatory protocols (GMP/non-GMP) and other factors. However, the ceiling of funding will not exceed the limits as prescribed under 5.1 IIIC.

6. Eligible Organisations/Beneficiaries: The applicant seeking support should:

a. be a legal entity (for profit/not-for-profit entities), registered in India with taxation and other administrative authorities.

b. have prior experience in the applied area of Bio-services/Biomanufacturing. Details regarding Bio-services/Biomanufacturing shall be clearly specified in the proposal.

c. be profitable and should not have incurred loss in the last 3 consecutive Fiscal Years except for in the case of Startups/ *Not-for-Profit* entities/ Public institutions.

d. not be blacklisted by any Central/ State Government/Public Sector Undertaking, Govt. of India.

e. Major promoter(s) or the legal entity not involved in any major litigation that may have an impact of affecting or compromising delivery of assigned projects.

f. Adhere to the Policies of DBT and BIRAC on data protection, confidentiality & conflict of interest.

g. Startups/SMEs/Industry: applicant should be an Indian legal entity with a minimum 51% stake is owned and controlled by resident Indian citizens.

7. Selection Process:

a. Proposals will be invited through national calls.
b. In some cases, 'Expression of Interest' may be invited before seeking the full proposals with the approval of DBT.
c. Screening of the proposals will be done through 'Preliminary Screening Committee' based on the defined eligibility criteria. The proposals will be selected based on Technical evaluation followed by Financial Evaluation.
d. The 'Selection Committee for Biofoundries and Biomanufacturing Hubs (SCBB)' (to be constituted by DBT and BIRAC with the experts having relevant expertise) will evaluate the technical aspects of the proposals taking into consideration the experts comments and also the presentation and will submit it's recommendations on the proposals.
e. Whereas, the 'Financial Evaluation Committee (FEC) on Biomanufacturing' (to be constituted by DBT and BIRAC with the experts having relevant expertise) will evaluate the proposals w.r.t financial mechanisms/modalities such as co-funding/equity financing & management/royalty sharing, etc. and will submit its recommendations on the proposals.
f. Selection of proposals with defined objectives/milestones, deliverables, duration, total cost, funds disbursement mechanisms/modalities, etc. would be as per the recommendations of ,Apex Committee

8. Monitoring and Evaluation:

a. The performance of the projects will be reviewed by both the above mentioned Committees. These Committees may also constitute 'Project Monitoring Committee' for onsite monitoring of the facilities/Projects, if necessary.
b. 'Third Party Evaluation' of the 'Component' will be carried out periodically (on yearly basis or whenever required) and a report shall be placed before the SCBB and FEC.

9. Expected Outcomes: The anticipated outcomes from this Component include:

a. *Accelerated Transition to Scale*: Enhanced lab-to-pilot and pre-commercial scale manufacturing of bio-based products by startups, SMEs, industries, and academic institutions.
b. *Increased Visibility for Indigenous Products*: Greater visibility of an indigenous pipeline of high-value bio-based products, attracting subsequent private investments and fostering a robust market presence.
c. *Development of a Skilled Workforce*: An expanded cohort of highly skilled professionals in India, leading to increased employment opportunities and heightened entrepreneurial momentum.
d. *Strengthened Local Market*: A range of Made-in-India bio-based products entering the market, bolstering local logistics and vendor networks while reducing reliance on imports and non-renewable resources.

e. *Maturation of the Biotech Innovation Ecosystem*: The development of a thriving biotech innovation ecosystem in the country, contributing to the vision of establishing India as a Biomanufacturing hub.