DEPARTMENT OF BIOTECHNOLOGY
Ministry of Science & Technology
Government of India

BioE3

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BioE3

Biotechnology for Economy, Environment and Employment 2024

For Fostering High-Performance Biomanufacturing

जैवप्रौद्योगिकी विभाग
DEPARTMENT OF
BIOTECHNOLOGY
सत्यमेव जयते

A REPORT ON MEDIA COVERAGE OF

BiOE3
Biotechnology for Economy, Environment & Employment

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1. Introduction

The Union Cabinet, chaired by the Prime Minister Shri Narendra Modi, approved the 'BioE3 (Biotechnology for Economy, Environment and Employment) Policy for Fostering High Performance Biomanufacturing' of the Department of Biotechnology.

This Policy will further strengthen Government's initiatives such as 'Net Zero' carbon economy & 'Lifestyle for Environment' and will steer India on the path of accelerated 'Green Growth' by promoting 'Circular Bioeconomy'. The BioE3 Policy will foster and advance future that is more sustainable, innovative, and responsive to global challenges and lays down the Bio-vision for Viksit Bharat.

Our present era is an opportune time to invest in the industrialization of biology to promote sustainable and circular practices to address some of the critical societal issues-such as climate change mitigation, food security and human health. It is important to build a resilient biomanufacturing ecosystem in our nation to accelerate cutting-edge innovations for developing bio-based products.

2. PRINT MEDIA COVERAGE

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Building a bioeconomy to boost green growth

In an initiative with far-reaching and futuristic implications, the Union Cabinet headed by Prime Minister (PM) Narendra Modi has approved the BioE3 (Biotechnology for Economy, Employment and Environment) Policy of the department of biotechnology (DBT) to foster high-performance bio-manufacturing for a clean, green, prosperous, and self-reliant Bharat. This will ensure a pioneering role for India in the global arena, as one of the earliest torchbearers of the world's future economic growth.

The unsustainable pattern of material consumption, excessive resource utilisation, and waste generation have led to disasters such as forest fires, melting glaciers, and declining biodiversity across the globe. Keeping in view the national priority of steering India on the path of accelerated green growth, the integrated BioE3 policy is a positive and decisive step towards sustainable growth in the challenging backdrop of the climate crisis, depleting non-renewable resources, and unsustainable waste generation. A major aim of this policy is to stimulate the transition of chemical-based industries to more sustainable bio-based industrial models. It will also promote a circular bioeconomy and provide an impetus to achieving net zero carbon emissions by encouraging the utilisation of waste from biomass, landfills and greenhouse gases by microbial-cell factories to produce bio-based products.

Jitendra Singh

In addition, the BioE3 policy will create novel solutions for fostering the growth of India's bioeconomy, facilitating scaling up and commercialisation of bio-based products; reducing, reusing, and recycling waste materials; expanding India's cohort of a highly skilled workforce; driving a surge in job creation; and intensifying entrepreneurial momentum. Salient features of the policy include: 1) encouragement and support to indigenous research-and-development-focused entrepreneurship across thematic sectors such as high-value bio-based chemicals, biopolymers and enzymes; smart proteins and functional foods; precision biotherapeutics; climate-resilient agriculture; carbon capture and its utilisation; and marine and space research; 2) acceleration of technology development and commercialisation by establishing bio-manufacturing facilities, bio-foundry clusters, and bio-Artificial Intelligence (bio-AI) hubs; 3) prioritising regenerative models of economic growth and job creation with an emphasis on ethical and bio-safety consideration; and 4) harmonising regulatory reforms with global standards.

India has demonstrated strong economic growth in the past decade and has tremendous potential to be amongst the global leaders of the fourth industrial revolution. Our bioeconomy has grown 13-fold, from $10 billion in 2014 to over $130 billion in 2024. It is further expected to reach a market value of $300 billion by 2030. The implementation of BioE3 policy across diverse sectors is likely to further boost the country's bioeconomy, while promoting green growth. The foundation for this will be laid by leveraging emerging technologies and innovations that result from nurturing the country's high-performance bio-manufacturing initiatives. Bio-manufacturing is primed to become an important pillar of the 'Make in India' initiative and will provide a transformative approach to meet the demands of the 21st century. As a multidisciplinary endeavour, it has the power to unlock the potential of microbes, plants, and animal cells, including human cells, to develop bio-based products cost-effectively with a minimal carbon footprint.

It is envisioned that bio-manufacturing hubs will serve as centralised facilities that catalyse the production, development, and commercialisation of bio-based products through advanced manufacturing technologies, and collaborative efforts. This will create a community where resources, expertise, and technology can be shared to drive scalability, sustainability, and innovation of bio-manufacturing processes. These bio-manufacturing hubs will bridge the gap between lab-to-pilot and pre-commercial-scale manufacturing of bio-based products. Start-ups will play a pivotal role in this process by bringing and developing novel ideas and feeding them into small and medium-sized enterprises (SMEs) and established manufacturers.

Bio-foundry refers to the creation of advanced clusters to make biological engineering processes scalable—from the initial design and testing stages to pilot and pre-commercial production. Large-scale manufacturing of mRNA-based vaccines and proteins for a wide variety of applications are some appreciable examples for which bio-foundries could be valuable. These clusters will specialise in designing, constructing, and testing biological systems and organisms using standardised and automated processes.

Bio-AI hubs will serve as a focal point for encouraging and incentivising the integration of AI in research and development. These Bio-AI hubs will provide biotechnological expertise, cutting-edge infrastructure, and logistical support for the integration, storage, and analysis of large-scale biological data using AI and machine learning. Making these resources accessible to experts from various disciplines (biology, epidemiology, computer science, engineering, data science, for example) will facilitate the creation of innovative bio-based end products—be it a new variety of gene therapy or a new food processing alternative.

Through these coordinated initiatives, the BioE3 policy will create a surge in employment, particularly in tier-II and tier-III cities, where bio-manufacturing hubs are proposed to be set up due to their proximity to biomass sources. By investing in India's economy, environment, and employment, this comprehensive policy will contribute towards the nation's *sankalp* of Viksit Bharat. This policy will serve as a benchmark that highlight an effective science policy can actively contribute towards nation-building and development.

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Jitendra Singh is the minister of State (independent charge) of science and technology. The views expressed are personal

2. PRINT MEDIA COVERAGE

2.1 OP-ED ARTICLES

बायोई3 नीतिः अर्थव्यवस्था, पर्यावरण और रोजगार के लिए जैव प्रौद्योगिकी

डा. जितेंद्र सिंह
केंद्रीय विज्ञान और प्रौद्योगिकी राज्य मंत्री (स्वतंत्र प्रभार), भारत सरकार

दूरगामी प्रभाव वाली एक ऐतिहासिक पहल के रूप में, प्रधानमंत्री नरेंद्र मोदी की अध्यक्षता में केंद्रीय मंत्रिमंडल ने जैव प्रौद्योगिकी विभाग (डीबीटी) की बायोई3 (अर्थव्यवस्था, रोजगार और पर्यावरण के लिए जैव प्रौद्योगिकी) नीति को मंजूरी दे दी है। इस नीति का उद्देश्य स्वच्छ, हरित, समृद्ध और आत्मनिर्भर भारत के लिए उच्च प्रदर्शन वाले जैव विनिर्माण को बढ़ावा देना है। यह नीति पूरी दुनिया के भविष्य के आर्थिक विकास के शुरुआती मार्गदर्शकों में से एक के रूप में भारत के लिए वैश्विक परिदृश्य में अग्रणी भूमिका सुनिश्चित करेगी। भौतिक उपभोग, अत्यधिक संसाधन उपयोग और अपशिष्ट उत्पादन के असंवहनीय प्रारूप ने विभिन्न वैश्विक आपदाओं को जन्म दिया है, जैसे जंगल की आग, ग्लेशियरों का पिघलना और जैव विविधता में कमी आदि।

भारत को हरित विकास के मार्ग पर तेजी से आगे बढ़ाने की राष्ट्रीय प्राथमिकता को ध्यान में रखते हुए, एकीकृत बायोई3 (अर्थव्यवस्था, पर्यावरण और रोजगार के लिए जैव प्रौद्योगिकी) नीति जलवायु परिवर्तन, घटते गैर-नवीकरणीय संसाधनों और असंवहनीय अपशिष्ट उत्पादन की चुनौतीपूर्ण पृष्ठभूमि में, सतत् विकास की दिशा में एक सकारात्मक और निर्णायक कदम है। इस नीति का एक प्रमुख उद्देश्य रसायन आधारित उद्योगों को अधिक स्थायी जैव-आधारित औद्योगिक मॉडल में परिवर्तित करना है। यह चक्रीय जैव अर्थव्यवस्था को भी बढ़ावा देगा, ताकि नेट-जीरो कार्बन उत्सर्जन का लक्ष्य हासिल किया जा सके। इसके लिए यह जैव-आधारित उत्पादों के उत्पादन के लिए माइक्रोबियल सेल कारखानों द्वारा बायोमास, लैंडफिल, ग्रीन हाउस गैसों जैसे अपशिष्ट के उपयोग को प्रोत्साहित करेगा। इसके अलावा, बायोई3 नीति भारत की जैव अर्थव्यवस्था के विकास को बढ़ावा देने, जैव-आधारित उत्पादों के पैमाने का विस्तार करने और व्यावसायीकरण की सुविधा प्रदान करने; अपशिष्ट पदार्थों की मात्रा कम करने, इनका पुनः उपयोग और पुनर्चक्रण करने; भारत के अत्यधिक कुशल कार्यबल के समूह का विस्तार करने; रोजगार सृजन में तेजी लाने तथा उद्यमिता की गति को तेज करने के लिए अभिनव समाधान तैयार करेगी। नीति की प्रमुख विशेषताओं में शामिल हैः 1) उच्च मूल्य वाले जैव-आधारित रसायन, बायोपॉलिमर और एंजाइम; स्मार्ट प्रोटीन और फंक्शनल फूड; सटीक जैव चिकित्सा; जलवायु अनुकूल कृषि; कार्बन स्तर में कमी और इसका उपयोग; तथा समुद्री एवं अंतरिक्ष अनुसंधान जैसे विषयगत क्षेत्रों में स्वदेशी अनुसंधान और विकास-केंद्रित उद्यमिता को प्रोत्साहन और समर्थन; 2) जैव विनिर्माण सुविधाएं, जैव फाउंड्री क्लस्टर और जैव-कृत्रिम बुद्धिमत्ता (बायो-एआई) हब की स्थापना के जरिए प्रौद्योगिकी विकास और व्यावसायीकरण में तेजी; 3); नैतिक और जैव सुरक्षा विचार पर जोर देते हुए आर्थिक विकास और रोजगार सृजन के पुनरुत्पादन मॉडल को प्राथमिकता देना; 4) वैश्विक मानकों के अनुरूप नियामक सुधारों का सामंजस्य।

भारत ने पिछले दशक में मजबूत आर्थिक विकास का प्रदर्शन किया है। भारत में चौथी औद्योगिक क्रांति के वैश्विक अग्रणी देशों में से एक होने की अद्भुत क्षमता है। हमारी जैव अर्थव्यवस्था 2014 के 10 बिलियन डॉलर से 13 गुना बढ़कर 2024 में 130 बिलियन डॉलर से अधिक की हो गई है। 2030 तक इसके 300 बिलियन डॉलर के बाजार मूल्य तक पहुंचने की उम्मीद है। विभिन्न क्षेत्रों में बायोई3 नीति के कार्यान्वयन से देश की जैव अर्थव्यवस्था को और बढ़ावा मिलने की संभावना है, साथ ही हरित विकास को प्रोत्साहन मिलेगा। देश की उच्च प्रदर्शन वाली जैव विनिर्माण पहलों को बढ़ावा देने से उभरती प्रौद्योगिकियां और नवाचार सामने आएंगे, जिनका लाभ उठाते हुए जैव अर्थव्यवस्था की आधारशिला रखी जाएगी। जैव विनिर्माण मेक इन इंडिया पहल का एक महत्वपूर्ण स्तंभ बनने के लिए तैयार है और यह 21वीं सदी की मांगों को पूरा करने के लिए एक परिवर्तनकारी दृष्टिकोण प्रदान करेगा। एक बहु-विषयक प्रयास के रूप में, इसमें मानव कोशिकाओं सहित सूक्ष्मजीवों, पौधे और पशु कोशिकाओं की क्षमता को उजागर करने की शक्ति है, ताकि न्यूनतम कार्बन उत्सर्जन के साथ लागत प्रभावी तरीके से जैव-आधारित उत्पाद विकसित किए जा सकें।

यह परिकल्पना की गई है कि जैव-विनिर्माण हब केंद्रीकृत सुविधाओं के रूप में काम करेंगे, जो उन्नत विनिर्माण प्रौद्योगिकियों और सहयोगी प्रयासों के माध्यम से जैव-आधारित उत्पादों के उत्पादन, विकास और व्यावसायीकरण को गति प्रदान करेंगे। इससे एक ऐसे समुदाय का निर्माण होगा, जहां जैव-विनिर्माण प्रक्रियाओं के पैमाने, स्थायित्व और नवाचार को बढ़ावा देने के लिए संसाधन, विशेषज्ञता और प्रौद्योगिकी साझा की जा सकती है। ये जैव-विनिर्माण हब, जैव-आधारित उत्पादों के प्रयोगशाला-से-प्रारंभिक विनिर्माण और पूर्व-व्यावसायिक पैमाने के विनिर्माण के बीच के अंतर को दूर करेंगे।

बायोफाउंड्री का तात्पर्य है, उन्नत क्लस्टरों के निर्माण, ताकि जैविक इंजीनियरिंग प्रक्रियाओं को पैमाने के अनुरूप प्रारंभिक डिजाइन और 'परीक्षण चरणों से लेकर पायलट' तथा 'पूर्व-व्यावसायिक उत्पादन' तक-तैयार किया जा सके। विभिन्न प्रकार के अनुप्रयोगों के लिए एमआरएनए-आधारित टीकों और प्रोटीन का बड़े पैमाने पर निर्माण कुछ सराहनीय उदाहरण हैं, जिनके लिए बायोफाउंड्री मूल्यवान हो सकती है। ये क्लस्टर मानकीकृत और स्वचालित प्रक्रियाओं का उपयोग करके जैविक प्रणालियों और जीवों के डिजाइन, निर्माण एवं परीक्षण में विशेषज्ञता प्राप्त करेंगे। बायो-एआई हब अनुसंधान एवं विकास में एआई के एकीकरण को प्रोत्साहित करने और प्रोत्साहन प्रदान करने के लिए एक केंद्र बिंदु के रूप में काम करेंगे। एआई और मशीन लर्निंग का उपयोग करके, ये बायो-एआई हब बड़े पैमाने पर जैविक डेटा के एकीकरण, भंडारण और विश्लेषण के लिए जैव प्रौद्योगिकी विशेषज्ञता, अत्याधुनिक अवसंरचना और लॉजिस्टिक्स सहायता प्रदान करेंगे। विभिन्न विषयों (उदाहरण के लिए, जीव विज्ञान, महामारी विज्ञान, कंप्यूटर विज्ञान इंजीनियरिंग, डेटा विज्ञान) के विशेषज्ञों के लिए इन संसाधनों को सुलभ बनाने से अभिनव जैव-आधारित अंतिम उत्पादों के निर्माण की सुविधा मिलेगी-चाहे वह जीन थेरेपी की एक नई किस्म हो, या एक नया खाद्य प्रसंस्करण विकल्प हो।

इन समन्वित पहलों के माध्यम से, बायोई3 नीति, विशेष रूप से टियर-2 और टियर-3 शहरों में, रोजगार सृजन में वृद्धि लाएगी, जहां जैव विनिर्माण हब स्थापित करने का प्रस्ताव है क्योंकि ये स्थान बायोमास स्रोतों के निकट स्थित हैं। भारत की अर्थव्यवस्था, पर्यावरण और रोजगार में निवेश करके, यह व्यापक नीति राष्ट्र के 'विकसित भारत' के संकल्प में योगदान देगी। यह नीति एक बैंचमार्क के रूप में काम करेगी तथा इस बात को दर्शाएगी कि एक प्रभावी विज्ञान नीति राष्ट्र निर्माण और विकास में सक्रिय रूप से योगदान दे सकती है।

2. PRINT MEDIA COVERAGE

2.1 OP-ED ARTICLES

BioE3 Policy: Biotechnology for Economy, Environment and Employment

DR. JITENDRA SINGH

In a landmark initiative with far reaching futuristic implications, the Union Cabinet headed by Prime Minister Narendra Modi has approved the BioE3 (Biotechnology for Economy, Employment and Environment) Policy of the Department of Biotechnology (DBT) to foster high-performance biomanufacturing for a clean, green, prosperous, and self-reliant Bharat. This will ensure for India a pioneering role in the global arena as one of the earliest torch-bearers of world's future economic growth.

The unsustainable pattern of material consumption, excessive resource utilization and waste generation have led to global cataclysms such as forest fires, melting glaciers, and declining biodiversity. Keeping in view the national priority of steering India on the path of accelerated 'Green Growth', the integrated BioE3 (Biotechnology for Economy, Environment and

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India has demonstrated strong economic growth in the past decade and has tremendous potential to be amongst the global leaders of the 4th industrial revolution. Our bioeconomy has grown 13 folds from $10 billion in 2014 to over $130 billion in 2024. It is further expected to

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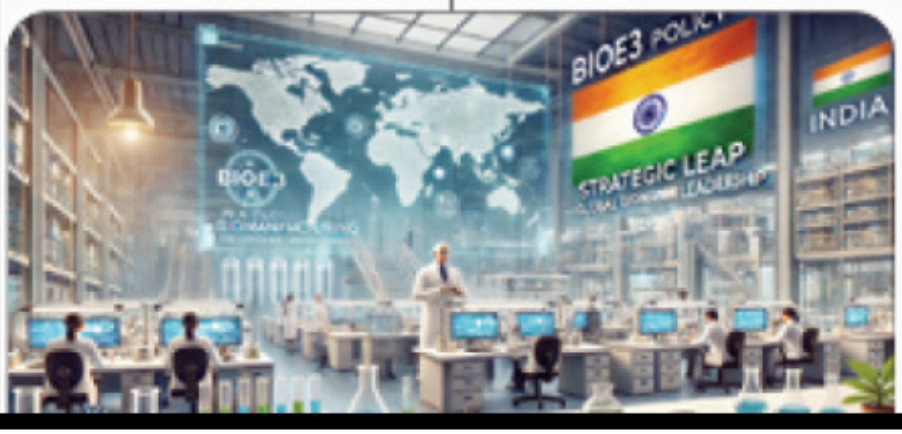

2. PRINT MEDIA COVERAGE

2.1 OP-ED ARTICLES

BioE3 Policy: Biotechnology for Economy, Environment and Employment

IN a landmark initiative with far reaching futuristic implications,the Union Cabinet headed by Prime Minister Narendra Modi has approved the BioE3 (Biotechnology for Economy, Employment and Environment) Policy of the Department of Biotechnology (DBT) to foster high-performance biomanufacturing for a clean, green, prosperous, and self-reliant Bharat. This will ensure for India a pioneering role in the global arena as one of the earliest torch-bearers of world's future economic growth.

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In addition, the BioE3 Policy will create novel solutionsfor fostering the growth of India'sbioeconomy, facilitating scale-up and commercialisation of bio-based products; reducing, reusing, and recycling waste materials; expanding India's cohort of a highly skilled workforce; driving a surge in job creation; and intensifying entrepreneurial momentum. Salient features of the Policy include: 1) Encouragement emphasis on ethical & biosafety consideration; 4) Harmonizing regulatory reforms with global standards.

India has demonstrated strong economic growth in the past decade and has tremendous potential to be amongst the global leaders of the 4th industrial revolution.Our bioeconomy has grown 13 folds from $10 billion in 2014 to over $130 billion in 2024. It isfurther expected to reach a market value of $300 billion by 2030. The implementation of BioE3 Policy across diverse sectors is likely to further boost the country's bioeconomy, while promoting 'Green Growth'.The foundation for this will be laid by leveraging emerging ties that catalyze the production, development, and commercialization of bio-based products through advanced manufacturing technologies, and collaborative efforts.Thiswill create a community where resources, expertise, and technology can be shared to drive scalability, sustainability, and innovation of biomanufacturing processes.Thesebiomanufacturinghubs will bridge the gap between 'lab-to-pilot' and 'pre-commercial scale' manufacturing of bio-based products. Start-ups will play a pivotal role in this process by bringing and developing novel ideas and feedingthem into small and medium-sized enterprises (SMEs) and established manufacturers.

a focal point for encouragingand incentivizing the integration of AI in researchand development. These Bio-AI hubs will provide biotechnological expertise, cutting-edge infrastructure, and logistical support for the integration, storage, and analysis of large-scale biological data using AI and machine learning. Making these resources accessible to experts from various disciplines (biology, epidemiology,computer science, engineering, data science, for example.)willfacilitate the creation of innovative bio-based end products - be it a new variety of gene therapy, or a new food processing alternative.

Through these coordinated initiatives, the BioE3 pol-

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2.1 OP-ED ARTICLES

Biotechnology for Economy, Environment and Employment

This policy will serve as a benchmark that highlight show an effective science policy can actively contribute towards nation-building and development

DR. JITENDRA SINGH

In a landmark initiative with far reaching futuristic implications, the Union Cabinet headed by Prime Minister Narendra Modi has approved the BioE3 (Biotechnology for Economy, Employment and Environment) Policy of the Department of Biotechnology (DBT) to foster high-performance biomanufacturing for a clean, green, prosperous, and self-reliant Bharat. This will ensure for India a pioneering role in the global arena as one of the earliest torch-bearers of world's future economic growth.

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BioE3 Policy: Biotechnology for Economy, Environment and Employment

Dr. Jitendra Singh
Minister of State (I/C) Science and Technology

In a landmark initiative with far reaching futuristic implications, the Union Cabinet headed by Prime Minister Narendra Modi has approved the BioE3 (Biotechnology for Economy, Employment and Environment) Policy of the Department of Biotechnology (DBT)

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Biofoundry refers to the creation of advanced clusters for making biological engineering processes scalable - from the initial design and testing stages to pilot and pre-commercial production. Large-scale manufacturing of mRNA-based vaccines and proteins for a wide variety of applications aresome appreciable examples for which biofoundries could be valuable. These clusterswill specialize in designing, constructing, and testing biological systems and organisms using standardized and automated processes.

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BioE3 Policy: Biotechnology for Economy, Environment and Employment

Dr Jitendra Singh

In a landmark initiative with far reaching futuristic implications, the Union Cabinet headed by Prime Minister Narendra Modi has approved the BioE3 (Biotechnology for Economy, Employment and Environment) Policy of the Department of Biotechnology (DBT) to foster high-performance biomanufacturing for a clean, green, prosperous, and self-reliant Bharat. This will ensure for India a pioneering role in the global arena as one of the earliest torch-bearers of world's future economic growth.

The unsustainable pattern of material consumption, excessive resource utilization and waste generation have led to global cataclysms such as forest fires, melting glaciers, and declining biodiversity. Keeping in view the national priority of steering India on the path of accelerated 'Green Growth', the integrated BioE3 (Biotechnology for Economy, Environment and Employment) Policy is a positive and decisive step towards sustainable growth in the challenging backdrop of climate change, depleting non-renewable resources and unsustainable waste generation. A major aim of this policy is to stimulate the transition of chemical-based industries to more sustainable bio-based industrial models. It will also promote a circular bioeconomy and provide an impetus to achieving net-zero carbon emissions by encouraging the utilization of waste from biomass, landfills, green house gases, etc. by microbial cell factories to produce bio-based products.

In addition, the BioE3 Policy will create novel solutions for fostering the growth of India's bio economy, facilitating scale-up and commercialisation of bio-based products; reducing, reusing, and recycling waste materials; expanding India's cohort of a highly skilled work force; driving a surge in job creation; and intensifying entrepreneurial momentum. Salient features of the Policy include: 1) Encouragement and support to indigenous research and development-focused entrepreneurship across thematic sectors such as high-value bio-based chemicals, biopolymers & enzymes; smart proteins & functional foods; precision biotherapeutics; climate resilient agriculture; carbon capture and its utilization; and marine and space research; 2) Acceleration of technology development & commercialization by establishing bio manufacturing facilities, bio foundry clusters, and bio-artificial intelligence (Bio-AI) hubs; 3) Prioritizing regenerative models of economic growth and job creation with an emphasis on ethical & biosafety consideration; 4) Harmonizing regulatory reforms with global standards.

India has demonstrated strong economic growth in the past decade and has tremendous potential to be amongst the global leaders of the 4th industrial revolution. Our bioeconomy has grown 13 folds from $10 billion in 2014 to over $130 billion in 2024. It is further expected to reach a market value of $300 billion by 2030. The implementation of BioE3 Policy across diverse sectors is likely to further boost the country's bioeconomy, while promoting 'Green Growth'. The foundation for this will be laid by leveraging emerging technologies and innovations that result from nurturing the country's high-performance bio manufacturing initiatives. Bio manufacturing is primed to become an important pillar of the

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'Make in India' initiative and will provide a transformative approach to meet the demands of 21st century. As a multi disciplinary endeavour, it has the power to unlock the potential of microbes, plants and animal cells including human cells to develop bio-based products cost-effectively with a minimal carbon footprint.

It is envisioned that biomanufacturing hubs will serve as centralized facilities that catalyze the production, development and commercialization of bio-based products through advanced manufacturing technologies and collaborative efforts. This will create a community where resources, expertise and technology can be shared to drive scalability, sustainability and innovation of bio manufacturing processes. These biomanufacturing hubs will bridge the gap between 'lab-to-pilot' and 'pre-commercial scale' manufacturing of bio-based products. Start-ups will play a pivotal role in this process by bringing and developing novel ideas and feeding them into small and medium-sized enterprises (SMEs) and established manufacturers.

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Through these coordinated initiatives, the BioE3 policy will bring a surge in employment, particularly in tier-II and tier-III cities, where bio manufacturing hubs are proposed to be set up due to their proximity to biomass sources. By investing in India's economy, environment, and employment, this comprehensive policy will contribute towards the nation's sankalp of 'Viksit Bharat'.

(The author is Minister of State (IC) Science and Technology)

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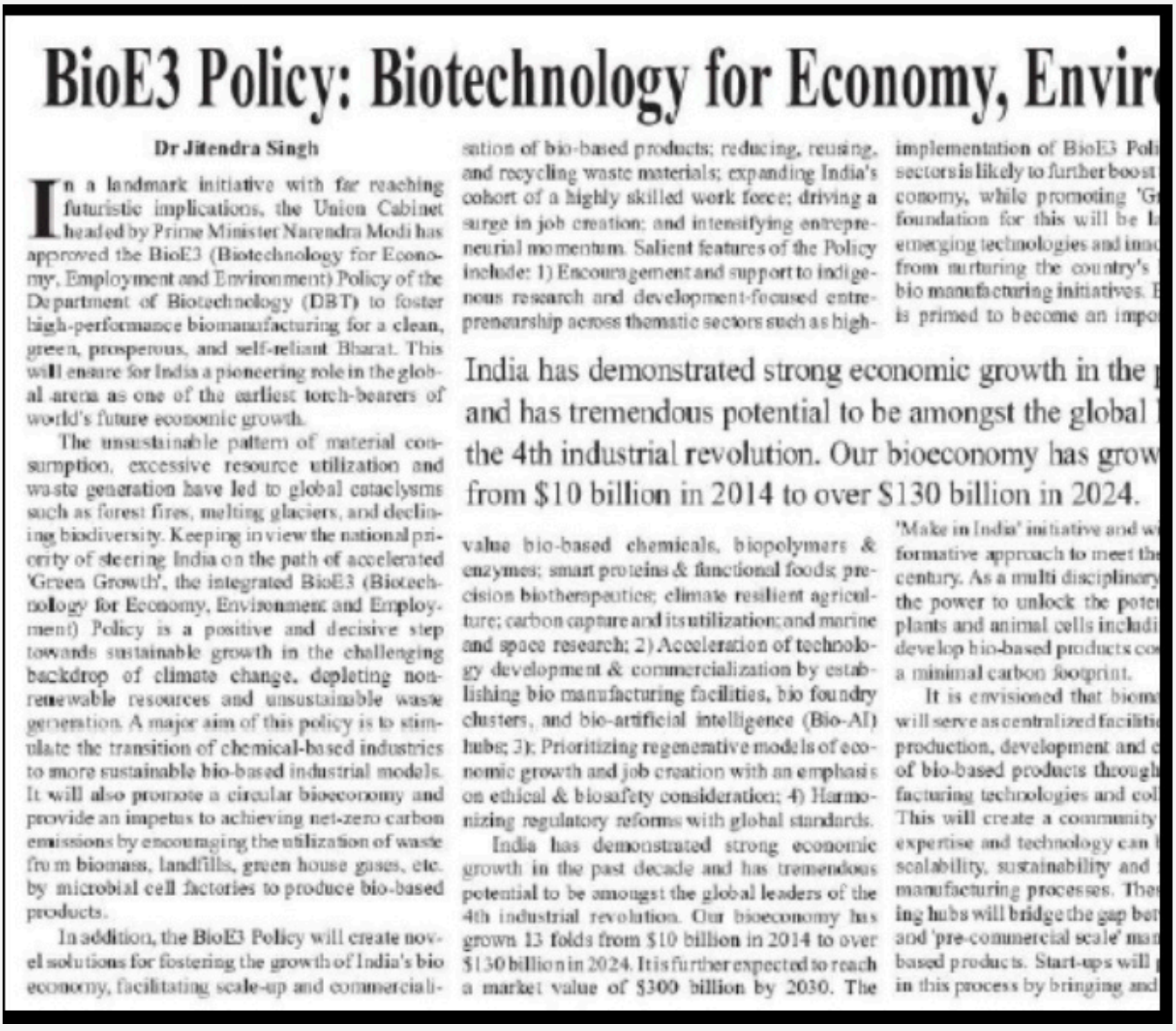

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2.1 OP-ED ARTICLES

ڈاکٹر جتیندر سنگھ

بائیو ای 3 - پالیسی: معیشت

ماحولیات اور روزگار کے لئے بائیو ٹیکنالوجی

2. PRINT MEDIA COVERAGE

2.1 OP-ED ARTICLES

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بائیو ای3- پالیسی:

معیشت، ماحولیات اور روزگار کے لئیبائیوٹیکنالوجی

۱۰ اکتوبر (جتیندر سنگھ، وزیر مملکت (آزاد انہ چارج) برائے سائنس اور ٹیکنالوجی

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بائیوای -3 پالیسی: معیشت،

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معیشت، ماحولیات اور روزگار کے لئے بائیوٹیکنالوجی

اظہار خیال

ڈاکٹر جیندر سنگھ

Cabinet Approves BioE3 Policy

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2.1 OP-ED ARTICLES

بائیوای-3 پالیسی : معیشت،ماحولیات اورروزگار کے لئے بائیوٹیکنالوجی

ڈاکٹر جتیندر سنگھ، وزیر مملکت (آزادانہ چارج) برائے سائنس اور ٹیکنالوجی

مستقبل کے دور رس مقاصد کے ساتھ ایک جرأتمندانہ اقدام میں، وزیر اعظم نریندر مودی کی زیر قیادت مرکزی کابینہ نے صاف ستھری، آلودگی سے پاک، خوشحال اور خود کفیل بھارت کے لیے اعلیٰ کارکردگی والی بایو مینوفیکچرنگ کو فروغ دینے کے لیے، بایوٹیکنالوجی کے محکمہ (ڈی بی ٹی) کی بائیوای - 3 (معیشت، روزگار اور ماحولیات کے لیے بایو ٹیکنالوجی) پالیسی کو منظوری دے دی ہے۔ یہ پالیسی منظرنامے میں، ہندوستان کے لیے ایک اہم کردار ... مستقبل کی اقتصادی ترقی کے ...

2. PRINT MEDIA COVERAGE

2.1 OP-ED ARTICLES

بائیوای-3 پالیسی: معیشت، ماحولیات اور روزگار

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مستقبل کے دوررس مقاصد کے ساتھ ایک تاریخی اقدام میں، وزیر اعظم نریندر مودی کی زیر قیادت مرکزی کابینہ نے صاف ستھری، آلودگی سے پاک، خوشحال اور خود کفیل بھارت کے لیے اعلیٰ کارکردگی والی بائیو مینوفیکچرنگ کو فروغ دینے کے لیے، بائیوٹکنالوجی کے محکمہ (ڈی بی ٹی) کی بائیوای-3 (معیشت، روزگار اور ماحولیات کے لیے بائیو ٹیکنالوجی) پالیسی کو منظوری دے دی ہے۔ یہ عالمی منظر نامہ میں، ہندوستان کے لیے ایک اہم کردار کو یقینی بنائے گا، جو دنیا کی مستقبل کی اقتصادی ترقی کے ابتدائی محرکین بردواروں میں سے ایک ہے۔

ماری کھپت کے غیر پائیدار انداز، وسائل کے بے تحاشا استعمال اور فضلہ کی پیداوار، جنگل میں آگ، گلیشیر پگھلنے اور حیاتیاتی تنوع میں کمی ہونے جیسے عالمی آفات کا باعث بنی ہے۔ ہندوستان کو تیز رفتار 'سبز ترقی' کی راہ پر گامزن کرنے کی قومی ترجیح کو مدنظر رکھتے ہوئے، مربوط بائیوای-3 (معیشت، ماحولیات اور روزگار کے لئے بائیو ٹیکنالوجی) پالیسی، آب و ہوا کی تبدیلی کی چنوتی کے پس منظر میں، پائیدار ترقی کی جانب ایک مثبت اور فیصلہ کن قدم ہے، جو غیر قابل تجدید وسائل کی کمی، اور غیر پائیدار فضلہ وضع ہونے میں کمی کرے گی۔ اس پالیسی کا ایک بڑا مقصد کیمیکل پر مبنی صنعتوں کی زیادہ پائیدار بائیو پر مبنی صحتی ماڈلز کی طرف منتقلی کو تحریک دینا ہے۔ یہ ایک مدور بائیو معیشت کو بھی فروغ دے گی اور بائیو ماس، لینڈ فلز، گرین ہاؤس گیسوں وغیرہ سے بائیو پر مبنی مصنوعات تیار کرنے کے لیے، مائیکروبیل سیل فیکٹریوں کے قضلے کے استعمال کی حوصلہ افزائی کرکے، خالص صفر کاربن کے اخراج کو حاصل کرنے کے لیے ایک تحریک فراہم کرے گی۔

ہوئے، ملک کی بایو معیشت کو مزید فروغ حاصل ہونے کا امکان ہے۔ اس کی بنیاد، ابھرتی ہوئی ٹیکنالوجیوں اور اختراعات کا فائدہ اٹھا کر رکھی جائے گی، جس کے نتیجے میں ملک کے اعلیٰ کارکردگی والے بایو مینوفیکچرنگ اقدامات کی پرورش ہوگی۔ بائیو مینوفیکچرنگ کو ممیک ان انڈیا پہل کا ایک اہم ستون بننے کا مقصد رکھا گیا ہے اور یہ 21ویں صدی کے تقاضوں کو پورا کرنے کے لیے، ایک تبدیلی کا طریقہ کار فراہم کرے گا۔ ایک کثیر الشعبہ کوشش کے طور پر، اس میں جڑی بوٹیوں، پودوں اور حیوانی خلیوں کی صلاحیت کو ظاہر کرنے کی طاقت ہے، جس میں انسانی خلیات بھی شامل ہیں، تاکہ کم سے کم کاربن فوٹ پرنٹ کے ہمراہ، کم سے کم لاگت کے ساتھ بائیو پر مبنی مصنوعات تیار کی جا سکیں۔ یہ تصور کیا جاتا ہے کہ بائیو مینوفیکچرنگ کے مراکز، مرکزی سہولیات کے طور پر کام کریں گے، جو جدید مینوفیکچرنگ ٹیکنالوجیوں اور باہمی تعاون کے ذریعے بائیو پر مبنی مصنوعات کی پیداوار، ترقی اور کمرشلائزیشن کو متحرک کرتے ہیں۔ یہ بائیو مینوفیکچرنگ مراکز اسکیل اپ صلاحیت، پائیداری، اور بائیو مینوفیکچرنگ کے عمل کی جدت، لیب سے پائلٹ اور پری کمرشل پیمانے پر بائیو پر مبنی مصنوعات کی مینوفیکچرنگ کے درمیان فرق کو پُر کریں گے۔ اسٹارٹ اپس نئے آئیڈیاز لا کر اور ان کو چھوٹے اور درمیانے درجے کے کاروباری اداروں (ایس ایم ایز) اور قائم شدہ مینوفیکچررز میں مدد دے کر، اس عمل میں ایک اہم کردار ادا کریں گے۔

بائیو فاؤنڈری سے مراد- ابتدائی ڈیزائن اور جانچ کے مراحل سے لے کر پائلٹ اور پری کمرشل پروڈکشن تک- حیاتیاتی انجینئرنگ کے عمل کو قابل توسیع بنانے کے لیے جدید کلسٹرز کی

2. PRINT MEDIA COVERAGE

2.1 OP-ED ARTICLES

وای-3 پالیسی: معیشت، ماحولیات اور روزگار کے لئے بائیوٹیکنالوجی

ڈاکٹر جتیندر سنگھ، وزیر مملکت (آزاد اسٹ چارج) برائے سائنس اور ٹیکنالوجی

2. PRINT MEDIA COVERAGE

2.1 OP-ED ARTICLES

بائیوای3-پالیسی: معیشت، ماحولیات اور روزگار کے لئے بائیوٹیکنالوجی

BioE3 POLICY

HERALDING A NEW ERA OF BIO REVOLUTION...

FOCUS AREAS OF THE POLICY

Facilitating shift from chemical based industries to sustainable bio-based models

Promoting a circular Bio economy

Achieving net zero carbon emissions

India's bio economy has skyrocketed from $10 billion in 2014 to over $130 billion in 2024, with projections to reach $300 billion by 2030

NET ZERO

2. PRINT MEDIA COVERAGE

2.1 OP-ED ARTICLES

بائیوای-3 پالیسی:

معیشت، ماحولیات اور روزگار کیلئے بائیوٹیکنالوجی

ڈاکٹر جتیندر سنگھ

وزیر مملکت (آزادانہ چارج)
برائے سائنس اور ٹیکنالوجی

مستقبل کے دور رس مقاصد کے ساتھ ایک تاریخی اقدام میں، وزیر اعظم نریندر مودی کی زیر قیادت مرکزی کابینہ نے صاف ستھری، آلودگی سے پاک، خوشحال اور خود کفیل بھارت کے لیے اہل کار کردگی والی بائیو مینوفیکچرنگ کو فروغ دینے کے لیے بائیوٹیکنالوجی کے محکمہ (ڈی بی ٹی) کی بائیو ای-3 (معیشت، روزگار اور ماحولیات کے لیے بائیو ٹیکنالوجی) پالیسی کو منظوری دے دی ہے۔ یہ حالی منظور نامہ میں، ہندوستان کے لیے ایک دہم کردار کو تشکیل دیا ہے گا، جو دنیا کی مستقبل کی اقتصادی ترقی کے ابتدائی محرک

بائیو فاؤنڈری، اور بائیو مینوفیکچرنگ کے عمل کی جدت، لیب سے پائلٹ اور پری کمرشل پیمانے پر بائیو پراسیس معلومات کی مینوفیکچرنگ کے درمیان فرق کو پر کریں گے۔ اسٹارٹ اپس سے آئیڈیاز لانا کر اور ان کو چھوٹے اور درمیانے درجے کے کاروباری اداروں (ایس ایم ایز) اور قائم شدہ مینوفیکچررز میں مدد دے کر، اس عمل میں ایک اہم کردار ادا کریں گے۔

بائیو فاؤنڈری سے مراد- ابتدائی ڈیزائن اور جانچ کے مراحل سے لے کر پائلٹ اور پری کمرشل پروڈکشن تک- حیاتیاتی انجینئرنگ کے عمل کو قابل توسیع بنانے کے لیے جدید انفراسٹرکچر کی تشکیل کرنا ہے۔ قابل پیمائش پراڈکٹ کے لیے اہم آر این اے پر مبنی ویکسین اور پروٹین کی بڑے پیمانے پر تیاری، اس کی قابل تعریف مثالیں ہیں جن کے لیے بائیو فاؤنڈری قابل قدر ہو سکتی ہے۔ یہ انفراسٹرکچر معیاری اور خودکار عمل کا استعمال کرتے ہوئے حیاتیاتی نظاموں اور جانداروں کی ڈیزائننگ، تعمیر اور جانچ میں مہارت حاصل کریں گے۔

بائیو-اے آئی مراکز، تحقیق اور ترقی میں متعلقہ ایپلیکیشنز کے انضمام کی حوصلہ افزائی اور ترغیب دینے کے لیے، ایک

ریشہ کو بڑھانے اور تجارتی پیمانے پر نقطہ مواد کو کم کرنے، دوبارہ استعمال کرنے اور ری سائیکل کرنے؛ ایک انتہائی بھرپور افرادی قوت کے ہندوستان کے سلسلے کو بڑھانے؛

13 گنا بڑھ کر 2024 میں 130 ارب ڈالر بائیو معیشت تک پہنچ گئی ہے۔ اس کے 2030 تک 300 ارب ڈالر کی مارکیٹ ویلیو حاصل کرنے کی توقع ہے۔ متوقع فائدہ میں

2. PRINT MEDIA COVERAGE

2.1 OP-ED ARTICLES

BioE3 Policy: Biotechnology for Economy, Environment and Employment

In a landmark initiative with far reaching futuristic implications, the Union Cabinet headed by Prime Minister Narendra Modi has approved the BioE3 (Biotechnology for Economy, Employment and Environment) Policy of the Department of Biotechnology (DBT) to foster high-performance biomanufacturing for a clean, green, prosperous, and self-reliant Bharat. This will ensure for India a pioneering role in the global arena as one of the earliest torch-bearers of world's future economic growth.

The unsustainable pattern of material consumption, excessive resource utilization and waste generation have led to global cataclysms such as forest fires, melting glaciers, and declining biodiversity.Keeping in view the national priority of steering India on the path of accelerated 'Green Growth', the integrated BioE3 (Biotechnology for Economy, Environment and Employment) Policy is a pos-

"Biomanufacturing is primed to become an important pillar of the 'Make in India' initiative and will provide a transformative approach to meet the demands of 21st century. As a multidisciplinary endeavour, it has the power to unlock the potential of microbes, plants, and animal cells including human cells to develop bio-based products cost-effec-

2. PRINT MEDIA COVERAGE

2.1 OP-ED ARTICLES

बायोई3 नीतिः अर्थव्यवस्था, पर्यावरण और रोजगार के लिए जैव प्रौद्योगिकी

दूरगामी प्रभाव वाली एक ऐतिहासिक पहल के रूप में, प्रधानमंत्री नरेन्द्र मोदी की अध्यक्षता में केंद्रीय मंत्रिमंडल ने जैव प्रौद्योगिकी विभाग (डीबीटी) की बायोई3 (अर्थव्यवस्था, रोजगार और पर्यावरण के लिए जैव प्रौद्योगिकी) नीति को मंजूरी दे दी है। इस नीति का उद्देश्य स्वच्छ, हरित, समृद्ध और आत्मनिर्भर भारत के लिए उच्च प्रदर्शन वाले जैव विनिर्माण को बढ़ावा देना है। यह नीति पूरी दुनिया के भविष्य के आर्थिक विकास के शुरुआती मार्गदर्शकों में से एक के रूप में भारत के लिए वैश्विक परिदृश्य में अग्रणी भूमिका सुनिश्चित करेगी।

भौतिक उपभोग, अत्यधिक संसाधन उपयोग और अपशिष्ट उत्पादन के असंवहनीय प्रारूप ने विभिन्न वैश्विक आपदाओं को जन्म दिया है, जैसे जंगल की आग, ग्लेशियरों का पिघलना और जैव विविधता में कमी आदि। भारत को हरित विकासके पथ पर तेजी से आगे बढ़ने की सुविधा प्रदान करने; अपशिष्ट पदार्थों की मात्रा कम करने, इनका पुनः उपयोग और पुनर्चक्रण करने; भारत के अत्यधिक कुशल कार्यबल के समूह का विस्तार करने; रोजगार सृजन में तेजी लाने तथा उद्यमिता की गति को तेज करने के लिए अभिनव समाधान तैयार करेगी। नीति की प्रमुख विशेषताओं में शामिल हैं- 1) उच्च मूल्य वाले जैव-आधारित रसायन, बायोपॉलिमर और एंजाइम; स्मार्ट प्रोटीन और फंक्शनल फूड; सटीक जैव चिकित्सा; जलवायु अनुकूल कृषि; कार्बन स्तर में कमी और इसका उपयोग; तथा समुद्री एवं अंतरिक्ष अनुसंधान जैसे विषयगत क्षेत्रों में स्वदेशी अनुसंधान और विकास-केंद्रित उद्यमिता को प्रोत्साहन और समर्थन; 2) जैव विनिर्माण सुविधाएं, जैव फाउंड्री क्लस्टर और जैव-कृषि पहलों को बढ़ावा देने से उभरती प्रौद्योगिकियां और नवाचार सामने आयेंगे, जिनका लाभ उठाते हुए जैव अर्थव्यवस्था की आधारशिला रखी जाएगी। जैव विनिर्माण मेक इन इंडिया पहल का एक महत्वपूर्ण स्तंभ बनने के लिए तैयार है और यह 21वीं सदी की मांगों को पूरा करने के लिए एक परिवर्तनकारी दृष्टिकोण प्रदान करेगा। एक बहु-विषयक प्रयास के रूप में, इसमें मानव कोशिकाओं सहित सूक्ष्मजीवों, पौधों और पशु कोशिकाओं की क्षमता को उजागर करने की शक्ति है, ताकि न्यूनतम कार्बन उत्सर्जन के साथ लागत प्रभावी तरीके से जैव-आधारित उत्पाद विकसित किए जा सकें।

डा.जितेंद्र सिंह

यह परिकल्पना की गई है कि जैव-विनिर्माण हब केंद्रीकृत सुविधाओं के रूप में काम करेंगे, जो उन्नत विनिर्माण प्रौद्योगिकियों और तक - तैयार किया जा सके। विभिन्न प्रकार के अनुप्रयोगों के लिए एमआरएनए-आधारित टीकों और प्रोटीन का बड़े पैमाने पर निर्माण कुछ सराहनीय उदाहरण है, जिनके लिए बायोफाउंड्री मूल्यवान हो सकती हैं। ये क्लस्टर मानकीकृत और स्वचालित प्रक्रियाओं का उपयोग करके जैविक प्रणालियों और जीवों के डिजाइन, निर्माण एवं परीक्षण में विशेषज्ञता प्राप्त करेंगे। बायो-एआई हब अनुसंधान एवं विकास में एआई के एकीकरण को प्रोत्साहित करने और प्रोत्साहन प्रदान करने के लिए एक केंद्र बिंदु के रूप में काम करेंगे। एआई और मशीन लर्निंग का उपयोग करके, ये बायो-एआई हब बड़े पैमाने पर जैविक डेटा के एकीकरण, भंडारण और विश्लेषण के लिए जैव प्रौद्योगिकी विशेषज्ञता, अत्याधुनिक अवसंरचना और लॉजिस्टिक्स सहायता प्रदान करेंगे। विभिन्न विषयों (उदाहरण के लिए जीव विज्ञान, महासागरीय विज्ञान, कंप्यूटर

2. PRINT MEDIA COVERAGE

2.1 OP-ED ARTICLES

ਆਰਥਿਕਤਾ, ਵਾਤਾਵਰਣ ਅਤੇ ਰੋਜ਼ਗਾਰ ਲਈ ਬਾਇਓ-ਟੈਕਨਾਲੋਜੀ

ਦੂਰਗਾਮੀ ਪੰਜਾਬ ਵਰਗੀ ਇਕ ਵਿਭਿੰਨਤਾ ਪੱਖੀਕਰਨਮੁਖੀ ਕਿਰਤ ਪ੍ਰਧਾਨ ਮੰਡਲੀ ਨਰਿੰਦਰ ਮੋਦੀ ਦੀ ਪ੍ਰਧਾਨਗੀ ਵਿਚ ਕੇਂਦਰੀ ਮੰਤਰੀ ਮੰਡਲ ਨੇ ਬਾਇਓ-ਟੈਕਨਾਲੋਜੀ ਵਿਕਾਸ (ਡੀ. ਬੀ. ਟੀ.) ਦੇ ਬਾਇਓਟੈਕਨਾਲੋਜੀ (ਆਰਥਿਕਤਾ, ਵਾਤਾਵਰਣ ਅਤੇ ਰੋਜ਼ਗਾਰ ਲਈ ਬਾਇਓਟੈਕਨਾਲੋਜੀ) ਨੀਤੀ ਨੂੰ ਮਨਜ਼ੂਰੀ ਦੇ ਦਿੱਤੀ ਹੈ।

ਨੀਤੀ ਦਾ ਉਦੇਸ਼ ਸਵੱਛ, ਹਰਿਆ-ਭਰਿਆ, ਖੁਸ਼ਹਾਲ ਅਤੇ ਸਭੇ-ਨਿਰਯਤ ਭਾਰਤ ਲਈ ਉਦਯ-ਪ੍ਰਵਰਤਨ ਵਾਲੇ ਬਾਇਓ-ਨਿਊਫੈਕਚਰਿੰਗ ਨੂੰ ਉਤਸ਼ਾਹਿਤ ਕਰਨਾ ਹੈ। ਇਹ ਨੀਤੀ ਵਿਸ਼ਵ ਤਰ ਵਿਚ ਡਿੱਚੀਂਦੀ ਆਰਥਿਕ ਵਿਕਾਸ ਦੇ ਸੁਖਮਣੀ ਮਾਰਕਸਵਾਰਥਾ ਵਿਚੋਂ ਇਕ ਬਨੇ ਵਿਸ਼ਵ ਵੰਨਤ ਵਿਚ ਭਾਰਤ ਲਈ ਇਕ ਮੋਹਰੀ ਭੂਮਿਕਾ ਨੂੰ ਯਕੀਨੀ ਬਣਾਵੇਗੀ।

ਸਮੇਂਕਰੀ ਦੀ ਖਪਤ, ਬਹੁਤ ਗਿਆਨਾ ਸ਼ਰੋਤਾਂ ਦੀ ਵਰਤੋਂ ਅਤੇ ਰਹਿੰਦ-ਖੂੰਹਦ ਦੀ ਪੈਦਾਵਾਰ ਦੇ ਅਨੁਕੂਲਿਤ ਪੈਟਰਨ ਨੇ ਵੱਖ-ਵੱਖ ਤਕਨੀਕੀ ਅੜਚਣਾਂ ਨੂੰ ਜਨਮ ਦਿੱਤਾ ਹੈ, ਜਿਵੇਂ ਕਿ ਜੈਵਾਲ ਦੀ ਘੱਟ, ਗਲੋਬੋਮਾਰਾਂ ਦਾ ਪਿਘਲਣਾ ਅਤੇ ਜੈਵ ਵਿਭਿੰਨਤਾ ਦਾ ਨੁਕਸਾਨ ਆਦਿ।

ਭਾਰਤ ਨੂੰ 'ਹਰੇ ਵਿਕਾਸ' ਦੇ ਰਾਹ 'ਤੇ ਤੇਜ਼ੀ ਨਾਲ ਅੱਗੇ ਵਧਣ ਦੀ ਵਾਸਤਵੀ ਜ਼ਰੂਰਤ ਨੂੰ ਮਿਆਰ ਵਿਚ ਲੈਂਦੇ ਹੋਏ ਕੇਂਦਰੀ ਬਾਇਓ ਦੀ 3 (ਆਰਥਿਕਤਾ, ਵਾਤਾਵਰਣ ਅਤੇ ਰੋਜ਼ਗਾਰ ਲਈ ਬਾਇਓਟੈਕਨਾਲੋਜੀ) ਨੀਤੀ ਜਲਵਾਯੂ ਤਬਦੀਲੀ , ਘਟਦੇ ਜੈਵ-ਨਵਿਆਊਣਯੋਗ ਸਰੋਤ ਅਤੇ ਅਸਥਿਰ ਰਹਿੰਦ-ਖੂੰਹਦ ਉਤਪਾਦਨ ਦੀ ਚੁਣੌਤੀਪੂਰਨ ਪਿਠਭੂਮੀ ਵਿਚ, ਟਿਕਾਊ ਵਿਕਾਸ ਵੱਲ ਇਕ ਸਕਾਰਾਤਮਕ ਅਤੇ ਨਿਰਣਾਇਕ ਕਦਮ ਹੈ। ਇਸ ਨੀਤੀ ਦਾ ਮੁੱਖ ਉਦੇਸ਼ ਰਸਾਇਣ ਆਧਾਰਿਤ ਉਦਯੋਗਾਂ ਨੂੰ ਬਾਯੋਰੇ ਟਿਕਾਊ ਬਾਇਓ-ਆਧਾਰਿਤ ਉਦਯੋਗਿਕ ਮਾਡਲ ਵਿਚ ਬਦਲਣਾ ਹੈ।

ਇਹ ਸਰਬਮੁਖ ਬਾਇਓ-ਇਕਾਨਮੀ ਨੂੰ ਵੀ ਉਤਸ਼ਾਹਿਤ ਕਰੇਗਾ ਜਾ ਸੋ ਉੱਚ-ਕੀਤੇ ਕਾਰਬਨ ਨਿਕਾਸ ਦੇ ਟੀਚੇ ਨੂੰ ਪ੍ਰਾਪਤ ਕੀਤਾ ਜਾ ਸਕੇ। ਇਸ ਦੇ ਲਈ ਇਹ ਬਾਇਓ-ਆਧਾਰਿਤ ਉਤਪਾਦਾਂ ਦੇ ਉਤਪਾਦਨ ਲਈ ਮਾਈਕ੍ਰੋਬਾਇਲ ਸੈੱਲ ਫੈਕਟਰੀਆਂ ਦੁਆਰਾ ਬਾਇਓਮਾਸ, ਸੈਲੂਲਿਕ, ਗ੍ਰੀਨ ਹਾਈਡ੍ਰੋਜਨਾਂ ਵਰਗੇ ਕੁਸ਼ੇਦੀ ਵਰਤੋਂ ਨੂੰ ਉਤਸ਼ਾਹਿਤ ਕਰੇਗਾ।

ਇਸ ਤੋਂ ਇਲਾਵਾ, ਬਾਇਓ ਈ-3 ਨੀਤੀ ਭਾਰਤ ਦੀ ਬਾਇਓ-ਆਰਥਿਕਤਾ ਦੇ ਵਿਕਾਸ ਨੂੰ ਉਤਸ਼ਾਹਿਤ ਕਰਨ, ਪੈਮਾਨੇ ਦਾ ਵਿਸਥਾਰ ਕਰਨ ਅਤੇ ਬਾਇਓ-ਆਧਾਰਿਤ

ਡਾ. ਜਤਿੰਦਰ ਸਿੰਘ

ਉਤਪਾਦਾਂ ਦੇ ਵਪਾਰੀਕਰਨ ਦੀ ਸਹੂਲਤ ਦੇਣ,ਰਹਿੰਦ-ਖੂੰਹਦ ਸਮੇਤ ਨੂੰ ਘਟਾਉਣ, ਇਸ ਤਰੀ ਦੁਬਾਰਾ ਵਰਤੋਂ ਅਤੇ ਰੀਸਾਈਕਲਿੰਗ ਕਰਨ, ਭਾਰਤ ਦੇ ਉੱਚ ਹੁਨਰਮੰਦ ਕਰਮਚਾਰੀਆਂ ਦੇ ਪੂਲ ਦਾ ਵਿਸਥਾਰ ਕਰਨਾ ,ਰੋਜ਼ਗਾਰ ਪੈਦਾ ਕਰਨ ਅਤੇ ਉਦਮਤਾ ਦੀ ਕਤੀ ਨੂੰ ਤੇਜ਼ ਕਰਨ ਲਈ ਨਵੀਨਤਮਕਾਰੀ ਹੱਲ ਸਿਰਜ ਕਰੇਗੀ।

ਨੀਤੀ ਦੀਆਂ ਮੁੱਖ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ ਵਿਚ ਸ਼ਾਮਲ ਹਨ:

1) ਉੱਚ ਮੁੱਲ ਵਾਲੇ ਬਾਇਓ-ਆਧਾਰਤ ਰਸਾਇਣ, ਬਾਇਓਪੋਲੀਮਰ ਅਤੇ ਐਨਜ਼ਾਈਮ, ਸਮਾਰਟ ਪ੍ਰੋਟੀਨ ਅਤੇ ਫਾਰਮਾਸੀਉਟੀਕਲਜ਼ ਭੋਜਨ, ਉੱਚ ਬਾਇਓਐਕਟਿਵਜ਼, ਜਲਬਾਯੂ-ਅਨੁਕੂਲ ਖੇਤੀਬਾੜੀ ਵਰਤੋਂ , ਜਰਤ ਅਤੇ ਪਲਾਸ਼ ਫੈਸ ਵਰਤੋਂ ਵਿਚ-ਚਾਰੂ ਖੇਤਰਾਂ ਵਿਚ ਸਵਦੇਸ਼ੀ ਖੋਜ ਅਤੇ ਵਿਕਾਸ-ਕੇਂਦਰਿਤ ਉੱਦਮਤਾ ਨੂੰ ਉਤਸ਼ਾਹਿਤ ਅਤੇ ਸਸ਼ਕਤ ਕਰਨਾ, 2) ਬਾਇਓ-ਨਿਰਮਾਣ ਸੁਵਿਧਾਵਾਂ, ਬਾਇਓਫੈਕ ਪ੍ਰੋਡਕਟ ਕਲੱਸਟਰਾਂ' ਅਤੇ ਬਾਇਓ-ਅਰਥਨੀਤੀਆਂਕ ਰਿਟੇਨਟੈਸੈਸ (ਬਾਇਓ-ਏ ਆਈ) ਹੱਬਾਂ ਦੀ ਸਥਾਪਨਾ ਦੁਆਰਾ ਤਕਨਾਲੋਜੀ ਦੇ ਵਿਕਾਸ ਅਤੇ ਵਪਾਰੀਕਰਨ ਨੂੰ ਤੇਜ਼ ਕਰਨਾ, 3) ਨੌਕਿਰ ਅਤੇ ਜੀਵਨ-ਸੁਰੱਖਿਆ ਵਿਚਾਰਾਂ 'ਤੇ ਜੋਰ ਦੇ ਕੇ ਆਰਥਿਕ ਵਿਕਾਸ ਅਤੇ ਰੋਜ਼ਗਾਰ ਸਿਰਜਣ ਦੇ ਮੁਖ ਉਤਪਾਦਨ ਮਾਰਗਾਂ ਨੂੰ ਤਰਜੀਹ ਦੇਣਾ, 4) ਗਲੋਬਲ ਮਾਪਦੰਡਾਂ ਦੇ ਅਨੁਸਾਰ ਰੈਗੂਲੇਟਰੀ ਸੁਧਾਰਾਂ ਦਾ ਤਾਲਮੇਲ।

ਇਹ ਖਲਾਸਾ ਕੀਤੀ ਹੈ ਕਿ ਬਾਇਓਨਿਊ ਫੈਕਚਰਿੰਗ ਹੱਬ ਕੇਂਦਰੀਕ੍ਰਿਤ ਬੁਨਿਆਦੀ ਢਾਂਚੇ ਵਾਲੇ ਕੇਂਦਰ ਕਰਨਗੇ ਜੋ ਉੱਨਤ ਨਿਰਮਾਣ ਤਕਨੀਕਾਂ ਅਤੇ ਸਹਿਯੋਗੀ ਖੋਜ ਨੂੰ ਬਾਇਓ-ਆਧਾਰਿਤ ਉਤਪਾਦਾਂ ਦੇ ਉਤਪਾਦਨ, ਵਿਕਾਸ ਅਤੇ ਵਪਾਰੀਕਰਨ ਨੂੰ ਤੇਜ਼ ਕਰਨਗੇ। ਇਹ ਇਕ ਅਜਿਹਾ ਫਾਈਦਾਚਾਰ ਬਣਾਵੇਗਾ ਜਿੱਥੇ ਬਾਇਓ ਨਿਊ ਫੈਕਚਰਿੰਗ ਦੇ ਪੈਮਾਨੇ, ਸਹਿਜਤਾ ਅਤੇ ਲਾਗਤ ਨੂੰ ਉਤਸ਼ਾਹਿਤ ਕਰਨ ਲਈ ਮਰੋਜ਼,ਮੁਹਾਰਤ ਅਤੇ ਤਕਨਾਲੋਜੀ ਨੂੰ ਸਾਝਾ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।

ਇਹ ਬਾਇਓ ਨਿਊ ਫੈਕਚਰਿੰਗ ਹੱਬ ਬਾਇਓ-ਆਧਾਰਿਤ ਉਤਪਾਦਾਂ ਦੇ 'ਲੈਬ-ਟੂ-ਮਾਰਿਕਟ' ਅਤੇ 'ਪ੍ਰਯੋਗ-ਬਾਯਰਯ ਪੈਮਾਨੇ' ਦੇ ਨਿਰਮਾਣ ਵਿਚਕਾਰ ਪਾੜੇ ਨੂੰ ਪੂਰਾ ਕਰਨਗੇ। ਸਟਾਰਟ-ਅੱਪ ਨਵੀਨਤਮਕਾਰੀ ਵਿਚਾਰਾਂ ਨੂੰ ਲਿਆ ਕੇ ਅਤੇ ਵਿਕਸਤ ਕਰ ਕੇ ਅਤੇ ਉਨ੍ਹਾਂ ਨੂੰ ਛੋਟੇ ਅਤੇ ਮੱਧਮ ਆਕਾਰ ਦੇ ਉਦਯੋਗਾ (ਐਸ ਐਮ ਈ) ਵਿਚ ਬਦਲਣ ਅਤੇ ਸਥਾਪਿਤ ਨਿਰਮਾਤਾ ਬਣਨ ਵਿਚ ਮਦਦ ਕਰ ਕੇ ਇਸ ਪ੍ਰਕਿਰਿਆ ਵਿਚ ਇਕ ਮਹੱਤਵਪੂਰਨ ਭੂਮਿਕਾ ਨਿਭਾਉਣਗੇ।

ਏ ਆਈ. ਵਿਚ ਬਾਇਓ-ਏ ਆਈ ਹੱਬ ਖੇਤ ਅਤੇ ਵਿਕਾਸ ਦੇ ਸੰਗੋਕਰਨ ਲਈ ਉਤਸ਼ਾਹਿਤ ਕਰਨ ਲਈ ਇਕ ਏਕਲ ਪ੍ਰਮਾਣਿਤ ਥਲੇ ਕੰਮ ਕਰੇਗਾ। ਏ ਆਈ. ਅਤੇ ਮਸ਼ੀਨ ਲਰਨਿੰਗ ਦੀ ਵਰਤੋਂ ਕਰ ਕੇ ਇਹ ਬਾਇਓ-ਏ ਆਈ. ਹੱਬ ਬਾਇਓਇੰਫੋਮੈਟਿਕਸ ਮੁਹਾਰਤ, ਅਤਿ-ਆਧੁਨਿਕ ਬੁਨਿਆਦੀ ਢਾਂਚਾ ਅਤੇ ਵੱਡੇ ਪੈਮਾਨੇ ਦੇ ਜੈਵਿਕ ਡੇਟਾ ਦੇ ਏਕੀਕਰਨ, ਸਟੈਂਡਰਡ ਅਤੇ ਵਿਸ਼ਲੇਸ਼ਣ ਲਈ ਮਸ਼ੀਨ ਲਰਨਿੰਗ ਮਾਡਿਲਾਂ ਦਾ ਵਿਕਾਸ ਕਰੇਗਾ।

ਇਨ੍ਹਾਂ ਸਭੋਤਾਂ ਨੂੰ ਵੱਡੇ-ਵੱਡੇ ਵਿਭਿੰਨ ਮਿਆਰੀ ਕਿ ਮੌਲਿਕ-ਵਿਗਿਆਨ, ਮਸ਼ਾਨੀ ਵਿਗਿਆਨ , ਕੰਪਿਊਟਰ ਵਿਗਿਆਨ, ਇੰਜਨੀਅਰਿੰਗ, ਡੇਟਾ ਸਾਇੰਸ)ਦੇ ਮਾਹਿਰਾਂ ਲਈ ਪ੍ਰੋਫੈਸ਼ਨਲ ਬਣਾਉਣਾ,ਨਵੀਨਤਾਕਾਰੀ ਬਾਇਓ-ਆਧਾਰਿਤ ਅੰਤਿਮ ਉਤਪਾਦਾਂ ਦੇ ਵਿਕਾਸਣਾ ਦੀ ਸਹੂਲਤ ਦੇਵੇਗਾ ,ਤਾਕੀ ਇਹ ਇਕ ਨਵੀਨਿਕਸ ਦੀ ਖੋਜ ਬੋਰਡੀ ਹੋਵੇ ਜਾਂ ਇਕ ਨਵਾਂ ਦੁਖ ਪ੍ਰੋਸੈਸਿਕ ਸਥਲ ਹੋਵੇ।

ਰਾਯਰ ਦੀ ਅਰਥਿਕਤਾ, ਵਾਤਾਵਰਣ ਅਤੇ ਰੋਜ਼ਗਾਰ ਵਿਚ ਨਿਵੇਸ਼ ਕਰ ਕੇ ਇਹ ਵਿਭਾਗ ਨੀਤੀ ਭਾਰਤ ਦੇ 'ਵਿਕਸਿਤ ਭਾਰਤ' ਸਿਜਨ ਵਿਚ ਯੋਗਦਾਨ ਦੇਵੇਗੀ। ਇਹ ਨੀਤੀ ਇਕ ਮਾਪਦੰਡ ਵਜੋ ਕੰਮ ਕਰੇਗੀ ਅਤੇ ਇਹ ਦਰਸਾਵੇਗੀ ਕਿ ਇਕ ਪ੍ਰਗਤਸ਼ਾਲੀ ਵਿਗਿਆਨ ਨੀਤੀ ਭਾਰਤ ਨਿਰਮਾਣ ਅਤੇ ਵਿਕਾਸ ਵਿਚ ਸਹਭਾਗੀ ਨਾਲ ਯੋਗਦਾਨ ਪਾਸਕਦੀ ਹੈ।

ਲੇਖਕ ਕੇਂਦਰੀ ਵਿਗਿਆਨ ਅਤੇ ਤਕਨਾਲੋਜੀ ਰਾਜ ਮੰਤਰੀ (ਆਜ਼ਾਦ ਚਾਰਜ) ਹਨ।

2. PRINT MEDIA COVERAGE

2.1 OP-ED ARTICLES

अर्थव्यवस्था, पर्यावरण और रोजगार के लिए 'जैव प्रौद्योगिकी'

दूरगामी प्रभाव वाली एक ऐतिहासिक पहल के रूप में, प्रधानमंत्री नरेन्द्र मोदी की अध्यक्षता में केंद्रीय मंत्रिमंडल ने जैव प्रौद्योगिकी विभाग (डी.बी.टी.) की बायो ई.3 (अर्थव्यवस्था, रोजगार और पर्यावरण के लिए जैव प्रौद्योगिकी) नीति को मंजूरी दे दी है।

इस नीति का उद्देश्य स्वच्छ, हरित, समृद्ध और आत्मनिर्भर भारत के लिए उच्च प्रदर्शन वाले जैव विनिर्माण को बढ़ावा देना है। यह नीति पूरी दुनिया के भविष्य के आर्थिक विकास के शुरूआती मार्गदर्शकों में से एक के रूप में भारत के लिए वैश्विक परिदृश्य में अग्रणी भूमिका सुनिश्चित करेगी।

भौतिक उपभोग, आत्यधिक संसाधन उपयोग और अपशिष्ट उत्पादन के असंवहनीय प्रारूप ने विभिन्न वैश्विक आपदाओं को जन्म दिया है, जैसे जंगल की आग, ग्लेशियरों का पिघलना और जैव विविधता में कमी आदि।

भारत को 'हरित विकास' के मार्ग पर तेजी से आगे बढ़ाने की राष्ट्रीय प्राथमिकता को ध्यान में रखते हुए, एकीकृत बायो ई. (अर्थव्यवस्था, पर्यावरण और रोजगार के लिए जैव प्रौद्योगिकी) नीति जलवायु परिवर्तन, घटते गैर-नवीकरणीय संसाधनों और असंवहनीय अपशिष्ट उत्पादन की चुनौतीपूर्ण पृष्ठभूमि में, मानव विकास की दिशा में एक सकारात्मक और निर्णायक कदम है। इस नीति का एक प्रमुख उद्देश्य रासायन आधारित उद्योगों को अधिक स्थायी जैव-आधारित औद्योगिक मॉडल में परिवर्तित करना है।

यह चक्रीय जैव अर्थव्यवस्था को भी बढ़ावा देगा, ताकि पेट-जीरो कार्बन उत्सर्जन का लक्ष्य हासिल किया जा सके। इसके लिए यह जैव-आधारित उत्पादों के उत्पादन के लिए माइक्रोबियल सेल कारखानों द्वारा बायोमास, सिंथेटिक, ग्रीन हाउस गैसों जैसे अपशिष्ट के उपयोग को प्रोत्साहित करेगा।

इसके अलावा, बायो ई.3 नीति भारत को जैव अर्थव्यवस्था के विकास को बढ़ावा देने, जैव-आधारित उत्पादों के पैमाने का विस्तार करने और व्यवसायीकरण की सुविधा प्रदान करने; अपशिष्ट पदार्थों की मात्रा कम करने, इनका पुनः उपयोग और पुनर्चक्रण करने; भारत के

डा. जितेंद्र सिंह

आत्यधिक कुशल कार्यबल के समूह का विस्तार करने; रोजगार सृजन में तेजी लाने तथा उद्यमिता की गति को तेज करने के लिए अभिनव समाधान तैयार करेगी।

नीति की प्रमुख विशेषताओं में शामिल हैं :

1) उच्च मूल्य वाले जैव-आधारित रसायन, बायोपॉलिमर और एंजाइम, स्मार्ट प्रोटीन और संरक्षात्मक फूड; सटीक जैव चिकित्सा; जलवायु अनुकूल कृषि उपयोग; तथा ममुद्री एवं अंतरिक्ष अनुसंधान जैसे विषयगत क्षेत्रों में स्केटेशो अनुसंधान और विकास-केंद्रित गतिविधियों को प्रोत्साहन और सहयोग; 2) जैव विनिर्माण सुविधाएं, जैव फाउंड्री क्लस्टर और जैव-कृत्रिम बुद्धिमत्ता (बायो-ए.आई.) हब की स्थापना के जरिए प्रौद्योगिकी विकास और व्यावसायीकरण में तेजी; 3); वैश्विक और जैव सुरक्षा विचार पर जोर देते हुए, आर्थिक विकास और रोजगार सृजन के पुनरुत्पादन मॉडल को प्राथमिकता देना; 4) वैश्विक मानकों के अनुरूप नियामक सुधारों का सामंजस्य।

यह परिकल्पना की गई है कि जैव-विनिर्माण हब केंद्रीय सुविधाओं के रूप में काम करेंगे, जो उन्नत विनिर्माण प्रौद्योगिकियों और सहयोगी प्रयासों के माध्यम से जैव-आधारित उत्पादों के उत्पादन, विकास और व्यावसायीकरण को गति प्रदान करेंगे। इससे एक ऐसे समुदाय का निर्माण होगा, जहां जैव-विनिर्माण प्रक्रियाओं के पैमाने, स्थापित और नवाचार को बढ़ावा देने के लिए संसाधन, विशेषज्ञता और प्रौद्योगिकी साझा की जा सकती है।

ये जैव-विनिर्माण हब, 'जैव-आधारित उत्पादों की 'प्रयोगशाला-से-प्रारंभिक विनिर्माण' (लैब-टू-पायलट) और 'पूर्व-व्यावसायिक पैमाने' के विनिर्माण के बीच के अंतर को दूर करेंगे। स्टार्ट-अप इस प्रक्रिया में अभिनव विचारों को लाकर और विकसित करके तथा उन्हें लघु एवं मध्यम आकार के उद्यम (एस एम ई) बनाकर और स्थापित निर्माताओं के सहयोग करके महत्वपूर्ण भूमिका निभाएंगे।

बायो-ए.आई. हब अनुसंधान एवं विकास में ए.आई. के एकीकरण को प्रोत्साहित करने और प्रोत्साहन प्रदान करने के लिए एक केंद्र बिंदु के रूप में काम करेंगे। ए.आई. और मशीन लर्निंग का उपयोग करके, ये बायो-ए.आई. हब बड़े पैमाने पर जैविक डाटा के एकीकरण, भंडारण और विश्लेषण के लिए जैव प्रौद्योगिकी विशेषज्ञता, अत्याधुनिक अवसंरचना और एल्गोरिदम्स सहायता प्रदान करेंगे।

विभिन्न विषयों (उदाहरण के लिए, जीव विज्ञान, महासागरीय विज्ञान, कम्प्यूटर विज्ञान, इंजीनियरिंग, डेटा विज्ञान) के विशेषज्ञों के लिए इन संसाधनों को सुलभ बनाने से अभिनव जैव-आधारित अंतिम उत्पादों के निर्माण की सुविधा मिलेगी चाहे यह जीन थैरेपी की एक नई किस्म हो, या एक नया खाद्य प्रसंस्करण विकल्प हो।

भारत की अर्थव्यवस्था, पर्यावरण और रोजगार में निवेश करके, यह व्यापक नीति राष्ट्र के 'विकसित भारत' के संकल्प में योगदान देगी। यह नीति एक वैचपवर्क के रूप में काम करेगी तथा इस बात को दर्शाएगी कि एक प्रभावी विज्ञान नीति राष्ट्र निर्माण और विकास में सक्रिय रूप से योगदान दे सकती है।

2. PRINT MEDIA COVERAGE

2.1 OP-ED ARTICLES

THEHINDU.COM

Biotech enigma

Biotechnology initiatives need long-term capital investments

Earlier this week the Cabinet cleared a proposal, though without specifying a budget, called BioE3 or Biotechnology for Economy, Environment and Employment. Its thrust is to boost manufacturing in the biotechnology sector. Since 1986, India has had a dedicated department for biotechnology, and which deserves substantial credit. For instance, the progress in vaccine development, diagnostics and biologicals, that has bolstered India's reputation as a 'vaccine factory', is due to the initiatives of this department. However, biotechnology did not quite spawn the equivalent of the IT revolution. There is much more to an industrialised biotechnology sector beyond vaccines. There are billion-dollar conglomerates today that rest on high-value microbes, gene-modification technologies, bio-plastics, bio-materials, and high-precision medical devices. However, despite the know-how and human resource capital, only a few Indian biotechs have global resonance, as there are few local manufacturers who can supply Indian laboratories/startups with the ingredients and devices to make products. The reliance on imports means that India loses its international competitiveness. The BioE3 policy aims to correct this.

In the last four decades, India has funded biotech research institutions but now sees that it needs to be going beyond and setting up companies, in public private partnership mode, to bolster biotechnology manufacturing. There are six verticals that this initiative envisages: bio-based chemicals and enzymes; functional foods and smart proteins; precision biotherapeutics; climate-resilient agriculture; carbon capture, and futuristic marine and space research. Futurists have been saying that the era of fossil-fuel industrialisation is over and humanity will have to rely on the natural world – for food and for making consumer products. This is to solve the global problem of non-biodegradable waste and carbon emissions. Future industries must be grounded in environmentally benign products, and this is impossible without sophisticated biotechnology. By setting up bio-foundries and bio-artificial intelligence hubs, the policy hopes there will be avenues for a variety of biotechnologists to congregate. Well intentioned this may be, but India's woes with manufacturing have chronic causes. Without establishing enabling grounds for long-term capital investment – and these have little to do with biotechnology per se – top-down initiatives will have limited impact. The BioE3 policy

OPINION

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Old wine in a new biotech bottle

Biotechnology for Economy, Environment & Employment Policy silent on timelines, investments

DINESH C SHARMA
SCIENCE COMMENTATOR

CHALLENGE: Regulation is critical as biomanufacturing is all about genetically modified organisms. ISTOCK

CLIMATE change, energy transition, waste management, sustainability, agricultural productivity, the need for new health tools and much more. India can not only address these pressing challenges through the application of biotechnology but can do so while generating jobs and contributing to the national economy. This is what the Biotechnology for Economy, Environment and Employment (BioE3) Policy released by the government on August 31 would have us believe. The only caveat is that the policy is silent on the timeframe, the quantum of investment and human resources required, the possible number or types of jobs that will be generated and the pathway to achieve the goal.

The 'vision' of the policy is to "set Bharat at the forefront of the future that is more sustainable and responsive to global challenges by accelerating and harnessing biomanufacturing solutions that encompass diverse bioeconomic activities while safeguarding environmental and climate impacts." The 'goal' of the policy is "to fast-track innovation-to-technology" by weaving together fragmented activities under the umbrella of biomanufacturing and to incentivise "concrete options to build a sustainable future". The overall 'objective' is to present a framework to ensure the adoption of cutting-edge technologies and accelerate the development and production of bio-based high-value products.

While presenting the policy, Department of Biotechnology (DBT) Secretary Rajesh Gokhale declared that the goal was the 'industrialisation of biology' and making India a global leader in this field. If one cuts the fluff, all that the policy document indicates is the government's intent to promote biotechnology-based industry and the use of new tools like digitalisation, artificial intelligence and machine learning. If that is so, there is nothing new here because the last policy document the DBT released in 2021 — National Biotechnology Development Strategy (2021-25) — said precisely the same thing but it was backed with timelines, financial targets and clear pathways.

The goal set in 2021 by the DBT was to develop a biotechnology-led 'knowledge and innovation-driven bioeconomy' and make India a 'global biomanufacturing hub' by 2025. This was to be achieved by building a skilled workforce and enabling infrastructure for industry like bio-foundries, and incentives to the industry for developing and producing affordable products. The thrust areas identified in 2021 were climate change, food security, green energy, waste management, etc. The list has been repeated in the 2024 document, but the DBT has cleverly made no mention of previous policies and strategies to avoid questions being asked about missed goals. The only follow-up action since 2021 is a new scheme to promote bio-foundries announced in the 2024-25 Budget.

> Before embarking upon building a large-scale biotech industry, it would be prudent to develop a robust, autonomous and statutory regulatory system.

In the past four decades, biotechnology has demonstrated its potential in applications ranging from new vaccines and novel crop varieties to environmental cleanup using microbes. Indian policymakers recognised its potential early on, establishing a dedicated government department for its promotion in 1986. The DBT, in its formative years, focused on building research and education capabilities, which has made India a significant player in this field.

However, the biotech-based industry was slow to pick up due to reasons such as a lack of venture capital and an enabling environment. Whatever industry developed was not a result of the DBT's programmes. The poster boy of the Indian biotech industry, Biocon, predates the formation of the DBT, and other pioneers like Shantha Biotech and Bharat Biotech took root with the help of risk financing by another government body, the Technology Development Board.

In the 2000s, the governments of Karnataka and then undivided Andhra Pradesh rolled out their policies that gave incentives to the biotech industry. The success of the Genome Valley and the IKP Knowledge Park in Hyderabad are shining examples of a state-sponsored technology cluster developing with the active participation of the private sector. It was only in 2012 that the DBT established a commercial arm for industry promotion — the Biotechnology Industry Research Assistance Council.

The government should boost the industrial base in biotechnology by leveraging existing strengths and learning from the experience. However, the new policy does not mention successful models like the Genome Valley or IKP Knowledge Park. Instead, it has rehashed the same concept and given it a new name (Mulsleur Bio-Enabler Hub). These hubs, the policy says, will "augment discovery and translational research' and 'support facilities for pilot scale and pre-commercial scale research'. This is what the functional technology clusters are doing and have successfully incubated firms that have grown to become billion-dollar companies.

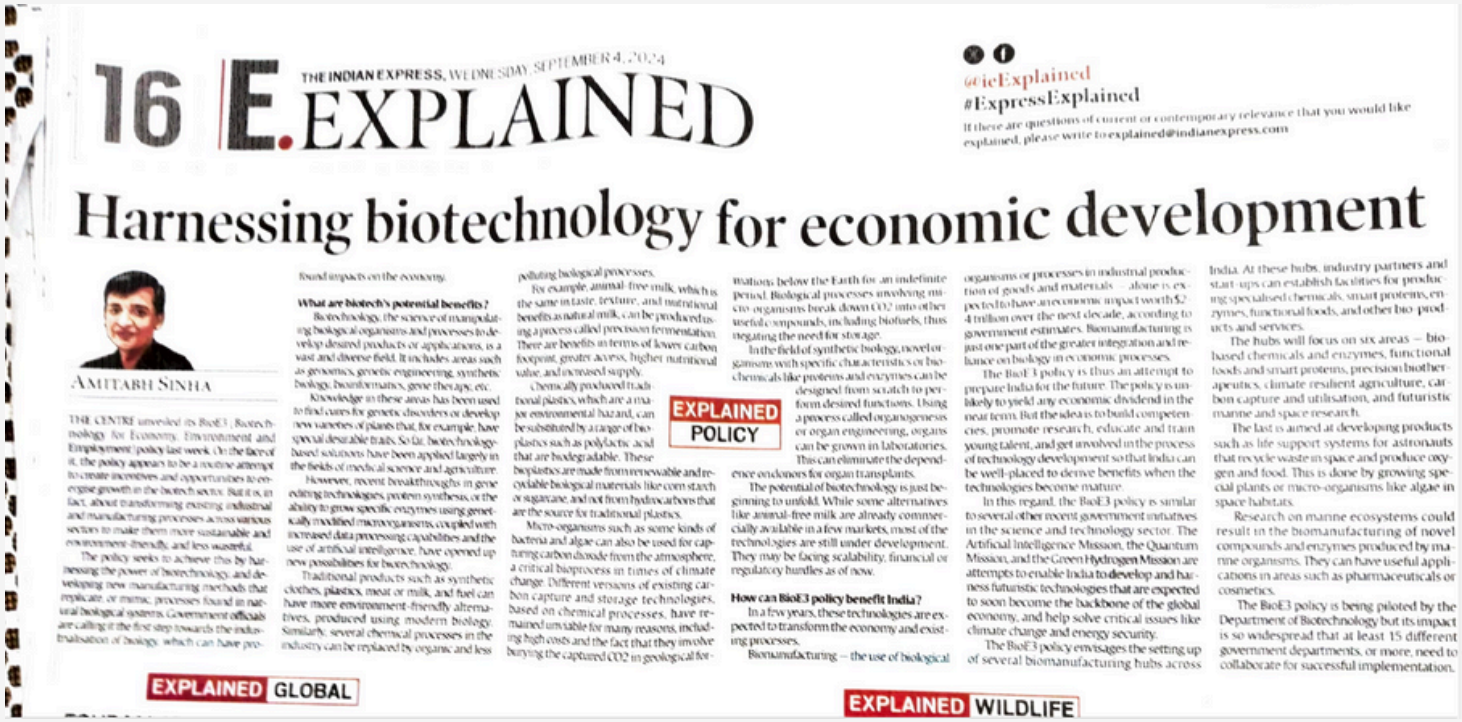
While unveiling a grand utopian vision of solving all problems, the policy underplays the key role of regulation. (it calls regulation a 'roadblock'), the need to invest in developing technical manpower and boosting state funding for fundamental research. Regulation is critical as biomanufacturing is all about genetically modified organisms. At present, regulation is fragmented and opaque. The Biotechnology Regulatory Authority of India Bill has been in cold storage since 2013. Before embarking upon building a large-scale biotech industry, it would be prudent to develop a robust, autonomous and statutory regulatory system.

The DBT Secretary talks about a 'new industrial revolution' fuelled by biotechnology, like the much-celebrated IT Revolution. He should remember that the communication revolution was triggered not by a policy but by the government's resolve to develop a digital telephone exchange from scratch with a committed investment and a tight deadline. In the same way, it was the state-promoted Software Technology Parks scheme that led to an exponential growth of the software industry and the IT Revolution. Decisive government actions are more important than policy pronouncements.

Public policies are supposed to be guiding documents for responsible governance. They can be forward-looking and aspirational but should have clearly laid out objectives, well-defined timeframes and an understanding of challenges. The DBT, which adhered to this time-tested template in the past, decided to deviate from it while preparing the new policy. Being a scientific department, the least it could have done was to make the policy logical, evidence-based and rational. For a policy with 'economy' and 'employment' in its title and as prime focus, it is vague, ambiguous and full of rhetoric.

2. PRINT MEDIA COVERAGE

2.2 NEWSPAPER ARTICLES



16 E. EXPLAINED

THE INDIAN EXPRESS, WEDNESDAY, SEPTEMBER 4, 2024

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If there are questions of current or contemporary relevance that you would like explained, please write to explained@indianexpress.com

Harnessing biotechnology for economic development

AMITABH SINHA

THE CENTRE unveiled its BioE3 | Biotechnology for Economy, Environment and Employment | policy last week. On the face of it, the policy appears to be a routine attempt to create incentives and opportunities to energise growth in the biotech sector. But it is, in fact, about transforming existing industrial and manufacturing processes across various sectors to make them more sustainable and environment-friendly, and less wasteful.

The policy seeks to achieve this by harnessing the power of biotechnology, and developing new manufacturing methods that replicate, or mimic, processes found in natural biological systems. Government officials are calling it the first step towards the industrialisation of biology, which can have profound impacts on the economy.

What are biotech's potential benefits?

Biotechnology, the science of manipulating biological organisms and processes to develop desired products or applications, is a vast and diverse field. It includes areas such as genomics, genetic engineering, synthetic biology, bioinformatics, gene therapy, etc.

Knowledge in these areas has been used to find cures for genetic disorders or develop new varieties of plants that, for example, have special desirable traits. So far, biotechnology-based solutions have been applied largely in the fields of medical science and agriculture.

However, recent breakthroughs in gene editing technologies, protein synthesis, or the ability to grow specific enzymes using genetically modified microorganisms, coupled with increased data processing capabilities and the use of artificial intelligence, have opened up new possibilities for biotechnology.

Traditional products such as synthetic clothes, plastics, meat or milk, and fuel can have more environment-friendly alternatives, produced using modern biology. Similarly, several chemical processes in the industry can be replaced by organic and less polluting biological processes.

For example, animal-free milk, which is the same in taste, texture, and nutritional benefits as natural milk, can be produced using a process called precision fermentation. There are benefits in terms of lower carbon footprint, greater access, higher nutritional value, and increased supply.

Chemically produced flexible plastics, which are a major environmental hazard, can be substituted by a range of bioplastics such as polylactic acid that are biodegradable. These bioplastics are made from renewable and recyclable biological materials like corn starch or sugarcane, and not from hydrocarbons that are the source for traditional plastics.

Micro-organisms such as some kinds of bacteria and algae can also be used for capturing carbon dioxide from the atmosphere, a critical bioprocess in times of climate change. Different versions of existing carbon capture and storage technologies, based on chemical processes, have remained unviable for many reasons, including high costs and the fact that they involve burying the captured CO_2 in geological formations below the Earth for an indefinite period. Biological processes involving micro-organisms break down CO_2 into other useful compounds, including biofuels, thus negating the need for storage.

EXPLAINED POLICY

In the field of synthetic biology, novel organisms with specific characteristics or biochemicals like proteins and enzymes can be designed from scratch to perform desired functions. Using a process called organogenesis or organ engineering, organs can be grown in laboratories. This can eliminate the dependence on donors for organ transplants.

The potential of biotechnology is just beginning to unfold. While some alternatives like animal-free milk are already commercially available in a few markets, most of the technologies are still under development. They may be facing scalability, financial or regulatory hurdles as of now.

How can BioE3 policy benefit India?

In a few years, these technologies are expected to transform the economy and existing processes.

Biomanufacturing — the use of biological organisms or processes in industrial production of goods and materials — alone is expected to have an economic impact worth $2-4 trillion over the next decade, according to government estimates. Biomanufacturing is just one part of the greater integration and reliance on biology in economic processes.

The BioE3 policy is thus an attempt to prepare India for the future. The policy is unlikely to yield any economic dividend in the near term. But the idea is to build competencies, promote research, educate and train young talent, and get involved in the process of technology development so that India can be well-placed to derive benefits when the technologies become mature.

In this regard, the BioE3 policy is similar to several other recent government initiatives in the science and technology sector. The Artificial Intelligence Mission, the Quantum Mission, and the Green Hydrogen Mission are attempts to enable India to develop and harness futuristic technologies that are expected to soon become the backbone of the global economy, and help solve critical issues like climate change and energy security.

The BioE3 policy envisages the setting up of several biomanufacturing hubs across India. At these hubs, industry partners and start-ups can establish facilities for producing specialised chemicals, smart proteins, enzymes, functional foods, and other bio-products and services.

The hubs will focus on six areas — bio-based chemicals and enzymes, functional foods and smart proteins, precision biotherapeutics, climate resilient agriculture, carbon capture and utilisation, and futuristic marine and space research.

The last is aimed at developing products such as life support systems for astronauts that recycle waste in space and produce oxygen and food. This is done by growing special plants or micro-organisms like algae in space habitats.

Research on marine ecosystems could result in the biomanufacturing of novel compounds and enzymes produced by marine organisms. They can have useful applications in areas such as pharmaceuticals or cosmetics.

The BioE3 policy is being piloted by the Department of Biotechnology but its impact is so widespread that at least 15 different government departments, or more, need to collaborate for successful implementation.

EXPLAINED GLOBAL

EXPLAINED WILDLIFE

2. PRINT MEDIA COVERAGE

2.2 NEWSPAPER ARTICLES

Centre plans to boost '2G ethanol' production, set up enzyme-manufacturing facilities to reduce imports

Jacob Koshy
NEW DELHI

Days after the Centre unveiled its BioE3 policy to boost bio-technology-centric manufacturing in India, the Department of Biotechnology is contemplating setting up enzyme-manufacturing facilities to bolster ethanol production, according to scientists and officials with the department.

The first such plant may come up in Manesar, Haryana and will likely be a supplier to proposed 2G bio-ethanol plants in Mathura (Uttar Pradesh), Bhatinda (Punjab) and an existing plant in Panipat. Among other things, the BioE3 (Biotechnology for Economy, Environment and Employment) policy cleared by the Union Cabinet last week aims to set up 'bio-foundries' that will produce biotechnology-developed feedstock and catalysts.

The NITI Aayog estimates that India will need about 13.5 billion litres of ethanol annually by 2025-26. Of this, about 10.16 billion litres will go towards meeting the fuel-blending mandate of E20. '2G' or second generation bioethanol is ethanol that is produced from rice-straw as opposed to the conventional method of sourcing it from molasses (sugar cane).

In 2022, the Indian Oil Corporation set up a first-of-its-kind 2G ethanol plant in Panipat that uses rice stubble – the burning of which spikes pollution in North India – as feedstock. The plant, theoretically capable of producing one lakh litres of ethanol a day runs at 30% capacity and needs 1.5 lakh to 2 lakh tonnes of rice straw per year, which is generated at the end of the sowing period in September-October.

Critical ingredients

However a critical ingredient to convert stubble into ethanol are enzymes and an appropriate treatment process. As of today, these enzymes are imported and constitute a significant component of the cost of the 2G-ethanol production process, said Ramesh Sonthi, Director, International Centre for Genetic Engineering and Biotechnology (ICGEB). "We have developed enzymes that are as good, if not better, than the ones currently used for the production of ethanol at Panipat. We have been able to show its efficacy in producing up to 15,000 litres of ethanol and are looking at scaling up," Dr. Sonthi said.

The use of agriculture residue as fuel sources could curb the practice of burning stubble that often leads to pollution. AFP

The Maharashtra-based Praj Industries, an industrial biotechnology company, is the technology licensor (of enzymes from Danish Biotechnology company, Novozymes).

"We are now currently working with Praj and they have tested our enzyme and said it as good as the ones they use. They are going to work with us on techno-economic analysis as well as the building of plants," Dr. Shams Yazdani, senior scientist at the ICGEB, whose research group has developed the enzymes, said. While still early days, a first step is to be able to produce at least 20,000 litres of ethanol at Panipat using the ICGEB-Praj processes.

The enyzmes in question are derived from tweaking a fungus that belongs to a broader family of fungi called *Penicillium funoculosum*. However, it is only through several steps of genetic engineering that the fungus can be tweaked to produce the necessary enzymes in sufficient quantity that can then act as an efficient hydrolyser of organic refuse such as rice stubble.

"It is a cell-free system with enzymes available now to digest the biomass. So eventually what you have after digestion is a free sugar, which can be fermented not only for ethanol but to make cosmetics, active pharmaceutical ingredients," Mr. Yazdani said.

He estimates that if India's future ethanol needs – government policy currently mandates all petrol to be blended 20% with ethanol by 2025 – were to rely on locally developed enzymes it could mean a roughly two-thirds reduction cost in procuring the enzymes.

A report by the NITI Aayog on India's ethanol blending programme estimates that a litre of ethanol requires 2.3 kg of rice, 2.6 kg of maize or 50 kg of sugar cane. Because these are key food crops, relying on them for fuel means using land for food for fuel. Secondly these crops are extremely water-guzzling. The recommendation thus is to rely on agriculture biomass, and further municipal solid waste, to serve as the feedstock for ethanol. Additionally, use agriculture residue as fuel sources, also translates to an alternative use of stubble that is otherwise burned by farmers to clear the land for cropping. This year Punjab alone is estimated to produce 20 million tonnes of rice stubble. A plant, even like the one at Panipat, can process at its maximum 2,00,000 tonnes.

M ND-ND

2. PRINT MEDIA COVERAGE

2.2 NEWSPAPER ARTICLES

ILS to implement BioE3 policy goals

POST NEWS NETWORK

Bhubaneswar, August 28: Institute of Life Sciences (ILS) here, recently organised a meeting with the student community to discuss the BioE3 (Biotechnology for Economy, Environment, and Employment) policy.

In a pivotal development, the Union Cabinet has endorsed the BioE3 policy recently, with the support and vision of the department of Biotechnology.

ILS director Debasis Dash said that the BioE3 policy is a welcome initiative with far-reaching and futuristic implications. "The policy will drive significant growth and innovation, creating long-term benefits for the economy, job creation, and environmental sustainability," he said.

"The policy aims to foster innovation in crucial sectors, generate job opportunities, and enhance sustainability," he added.

Dash emphasised on the fact that ILS will follow a structured approach to implement the goals of the BioE3 policy to mitigate national and global challenges, specifically in the area of health sciences.

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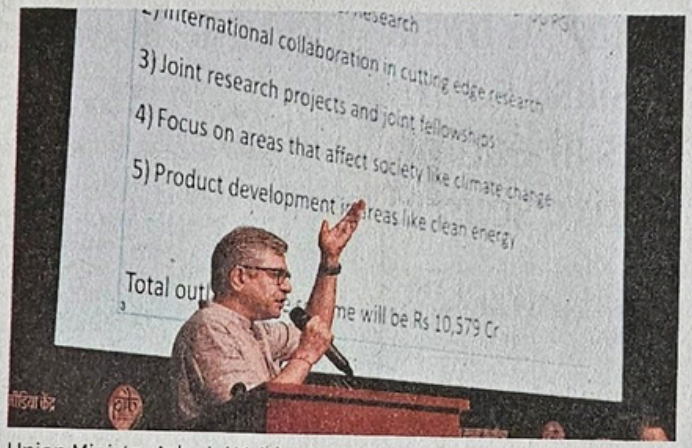
2.2 NEWSPAPER ARTICLES

Union Cabinet approves proposal to bolster biotech manufacturing

Jacob Koshy
NEW DELHI

The Union Cabinet on Saturday cleared a proposal to bolster biotechnology-based manufacturing, called BioE3 (Biotechnology for Economy, Environment and Employment) Policy for Fostering High Performance Biomanufacturing. To be steered by the Department of Biotechnology, the aim is to have it catalyse a technology revolution "just as the IT industry revolutionised life in the 1990s", an internal note viewed by *The Hindu* said.

A financial outlay was not specified for the programme. High performance biomanufacturing the ability to produce products from medicine to materials, address farming and food challenges, and promote manufacturing of bio-based products through integration of advanced biotechnological processes.



Union Minister Ashwini Vaishnaw addressing the media on Cabinet decision in New Delhi on Saturday. SUSHIL KUMAR VERMA

"To address the national priorities, the BioE3 Policy would broadly focus on the following strategic/thematic sectors: high value bio-based chemicals, biopolymers and enzymes; smart proteins and functional foods; precision biotherapeutics; climate resilient agriculture; carbon capture and its utilisation; marine and space research," a press statement from the Ministry of Science and Technology (MoST) said.

6 verticals of the policy

The six thematic verticals of the policy are: bio-based chemicals and enzymes, functional foods and smart proteins, precision biotherapeutics, climate resilient agriculture, carbon capture and its utilisation, futuristic marine, and space research.

The Cabinet also merged three schemes of the Science Ministry into one, called Vigyan Dhara, which expects to spend ₹10,579 crore until 2025-26 on Science and Technology Institutional and Human Capacity Building, Research and Development and, Innovation, Technology Development and Deployment, according to a note from the Ministry.

Internships would be arranged for students in the 11th and 12th grades and fellowships for research at the graduate and post-graduate level. "The scheme endeavours to promote research in areas such as basic research with access to international facilities, translational research in sustainable energy, etc.," the note said.

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2.2 NEWSPAPER ARTICLES

STATESMAN NEWS SERVICE
NEW DELHI, 26 AUGUST

Union Minister Dr Jitendra Singh has highlighted that the new Bioeconomy policy rolled out by the government is set to place India as a global leader in the years to come.

Singh was briefing about the recent Union Cabinet decision on the ambitious BioE3 (Biotechnology for Economy, Employment, and Environment) Policy, heralding a transformative shift in India's manufacturing sector.

As India emerges as a Global Biotech Powerhouse, Dr Jitendra Singh said, Prime Minister Narendra Modi will be hailed across the world as the champion of the new Biotech Boom, which promises to boost the economy, innovation, jobs, and environmental commitments.

Speaking on the surge in the Bio economy, he said "India's bio economy has experienced remarkable

USD 10 billion in 2014 to over USD 130 billion in 2024, with projections to reach USD 300 billion by 2030. This surge reflects India's robust economic growth."

The recent policy will reignite growth spirits and position India as a potential leader in the 4th industrial revolution, he added.

"The BioE3 Policy is set to accelerate this growth trajectory, making substantial

in India' initiative by fostering the development of bio-based products with minimal carbon footprints."

According to Dr Singh the BioE3 Policy is designed to address critical global challenges such as climate change and depleting non-renewable resources by facilitating the shift from chemical-based industries to sustainable bio-based models; promoting a circular bio economy; achiev-

through innovative waste utilization from biomass, landfills, and greenhouse gases and; encouraging the development of bio-based products and expanding job creation.

The policy encourages entrepreneurship across diverse sectors, including bio-based chemicals, smart proteins, precision bio therapeutics, climate-resilient agriculture, and carbon capture. It establishes cutting-edge bio manufacturing facilities, bio foundry clusters, and Bio-AI hubs, he added.

Understanding the importance of biomanufacturing hubs, Dr Singh highlighted that it will serve as centralised facilities crucial for the production, development, and commercialisation of bio-based products.

He said "These hubs will bridge the gap between laboratory-scale and commercial-scale manufacturing, fostering collaboration among startups, SMEs, and estab-

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2.2 NEWSPAPER ARTICLES

పశు, జంతుజాల ఆరోగ్య రక్షణలో ఎన్ఐఏబీ కీలకం

సమావేశంలో డా.తారు శర్మ, హర్జిత్ సింగ్ తదితరులు

రాయదుర్గం, న్యూస్ టుడే: పలు టీకాలు, మందులు, రోగనిర్ధారణ పరికరాలను ఆవిష్కరించడం ద్వారా నేషనల్ ఇన్స్టిట్యూట్ ఆఫ్ యానిమల్ బయోటెక్నాలజీ (ఎన్ఐఏబీ) పశువులు, జంతువుల ఆరోగ్య పరిరక్షణ, పాడిపరిశ్రామికాభివృద్ధిలో కీలకంగా నిలుస్తోందని ఆ సంస్థ డైరెక్టర్ డా.జి.తారు శర్మ అన్నారు. కేంద్ర ప్రభుత్వం బయోఈ3 పేరుతో అమల్లోకి తీసుకొచ్చిన విధానంపై గొల్లిదొడ్డిలోని ఆ సంస్థ సమావేశ మందిరంలో మంగళవారం అవగాహన కల్పించారు. తారు శర్మ మాట్లాడుతూ.. ప్రపంచంలోనే అతిపెద్ద బోవైన్ మైక్రోఅరే హెచ్డీ చిప్ను ఆవిష్కరించినట్లు తెలిపారు. సంస్థ శాస్త్రవేత్త డా.గిరీష్ రాధాకృష్ణన్ బ్రూసెలోసిస్ కిట్ను, పాల దిగుబడి పెంచే మాస్టిటిస్ కిట్ను డా.పంకజ్ సుమన్, డా.అభిజిత్ దేశ్ముఖ్ టోక్సోప్లాస్మా కిట్ను ఆవిష్కరించినట్లు తెలిపారు. డా.ఆనంద్ శ్రీవాస్తవ, డా.నిర్మల్య గంగూలీ, డా.శర్మ వంటి శాస్త్రవేత్తల పరిశోధనలతో పలు పరిష్కారాలు తెచ్చినట్లు వివరించారు. ఎన్ఐఏబీ సీనియర్ మేనేజర్ హర్జిత్ సింగ్ తదితరులు పాల్గొన్నారు.

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సాక్షి

సామాన్యులకు ఉపయోగపడేలా..

- బయో ఈ-3 పాలసీకి అనుగుణంగా పరిశోధనలు
- ఎన్ఐఏబీ డైరెక్టర్ తరు శర్మ వెల్లడి

సాక్షి, హైదరాబాద్: కేంద్రం ఇటీవల తీసుకొచ్చిన బయో ఈ3 పాలసీకి అనుగుణంగా తమ పరిశోధనలు సాగుతున్నాయని నేషనల్ ఇన్స్టిట్యూట్ ఆఫ్ యానిమల్ బయోటెక్నాలజీ (ఎన్ఐఏబీ) డైరెక్టర్ తరు శర్మ తెలిపారు. బయో మెడిసిన్ తయారీ కోసం తాము ఎంతో కృషి చేస్తున్నామని పేర్కొన్నారు. మంగళవారం ఎన్ఐఏబీలో మీడియా సమావేశం నిర్వహించారు. ఈ సందర్భంగా పలువురు శాస్త్రవేత్తలు జరిపిన పరిశోధనలకు సంబంధించిన వివరాలను పంచుకున్నారు. ఎలాంటి కర్బన పదార్థాలు విడుదల కాకుండా ఆర్థికాభివృద్ధి సాధించడమే బయో ఈ-3 పాలసీ లక్ష్యమని పేర్కొన్నారు. పర్యావరణహిత వృద్ధితో పాటు పునర్వినియోగ బయో ఆర్థిక వ్యవస్థను అభివృద్ధి చేసేందుకు ఈ పాలసీ ఎంతగానో ఉపయోగపడుతుందని వివరించారు. ఈ-3 అంటే ఎకానమీ (ఆర్థికవ్యవస్థ), ఎన్విరాన్మెంట్ (పర్యావరణం), ఎంప్లాయ్మెంట్ (ఉపాధి) అని, పర్యావరణహితమైన ఆర్థిక వ్యవస్థలో ఉద్యోగ ఉపాధి కల్పించాలనే ఉద్దేశంతో తాము ముందుకు సాగుతున్నామని తెలిపారు.

తక్కువ ధరకే ఇన్సులిన్..

డయాబెటిస్తో బాధపడేవారికి తక్కువ ధరకే ఇన్సులిన్ ఇంజెక్షన్లు లభ్యమయ్యేలా పరిశోధనలు చేశామని శాస్త్రవేత్త డాక్టర్ గంగూలీ తెలిపారు. అలాగే బ్రుసెల్లోసిస్ అనే బ్యాక్టీరియా జంతువులతో పాటు మానవులకు కూడా సోకుతుందని, ఈ బ్యాక్టీరియా వల్ల జంతువుల్లో సంభవిస్తున్న మరణాలను 2030 నాటికి పూర్తిగా తగ్గించాలనే ఉద్దేశంతో తాము ఓ పరిశోధన నిర్వహించామని డాక్టర్ గిరీశ్ వివరించారు. డీపీఎస్ అనే ప్రోటీన్ను తాము గుర్తించామని, ఈ యాంటీబాడీ ద్వారా సహజంగా సోకిన జంతువులను (దివా కేపబిలిటీ) గుర్తించవచ్చని చెప్పారు. ఈ పరిశోధనలు చేసేందుకు ఆరేళ్లు కష్టపడ్డామన్నారు. దీనికి సంబంధించిన ఉత్పత్తిని మెడికల్ డివైజెస్ పార్కులో ఉన్న ఎన్గ్రేవ్ బయోల్యాబ్స్ అభివృద్ధిపరిచింది. త్వరలోనే ఈ కిట్ను మార్కెట్లోకి విడుదల చేస్తామని సంస్థకు చెందిన డాక్టర్ శశి భూషణ్రావు వెల్లడించారు.

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Source : https://epaper.sakshi.com/

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Biotechnology for Economy, Environment and Employment (BioE3) Policy is a great landmark initiative of DBT: Director BRIC-IBSD

BISWADEEP GUPTA

IMPHAL: Prof. Pulok Kumar Mukherjee, Director, BRIC-Institute of Bioresources and Sustainable Development (Department of Biotechnology, Ministry of Science & Technology, Govt. of India) having its operations in the state of Manipur, Sikkim, Mizoram, Meghalaya informed that the Union Cabinet has approved the proposal of Department of Biotechnology (DBT) for 'BioE3 (Biotechnology for Economy, Environment and Employment) Policy for Fostering High-Performance Biomanufacturing'.

Prof Mukherjee further explained that the salient features of BioE3 policy include innovation-driven support to R&D and entrepreneurship across thematic sectors. This will accelerate technology development and commercialization by establishing Biomanufacturing & Bio-AI hubs and Biofoundry, he believes. Along with prioritizing regenerative bioeconomy models of green growth, this policy will facilitate the expansion of India's skilled workforce and provide a surge in job creation.

Overall, this Policy will further strengthen the Government's initiatives such as a 'Net Zero' carbon economy & 'Lifestyle for Environment' and will steer India on the path of accelerated 'Green Growth' by promoting a 'Circular Bioeconomy'. The BioE3 Policy will foster and advance a future that is more sustainable, innovative, and responsive to global challenges and lays down the Bio-vision for Viksit Bharat, echoed the Director, BRIC-IBSD, while speaking here at Imphal.

He further stated that the present era is an opportune time to invest in the industrialization of biology to promote sustainable and circular practices to address some of the critical societal issues such as climate change mitigation, food security and human health. Building a resilient biomanufacturing ecosystem in our nation is important to accelerate cutting-edge innovations for developing bio-based products.

Prof. Pulok Kumar Mukherjee

Prof. Mukherjee explained that high-performance biomanufacturing is the ability to produce products from medicine to materials, address farming and food challenges, and promote the manufacturing of bio-based products through the integration of advanced biotechnological processes. To address the national priorities, the BioE3 Policy would broadly focus on the following strategic/thematic sectors: high-value bio-based chemicals, biopolymers & enzymes; smart proteins & functional foods; precision biotherapeutics; climate resilient agriculture; carbon capture & its utilization; marine and space research. Institute of Bioresources and Sustainable Development (IBSD) is the only institute in the North Eastern Region of India (NER) in the ambit of the Biotechnology Research and Innovation Council (BRIC), Department of Biotechnology, Govt. of India established at Imphal, Manipur which is working on "Bioresources development and their sustainable use through biotechnological interventions for the socio-economic growth of the North Eastern Region".

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2.2 NEWSPAPER ARTICLES

केंद्राचे 'बायोईथ्री' धोरण

जैव उत्पादनाला चालना देण्यासाठी अत्याधुनिक तंत्रज्ञानाच्या वापर

मटा विशेष

मयुरेश प्रभुणे

पुणे : एकविसाव्या शतकातील अद्ययावत संशोधनासोबत जैव उत्पादनाला चालना देण्यासाठी केंद्र सरकारतर्फे 'बायोईथ्री' (बायोटेक्नॉलॉजी फॉर इकॉनॉमी एन्व्हायर्न्मेंट अँड एम्प्लॉयमेंट) हे देशाचे पहिले जैवतंत्रज्ञान धोरण जाहीर करण्यात आले आहे. पंतप्रधान नरेंद्र मोदी यांच्या अध्यक्षतेखाली पार पडलेल्या केंद्रीय मंत्रिमंडळाच्या बैठकीत नुकतीच 'बायोईथ्री' धोरणाला मान्यता देण्यात आली.

सन १९८६मध्ये केंद्राच्या जैव तंत्रज्ञान विभागाची (डीबीटी) स्थापना झाली. तेव्हापासून गेल्या चार दशकांमध्ये देशातील जैवशास्त्रीय संशोधनाची प्रगती साधतानाच औषधे, लशी यांच्या उत्पादनातही देशाने मोठी मजल मारली. मात्र, अद्यापही अनेक रासायनिक, जैविक उत्पादनांसाठी आवश्यक मूलभूत घटक आपल्याला आयात करावे लागतात. जगभरात जैव उत्पादनाची मोठी बाजारपेठ लक्षात घेता अमेरिका, ऑस्ट्रेलिया, जपान; तसेच युरोपीय देशांनी आपल्या जैव तंत्रज्ञान धोरणांमध्ये अनुरूप बदल करून घेतले. भारतात मात्र, जैवतंत्रज्ञान क्षेत्रातील संशोधन आणि उत्पादनासाठी निश्चित अशी धोरणाची रचना अस्तित्वात नव्हती.

येत्या २०४७पर्यंत जैवतंत्रज्ञान क्षेत्रात देशाची मोठी प्रगती साधण्यासाठी डीबीटीने 'बायोईथ्री' हे धोरण तयार केले आहे. एकविसाव्या शतकातील बदलते तंत्रज्ञान, वाढती लोकसंख्या, हवामान बदलाची समस्या आदी बाबी गृहीत धरून देशातील जैव उत्पादनात मोठी वाढ करण्यासाठी या धोरणात नेमक्या उपाययोजना सुचवण्यात आल्या आहेत.

जैवरसायने व एन्झाइम, फंक्शनल फूड व स्मार्ट प्रोटीन, अचूक जैवउपचार पद्धती, हवामान बदलांशी अनुरूप कृषी, वातावरणीय कार्बन शोषण व त्याचा वापर आणि भविष्यवेधी अवकाशीय; तसेच समुद्री संशोधन या सहा घटकांना 'बायोईथ्री' धोरणात प्राधान्य देण्यात आले आहे.

धोरणातील काही ठळक मुद्दे

- देशात आयटीप्रमाणे बीटी क्रांती आणण्यासाठी पुढाकार
- जैव उत्पादन वाढवतानाच शून्य कार्बन उत्सर्जन आणि पर्यावरण पूरक जीवनपद्धतीचे लक्षही गाठणार
- सूक्ष्मजीव, जनुके, पेशी यांवर आधारित संशोधन आणि उपचार पद्धतींना चालना
- जैवशास्त्रीय प्रचंड माहितीसाठ्याचा वापर करून बायो आर्टिफिशिअल इंटेलिजन्स हब विकसित करणार
- एआयच्या साह्याने नवी औषधे, उपचार पद्धती यांचे शोध लावणार
- विविध राज्यांत संशोधन संस्था आणि स्टार्टअप यांच्या समन्वयातून बायो मॅन्युफॅक्चरिंग हब उभारून 'प्रयोगशाळा ते उत्पादन' या प्रक्रियेला चालना देणार.

(चित्र : एआय)

"सन २०१४मध्ये देशाची जैवअर्थव्यवस्था १० अब्ज डॉलर इतकी होती, ती आता १३० अब्ज डॉलर झाली आहे. २०३०पर्यंत देशाची देशाची जैवअर्थव्यवस्था ३०० अब्ज डॉलरपर्यंत पोचण्याचा अंदाज आहे. 'बायोईथ्री' धोरणाच्या साह्याने भारतातच नाही, तर या क्षेत्रात जागतिक पातळीवर बदल आणले जातील.

- डॉ. जितेंद्र सिंग, विज्ञान तंत्रज्ञान राज्यमंत्री (स्वतंत्र प्रभार)

2. PRINT MEDIA COVERAGE

2.2 NEWSPAPER ARTICLES

Minister: India will lead biotech revolution

TRIBUNE NEWS SERVICE

NEW DELHI, AUGUST 31

Minister Jitendra Singh on Saturday said while the IT revolution was led by the West, India would lead the biotechnology revolution.

Launching the Biotechnology for Economy, Environment and Employment (BioE3) Policy-2024, Singh said: "India has a huge wealth of bioresources — vast biodiversity, unique bioresources in the Himalayas as well as unsaturated resources that are waiting to be harnessed. We have a 7,500-km coastline. We also launched the 'Deep Sea Mission' last year to harness the biodiversity beneath the seas."

"Biotech is the future and it is set to revolutionise the economy. Bio-manufacturing offers solutions to climate change, resource depletion, waste generation and pollution. It can help meet the growing demand for food and fuel, while also creating new jobs," Singh said.

The minister said bio-manufacturing — using biomass and carbon dioxide – could make the country more self-reliant in fuel production. India's bioeconomy has skyrocketed from $10 billion in 2014 to over $130 billion in 2024. The industry is projected to reach $300 billion by 2030, Singh said.

Dr Rajesh Gokhale, Secretary, Department of Biotechnology, said the BioE3 policy was aimed towards a future that is sustainable, innovative and responsive to global change.

2. PRINT MEDIA COVERAGE

2.2 NEWSPAPER ARTICLES

प्रौद्योगिकी विकास को बढ़ावा देगा बायोई3

चंडीगढ़| प्रधानमंत्री नरेंद्र मोदी की अध्यक्षता में केंद्रीय मंत्रिमंडल ने हाल ही में उच्च प्रदर्शन जैव विनिर्माण को बढ़ावा देने के लिए बायोई3 (अर्थव्यवस्था, पर्यावरण और रोजगार के लिए जैव प्रौद्योगिकी) नीति प्रस्ताव को मंजूरी दी। इससे बायो मैन्युफैक्चरिंग और बायो-एआई हब और बायोफाउंड्री की स्थापना करके प्रौद्योगिकी विकास और व्यावसायीकरण को गति देगा। मोहाली स्थित राष्ट्रीय कृषि-खाद्य जैव प्रौद्योगिकी संस्थान भारत सरकार के जैव प्रौद्योगिकी विभाग के तत्वावधान में भारत में एक प्रमुख शोध संस्थान है। जैव प्रौद्योगिकी उपकरणों का उपयोग करके खाद्य और पोषण सुरक्षा प्राप्त करने पर ध्यान केंद्रित करते हुए भारत सहित कई विकासशील देशों के सामने प्रोटीन कुपोषण एक गंभीर चुनौती है। कई अंतरराष्ट्रीय और भारतीय कंपनियां पहले ही स्मार्ट प्रोटीन बाजार में उतर चुकी हैं। भारत की जैव-अर्थव्यवस्था ने उल्लेखनीय वृद्धि का अनुभव किया है।

2. PRINT MEDIA COVERAGE

2.2 NEWSPAPER ARTICLES

'भारत प्रचुर संसाधनों के कारण जैव-विनिर्माण क्रांति का करेगा नेतृत्व'

नई दिल्ली, 31 अगस्त (ब्यूरो)।

केंद्रीय मंत्री जितेंद्र सिंह ने शनिवार को कहा कि जैव-विनिर्माण वैश्विक अर्थव्यवस्था के भविष्य को आकार देगा और भारत अपने प्रचुर जैव-संसाधनों के कारण इस क्रांति का नेतृत्व करने के लिए अच्छी स्थिति में है। सिंह ने कहा, 'भारत के पास अगली बड़ी क्रांति का नेतृत्व करने का अवसर है, जो जैव-विनिर्माण पर आधारित होगी। जहां पश्चिम ने आइटी क्रांति का नेतृत्व किया, वहीं भारत अपने विशाल और बड़े पैमाने पर अप्रयुक्त जैव-संसाधनों के साथ नेतृत्व करने के लिए तैयार है।' जैव-विनिर्माण जलवायु परिवर्तन, संसाधनों की कमी और प्रदूषण जैसी वैश्विक चुनौतियों का समाधान प्रस्तुत करता है। इससे खाद्यान्न और ईंधन की बढ़ती मांग को पूरा करने में मदद मिलेगी। भारत वर्तमान में अपना अधिकांश कच्चा तेल आयात करता है, लेकिन बायोमास और कार्बन डाइआक्साइड का उपयोग करके जैव-विनिर्माण देश को ईंधन उत्पादन में अधिक आत्मनिर्भर बना सकता है।

2. PRINT MEDIA COVERAGE

2.2 NEWSPAPER ARTICLES

PIB conducts workshop on BioE3 policy

EXPRESS NEWS SERVICE
@ Chennai

THE Press Information Bureau conducted a workshop for journalists on Biotechnology for Economy, Environment and Employment (BioE3) Policy at the Asian College of Journalism in Taramani on Friday. Scientists, including Dr Alka Sharma and Dr A Vamsi Krishna from the Department of Biotechnology, Dr G Dharani from NIOT, and Guhan Jeyaraman from IITM-Bio-based Chemicals took part.

2. PRINT MEDIA COVERAGE

2.2 NEWSPAPER ARTICLES

'Biotechnology will usher in next global revolution'

DC CORRESPONDENT
CHENNAI, SEPT. 6

Biotechnology will lead the next global revolution, akin to the information technology revolution, according to Dr. Alka Sharma, senior adviser at the department of biotechnology. Speaking at a workshop on the BioE3 Policy—Biotechnology for Economy, Environment, and Employment—organised by the Press Information Bureau in Chennai on Friday, Dr. Sharma highlighted the significance of the recently approved policy by the Union cabinet.

Dr. Sharma emphasised that the BioE3 Policy aims to tackle pressing issues like climate change, plastic waste, and biodiversity loss by promoting bio-based processes. She pointed out that only 11 percent of the 8.7 billion tonnes of plastic waste generated between 1950 and 2021 have been recycled, making the planet unsustainable. The BioE3 policy seeks to address these challenges through biomanufacturing, focusing on six sectors, including bio-based chemicals, climate-resilient agriculture, and carbon capture.

Dr. Sharma also discussed the establishment of Bio-AI hubs and biofoundries to boost research and development in bio-manufacturing. She noted that the policy aligns with India's green growth goals and the PM's vision for net-zero carbon emissions.Experts at the workshop discussed the science behind bioprocess engineering.

2. PRINT MEDIA COVERAGE

2.2 NEWSPAPER ARTICLES

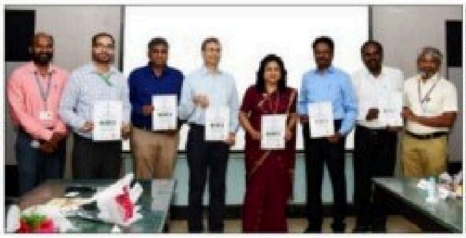
தினகரன் நகரம்

ஊடகவியலாளர்களுக்கான பயிலரங்கு

தரமணி சிஐடி வளாகத்தில் உள்ள ஏசியன் ஜர்னலிசம் கல்லூரியில் பொருளாதாரம் சுற்றுச்சூழல் மற்றும் வேலைவாய்ப்புக்கான பயோ டெக்னாலஜி குறித்த ஊடகவியலாளர் களுக்கான பயிலரங்கு நடந்தது. இதில், டெல்லி பிஜபி உதவி இயக்குனர் மட்கி பியூஷ் சுதாகர், சென்னை செய்தி தகவல் பணி மற்றும் மத்திய தகவல் தொடர்பு துறை கூடுதல் இயக்குனர் அண்ணாதுரை, விஞ்ஞானி அல்கா சர்மா, ஐஐடி பேராசிரியர் குகன் ஜெயராம், என்ஐஓடி விஞ்ஞானி தரணி, விண்வெளி உயிர் உற்பத்தி விஞ்ஞானி வம்சி கிருஷ்ணா.

2. PRINT MEDIA COVERAGE

2.2 NEWSPAPER ARTICLES



உயிரியல் என்பது அடுத்த தொழில்நுட்ப புரட்சியாக இருக்கும்

சென்னை கருத்தரங்கில் டாக்டர் அல்கா சர்மா பேச்சு

சென்னை, செப்.7- உயிரியல் என்பது அடுத்த தொழில்நுட்ப புரட்சியாக இருக்கும் என்று மத்திய உயிரி தொழில்நுட்ப துறையின் மூத்த ஆலோசகரும், விஞ்ஞானியுமான டாக்டர் அல்கா சர்மா தெரிவித்துள்ளார்.

பயோஇ3 குறித்து சென்னையில் நேற்று நடைபெற்ற ஊடகவியலாளர்களுக்கான விழிப்புணர்வு கருத்தரங்கில் பேசிய அவர், கடந்த சில 10 ஆண்டுகளில் தகவல் தொழில்நுட்பம் சமூகத்தில் ஏற்படுத்திய தாக்கத்தை போல் பயோஇ 3 எனும் உயிரி தொழில்நுட்பம் அடுத்த 20 ஆண்டுகளுக்கு இந்தியாவிலும், உலகிலும் தாக்கத்தை ஏற்படுத்தும் என்றார்.

இதனைக் கருத்தில் கொண்டே பயோஇ3 கொள்கைக்கு மத்திய அமைச்சரவை ஒப்புதல் அளித்திருப்பதாக அவர் கூறினார். இந்தத் தொழில்நுட்பம் அனைத்து துறைகளிலும் அன்றாட வாழ்க்கையில் தாக்கத்தை ஏற்படுத்தும் என்று அவர் உறுதிபட தெரிவித்தார்.

சோதனை கூடத்தில் இருந்து வணிக மயத்தை நோக்கி என்பது இந்த தொழில்நுட்பத்தின் நோக்கம் என்று அவர் குறிப்பிட்டார். கழிவு பொருட்களை குறைப்பது, மறு பயன்பாட்டுக்கு உட்படுத்துவது, மறு சுழற்சி செய்வது ஆகியவை செல்வத்தை உருவாக்கும் நடைமுறைகளாக அமையும். மத்திய அரசும், மாநில அரசுகளும் இணைந்து உயிரி தொழில்நுட்பம் தொடர்பான உற்பத்தியில் ஈடுபடுவதன் அவசியத்தை வலியுறுத்தினார்.

உயிரி அடிப்படையிலான ரசாயனங்கள், என்சைம்கள் பற்றியும், பருவநிலைக்கு ஏற்ற வேளாண்மை குறித்தும் கார்பன் சேகரிப்பு, அதன் பயன்பாடு பற்றியும் அவர் எடுத்துரைத்தார். கண்டுபிடிப்புகளை பரவலாக்கவும், மாற்றத்திற்கான ஆராய்ச்சிக்காகவும் உயிரி-செயற்கை நுண்ணறிவு மையங்கள், உயிரி உற்பத்தி மையங்கள், பயோ பவுண்டரிகள் ஆகியவை நாடு முழுவதும் நிறுவப்படும் என்று அவர் கூறினார்.

இந்த கருத்தரங்கில் உரையாற்றிய சென்னை ஐஐடி பேராசிரியர் குகன் ஜெயராமன், பயோஇ3 கொள்கை என்பது வேலைவாய்ப்புகளையும், நீடிக்கவல்ல சுற்றுச்சூழலையும் உருவாக்கும் என்றார். லிக்னோசெல்லுலோஸ் என்பது கோதுமை தட்டை மற்றும் நெல் பயிர் வைக்கோலில் அதிகம் உள்ளதாகவும், இதனைக் கொண்டு எத்தனால் தயாரிக்கலாம் என்பதால் ஊரகப்பகுதியில் புதிய வேலைவாய்ப்பு உருவாகும் என்று அவர் குறிப்பிட்டார்.

சென்னையில் உள்ள தேசிய கடல்சார் தொழில்நுட்ப கல்வி கழகத்தின் பேராசிரியர் டாக்டர் தரணி இந்தக் கருத்தரங்கில், கடல்சார் உயிரினம் மற்றும் உயிரற்ற ஆதார வளங்கள் கண்டுபிடிப்பு குறித்த புவி அறிவியல் அமைச்சகத்தின் முன்முயற்சிகள் பற்றியும், கடல்சார் உயிரி தொழில்நுட்பத்துறையில் உள்ள பல்வேறு வாய்ப்புகள் குறித்தும் விவரித்தார்.

மத்திய உயிரி தொழில்நுட்பத்துறையின் டாக்டர் ஏ வம்சி கிருஷ்ணா பேசுகையில், விண்வெளி சுற்றுலா என்பது 2030-ம் ஆண்டு வாக்கில் உண்மையாகும் என்றும், விண்வெளி சார்ந்த உயிரி உற்பத்தி உலகம் முழுவதும் பல நாடுகளுக்கு நிதி ஆதாரத்தை வழங்கும் என்றும் கூறினார்.

சென்னையில் உள்ள பத்திரிகை தகவல் அலுவலகம் இந்த கருத்தரங்கிற்கு ஏற்பாடு செய்திருந்தது. கருத்தரங்கத்தின் நோக்கம் குறித்து பத்திரிகை தகவல் அலுவலக கூடுதல் தலைமை இயக்குநர் திரு எம் அண்ணாதுரை எடுத்துரைத்தார்.

3. SOCIAL MEDIA COVERAGE

3.1 HON'BLE PRIME MINISTER'S POST

Narendra Modi
@narendramodi

The BioE3 (Biotechnology for Economy, Environment and Employment) Policy that has been approved by the Cabinet is a landmark initiative that will foster High Performance Bio-manufacturing. This will also encourage scientific, industrial and societal advancements in the times to come. Other benefits include environmental preservation and employment creation.
pib.gov.in/PressReleasePa...

8:50 PM · Aug 24, 2024 · **451.2K** Views

346 2.6K 9.8K 130

3. SOCIAL MEDIA COVERAGE

3.2 HON'BLE MINISTER'S POST

Dr Jitendra Singh @DrJitendraSingh · Aug 24

#Cabinet under PM Sh @NarendraModi approves '#BioE3 (Biotechnology for Economy, Environment and Employment) Policy for Fostering High Performance Biomanufacturing'
#cabinetdecisions
Department of Biotechnology #DBT
Ministry of Science & Technology

5 · 101 · 164 · 10K

Dr Jitendra Singh @DrJitendraSingh · Aug 26

Under leadership of PM Sh @NarendraModi,#BioE3 is set to position India as global biomanufacturing hub,driving towards bioeconomy targets. Expecting job growth,entrepreneurial boost,& sustainable innovation! Let's fast-track green growth & create a thriving Bio-Vision for Bharat!

19 · 258 · 290 · 18K

Dr Jitendra Singh @DrJitendraSingh · Sep 13

Deccan Herald: '#BioE3' policy will usher in bio-revolution in India
#DBT

Read:
deccanherald.com/india/bio-e3-p...

'Bio-E3' policy will usher in bio-revolution in India: Jitendra Singh

The BioE3 policy was formally launched last month and aims to facilitate sustainable and efficient utilisation of biological resources for innovation, scaling-up and bio-manufacturing of specialty chemicals, enzymes, bio-polymers, functional foods, smart proteins, veterinary products, precision bio-therapeutics and services.

PTI
Last Updated : 12 September 2024, 15:08 IST
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Union Minister Jitendra Singh Credit: PTI Photo

4 · 8 · 855

Dr Jitendra Singh @DrJitendraSingh · Aug 27

The Statesman: New Bioeconomy policy to place India as global leader soon
#BioE3 #DBT

Read:
thestatesman.com/business/new-b...

New Bioeconomy policy to place India as global leader soon: Jitendra Singh

STATESMAN NEWS SERVICE
NEW DELHI, 26 AUGUST

Union Minister Dr Jitendra Singh has highlighted that the new Bioeconomy policy rolled out by the government is set to place India as a global leader in the years to come.

Singh was briefing about the recent Union Cabinet decision on the ambitious BioE3 (Biotechnology for Economy, Employment, and Environment) Policy, heralding a transformative shift in India's manufacturing sector.

As India emerges as a Global Biotech Powerhouse, Dr Jitendra Singh said, Prime Minister Narendra Modi will be hailed across the world as the champion of the new Biotech Boom, which promises to boost the economy, innovation, jobs, and environmental commitments.

Speaking on the surge in the Bio economy, he said "India's bio economy has experienced remarkable growth, skyrocketing from USD 10 billion in 2014 to over USD 130 billion in 2024, with projections to reach USD 300 billion by 2030. This surge reflects India's robust economic growth."

The recent policy will reignite growth spirits and position India as a potential leader in the 4th industrial revolution, he added.

"The BioE3 Policy is set to accelerate this growth trajectory, making substantial contributions to the 'Make in India' initiative by fostering the development of bio-based products with minimal carbon footprints."

According to Dr Singh the BioE3 Policy is designed to address critical global challenges such as climate change and depleting non-renewable resources by facilitating the shift from chemical-based industries to sustainable bio-based models; promoting a circular bio economy; achieving net-zero carbon emissions through innovative waste utilization from biomass, landfills, and greenhouse gases and; encouraging the development of bio-based products and expanding job creation.

The policy encourages entrepreneurship across diverse sectors, including bio-based chemicals, smart proteins, precision bio therapeutics, climate-resilient agriculture, and carbon capture. It establishes cutting-edge bio manufacturing facilities, bio foundry clusters, and Bio-AI hubs, he added.

Understanding the importance of biomanufacturing hubs, Dr Singh highlighted that it will serve as centralised facilities crucial for the production, development, and commercialisation of bio-based products.

He said "These hubs will bridge the gap between laboratory-scale and commercial-scale manufacturing, fostering collaboration among startups, SMEs, and established manufacturers."

3 · 43 · 95 · 3.7K

3. SOCIAL MEDIA COVERAGE

3.2 HON'BLE MINISTER'S POST

Dr Jitendra Singh @DrJitendraSingh · Aug 31

Released India's pathbreaking new #BioE3 Policy —Biotechnology for Economy, Environment & Employment. An initiative which will propel India towards global leadership in the next Industrial Revolution, fostering sustainable 1/2

3 · 35 · 84 · 5.1K

Dr Jitendra Singh @DrJitendraSingh · Aug 31

growth and employment.
Grateful to PM Shri @narendramodi for envisioning the future of #BioEconomy 2/2

8 · 20 · 1.9K

Dr Jitendra Singh @DrJitendraSingh · Sep 13

The Week: #BioE3 policy will usher in bio-revolution in India
#DBT

From theweek.in

2 · 6 · 521

Dr Jitendra Singh @DrJitendraSingh · Aug 27

Dev Discourse: India Unveils #BioE3 Policy to Lead Global Bioeconomy and Drive Sustainable Growth
#DBT

From devdiscourse.com

6 · 10 · 930

Dr Jitendra Singh @DrJitendraSingh · Aug 27

United News of India: नयी जैव-अर्थव्यवस्था नीति भारत को अग्रणी स्थानी दिलायेगी
#DBT

Read:
univarta.com/the-new-bio-ec...

नयी जैव-अर्थव्यवस्था नीति भारत को अग्रणी स्थानी दिलायेगी: डॉ जितेंद्र सिंह

नयी दिल्ली, 26 अगस्त (वार्ता) विज्ञान एवं प्रौद्योगिकी मंत्री डॉ जितेन्द्र सिंह ने कहा है कि सरकार द्वारा शुरू की गयी नयी जैव - अर्थव्यवस्था नीति आने वाले वर्षों में भारत को इस क्षेत्र में अग्रणी देश के रूप में स्थापित करेगी।

श्री सिंह ने कहा कि इसके लिये अंतरराष्ट्रीय मानकों के साथ जुड़ते हुये नैतिक जैव सुरक्षा संबंधी विचारों और वैश्विक नियामकीय सामंजस्य पर नये सिरे से ध्यान दिया जा रहा है।

डॉ सिंह ने मीडिया चैनल से बातचीत में कहा कि केंद्रीय मंत्रिमंडल ने पिछले सप्ताह जिस जैव अर्थव्यवस्था नीति- बायो-ई3 (इकोनॉमी, एम्प्लायमेंट और एनवायरानमेंट) यानी जैवप्रौद्योगिकी पर विकसित अर्थव्यवस्था, रोजगार और पर्यावरण को मंजरी दी है, वह भारत को इस क्षेत्र में नेतत्वकारी भमिका दिलाने में सहायक होगी।

Dr Jitendra Singh @DrJitendraSingh · Aug 27

InSamachar: नई जैव- अर्थव्यवस्था नीति आने वाले वर्षों में भारत को वैश्विक लीडर के तौर पर स्थापित करेगी
#DBT

Read:
insamachar.com/new-bio-econom...

नई जैव- अर्थव्यवस्था नीति आने वाले वर्षों में भारत को वैश्विक लीडर के तौर पर स्थापित करेगी: केन्द्रीय मंत्री डॉ. जितेन्द्र सिंह

4 · 18 · 1K

3. SOCIAL MEDIA COVERAGE

3.2 HON'BLE MINISTER'S POST

Dr Jitendra Singh
@DrJitendraSingh

With the Union Cabinet's approval led by PM Sh @NarendraModi, the #BIOE3 Policy 2024 is set to transform biotech by intensifying research, scaling up facilities, and advancing capabilities. Get ready for a new era of innovation!
#DBT

1:24 PM · Aug 28, 2024 · **8,273** Views

6 68 98 2

Dr Jitendra Singh @DrJitendraSingh · Aug 27
The Statesman: New Bioeconomy policy to place India as global leader soon
#BioE3 #DBT

Read:
thestatesman.com/business/new-b...

New Bioeconomy policy to place India as global leader soon: Jitendra Singh

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"The BioE3 Policy is set to accelerate this growth trajectory, making substantial contributions to the 'Make in India' initiative by fostering the development of bio-based products with minimal carbon footprints."

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He said "These hubs will bridge the gap between laboratory-scale and commercial-scale manufacturing, fostering collaboration among startups, SMEs, and established manufacturers."

3 43 95 3.7K

Dr Jitendra Singh @DrJitendraSingh · Aug 27
Dainik Jagran: गेम चेंजर साबित होगी नई #BioE3 नीति
#DBT

From jagran.com

11 26 1.6K

3. SOCIAL MEDIA COVERAGE

3.2 HON'BLE MINISTER'S POST

3. SOCIAL MEDIA COVERAGE

3.2 HON'BLE MINISTER'S POST

3. SOCIAL MEDIA COVERAGE

3.3 DEPARTMENT OF BIOTECHNOLOGY'S POST

3. SOCIAL MEDIA COVERAGE

3.3 DEPARTMENT OF BIOTECHNOLOGY'S POST

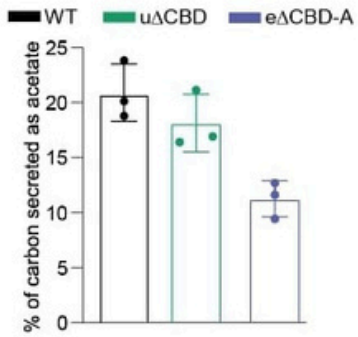
3. SOCIAL MEDIA COVERAGE

3.3 DEPARTMENT OF BIOTECHNOLOGY'S POST

3. SOCIAL MEDIA COVERAGE

3.3 DEPARTMENT OF BIOTECHNOLOGY'S POST

Acetate production is a common obstacle for useful metabolite production using E. coli."



Carbon conservative nature of the optimized bd oxidase deficient strain

Boss demands, I deliver!

BioE3 Policy

(Biotechnology for Economy, Environment and Employment) 2024

Department of Biotechnology
Ministry of Science & Technology
Government of India

The policy seeks to achieve this by harnessing the power of biotechnology, and developing new manufacturing methods that replicate, or mimic, processes found in natural biological systems.

11

3. SOCIAL MEDIA COVERAGE

3.3 DEPARTMENT OF BIOTECHNOLOGY'S POST

Department of Biotechnology
24,678 followers
1w •

National competition to spread awareness on the #BioE3Policy launched virtually by Dr Rajesh Gokhale, Secy Department of Biotechnology at BRIC- Institute of Life Sciences, Bhubaneswar. We invite biotech students & scholars to participate & demonstrate their talent.

Rajesh Gokhale Abhay Karandikar
Department of Biotechnology #IndiaDST
Biotechnology Industry Research Assistance Council (BIRAC)

Mohit Kumar Vats and 128 others
2 comments • 10 reposts

Like Comment Repost

Organic impressions: 5,903 Impressions
Preview results

3. SOCIAL MEDIA COVERAGE

3.3 DEPARTMENT OF BIOTECHNOLOGY'S POST

Department of Biotechnology
24,678 followers
3d •

Dr. Alka Sharma discussed the #BioE3 policy's key features on DD Morning Show and outlined the policy's potential to enhance India's bioeconomy, tackle climate change, and create new employment opportunities.
Watch the full episode here: https://lnkd.in/gj2fDm2P

Rajesh Gokhale

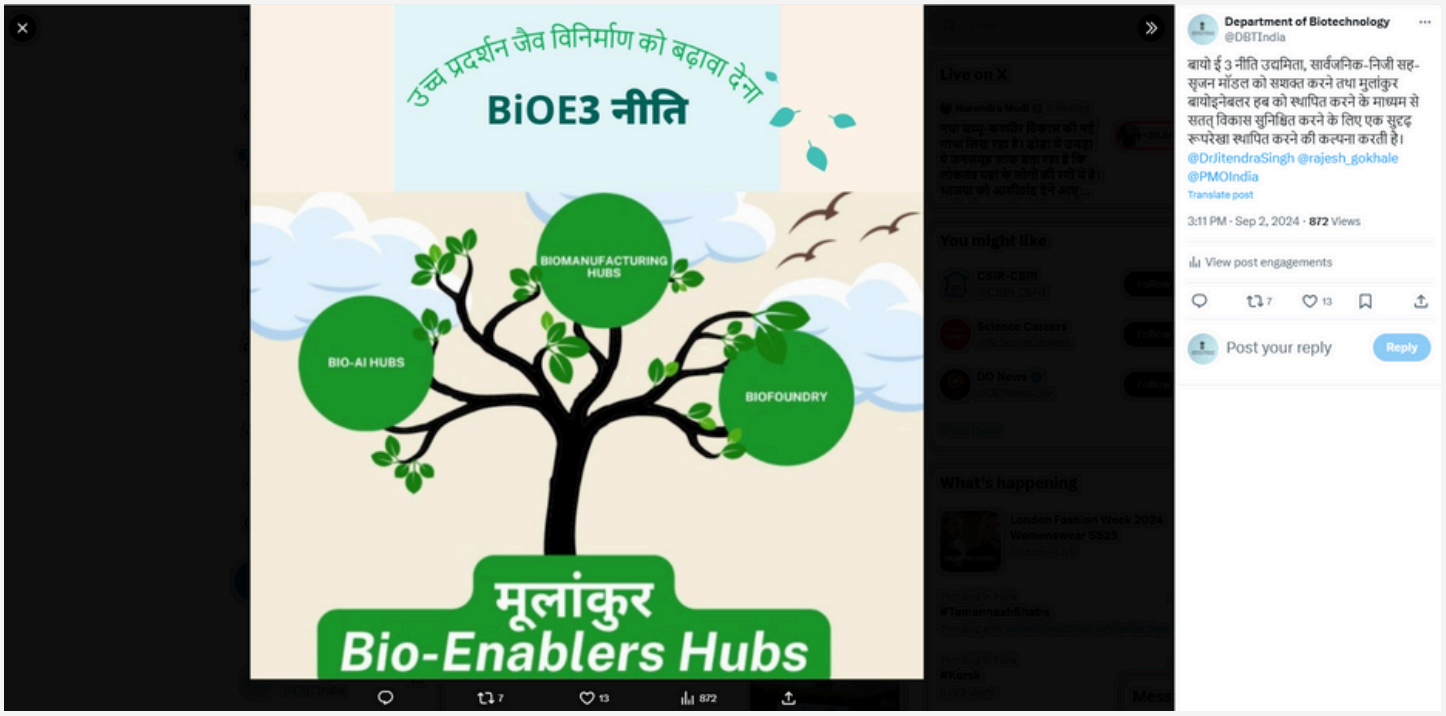
Mohit Kumar Vats and 34 others

Like Comment Repost

Organic impressions: 2,382 Impressions Preview results

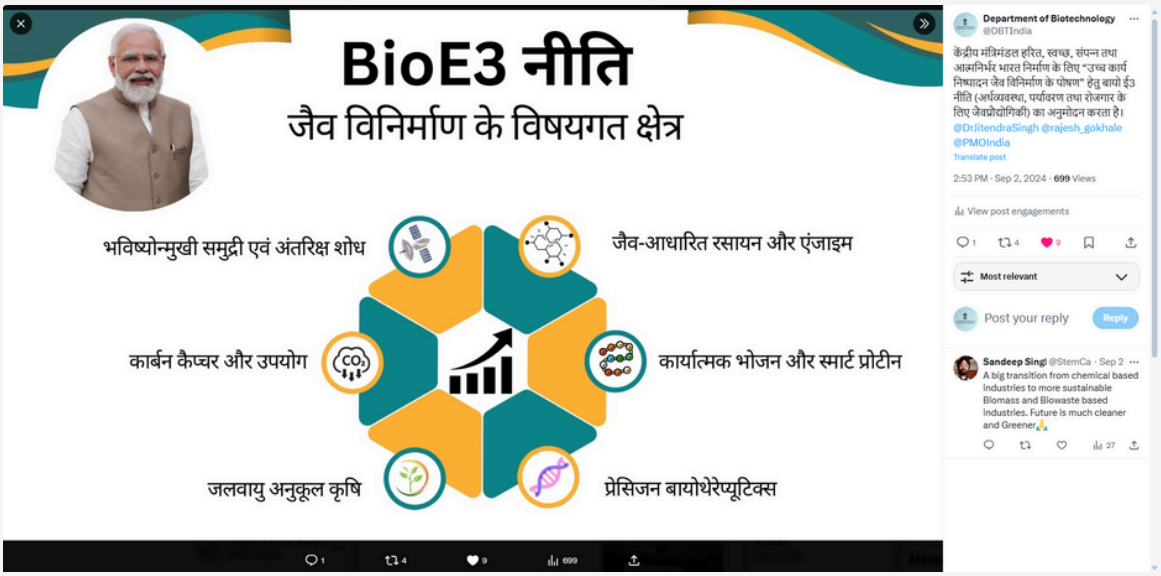
3. SOCIAL MEDIA COVERAGE

3.3 DEPARTMENT OF BIOTECHNOLOGY'S POST



3. SOCIAL MEDIA COVERAGE

3.3 DEPARTMENT OF BIOTECHNOLOGY'S POST



3. SOCIAL MEDIA COVERAGE

3.3 DEPARTMENT OF BIOTECHNOLOGY'S POST

Global Bio India reposted

Science Media Communication Cell (SMCC) @SMCC_NIScPR · 5h

"@GlobalBioIndia is the biggest platform where all the people of biotech including incubators, policymakers, innovators and idea makers come together and make bio-revolution happen." - Dr. @rajesh_gokhale, Secretary @DBTIndia
@BIRAC_2012 @DBT_inStem @CSIR_IND #GlobalBioIndia2024

4 7 375

Global Bio India @GlobalBioIndia · 3h

We are looking at polylactic acid to be developed indigenously from sugar based feedstock. These are well proven to be compostable and are environmental friendly alternatives to polyethylene and polypropylene based plastics

At the backdrop of Bio-E3 policy, we are looking at a
Show more

Praj Industries Ltd. and Anand Ghosalkar

1 1 172

3. SOCIAL MEDIA COVERAGE

3.3 DEPARTMENT OF BIOTECHNOLOGY'S POST

3. SOCIAL MEDIA COVERAGE

3.3 DEPARTMENT OF BIOTECHNOLOGY'S POST

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3.3 DEPARTMENT OF BIOTECHNOLOGY'S POST

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3.3 DEPARTMENT OF BIOTECHNOLOGY'S POST

3. SOCIAL MEDIA COVERAGE

3.4 VIDEO POSTS BY STAKEHOLDERS

3. SOCIAL MEDIA COVERAGE

3.4 VIDEO POSTS BY STAKEHOLDERS

Department of Biotechnology @DBTIndia · Sep 11

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Watch the full episode here: youtu.be/XnGw7oaDPGo?si...

Dr Jitendra Singh and Rajesh Gokhale

2 18 809

BRIC-NCCS @DBT_NCCS_Pune · Aug 31

Today, our faculty member, Dr.@PrasadAbnave, offers a glimpse at what the #scientific community could expect from the **#BioE3** policy.

#bioe3policy #biotechnology #economy #environment #employment #CabinetDecisions
@PMOIndia @OfficeOfDrJS @rajesh_gokhale @SharmilaBapat @DBTIndia

4 15 998

3. SOCIAL MEDIA COVERAGE

3.4 VIDEO POSTS BY STAKEHOLDERS

3. SOCIAL MEDIA COVERAGE

3.4 VIDEO POSTS BY STAKEHOLDERS

CSIR-NIScPR
@CSIR_NIScPR

"By converting agricultural biomass into ethanol, we are not only reducing waste but also adding significant value for farmers." - Ramesh V. Sonti, Director, @ICGEBNewDelhi
@ICGEB @DBTIndia @ICGEBBioenergy
#biofuels #ethanol #stubble #agriculturesafety

3:31 PM · Aug 20, 2024 · **485** Views

4 7

3. SOCIAL MEDIA COVERAGE

3.4 VIDEO POSTS BY STAKEHOLDERS

CATALIZING BIO INNOVATION : THE BIO E3 INITIATIVE | Dr G TARU SHARMA

AIRHyderabad 44.6K subscribers Subscribe 14 Share Download

3. SOCIAL MEDIA COVERAGE

3.4 VIDEO POSTS BY STAKEHOLDERS

3. SOCIAL MEDIA COVERAGE

3.4 VIDEO POSTS BY STAKEHOLDERS

3. SOCIAL MEDIA COVERAGE

3.4 VIDEO POSTS BY STAKEHOLDERS

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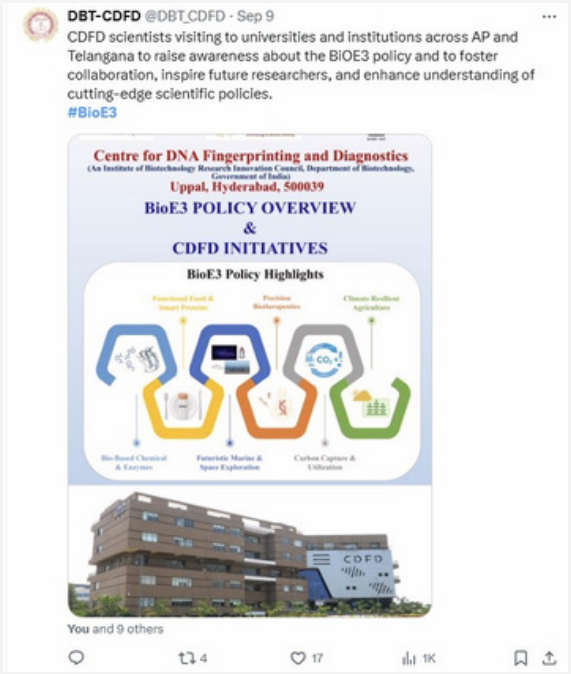
3.4 VIDEO POSTS BY STAKEHOLDERS

3. SOCIAL MEDIA COVERAGE

3.4 VIDEO POSTS BY STAKEHOLDERS

3. SOCIAL MEDIA COVERAGE

3.5 DBT INSTITUTE'S POST



3. SOCIAL MEDIA COVERAGE

3.5 DBT INSTITUTE'S POST

DBT-RGCB @RGCB_Trivandrum · Sep 10

RGCB conducted a panel discussion on **#BioE3**, a newly announced policy of the Government of India at RGCB
The YouTube link to the discussion: youtu.be/Nq_FsjX1qgI
@PMOIndia
@DrJitendraSingh
@rajesh_gokhale
@ChandrabhasN
@DBTIndia
@IndiaDST

youtube.com
RGCB BioE3 POLICY

1 · 1 · 184

DBT-RGCB @RGCB_Trivandrum · Sep 6

#RGCB conducted a panel discussion on **#BioE3**, a new policy of the GoI. Dr G Padmanaban (IISc Bengaluru), Dr Ram Rajasekhar (CUTN, Thiruvarur), Dr T R Santhosh Kumar (RGCB), & Dr K Ampady (CEO, Bio-Nest) were the panelists
@DrJitendraSingh
@rajesh_gokhale
@DBTIndia
@IndiaDST

1 · 1 · 215

3. SOCIAL MEDIA COVERAGE

3.5 DBT INSTITUTE'S POST

3. SOCIAL MEDIA COVERAGE

3.5 DBT INSTITUTE'S POST

3. SOCIAL MEDIA COVERAGE

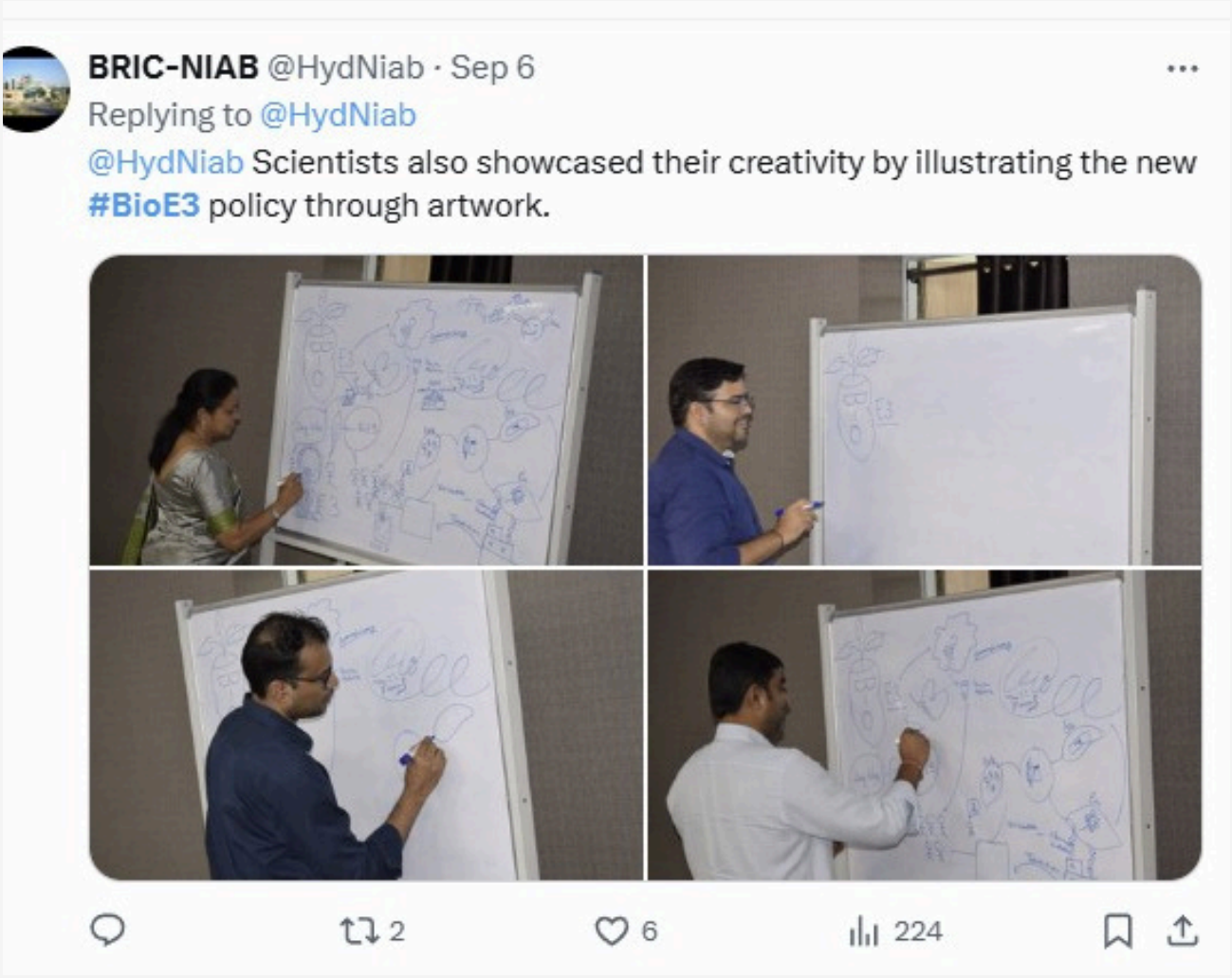
3.5 DBT INSTITUTE'S POST

BRIC-ILS @DBT_ILS · 1h

Dr. Rajesh S Gokhale, Secretary @DBTIndia, launched the **#BioE3** Policy Awareness Campaign Competition for students & researchers across the sector in India. The online creative activity is hosted by @DBTIndia in association with @DBT_ILS , Bhubaneswar. @Ddash_Debasis

3. SOCIAL MEDIA COVERAGE

3.5 DBT INSTITUTE'S POST



3. SOCIAL MEDIA COVERAGE

3.5 DBT INSTITUTE'S POST

DBT-CDFD @DBT_CDFD · Sep 5

Our Series of Open Days was a hit! Students connected with researchers and also explored the BioE3 policy of the Government of India.

#BioE3 #ScienceEducation #Outreach

You and Ullas Kolthur

2 186

3. SOCIAL MEDIA COVERAGE

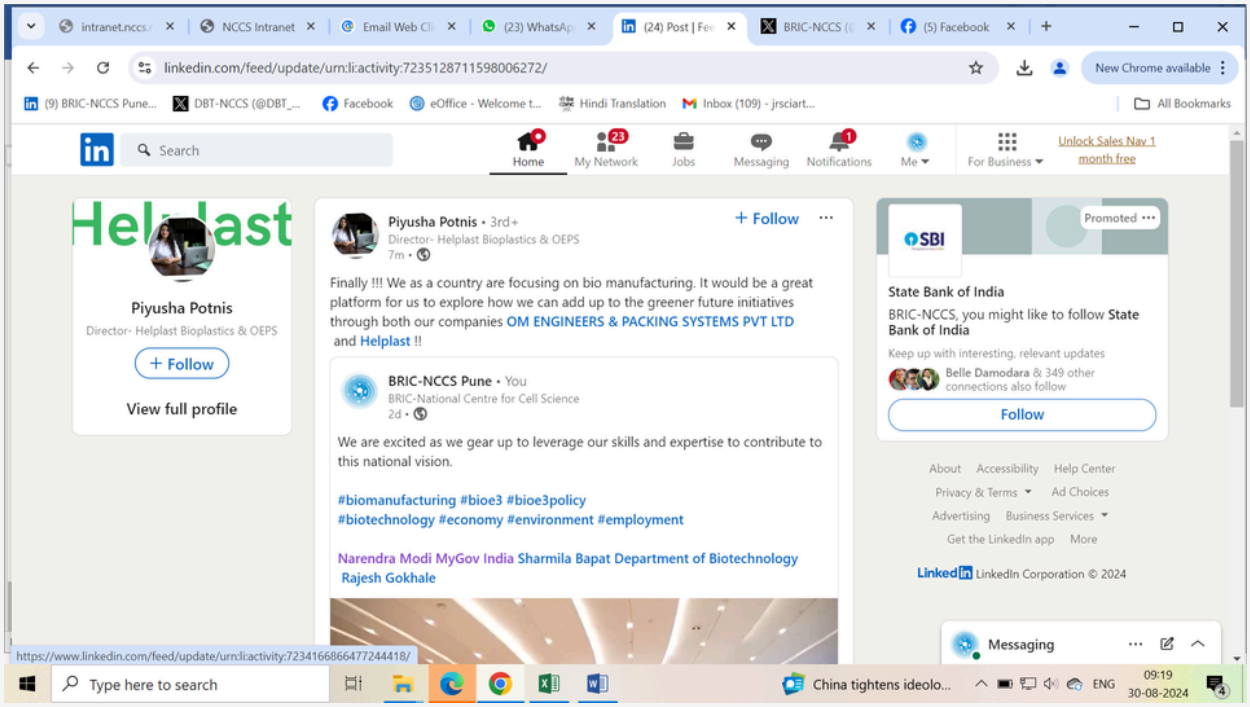
3.5 DBT INSTITUTE'S POST

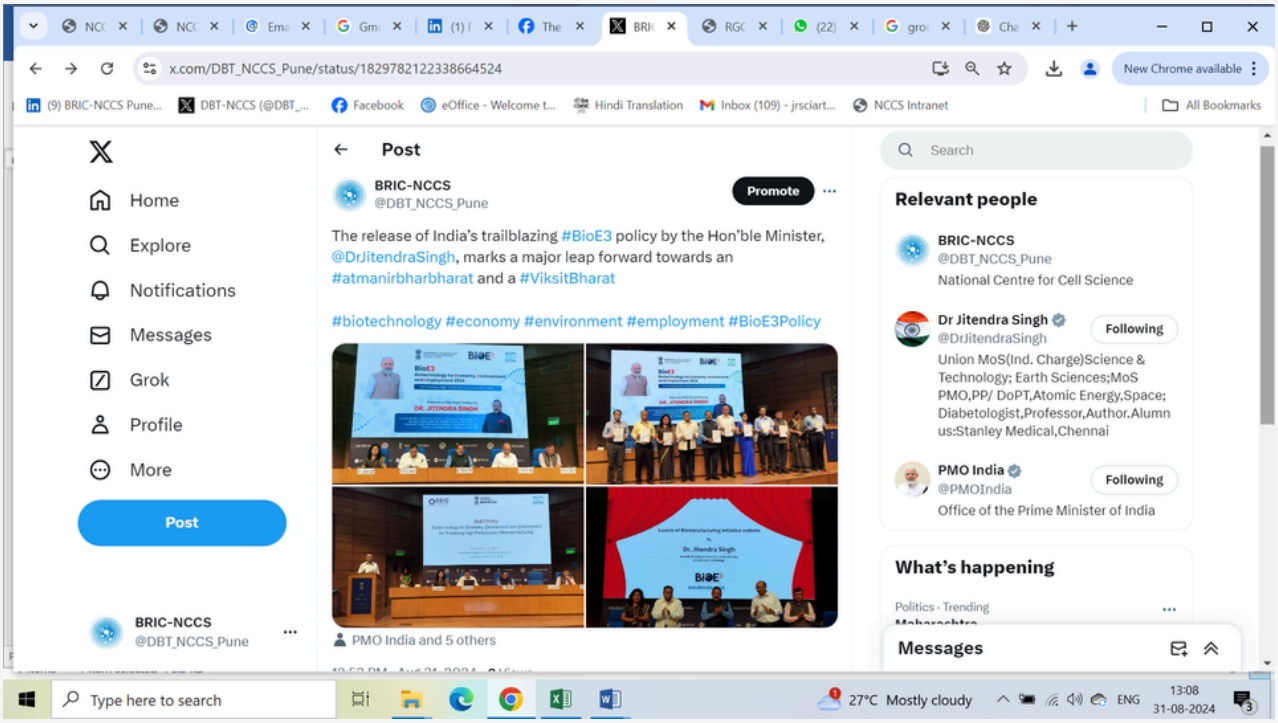
3. SOCIAL MEDIA COVERAGE

3.5 DBT INSTITUTE'S POST

3. SOCIAL MEDIA COVERAGE

3.5 DBT INSTITUTE'S POST





3. SOCIAL MEDIA COVERAGE

3.5 DBT INSTITUTE'S POST

3. SOCIAL MEDIA COVERAGE

3.5 DBT INSTITUTE'S POST

DBT-CDFD
@DBT_CDFD

The Informative Session on BioE3 Policy to be jointly organised by Centre for DNA Fingerprinting and Diagnostics and University of Hyderabad on 4th September 2024.

#BioE3Policy #BioE3

@PMOIndia @DrJitendraSingh @rajesh_gokhale @DBTIndia @HydUniv @UllasKolthur

1:26 PM · Sep 3, 2024 · **926** Views

4 7

3. SOCIAL MEDIA COVERAGE

3.5 DBT INSTITUTE'S POST

BRIC-National Institute of Immunology
64,583 followers
2w •

#BioE3 is positioning India as a global leader in biomanufacturing, aiming for significant bioeconomy milestones.

With a focus on #innovation-driven R&D, #GreenGrowth, and #Entrepreneurship, this initiative will foster sustainability for a #ViksitBharat & #SustainableFuture

You and 40 others 4 reposts

Like Comment Repost Send

BRIC-National Institute of Immunology
64,583 followers
2w •

Dive into the discussion on the BioE3 policy and bioeconomy as experts on Akashvani AIRNews break down the policy's features, impact and future.

#BioE3 #Bioeconomy Department of Biotechnology

Tune in now!
https://lnkd.in/e6NF5Vhm

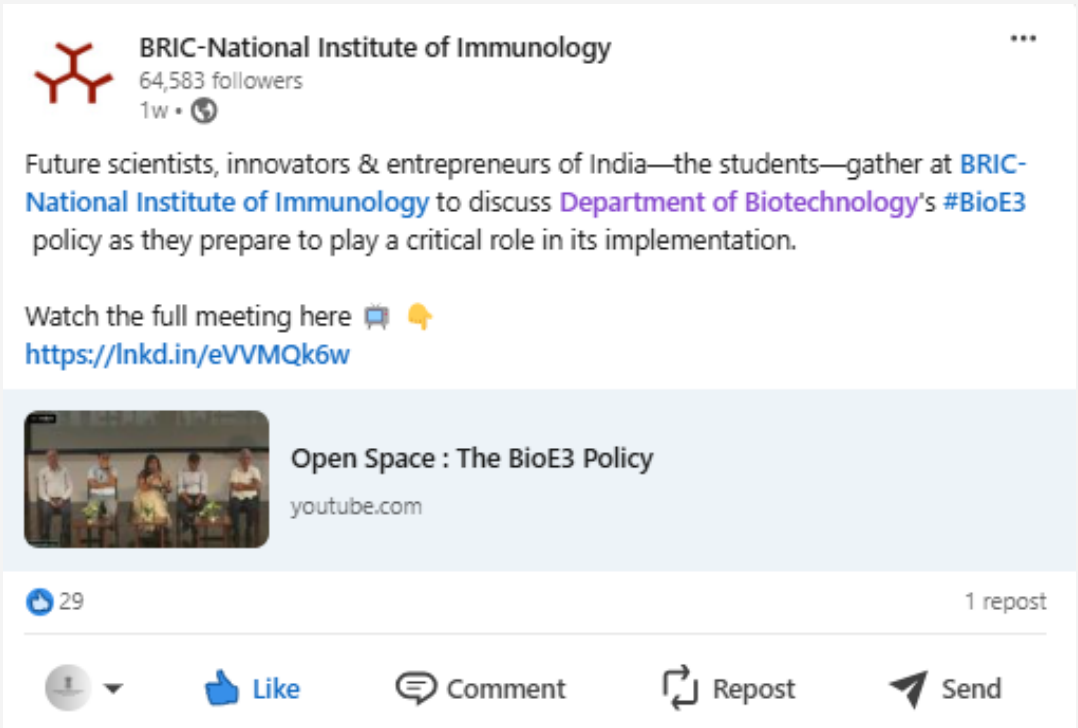
Discussion on BioE3 Policy.
youtube.com

21

Like Comment Repost Send

3. SOCIAL MEDIA COVERAGE

3.5 DBT INSTITUTE'S POST

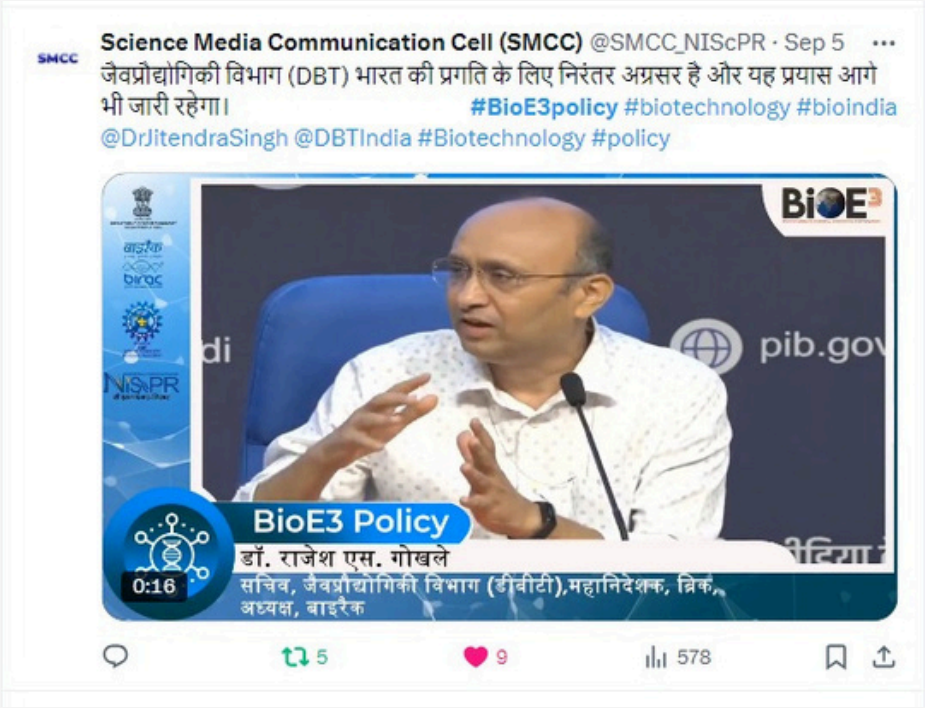


3. SOCIAL MEDIA COVERAGE

3.5 DBT INSTITUTE'S POST

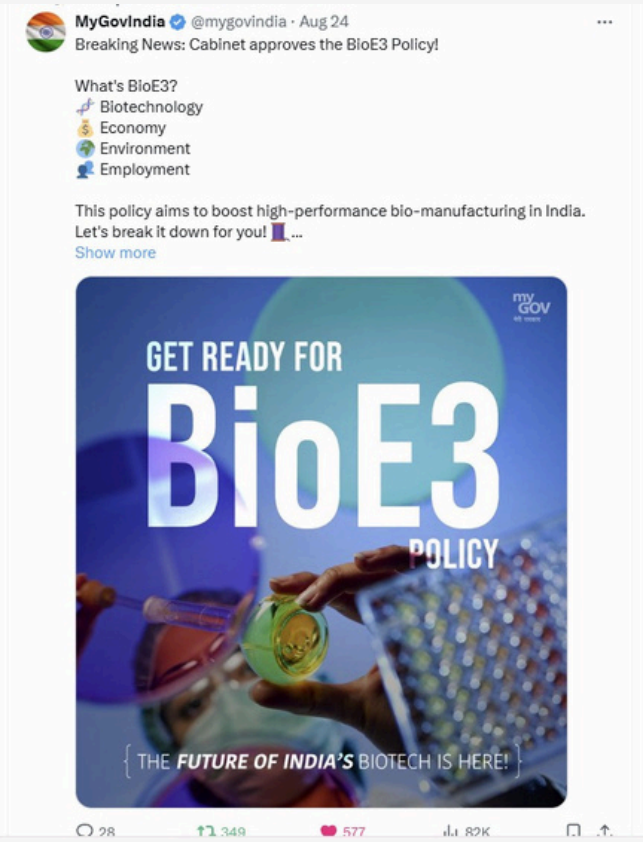
3. SOCIAL MEDIA COVERAGE

3.5 DBT INSTITUTE'S POST



3. SOCIAL MEDIA COVERAGE

3.6 POSTS FROM OTHER MINISTRIES



3. SOCIAL MEDIA COVERAGE

3.6 POSTS FROM OTHER MINISTRIES

MoES GoI @moesgoi · Aug 24

Driving innovation for a sustainable future! The Cabinet under PM Shrig @NarendraModi ji approves the '#BioE3 Policy for Fostering High-Performance Biomanufacturing,' boosting biotechnology for the economy, environment, and employment.

Read More: pib.gov.in/PressReleseDet...
Show more

1 2 4 392

3. SOCIAL MEDIA COVERAGE

3.6 POSTS FROM OTHER MINISTRIES

Invest India @investindia · Aug 29

#BioE3 policy is here to promote high-performance #biomanufacturing in #NewIndia with a focus on:

🧬 Biotechnology
💰 Economy
🌍 Environment
👥 Employment

We are your gateway to the future of #biotechnology. Let's explore more here: bit.ly/II-Biotech...
Show more

You and 6 others

5 6 704

3. SOCIAL MEDIA COVERAGE

3.6 POSTS FROM OTHER MINISTRIES

3. SOCIAL MEDIA COVERAGE

3.6 POSTS FROM OTHER MINISTRIES

3. SOCIAL MEDIA COVERAGE

3.6 POSTS FROM OTHER MINISTRIES

All India Radio News @airnewsalerts · Aug 31

Science & Technology Minister @DrJitendraSingh releases the Biotechnology for Economy, Environment and Employment (#BioE3) policy 2024 in Delhi.

Dr Singh says that this policy will foster high-performance bio manufacturing in the country. He also says, future economy of the

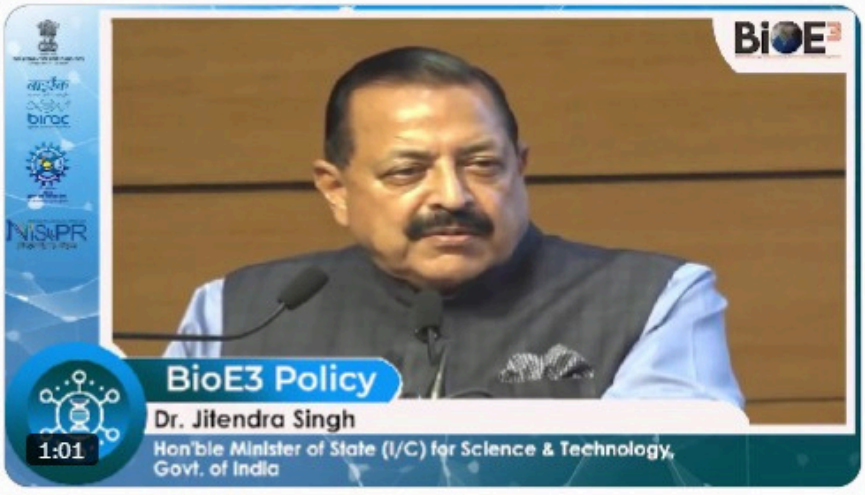
Show more

3 11 37 2.5K

CSIR-NIScPR @CSIR_NIScPR · Sep 3

"The future economy will be Bio-driven. India will lead the #Bioeconomy revolution, leveraging unexplored resources & biomanufacturing potential, unlike the West-led IT revolution." - @DrJitendraSingh, Hon'ble Minister of S&T at the launch of #BioE3 Policy

@DBTIndia @BIRAC_2012



6 9 1.9K

3. SOCIAL MEDIA COVERAGE

3.6 POSTS FROM OTHER MINISTRIES

PIB India @PIB_India · Sep 1

Union Minister @DrJitendraSingh formally released new #BioE3 policy, hailed India as global torch bearer of next Industrial Revolution & thanked PM @narendramodi for his support

BioE3 policy will a prove to a milestone not only for bio economy but a game changer for Viksit

Show more

1 9 33 3.7K

PIB in Tamil Nadu @pibchennai · Sep 6

The Vartalap, media orientation program on BIOE3 (Biotechnology for Economy, Environment, and Employment), organized by @pibchennai, was a great success! 🎉

🗞️ Journalists engaged in dynamic discussions on policies to foster high-performance biomanufacturing.

#BIOE3 #Biotech

You and 8 others

1 1 262

3. SOCIAL MEDIA COVERAGE

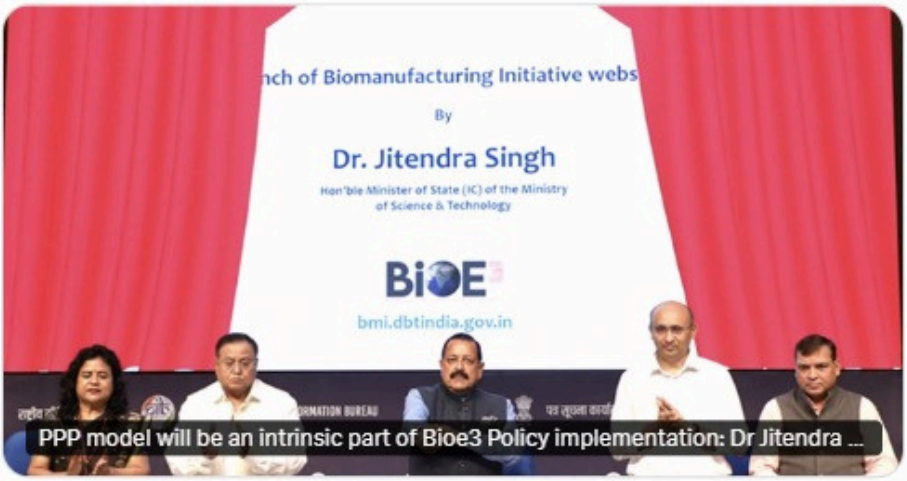
3.6 POSTS FROM OTHER MINISTRIES

BioVoice News @BiovoiceNews · Sep 2

BIO-POLICY: "#BioE3 policy will prove to be a milestone not only for the bioeconomy but a game changer for Viksit Bharat by 2047," stated @DrJitendraSingh, MoS-S&T at the release of new bioeconomy policy.

Details: biovoicenews.com/ppp-model-will... via #BiovoiceNews

@DBTIndia @BIRAC_2012



From biovoicenews.com

1 2 94

DD Tamil News @DDTamilNews · Aug 24

#CabinetDecisions | #BioE3 கொள்கை - மத்திய அமைச்சரவை ஒப்புதல்.

@AshwiniVaishnaw @DrJitendraSingh @IndiaDST @MIB_India @pibchennai

1 2 134

3. SOCIAL MEDIA COVERAGE

3.7 POSTS FROM INFLUENCERS AND OTHERS

Yelagandula Ramesh
@yelagandula_ram

CDFD scientists organized an awareness program at NIT Warangal about BioE3 policy of DBT, Government of India. #BioE3 @NITWarangalOff1@warangal_nit @DBT_CDFD @UllasKolthur @DBTIndia @nandineni99 @AshwinDalal9 @LcdcsCDFD @maddika_s @yathishJachar

11:11 AM · Sep 8, 2024 · **1,711** Views

8 12

The Good Food Institute India @GoodFoodIndia · Aug 28

India just took a giant leap towards a sustainable future!🚀

The #BioE3 policy is set to foster high-performance biomanufacturing for Viksit Bharat. Find out what this means for India's smart protein sector: greenqueen.com.hk/india-bioe3-bi...

By providing dedicated R&D and innovation support, the BioE3 policy will accelerate the development of new technologies and processes that can pave the way towards the nutrition, price, and taste parity of smart protein products, making them a truly competitive alternative to their animal-derived counterparts.

Sneha Singh
Managing Director (Acting),
The Good Food Institute India

1 2 7 554

Yelagandula Ramesh @yelagandula_ram · Sep 9

Scientists from CDFD had an engaging interaction with the young researchers and faculty from the Mahatma Gandhi University, Nalgonda on BioE3 policy of DBT. #BioE3 @DBT_CDFD @DBTIndia @UllasKolthur @nandineni99 @AshwinDalal9

1 7 14 931

Gitanjali Yadav @gilienv · Sep 8

Tackling Queries, Doubts & apprehensions of inquisitive undergrads+ teachers of @Delhiuniversit on India's new #BioE3 policy; the futuristic #BioVision being viewed as India's #BioRevolution!

w/ @deb030903 @rajesh_gokhale @NIPGRsocial @NImmunology @PrinSciAdvGol @ICGEBNewDelhi

You and 8 others

1 1 16 1.3K

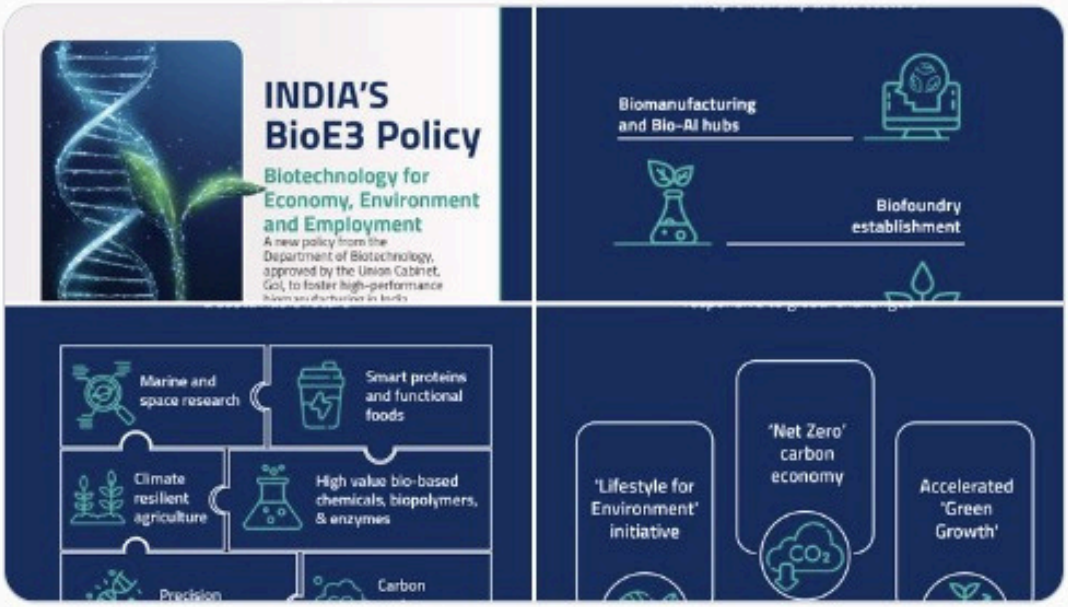
3. SOCIAL MEDIA COVERAGE

3.7 POSTS FROM INFLUENCERS AND OTHERS

IKP Knowledge Park @IKP_SciencePark · Aug 29

Exciting times for India's #biotech future!

The new #BioE3 policy is set to revolutionize #biomanufacturing, drive #sustainability, and create jobs. Swipe to explore key features, target sectors, and it's impact on our future. What are your thoughts? Comment below!



You and 9 others

1 3 4 165

3. SOCIAL MEDIA COVERAGE

3.7 POSTS FROM INFLUENCERS AND OTHERS

3. SOCIAL MEDIA COVERAGE

3.7 POSTS FROM INFLUENCERS AND OTHERS

3. SOCIAL MEDIA COVERAGE

3.7 POSTS FROM INFLUENCERS AND OTHERS

3. SOCIAL MEDIA COVERAGE

3.7 POSTS FROM INFLUENCERS AND OTHERS

Phillips Education @phillipsedu2 · Aug 27

Proud to witness India's journey toward becoming a global biomanufacturing leader! This is a significant leap for our bioeconomy and a brighter, greener future.

159

S Venkata Mohan @SVenkataMohan2 · Aug 27

Biomanufacturing of specialty chemicals will provide an ample scope and impact on the sustainability in wide industrial sectors comprehensively addressing the climate change issues. # BioE3 @PMOIndia @DBTIndia @Csir

1 2 83

Jitendra Shukla @drjitendra18 · Aug 27

This is excellent initiative which will boon the bioeconomy from the rich Bioresources of the North-East region of India.@DrJitendraSingh @ibsd

15

Evanylla Kharlyngdoh @EvanyllaK · Aug 27

Great initiative by India.
The BioE3 policy will transform India's manufacturing sector towards innovative & sustainable bioeconomy, green growth & entrepreneurial boost.
Looking forward towards BioE3 policy implementation for a bright Viksit Bharat.@DrJitendraSingh and @DBT_IBSD

3. SOCIAL MEDIA COVERAGE

3.7 POSTS FROM INFLUENCERS AND OTHERS

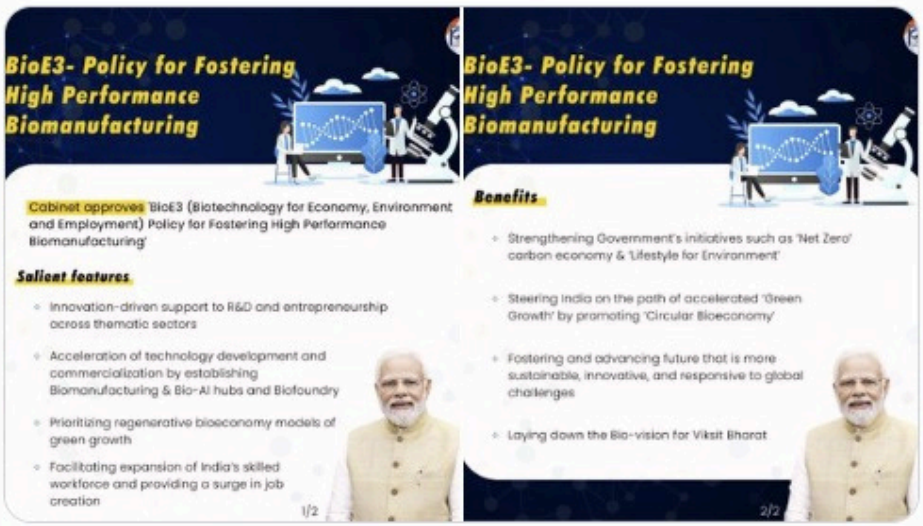
3. SOCIAL MEDIA COVERAGE

3.7 POSTS FROM INFLUENCERS AND OTHERS

Dr. Rutvij Patel @DrRutvij · Aug 24

Union Cabinet under the leadership of Hon'ble PM Shri @narendramodi ji approves '#BioE3 (Biotechnology for Economy, Environment and Employment) Policy for Fostering High Performance Biomanufacturing'.

#CabinetDecisions



2 4 213

TIDES, IIT Roorkee
7,023 followers
20h • Edited •

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BioE3 Policy: A Game-Changer for a Sustainable Future

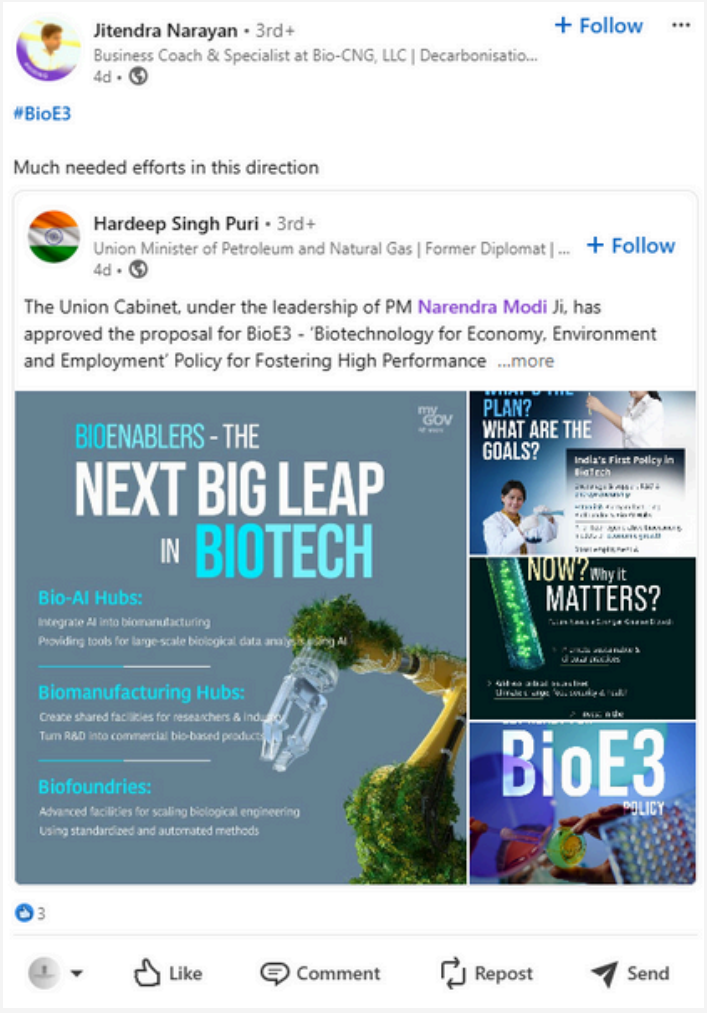
Ready to revolutionize the biotech industry? The BioE3 policy is paving the way for a more sustainable future with its focus on high-performance biomanufacturing.
Key areas of focus:
Sustainable materials: Biopolymers, enzymes, and bio-based chemicals
Precision health: Biotherapeutics and functional foods
Climate action: Resilient agriculture, carbon capture, and marine/space research
Let's work together to create a more sustainable world.

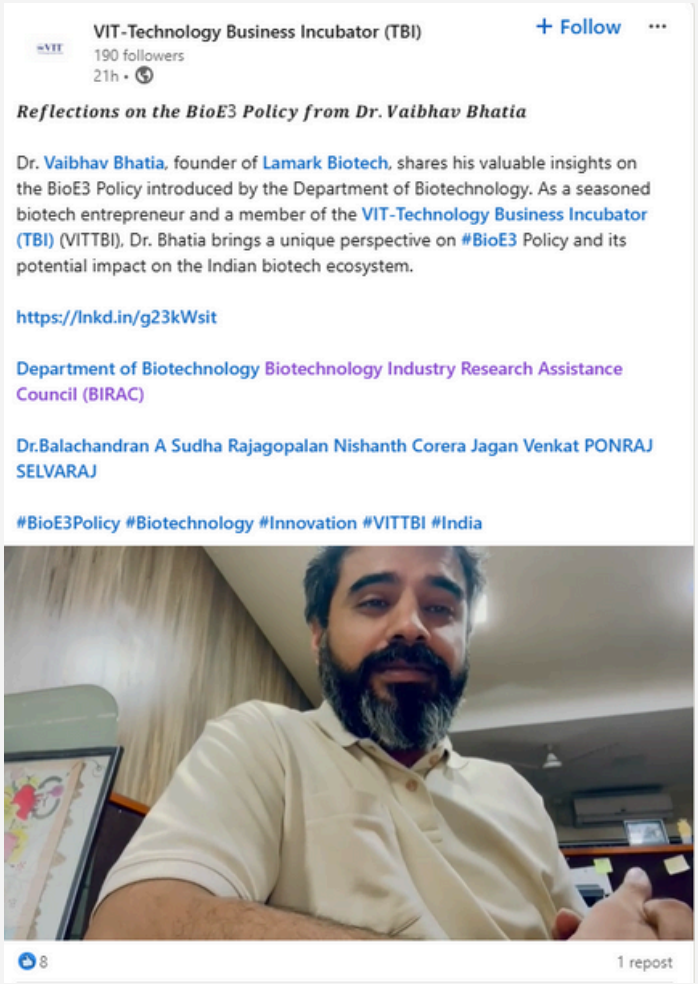
Indian Institute of Technology, Roorkee | Rajesh Gokhale | Jitendra Kumar | CEO, TIDES IIT Roorkee | Department of Biotechnology | Biotechnology Industry Research Assistance Council (BIRAC) | Manish Diwan | Chhaya Chauhan | Sonia Gandhi | Rekha Sharma

#GreenTech #Sustainability #Biotech #BioE3 #ClimateAction #PrecisionHealth #Innovation #FutureForward

3. SOCIAL MEDIA COVERAGE

3.7 POSTS FROM INFLUENCERS AND OTHERS





4. DIGITAL MEDIA COVERAGE

Ministry of Science & Technology

S&T Minister Dr. Jitendra Singh formally releases new BioE3 policy, hails India as global torch bearer of next Industrial Revolution thanked PM Sh Narendra Modi for his support

BioE3 policy will a prove to a milestone not only for bio economy but a game changer for Viksit Bharat @2047

"As India emerges as a Global Biotech Powerhouse, Prime Minister Narendra Modi will be hailed across the world as the champion of new Biotech Boom" says Union Minister Dr. Jitendra Singh

PPP model will be an intrinsic part of Bioe3 Policy implementation incentivizing industry to promote employment generation

India's bio economy skyrockets from $10 billion in 2014 to over $130 billion in 2024, with projections to reach $300 billion by 2030: Dr. Singh

Posted On: 31 AUG 2024 6:22PM by PIB Delhi

Formally releasing the pathbreaking new Bioeconomy policy at National Media Centre here today, Union Minister of State (IC) Science & Technology, Dr. Jitendra Singh hailed India as the global torchbearer of the next Industrial Revolution. He thanked PM Sh Narendra Modi for his support.

"BioE3 policy will prove to be a milestone not only for the bio economy but a game changer for Viksit Bharat @2047" said Dr. Jitendra Singh.

The Bio E3 policy was recently approved by the Union Cabinet chaired by Prime Minister Narendra Modi. The policy is aimed at 'Fostering High Performance Biomanufacturing' aligned with National initiatives of the government of India such as 'Net Zero' carbon economy and Mission LiFE(Lifestyle for environment).

Addressing the release ceremony, Union Minister of State (Independent Charge) for Science and Technology, Minister of State (Independent Charge) for Earth Sciences, MoS PMO, Department of Atomic Energy, Department of Space, Personnel, Public Grievances and Pensions, Dr. Jitendra Singh said "As India emerges as a Global Biotech Powerhouse, Prime Minister Narendra Modi will be hailed across the world as the champion of new Biotech Boom" going further he emphasised that Bharat has an innovative, competitive and a rapidly growing biotech industry.

The Science and Technology Minister said "BioE3 policy will have a momentous impact on various sectors like food, energy and health". He also highlighted the six thematic themes which were 1. Bio-based chemicals and enzymes; 2. Functional foods and Smart proteins; 3. Precision biotherapeutics; 4. Climate resilient agriculture; 5. Carbon capture and its utilisation; 6. Futuristic marine and space research.

Reiterating the success achieved in Space and bio-economy sectors the Minister underscored that the PPP model will be an intrinsic part of Bioe3 Policy implementation incentivizing industry to promote employment generation.

According to Dr. Jitendra Singh "Bio-manufacturing and Bio-foundry will drive India's future bioeconomy and promote "Green Growth". He categorically remarked that "After a policy shift under Prime Minister Shri Narendra Modi, Biotechnology research and Bio StartUps are prioritised and have been centre stage".

"It is the best time for Bio-Technology, highlighting the progress of biotechnology in India". He also emphasised India 's resources and said "India has a huge wealth of bioresources, an unsaturated resource waiting to be harnessed and an advantage in Biotechnology especially due to the vast biodiversity and the unique bioresources in the Himalayas. Then there is the 7,500 kms long coastline and last year we launched the Deep Sea Mission which is going to dig the biodiversity beneath the seas," he said.

Recalling the achievements of the last 10 years, India's bio economy skyrocketed from $10 billion in 2014 to over $130 billion in 2024, with projections to reach $300 billion by 2030, he reaffirmed that Biotechnology and huge potential for driving the next revolution of 21st Generation. He said " IT revolution was West driven the BioTechnology revolution will be India Driven".

Dr. Rajesh Gokhale, Secretary Department OF Bio-Technology and Dr. V.K Saraswat, Member (S&T) Niti Ayog were also present for the release and media interaction.

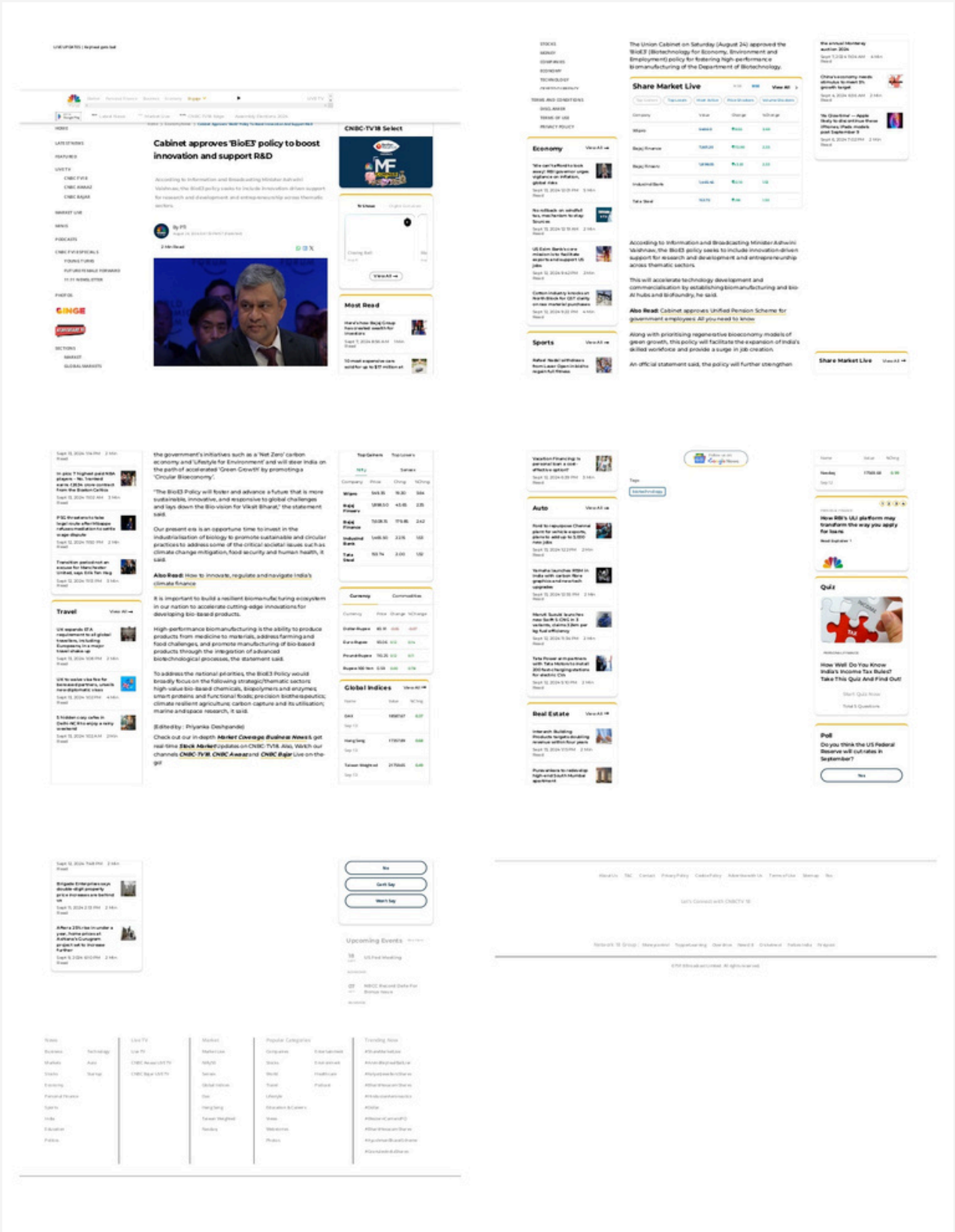
****

KSY/PSM

(Release ID: 2050446) Visitor Counter : 5354

Read this release in: Urdu , Marathi , Hindi , Tamil , Telugu , Kannada

4. DIGITAL MEDIA COVERAGE



4. DIGITAL MEDIA COVERAGE

Cabinet approves scheme to boost biotech manufacturing

Internships would be arranged for students in the 11th and 12th grades and fellowships for research at the graduate and post-graduate level

Updated - August 24, 2024 09:08 pm IST Published - August 24, 2024 08:21 pm IST - New Delhi

JACOB KOSHY

Union Minister Ashwini Vaishnaw addressing the media on Cabinet Decision at National Media Center on Saturday. | Photo Credit: Sushil Kumar Verma

The Union Cabinet on Saturday (August 24, 2024) cleared a proposal to bolster biotechnology-based manufacturing, called BioE3 (Biotechnology for Economy, Environment and Employment) Policy for Fostering High Performance Biomanufacturing. To be steered by the Department of Biotechnology, the aim is to have it catalyse a technology revolution "just as the IT industry revolutionised life in the 1990s", an internal note viewed by *The Hindu* said.

starting from school level to higher education, and for the industries and start-ups through targeted interventions. Significant support will be extended to increase collaboration between academia, Government, and also with industries," the note said. Several of these initiatives form part of the core, historic mandate of the MoST.

A financial outlay wasn't specified for the programme. High performance biomanufacturing is the ability to produce products from medicine to materials, address farming and food challenges, and promote manufacturing of bio-based products through integration of advanced biotechnological processes.

Also Read: Planning for a biosecure future

"To address the national priorities, the BioE3 Policy would broadly focus on the following strategic/thematic sectors: high value bio-based chemicals, biopolymers & enzymes; smart proteins & functional foods; precision biotherapeutics; climate resilient agriculture; carbon capture & its utilisation; marine and space research," a press statement from the Ministry of Science and Technology (MoST) said.

The six thematic verticals of the policy are: bio-based chemicals and enzymes, functional foods and smart proteins, precision biotherapeutics, climate resilient agriculture, carbon capture and its utilisation, futuristic marine, and space research.

The Cabinet also merged three schemes of the Science Ministry into a single scheme, called Vigyan Dhara, which expects to spend ₹10,579 crore until '25-'26 on Science and Technology (S&T) Institutional and Human Capacity Building, Research and Development and, Innovation, Technology Development and Deployment, according to a note from the Ministry.

Internships would be arranged for students in the 11th and 12th grades and fellowships for research at the graduate and post-graduate level.

"The scheme endeavours to promote research in areas such as basic research with access to the international mega facilities, translational research in sustainable energy, water, etc. and collaborative research through international bilateral and multilateral cooperation. It will also contribute to building critical human resource pool to strengthen the science and technology landscape and expand the R&D base of the country towards improving the Full-Time Equivalent (FTE) researcher count. Focused interventions will be taken up to enhance the participation of women in the field of Science and Technology (S&T) with the ultimate goal of bringing gender parity in Science, Technology and Innovation (STI). The scheme would reinforce the efforts of the government towards promoting innovations at all levels,

4. DIGITAL MEDIA COVERAGE

Cabinet nod to 'BioE3' policy for innovation-driven support to R&D

NEW DELHI: The Union Cabinet on Saturday approved the 'BioE3' (Biotechnology for Economy, Environment and Employment) policy for fostering high-performance biomanufacturing of the Department of Biotechnology.

According to Information and Broadcasting Minister Ashwini Vaishnaw, the BioE3 policy seeks to include innovation-driven support for research and development and entrepreneurship across thematic sectors.

This will accelerate technology development and commercialisation by establishing biomanufacturing and bio-AI hubs and biofoundry, he said.

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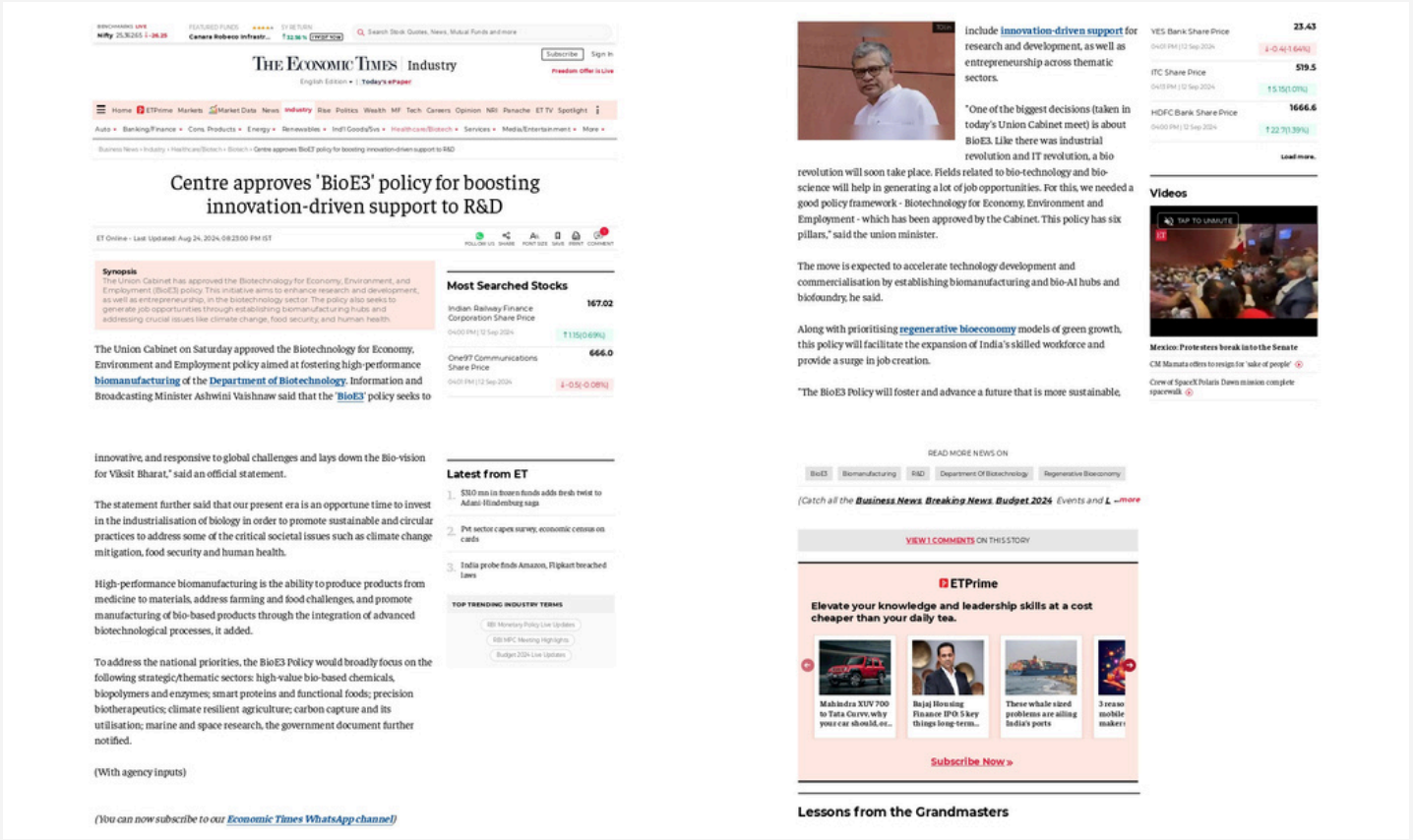
TMC MP Mahua Moitra lodges complaint with Lokpal against SEBI chief

Several parts in Chennai reel under power outage, EB reroutes supply to restore electricity

Nagamangala violence: Home Minister warns merciless action against those taking law into their hands

TOP VIDEOS

4. DIGITAL MEDIA COVERAGE



THE ECONOMIC TIMES | Industry

Centre approves 'BioE3' policy for boosting innovation-driven support to R&D

ET Online - Last Updated: Aug 24, 2024, 08:23:00 PM IST

Synopsis

The Union Cabinet has approved the Biotechnology for Economy, Environment, and Employment (BioE3) policy. This initiative aims to enhance research and development, as well as entrepreneurship, in the biotechnology sector. The policy also seeks to generate job opportunities through establishing biomanufacturing hubs and addressing crucial issues like climate change, food security, and human health.

The Union Cabinet on Saturday approved the Biotechnology for Economy, Environment and Employment policy aimed at fostering high-performance biomanufacturing of the Department of Biotechnology. Information and Broadcasting Minister Ashwini Vaishnaw said that the 'BioE3' policy seeks to innovative, and responsive to global challenges and lays down the Bio-vision for Viksit Bharat," said an official statement.

The statement further said that our present era is an opportune time to invest in the industrialisation of biology in order to promote sustainable and circular practices to address some of the critical societal issues such as climate change mitigation, food security and human health.

High-performance biomanufacturing is the ability to produce products from medicine to materials, address farming and food challenges, and promote manufacturing of bio-based products through the integration of advanced biotechnological processes, it added.

To address the national priorities, the BioE3 Policy would broadly focus on the following strategic/thematic sectors: high-value bio-based chemicals, biopolymers and enzymes; smart proteins and functional foods; precision biotherapeutics; climate resilient agriculture; carbon capture and its utilisation; marine and space research, the government document further notified.

(With agency inputs)

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TOP TRENDING INDUSTRY TERMS

include innovation-driven support for research and development, as well as entrepreneurship across thematic sectors.

"One of the biggest decisions (taken in today's Union Cabinet meet) is about BioE3. Like there was industrial revolution and IT revolution, a bio revolution will soon take place. Fields related to bio-technology and bio-science will help in generating a lot of job opportunities. For this, we needed a good policy framework - Biotechnology for Economy, Environment and Employment - which has been approved by the Cabinet. This policy has six pillars," said the union minister.

The move is expected to accelerate technology development and commercialisation by establishing biomanufacturing and bio-AI hubs and biofoundry, he said.

Along with prioritising regenerative bioeconomy models of green growth, this policy will facilitate the expansion of India's skilled workforce and provide a surge in job creation.

"The BioE3 Policy will foster and advance a future that is more sustainable,

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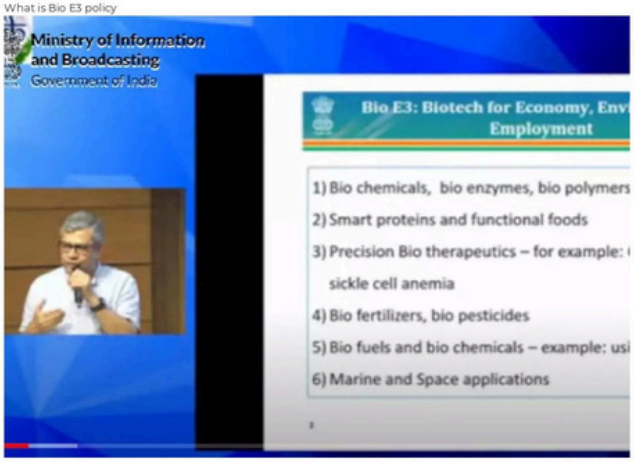
'Bio-revolution is coming': What is Centre's new BioE3 policy?

TIMESOFINDIA.COM | Aug 24, 2024, 08.27 PM IST

NEW DELHI: Union minister Ashwini Vaishnaw on Saturday said that the Union Cabinet chaired by Prime Minister Narendra Modi, has approved the BioE3 (Biotechnology for Economy, Environment, and Employment) policy to promote high-performance biomanufacturing adding that "a bio revolution will soon take place."

Addressing a recent cabinet briefing the minister of information and broadcasting said: "One of the biggest decisions taken by Union Cabinet today is about BioE3. Like there was the industrial revolution and IT revolution, a bio revolution will soon take place. For this, we needed a good policy framework - Biotechnology for Economy, Environment and Employment - which has been approved by the Cabinet."

What is Bio E3 policy



The BioE3 Policy primarily concentrate on the following strategic sectors: high-value bio-based chemicals, biopolymers & enzymes, smart proteins & functional foods, precision biotherapeutics, climate-resilient agriculture, carbon capture & its utilization, marine and space research, as per a statement released by cabinet ministry.

Key features of Bio E3

- The BioE3 policy's key aspects involve supporting innovation-driven R&D and entrepreneurship across various thematic sectors.
- This will expedite the development and commercialization of technology through the establishment of Biomanufacturing & Bio-AI hubs and Biofoundry.
- In general, this Policy will bolster the Government's initiatives such as 'Net Zero' carbon economy & 'Lifestyle for Environment' and will guide India towards accelerated 'Green Growth' by encouraging 'Circular Bioeconomy'.
- The BioE3 Policy will nurture an advanced future that is more sustainable, innovative, and responsive to global challenges and sets out the Bio-vision for Viksit Bharat.

What is high-performance biomanufacturing

High-performance biomanufacturing involves the production of products ranging from medicine to materials, tackling farming and food challenges, and promoting the manufacturing of bio-based products through the integration of advanced biotechnological processes.

The Union minister said that the upcoming revolution is expected to create numerous job opportunities in the fields of bio-technology and bio-science.

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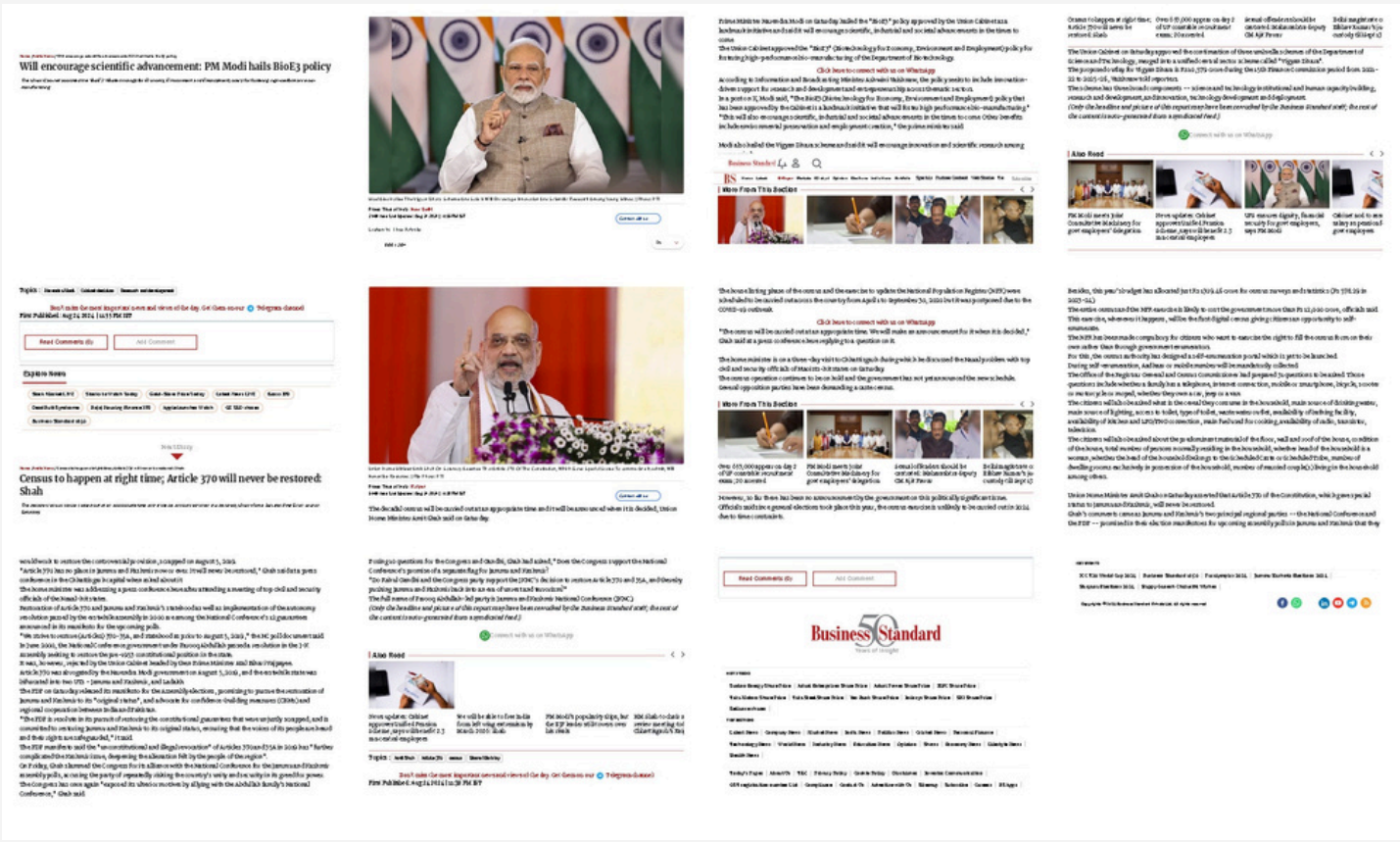

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Policy on high-performance biomanufacturing gets approval

TNN | Aug 25, 2024, 03.11 AM IST

NEW DELHI: Union Cabinet on Saturday approved a biotech policy for high-performance biomanufacturing - BioE3 - that will accelerate innovation-driven support to bio-economy and green growth, and cleared a proposal of continuation of the three schemes on institutional and human capacity building, R&D, and technology deployment as a unified central scheme named 'Vigyan Dhara'.

BioE3 will play a crucial role in steering India towards its 'net zero' emission goal of 2070.

The proposed outlay for implementation of 'Vigyan Dhara' is over Rs 10,579 crore during the 15th Finance Commission period from 2021-22 to 2025-26. The merger of the schemes into a single scheme is aimed at enhancing efficiency in fund utilisation and establishing synchronisation among the sub-schemes/ programmes.

The BioE3 (Biotechnology for Economy, Environment and Employment) policy seeks to accelerate technology development and promote entrepreneurship and commercialisation by establishing biomanufacturing (manufacturing of bio-based products), Bio-AI hubs and biofoundry in the country. It will focus on high value bio-based chemicals, biopolymers and enzymes; smart proteins and functional foods; precision biotherapeutics; climate resilient agriculture; carbon capture and its utilisation; and marine and space research.

"Overall, this policy will further strengthen govt's initiatives such as 'net zero' carbon economy and 'Lifestyle for Environment' (LiFE), and will steer India on the path of accelerated 'green growth' by promoting 'circular bioeconomy'," said a statement on the Cabinet decision.

Besides prioritising regenerative bioeconomy models of green growth, the BioE3 policy will facilitate expansion of India's the skilled workforce and provide a surge in job creation. It will promote sustainable and circular practices to address some of the critical societal issues, such as climate change mitigation, food security and human health.

Under 'Vigyan Dhara', the research & development (R&D) component of the unified scheme will be aligned with the Anusandhan National Research Foundation (ANRF). "Implementation of the scheme would follow the globally prevailing yardsticks while in alignment with the national priorities," said govt.

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Cabinet nod to 'BioE3' policy for innovation-driven support to R&D

NEW DELHI: The Union Cabinet on Saturday approved the 'BioE3' (Biotechnology for Economy, Environment and Employment) policy for fostering high-performance biomanufacturing of the Department of Biotechnology.

According to Information and Broadcasting Minister Ashwini Vaishnaw, the BioE3 policy seeks to include innovation-driven support for research and development and entrepreneurship across thematic sectors.

This will accelerate technology development and commercialisation by establishing biomanufacturing and bio-AI hubs and biofoundry, he said.

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News Updates

Cabinet approves BioE3 (Biotechnology for Economy, Environment and Employment) Policy for Fostering High Performance Biomanufacturing

24 Aug, 2024

The Union Cabinet, chaired by the Prime Minister Shri Narendra Modi, today approved the proposal '**BioE3** (Biotechnology for Economy, Environment and Employment) **Policy for Fostering High Performance Biomanufacturing**' of the Department of Biotechnology.

The salient features of BioE3 policy include innovation-driven support to R&D and entrepreneurship across thematic sectors. This will accelerate technology development and commercialization by establishing Biomanufacturing & Bio-AI hubs and Biofoundry. Along with prioritizing regenerative bioeconomy models of green growth, this policy will facilitate expansion of India's skilled workforce and provide a surge in job creation.

Overall, this Policy will further strengthen Government's initiatives such as 'Net Zero' carbon economy & 'Lifestyle for Environment' and will steer India on the path of accelerated 'Green Growth' by promoting 'Circular Bioeconomy'. The BioE3 Policy will foster and advance future that is more sustainable, innovative, and responsive to global challenges and lays down the Bio-vision for Viksit Bharat.

Our present era is an opportune time to invest in the industrialization of biology to promote sustainable and circular practices to address some of the critical societal issues-such as climate change mitigation, food security and human health. It is important to build a resilient biomanufacturing ecosystem in our nation to accelerate cutting-edge innovations for developing bio-based products.

High performance biomanufacturing is the ability to produce products from medicine to materials, address farming and food challenges, and promote manufacturing of bio-based products through integration of advanced biotechnological processes. To address the national priorities, the BioE3 Policy would broadly focus on the following strategic/thematic sectors: high value bio-based chemicals, biopolymers & enzymes; smart proteins & functional foods; precision biotherapeutics; climate resilient agriculture; carbon capture & its utilization; marine and space research.

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India aims for global biotechnology leadership with BioE3 policy

TV BRICS

Last updated: August 27, 2024 11:33 am

The Indian government has approved a new BioE3 policy, aiming to use biotechnology to boost the economy, protect the environment, and create jobs.

The policy, reported by ANI, a partner of TV BRICS, seeks to establish India as a global leader in biotechnology by 2047.

BioE3 aims to complement, not replace, traditional methods by leveraging biotechnology solutions to address India's development challenges. The policy envisages three key strategies: establishing research centres and research groups, bridging gaps in biotechnology development, and setting up new biotechnology centres.

"The strategy of the programme is to create a more sustainable and innovative economy through which India can tackle global challenges such as climate change and pollution," a government statement said.

The policy seeks to encourage innovation and commercialisation of biotechnological developments, leading to the establishment of special centres and biotechnology companies. More than 21 ministries and over 8,000 biotech startups are expected to participate in the policy's implementation.

The BioE3 policy is expected to come into effect by December of this year and is projected to create new jobs, increase GDP, and strengthen sustainable development.

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BioE3 policy to nurture green growth, create jobs

Also aims at facilitating expansion of skilled workforce

AKSHEEV THAKUR

Updated At : 06:43 AM Aug 26, 2024 IST

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Tribune News Service

New Delhi, August 25

With an aim to push biotechnology-based manufacturing, biomanufacturing and bio-artificial intelligence hubs and biofoundry will be established in the Public Private Partnership (PPP) mode.

The Union Cabinet on August 24 cleared BioE3 (Biotechnology for Economy, Environment and Employment) policy. The policy that will be steered by the Department of Biotechnology (DBT) will look towards facilitating skilled workforce and create jobs, besides nurturing green growth.

Officials from the DBT said the government was open to international collaborations to boost biotech manufacturing.

"Implementation of the policy will be in three buckets - discovering and integrated research network, bridging the gaps and setting up of bio-enabler hubs. Under these bio-synthetic platforms through a combination of innovative technologies, multi-disciplinary collaboration will be developed. The government will support the creation of specialised centres such as biomanufacturing and Bio-AI hubs and biofoundries. Bio-AI hubs will accelerate discoveries in improving healthcare solutions and drive innovations," an official said.

"The BioE3 policy will broadly focus on following strategic/thematic sectors - high value bio-based chemicals, biopolymers & enzymes; smart proteins & functional foods; precision biotherapeutics; climate resilient agriculture; carbon capture & its utilisation; marine and space research," a statement from the Ministry of Science and Technology said.

Biofoundry is a specialised facility equipped with automated tools and technologies for construction and testing of biological systems.

Officials also said high performance biomanufacturing would also curb pollution, address climate change and farming and food challenges.

"Steel and cement industries emit carbon dioxide and flue gas which are major contributors to pollution. Microalgae can capture carbon dioxide (CO_2) from the atmosphere and flue gas emissions and convert it into biomass or other organic compounds. The biomass can then be used as a carbon source to produce other products such as petroleum and green diesel," officials said.

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Union Cabinet Approves 'BioE3' Policy to Boost Biomanufacturing And Job Creation (Image Source: PTI)

The Union Cabinet, on Saturday, August 25, approved a new policy named "Biotechnology for Economy, Environment, and Employment" (BioE3), aimed at advancing high-performance biomanufacturing in India. The policy, designed by the Department of Biotechnology, seeks to support innovation-driven research and development, as well as entrepreneurship, across various thematic sectors.

Information and Broadcasting Minister Ashwini Vaishnaw announced the approval, highlighting the significance of the BioE3 policy. "This is one of the most significant decisions made in today's Union Cabinet meeting. Just as we have witnessed industrial and IT revolutions, we are on the brink of a biotechnology revolution. This policy will create vast job opportunities in fields related to biotechnology and biosciences. A strong policy framework was necessary, and the Cabinet has now approved it. The Biotechnology for Economy, Environment, and Employment policy is built on six key pillars," he said.

The BioE3 policy is expected to accelerate the development and commercialization of biotechnology by establishing biomanufacturing hubs, bio-AI hubs, and biofoundries. These efforts aim to promote high-performance biomanufacturing, enabling the production of a wide range of products, from medicines to materials, and addressing challenges in agriculture and food production through advanced biotechnological processes.

In addition to prioritizing green growth and regenerative bioeconomy models, the policy will play a crucial role in expanding India's skilled workforce and creating a surge in job opportunities. An official statement emphasized that the BioE3 Policy will "foster a future that is more sustainable, innovative, and responsive to global challenges, aligning with the vision of a developed India."

The policy also underscores the importance of investing in the industrialization of biology at this critical juncture, with the aim of promoting sustainable and circular practices. These efforts will address pressing societal issues such as climate change, food security, and public health.

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To align with national priorities, the BioE3 Policy will focus on strategic sectors including high-value bio-based chemicals, biopolymers and enzymes, smart proteins and functional foods, precision biotherapeutics, climate-resilient agriculture, carbon capture and utilization, and marine and space research, as outlined in the government document.

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Pawan Kumar is a Copyeditor for the business vertical of Times Now Digital. With a keen eye for impactful business news, he specialises in financial m...View More

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KAUMUDI ONLINE

FRIDAY, 13 SEPTEMBER 2024 2:48 PM IST

BioE3 Policy: Biotechnology for Economy, Environment and Employment

Wednesday 28 August, 2024 | 6:28 PM

Ahead of an important initiative that could have a far-reaching impact in the future, the Union Cabinet chaired by Prime Minister Narendra Modi approved the 'BioE3- Biotechnology for Economy, Employment and Environment Policy' of the Department of Biotechnology (DBT). The policy aims to promote organic production for a clean, green and self-sufficient India.

This will help India rise to a prominent position globally at the forefront of the world's future economic growth.

In the challenging context of climate change, non-renewable resources and unsustainable waste generation, an integrated 'BioE3' policy is a promising and critical step towards sustainable growth. The main objective of this policy is to convert chemical-based industries to sustainable bio-based industrial models. This will promote the vegetable bio-economic chain. Converting waste materials from landfills, and greenhouse gases into bio-based products using microorganisms will inspire to achieve net-zero carbon emissions.

Also, the BioE3 policy will promote the growth of India's bio-economy. facilitating the dissemination and commercialization of bio-based products. The policy also aims at creating entrepreneurial momentum.

Key features of the policy are:

1) High-value bio-based chemicals, biopolymers and enzymes; Smart Proteins and Functional Foods; Biotherapeutics; Climate Change Resilient Farming; carbon sequestration and utilization; Encouraging and supporting indigenous research and development-oriented entrepreneurship across various sectors, including marine and space research.

2) Accelerating technology development and commercialization by establishing bio-manufacturing facilities, bio-foundry clusters and bio-artificial intelligence (bio-AI) hubs.

3) Prioritizing regenerative models of economic growth and job creation taking into account ethical and biosecurity considerations.

India, which has shown strong economic growth in the last decade, has immense potential to become a global leader in the Fourth Industrial Revolution. Our organic economy has grown 13-fold from $10 billion in 2014 to $130 billion in 2024. The market value is expected to reach 300 billion dollars by 2030. Implementation of BioE3 policy in various sectors will further stimulate the country's bio-economy and promote 'green growth'. Leveraging new technologies and innovations lays the foundation for nurturing high-performance organic production enterprises in the country. Biomanufacturing is primarily aimed at becoming a key pillar of the 'Make in India' initiative. And it will provide a transformative approach to the needs of the 21st century. As an integrated initiative of various sectors, it has the power to develop bio-based products cost-effectively by harnessing the potential of microorganisms, plants and animal cells including human cells, creating only a low carbon footprint.

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New BioE3 Policy Is A Strategic Step Towards India's Biotech-Driven Future

SWARAJYA STAFF
Aug 26, 2024, 05:19 PM | Updated 05:15 PM IST

India aims to lead the next industrial revolution by tackling challenges related to food, energy, and climate.

The Union Cabinet, chaired by Prime Minister Narendra Modi, approved the BioE3 Policy on Saturday (24 August).

The policy aims to improve high-performance biomanufacturing in India, creating opportunities for a new segment that will contribute to the growth of the country's expanding manufacturing ecosystem.

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Kashmir Horizon

BioE3 Policy: Biotechnology For Economy, Environment, Employment

In a landmark initiative with far reaching futuristic implications, the Union Cabinet headed by Prime Minister Narendra Modi has approved the BioE3 (Biotechnology for Economy, Employment and Environment) Policy of the Department of Biotechnology (DBT) to foster high-performance biomanufacturing for a clean, green, prosperous, and self-reliant Bharat. This will ensure for India a pioneering role in the global arena as one of the earliest torch-bearers of world's future economic growth. The unsustainable pattern of material consumption, excessive resource utilization and waste generation have led to global cataclysms such as forest fires, melting glaciers, and declining biodiversity. Keeping in view the national priority of steering India on the path of accelerated 'Green Growth', the integrated BioE3 (Biotechnology for Economy, Environment and Employment) Policy is a positive and decisive step towards sustainable growth in the challenging backdrop of climate change, depleting non-renewable resources, and unsustainable waste generation. A major aim of this policy is to stimulate the transition of chemical-based industries to more sustainable bio-based industrial models. It will also promote a circular bioeconomy and provide an impetus to achieving net-zero carbon emissions by encouraging the utilization of waste from biomass, landfills, green house gases, etc. by microbial cell factories to produce bio-based products. In addition, the BioE3 Policy will create novel solutions for fostering the growth of India's bioeconomy, facilitating scale-up and commercialisation of bio-based products; reducing, reusing, and recycling waste materials; expanding India's cohort of a highly skilled workforce; driving a surge in job creation; and intensifying entrepreneurial momentum. Salient features of the Policy include: 1) Encouragement and support to indigenous research and development-focused entrepreneurship across thematic sectors such as high-value bio-based chemicals, biopolymers & enzymes; smart proteins & functional foods; precision biotherapeutics; climate resilient agriculture; carbon capture and its utilization; and marine and space research;2) Acceleration of technology development &commercialization by establishing bio manufacturing facilities, bio foundry clusters, and bio-artificial intelligence (Bio-AI) hubs; 3); Prioritising regenerative models of economic growth and job creation with an emphasis on ethical & biosafety consideration; 4) Harmonizing regulatory reforms with global standards. India has demonstrated strong economic growth in the past decade and has tremendous potential to be amongst the global leaders of the 4th industrial revolution. Our bioeconomy has grown 13 folds from $10 billion in 2014 to over $130 billion in 2024. It is further expected to reach a market value of $300 billion by 2030.

"By investing in India's economy, environment, and employment, this comprehensive policy will contribute towards the nation's sankalp of 'Viksit Bharat'. This policy will serve as a benchmark that highlight show an effective science policy can actively contribute towards nation-building and development. "

The implementation of BioE3 Policy across diverse sectors is likely to further boost the country's bioeconomy, while promoting 'Green Growth'. The foundation for this will be laid by leveraging emerging technologies and innovations that result from nurturing the country's high-performance biomanufacturing initiatives. Biomanufacturing is primed to become an important pillar of the 'Make in India' initiative and will provide a transformative approach to meet the demands of 21st century. As a multidisciplinary endeavour, it has the power to unlock the potential of microbes, plants, and animal cells including human cells to develop bio-based products cost-effectively with a minimal carbon footprint. It is envisioned that biomanufacturing hubs will serve as centralized facilities that catalyze the production, development, and commercialization of bio-based products through advanced manufacturing technologies, and collaborative efforts. This will create a community where resources, expertise, and technology can be shared to drive scalability, sustainability, and innovation of biomanufacturing processes. These biomanufacturing hubs will bridge the gap between 'lab-to-pilot' and 'pre-commercial scale' manufacturing of bio-based products. Start-ups will play a pivotal role in this process by bringing and developing novel ideas and feeding them into small and medium-sized enterprises (SMEs) and established manufacturers. Biofoundry refers to the creation of advanced clusters for making biological engineering processes scalable – from the initial design and testing stages to pilot and pre-commercial production. Large-scale manufacturing of mRNA-based vaccines and proteins for a wide variety of applications are some appreciable examples for which biofoundries could be valuable. These clusters will specialize in designing, constructing, and testing biological systems and organisms using standardized and automated processes. Bio-AI hubs will serve as a focal point for encouraging and incentivizing the integration of AI in research and development. These Bio-AI hubs will provide biotechnological expertise, cutting-edge infrastructure, and logistical support for the integration, storage, and analysis of large-scale biological data using AI and machine learning. Making these resources accessible to experts from various disciplines (biology, epidemiology, computer science, engineering, data science, for example.) will facilitate the creation of innovative bio-based end products – be it a new variety of gene therapy, or a new food processing alternative. Through these coordinated initiatives, the BioE3 policy will bring a surge in employment, particularly in tier-II and tier-III cities, where bio manufacturing hubs are proposed to be set up due to their proximity to biomass sources. By investing in India's economy, environment, and employment, this comprehensive policy will contribute towards the nation's sankalp of 'Viksit Bharat'. This policy will serve as a benchmark that highlight show an effective science policy can actively contribute towards nation-building and development.

(The author is Minister of State (UC) Science and Technology, Government Of India. Press Information Bureau-PIB Srinagar has mailed this article to "Kashmir Horizon" for publication in this newspaper. The views, opinions and conclusions expressed in this article are those of the author and aren't necessarily in accord with the views of "Kashmir Horizon")

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D organises awareness programme on BioE3 Policy

!9-Aug-2024

:aff Reporter

Aug 28: The Institute of Bioresources and Sustainable Development (IBSD) has organised an awareness programme on BioE3-Biotechnology for Economy, Environment and Employment

house programme for talented school students of Imphal aimed at highlighting the new bioeconomy policy which will be a transformative shift in India's bio-manufacturing sector and economy, enhance innovation, jobs and clean environment, said the institute in a statement.

from different schools including Ajad English School, Meitram; Rangtaiba Memorial Institute, Maram; The Blossom School, Changangei; Islamic Baby English School, Lilong; St George pol, Wangkhei; RK Sanatombi Devi Vidyalaya, Pangei; The Little Master English Hr Sec School, Samurou; Eastern Ideal High School, Akampat; King's Way English School, Sanjenthong; tar Hr Sec School, Khangabok attended the event in line with the "Science Motivational Programme" of MASTEC, Imphal.

ie programme, Professor Pulok Kumar Mukherjee, Director, IBSD, highlighted that the BioE3 (Biotechnology for Economy, Environment and Employment) Policy is a great landmark of DBT, Government of India.

ite BioE3 policy, IBSD will work towards development of bioeconomy from bioresources, the Director said.

the Union Cabinet has approved 'BioE3 (Biotechnology for Economy, Environment and Employment) Policy for fostering high performance biomanufacturing' of the Department of ology.

nt features of BioE3 policy include innovation-driven support to R&D and entrepreneurship across thematic sectors.

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his policy will further strengthen Government's initiatives such as 'Net Zero' carbon economy & 'Lifestyle for Environment' and steer India on the path of accelerated 'Green Growth' by g 'Circular Bioeconomy'.

tute of Bioresources and Sustainable Development (IBSD) at Imphal is the only institute in the North Eastern Region (NER), under the ambit of the Biotechnology Research and n Council (BRIC), Department of Biotechnology, Govt of India, which is working on "Bioresources development and their sustainable use through biotechnological interventions for the nomic growth of the North Eastern Region".

nergizing different research areas for the development of bioeconomy from bioresources with special reference to NER.

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Today

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ESG

India's bioeconomy set to soar to $300 Billion by 2030 with new BioE3 policy

The initiative focuses on advanced biomanufacturing, sustainability, and job creation, advancing India's development vision.

by Staff Writer August 27, 2024

SHARE

India's bioeconomy is set to reach $300 billion by 2030 under the new BioE3 policy, announced by Union Minister Jitendra Singh. The Union Cabinet announced this policy, which makes India a major player in the biotech industry around the world.

India's bioeconomy grew from $10 billion in 2014 to $130 billion in 2024. The BioE3 (Biotechnology for Economy, Employment, and Environment) Policy aims to triple this figure by 2030.

Singh highlighted that the BioE3 policy will transform India into a global biotech leader, reflecting Prime Minister Narendra Modi's commitment to innovation and environmental sustainability.

The policy's primary objective is to switch from traditional practices to advanced, self-regenerating biomanufacturing, which will contribute to a cleaner and more prosperous India.

Key objectives include shifting from chemical-based industries to sustainable bio-based models, promoting a circular bioeconomy, and achieving net-zero carbon emissions through innovative waste utilisation.

It is believed that the policy will create a lot of jobs, especially in tier-II and tier-III cities, where new biomanufacturing hubs will use local biomass.

Moreover, the policy promotes Bio-AI hubs for groundbreaking advancements in gene therapies and food processing. Aligning with international standards, the BioE3 Policy sets a benchmark for effective science policies supporting India's vision of a 'Viksit Bharat' (Developed India).

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NEWS | 28 August 2024

Policy push for India's bioeconomy

Researchers welcome targeted focus to reignite the biotech sector

By Sahana Ghosh & Subhra Priyadarshini

The new policy hopes to drive India's green bioeconomy while creating skilled employment opportunities in the sector. Credit: Subhra Priyadarshini

India has launched a new policy to scale up efforts in high-performance biomanufacturing with a stated ambition of achieving a US$300 billion bioeconomy by 2030.

doi: https://doi.org/10.1038/d44151-024-00136-1

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The BioE3 (Biotechnology for Economy, Environment, and Employment) policy, unveiled this week, intends to fuel high-performance biomanufacturing by supporting research and entrepreneurship. India's science minister Jitendra Singh announced. It foregrounds development of bio-based products with minimal carbon footprints, a shift from India's traditional chemical-based industries.

India's bioeconomy has grown from US$10 billion in 2014 to over US$130 billion in 2024. The new policy wants to accelerate technological development and commercialization by creating biomanufacturing hubs and biofoundries, according to Rajesh Gokhale, Secretary to India's Department of Biotechnology (DBT).

"The policy will drive green growth," said Jitendra Kumar, Managing Director of DBT's Biotechnology Industry Research Assistance Council (BIRAC). The council will steer the project by identifying and supporting scientists and institutions working on early-stage development. It will also help industry partners take their products from testing to near-market production, he said.

The BioE3 policy has six broad focus areas – bio-based chemicals, biopolymers and enzymes, smart proteins and functional foods, precision biotherapeutics, climate-resilient agriculture, carbon capture and its utilization and marine and space research.

All the thematic areas will be open for proposals providing technological solutions, Kumar said. An expert committee will evaluate these proposals and fund them based on national priorities and commercial potential. DBT and BIRAC will prioritise strategically important products, such as drugs and intermediates.

"India is also lagging behind in high-performance biomanufacturing such as precision fermentation, and in the use of artificial intelligence and Internet of Things (IoT)," Kumar said. The government will encourage international partnerships, especially in training, skilling, and technology licensing in these areas, to achieve cost advantages.

Reviving industrial biotechnology

Biotechnologists and start-up founders welcomed the initiative as a crucial step in optimizing home grown capacity and skills. Gahan Jayaraman, a professor at the Indian Institute of Technology in Madras (IIT-M), said since India's focus on industrial biotechnology and biomanufacturing was wavering over time, the new initiative is refreshing.

Kumar added that DBT and BIRAC will collaborate with IITs and industry partners to train a workforce equipped to meet market demands of high-performance biomanufacturing.

The policy also reflects a national thrust towards growing the bioeconomy, with states like Karnataka planning to increase their share in the field. Anurag Rathore, coordinator of the Centre of Excellence for Biopharmaceutical Technology at IIT Delhi, said India must focus on its strengths, such as biotherapeutics. "This means carefully screening projects to select those most likely to achieve the policy's goals," Rathore said.

Despite the optimism surrounding the BioE3 policy, challenges remain, particularly in scaling up biomanufacturing from the laboratory to commercial production. Jayaraman noted that while academic institutions have the skills to deliver, biotechnology requires more incubation time compared to fields like software. "It's important to recognize that while academia has the skills to deliver, biotechnology needs more incubation time compared to other fields," he said.

Karthik Raman, a start-up founder at IIT-M's Computational Systems Biology Lab, echoed this sentiment, stressing the need for the industry to adopt new technologies and processes, even if it means sacrificing short-term profits. "This shift is necessary to achieve long-term sustainability and become a global leader in the sector," Raman said.

Kumar said participating industries will be encouraged to lend capacity to start-ups so that they can cross the crucial bottleneck of scaling up production.

4. DIGITAL MEDIA COVERAGE

Sep 13, 2024 3:37 PM

THE NEW INDIAN EXPRESS

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Kochi

Rajiv Gandhi Centre for Biotechnology to lead BioE3 policy in Kerala

Approved last weekend, the policy aims to leverage bio-manufacturing for a cleaner and greener India.

Rajiv Gandhi Centre for Biotechnology Photo | Website

Express News Service

Updated on: 30 Aug 2024, 9:01 am · 1 min read

KOCHI: With the new BioE3 policy aiming to position India at the forefront of the next industrial revolution, the scientific community anticipates significant investments in innovation to help the bio-economic sector achieve growth of Rs 25 lakh crore by 2030.

The Rajiv Gandhi Centre for Biotechnology (RGCB) has initiated efforts to transition Kerala from chemical-based industries to bio-manufacturing hubs. These hubs are intended to drive the country's economy while addressing challenges related to food, energy, and climate.

Dr Chandrabhas Narayana, director of the Thiruvananthapuram-based RGCB, praised the proposed shift to bio-manufacturing hubs. The institution plans to conduct awareness programmes across Kerala to educate various stakeholders about BioE3, he revealed.

During a panel discussion with top officials of the Department of Science and Technology (DST) on Thursday, RGCB expressed its commitment to leading Kerala towards the implementation of the path-breaking policy. Approved last weekend, the policy aims to leverage bio-manufacturing for a cleaner and greener India.

Kicking off a state-wide drive featuring workshops and discussions on BioE3, experts highlighted the policy's potential to contribute significantly to the country's efforts in achieving carbon neutrality.

4. DIGITAL MEDIA COVERAGE

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Union cabinet approves BioE3 Policy to propel high-performance biomanufacturing in India

"Industrial revolutions have historically transformed human activities, and the coming years present an opportune moment for the industrialisation of biology. It is crucial to adopt new technologies to drive GDP growth, create new employment opportunities, and benefit the environment. The BioE3 policy is a forward-looking initiative that positions India as a potential global leader in this next revolution," officials stated on Sunday.

ANI
Updated On Aug 26, 2024 at: 06:49 AM IST

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New Delhi: The Union Cabinet, chaired by Prime Minister Narendra Modi, approved the BioE3 policy--Biotechnology for Economy, Environment, and Employment--aimed at fostering high-performance biomanufacturing, on Saturday.

The policy is designed to supplement, rather than replace, traditional supply methods with biotechnological solutions to meet the demands of a developed India by 2047.

"Industrial revolutions have historically transformed human activities, and the coming years present an opportune moment for the industrialisation of biology. It is crucial to adopt new technologies to drive GDP growth, create new employment opportunities, and benefit the environment. The BioE3 policy is a forward-looking initiative that positions India as a potential global leader in this next revolution," officials stated on Sunday.

The policy will accelerate technological development and commercialisation by establishing biomanufacturing facilities, bio-AI hubs, and biofoundries.

On the social media platform X, the Department of Biotechnology highlighted the policy's innovative approach.

"High-performance biomanufacturing can fundamentally transform the global economy from today's consumptive and unsustainable manufacturing paradigm to one based on regenerative principles," the department stated.

Government data reveals that between 1950 and 2021, 8.7 billion tonnes of plastic were produced, with only 11 percent recycled. This policy aims to introduce more sophisticated recycling processes, smarter materials, and biomanufacturing techniques to reimagine the future and address challenges in food, climate, energy, chemicals, and health.

The policy outlines three implementation strategies: discovery and integrated research networks, bridging existing gaps, and establishing bio-enabler hubs.

The policy envisions a future that is more sustainable, innovative, and responsive to global challenges like climate change, unsustainable material consumption, and waste generation. It also aims to revolutionise the production of everything from medicines to biomaterials.

"Broadly, the policy will also support the development of an integrated chemical and biological platform for the on-demand production of nutritious, palatable, and safe food from minimal resources, benefiting disaster relief efforts and space exploration," officials added.

A top source informed that 21 ministries have approved the policy, which is expected to take shape by December of this year. Additionally, over 8,000 biotechnological startups will be involved, generating more job opportunities, contributing to GDP growth, and promoting sustainability. (ANI)

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9/13/24, 3:12 PM Cabinet approves BioE3 policy to boost biotech manufacturing, DrugsControl Media Services

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NEWS DETAIL

Cabinet Approves BioE3 Policy To Boost Biotech Manufacturing (25-08-2024)

New Delhi, 25 Aug 2024: The Union Cabinet on Saturday (August 24, 2024) cleared a proposal to bolster biotechnology-based manufacturing, called BioE3 (Biotechnology for Economy, Environment and Employment) Policy for Fostering High Performance Biomanufacturing. To be steered by t.....

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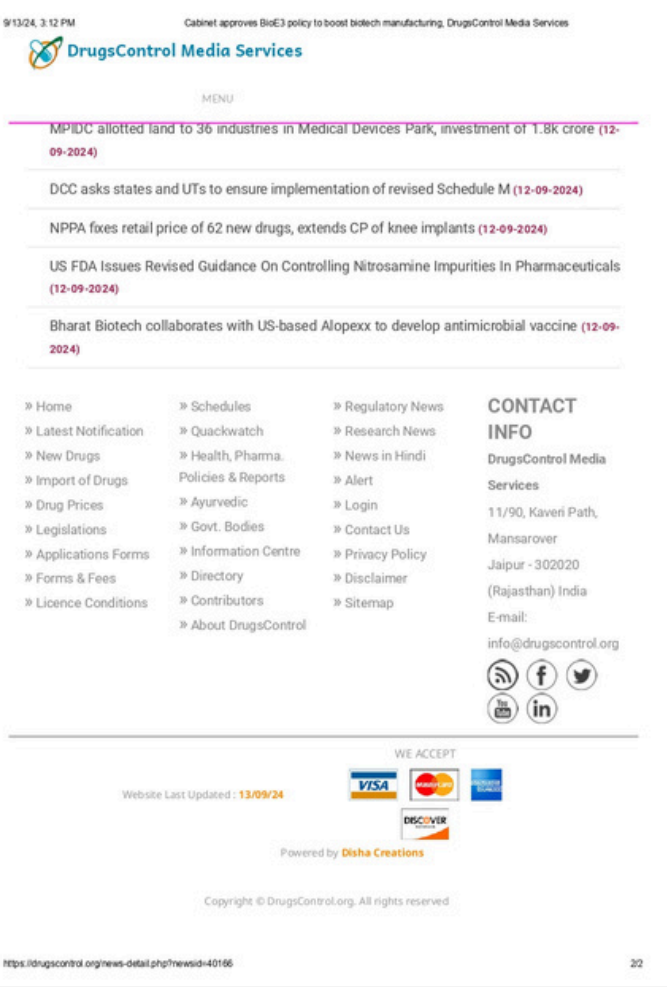

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'Bio-E3' policy will usher in bio-revolution in India: Jitendra Singh

The BioE3 policy was formally launched last month and aims to facilitate sustainable and efficient utilisation of biological resources for innovation, scaling-up and bio-manufacturing of specialty chemicals, enzymes, bio-polymers, functional foods, smart proteins, veterinary products, precision bio-therapeutics and services.

PTI

Last Updated : 12 September 2024, 15:08 IST

Union Minister Jitendra Singh Credit: PTI Photo

New Delhi: The government's Bio-E3 policy marks a crucial step in positioning India as a global bio-economy leader and is set to spark a "bio-revolution" in India similar to the IT revolution in the Western world, Union minister Jitendra Singh said on Thursday.

The BioE3 policy was formally launched last month and aims to facilitate sustainable and efficient utilisation of biological resources for innovation, scaling-up and bio-manufacturing of specialty chemicals, enzymes, bio-polymers, functional foods, smart proteins, veterinary products, precision bio-therapeutics and services.

Speaking at the Global Bio-India Summit 2024, Singh, the Minister of State (Independent Charge) for Science and Technology, said the policy marks a crucial step in positioning India as a global bio-economy leader.

Singh highlighted the importance of the Global Biotech platform, which brings together a diverse range of stakeholders, including start ups, SMEs, large industries, research institutes, and international bodies.

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Also Read: PM Modi asks automakers to bring global best practices to India, focus on clean mobility

Underscoring the wide range of opportunities in sectors like bio-pharma, bio-energy, and bio-industrials, which are rapidly evolving and contributing to the nation's bio-economy, he said the Bio-E3 policy focuses on biotechnology for economy, employment, and the environment.

This policy, he said, is poised to usher in a "bio-revolution" akin to the IT revolution in the Western world, supporting areas such as bio-based chemicals, climate-resilient agriculture, and carbon capture.

Singh said the policy will not only drive innovation but also contribute significantly to India's green transition, supporting the global fight against climate change.

He further outlined the creation of biotech hubs across India, which will foster collaboration between start ups and established companies, bridging the gap between research and commercial manufacturing.

These hubs are expected to generate employment, particularly in tier two and tier three cities, and contribute to regional economic development.

He projected a significant growth trajectory for India's biotech industry, which has expanded from 10 billion dollars in 2014 to 100 billion dollars in 2020, with the expectation that it will reach 300 billion dollars by 2030.

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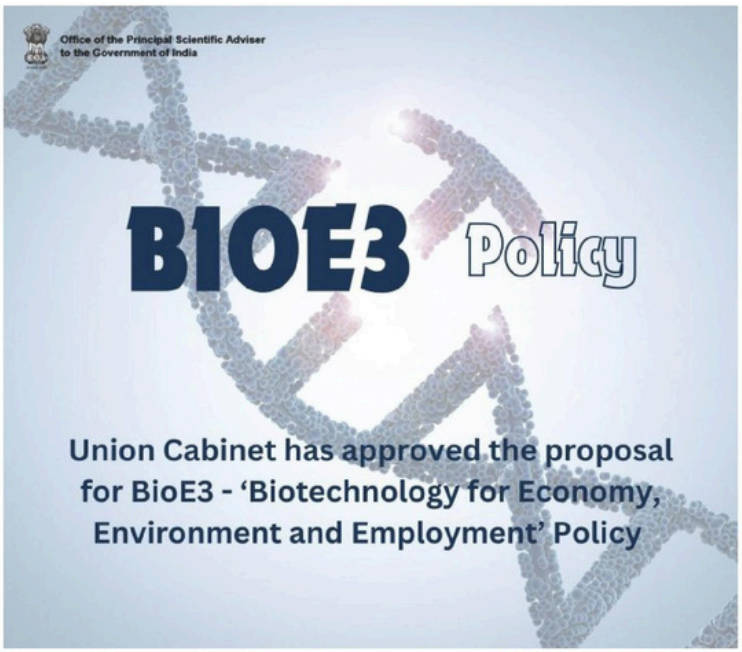
BioE3 Policy: Biotechnology for Economy, Environment and Employment

By **Daily Excelsior** - August 29, 2024



Dr Jitendra Singh

In a landmark initiative with far reaching futuristic implications, the Union Cabinet headed by Prime Minister Narendra Modi has approved the BioE3 (Biotechnology for Economy, Employment and Environment) Policy of the Department of Biotechnology (DBT) to foster high-performance biomanufacturing for a clean, green, prosperous, and self-reliant Bharat. This will ensure for India a pioneering role in the global arena as one of the earliest torch-bearers of world's future economic growth.

The unsustainable pattern of material consumption, excessive resource utilization and waste generation have led to global cataclysms such as forest fires, melting glaciers, and declining biodiversity. Keeping in view the national priority of steering India on the path of accelerated 'Green Growth', the integrated BioE3 (Biotechnology for Economy, Environment and Employment) Policy is a positive and decisive step towards sustainable growth in the challenging backdrop of climate change, depleting non-renewable resources and unsustainable waste generation. A major aim of this policy is to stimulate the transition of chemical-based industries to more sustainable bio-based industrial models. It will also promote a circular bioeconomy and provide an impetus to achieving net-zero carbon emissions by encouraging the utilization of waste from biomass, landfills, green house gases, etc. by microbial cell factories to produce bio-based products.

In addition, the BioE3 Policy will create novel solutions for fostering the growth of India's bio economy, facilitating scale-up and commercialisation of bio-based products; reducing, reusing, and recycling waste materials; expanding India's cohort of a highly skilled work force; driving a surge in job creation; and intensifying entrepreneurial momentum. Salient features of the Policy include: 1) Encouragement and support to indigenous research and development-focused entrepreneurship across thematic sectors such as high-value bio-based chemicals, biopolymers & enzymes; smart proteins & functional foods; precision biotherapeutics; climate resilient agriculture; carbon capture and its utilization; and marine and space research; 2) Acceleration of technology development & commercialization by establishing bio manufacturing facilities, bio foundry clusters, and bio-artificial intelligence (Bio-AI) hubs; 3); Prioritizing regenerative models of economic growth and job creation with an emphasis on ethical & biosafety consideration; 4) Harmonizing regulatory reforms with global standards.

India has demonstrated strong economic growth in the past decade and has tremendous potential to be amongst the global leaders of the 4th industrial revolution. Our bioeconomy has grown 13 folds from $10 billion in 2014 to over $130 billion in 2024. It is further expected to reach a market value of $300 billion by 2030. The implementation of BioE3 Policy across diverse sectors is likely to further boost the country's bioeconomy, while promoting 'Green Growth'.The foundation for this will be laid by leveraging emerging technologies and innovations that result from nurturing the country's high-performance bio manufacturing initiatives. Bio manufacturing is primed to become an important pillar of the 'Make in India' initiative and will provide a transformative approach to meet the demands of 21st century. As a multi disciplinary endeavour, it has the power to unlock the potential of microbes, plants and animal cells including human cells to develop bio-based products cost-effectively with a minimal carbon footprint.

It is envisioned that biomanufacturing hubs will serve as centralized facilities that catalyze the production, development and commercialization of bio-based products through advanced manufacturing technologies and collaborative efforts. This will create a community where resources, expertise and technology can be shared to drive scalability, sustainability and innovation of bio manufacturing processes. These biomanufacturing hubs will bridge the gap between 'lab-to-pilot' and 'pre-commercial scale' manufacturing of bio-based products. Start-ups will play a pivotal role in this process by bringing and developing novel ideas and feeding them into small and medium-sized enterprises (SMEs) and established manufacturers.

Biofoundry refers to the creation of advanced clusters for making biological engineering processes scalable – from the initial design and testing stages to pilot and pre-commercial production. Large-scale manufacturing of mRNA-based vaccines and proteins for a wide variety of applications are some appreciable examples for which bio foundries could be valuable. These clusters will specialize in designing, constructing and testing biological systems and organisms using standardized and automated processes.

Bio-AI hubs will serve as a focal point for encouraging and incentivizing the integration of AI in research and development. These Bio-AI hubs will provide bio technological expertise, cutting-edge infrastructure and logistical support for the integration, storage and analysis of large-scale biological data using AI and machine learning. Making these resources accessible to experts from various disciplines (biology, epidemiology, computer science, engineering, data science etc.) will facilitate the creation of innovative bio-based end products – be it a new variety of gene therapy, or a new food processing alternative.

Through these coordinated initiatives, the BioE3 policy will bring a surge in employment, particularly in tier-II and tier-III cities, where bio manufacturing hubs are proposed to be set up due to their proximity to biomass sources. By investing in India's economy, environment, and employment, this comprehensive policy will contribute towards the nation's sankalp of 'Viksit Bharat'.

(The author is Minister of State (I/C) Science and Technology)

Daily Excelsior
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4. DIGITAL MEDIA COVERAGE

BioSpectrum

Government gives nod to BioE3 policy for fostering high performance biomanufacturing

25 August 2024 | News

To invest in the industrialisation of biology to promote sustainable and circular practices

image credit- shutterstock

The Union Cabinet, chaired by the Prime Minister Narendra Modi, has approved the proposal 'BioE3 (Biotechnology for Economy, Environment and Employment) Policy for Fostering High Performance Biomanufacturing' of the Department of Biotechnology.

The salient features of BioE3 policy include innovation-driven support to R&D and entrepreneurship across thematic sectors. This will accelerate technology development and commercialization by establishing Biomanufacturing & Bio-AI hubs and Biofoundry.

Along with prioritising regenerative bioeconomy models of green growth, this policy will facilitate expansion of India's skilled workforce and provide a surge in job creation.

Overall, this Policy will further strengthen Government's initiatives such as 'Net Zero' carbon economy & 'Lifestyle for Environment' and will steer India on the path of accelerated 'Green Growth' by promoting 'Circular Bioeconomy'. The BioE3 Policy will foster and advance future that is more sustainable, innovative, and responsive to global challenges and lays down the Bio-vision for Viksit Bharat.

To address the national priorities, the BioE3 Policy would broadly focus on the following strategic/thematic sectors: high value bio-based chemicals, biopolymers & enzymes; smart proteins & functional foods; precision biotherapeutics; climate resilient agriculture; carbon capture & its utilisation; marine and space research.

Organ-on-chip tech could boost BioE3 goal to personalise medicine

A major driving factor in the organ-on-chip market is the increasing demand to replace the use of animals to test drugs

Published - September 12, 2024 05:30 am IST

MANJEERA GOWRAVARAM, VIRAJ MEHTA

Organ-on-chip technology offers a platform for testing drugs without involving animals or humans in the preclinical stages. Here, a lab technician is seen holding a Wistar laboratory rate. | Photo Credit: Janet Stephens

On August 24, the Government of India announced the 'BioE3' policy to drive innovation in the biotechnology sector by establishing biomanufacturing facilities, bio-AI hubs, and bio-foundries. ('AI' stands for artificial intelligence.) A key focus area of the policy is precision therapeutics, which involve developing and administering drugs according to the needs of individual patients. The policy also aims to boost the development of biologics such as gene therapy and cell therapy.

Recent advancements in human-relevant 3D culture models, also known as 'new approach methods' (NAMs), have shown promising results in the field of precision therapeutics. These models include 3D spheroids, organoids, bioprinting, and organ-on-chips.

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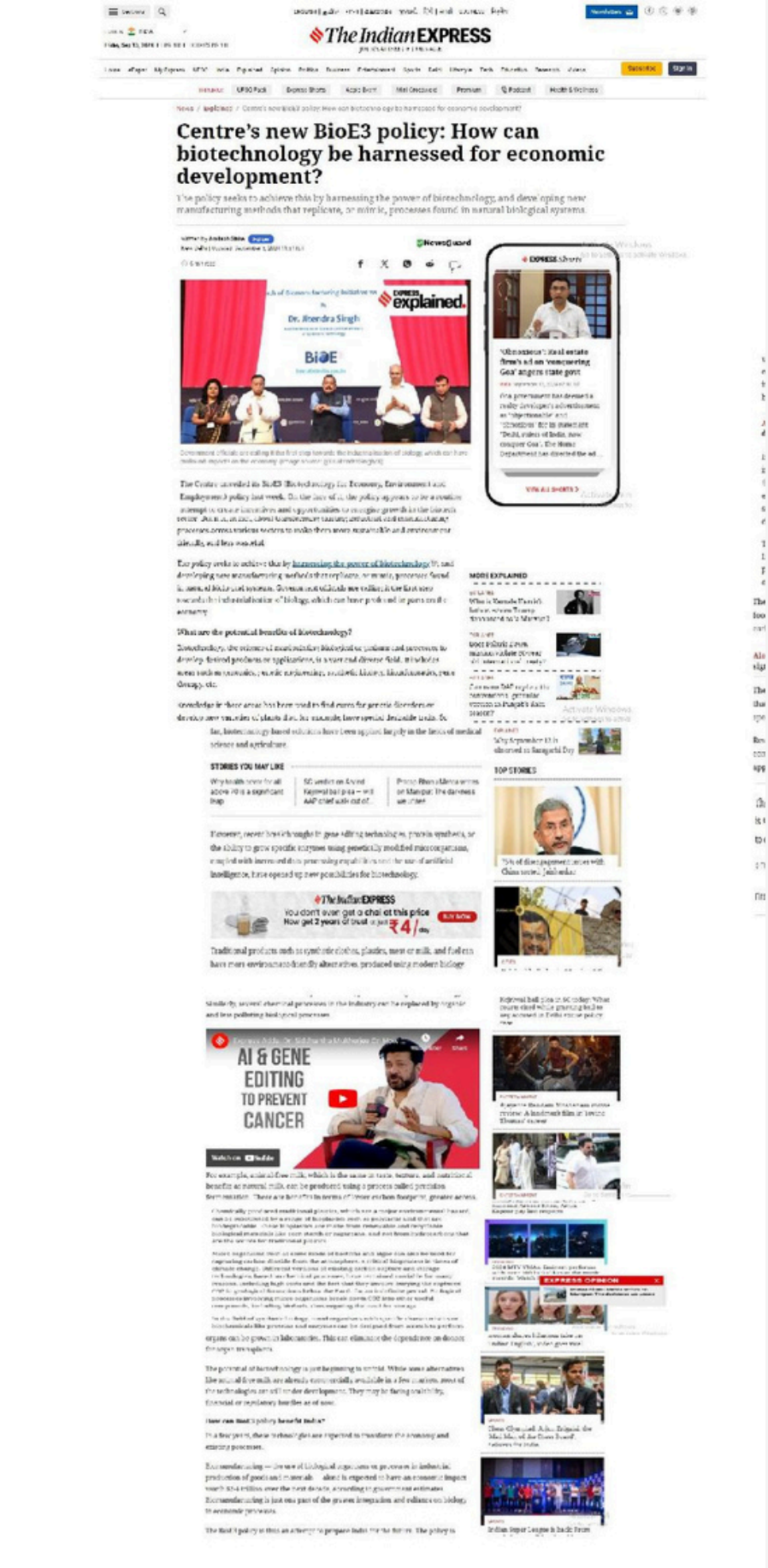

The Indian EXPRESS

Centre's new BioE3 policy: How can biotechnology be harnessed for economic development?

The policy seeks to achieve this by harnessing the power of biotechnology, and developing new manufacturing methods that replicate, or mimic, processes found in natural biological systems.

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BioE3 Policy: Fostering High Performance Biomanufacturing in India

The BioE3 Policy (Biotechnology for Economy, Environment and Employment) sets the stage for fostering high-performance biomanufacturing, positioning India at the forefront of global biotechnological innovation.

Sumit Arora · Published On September 12th, 2024

The Union Cabinet of India, under the leadership of Prime Minister Shri Narendra Modi, has approved a groundbreaking policy aimed at revolutionizing the country's biotechnology sector. The BioE3 Policy (Biotechnology for Economy, Environment and Employment) sets the stage for fostering high-performance biomanufacturing, positioning India at the forefront of global biotechnological innovation.

Key Features of the BioE3 Policy

Innovation Driven Support

The policy focuses on providing robust support for Research and Development (R&D) and entrepreneurship across various thematic sectors. This approach aims to:

1. Accelerate technology development
2. Enhance commercialization of biotechnology innovations

Infrastructure Development

To achieve its objectives, the policy proposes the establishment of:

Infrastructure	Purpose
Biomanufacturing Hubs	Centers for advanced biotechnology production
Bio-AI Hubs	Integration of artificial intelligence with biotechnology
Biofoundry	Facilities for rapid prototyping and testing of bio-based products

Focus on Sustainable Growth

The BioE3 Policy aligns with several key national initiatives:

Initiative	Contribution of BioE3 Policy
'Net Zero' Carbon Economy	Promote sustainable biotechnology practices
'Lifestyle for Environment'	Encourage eco-friendly bio-based products
'Green Growth'	Facilitate the development of a circular bioeconomy

Workforce Development

A crucial aspect of the policy is its focus on human resources.

- Expansion of India's skilled workforce in biotechnology
- Creation of new job opportunities in the biotech sector

Strategic Thematic Sectors

The BioE3 Policy targets several key areas to address national priorities:

High-Value Bio-based Chemicals

- Development of sustainable alternatives to petrochemicals
- Production of biopolymers and enzymes for industrial applications

Smart Proteins & Functional Foods

- Innovation in alternative protein sources
- Development of foods with enhanced nutritional profiles

Precision Biotherapeutics

- Advancement in personalized medicine
- Development of targeted biological treatments

Climate Resilient Agriculture

- Creation of crop varieties resilient to environmental stresses
- Sustainable farming practices to mitigate climate change impacts

Carbon Capture & Utilization

- Development of biotechnological solutions for carbon sequestration
- Conversion of captured carbon into useful products

Marine and Space Research

- Exploration of biotechnology applications in marine environments
- Development of bio-based solutions for space exploration

The Importance of High-Performance Biomanufacturing

High performance biomanufacturing represents a paradigm shift in production capabilities:

Aspect	Description
Definition	The ability to produce a wide range of products using advanced biotechnological processes
Applications	From medicines to materials, addressing challenges in farming, food, and manufacturing
Integration	Combines cutting-edge biotechnology with traditional manufacturing processes

Addressing Global Challenges

The policy recognizes the potential of biotechnology to tackle pressing issues:

Climate Change Mitigation

- Development of bio-based alternatives to fossil fuels
- Creation of carbon-neutral manufacturing processes

Food Security

- Enhancement of crop yields through biotechnology
- Development of nutrient-rich food varieties

Human Health

- Advancement in biopharmaceuticals and personalized medicine
- Biotechnological solutions for emerging health challenges

Vision for a Sustainable Future

The BioE3 Policy sets forth a comprehensive vision for India's biotechnology sector:

Sustainable Practices

- Promotion of circular bioeconomy models
- Establishment of environmental impact assessment mechanisms

Innovation-Driven Growth

- Encouragement of cutting-edge research in biotechnology
- Support for startups and entrepreneurship in the biotech sector

Global Competitiveness

- Positioning India as a leader in high-performance biomanufacturing
- Enhancing export potential of bio-based products

4. DIGITAL MEDIA COVERAGE

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India's bioeconomy hits $130 billion, to reach $ 300 billion by 2030: Minister

Agencies | Sep 1, 2024, 12.30 PM IST

NEW DELHI: India's economy has witnessed a remarkable surge, growing from USD 10 billion in 2014 to over USD 130 billion in 2024, with projections set to hit an impressive USD 300 billion by 2030. Dr Jitendra Singh, Union Minister of State for Science and Technology, lauded this extraordinary growth while formally releasing the groundbreaking BioE3 policy at the L Media Centre today.

Singh said, "India's bio economy skyrockets from USD 10 billion in 2014 to over USD 130 billion in 2024, with projections to reach USD 300 billion by 2030".
He added, "BioE3 policy will prove to be a milestone not only for the bio economy but a game changer for Viksit Bharat @2047".

According to the Ministry of Science and Technology, during the ceremony, Dr Singh hailed India as a global biotech powerhouse, crediting Prime Minister Narendra Modi's visionary leadership for this transformative journey.
Singh said, "As India emerges as a Global Biotech Powerhouse, Prime Minister Narendra Modi will be hailed across the world as the champion of new Biotech Boom".

The BioE3 policy, recently approved by the Union Cabinet under the chairmanship of PM Modi, aims to foster high-performance biomanufacturing, aligning with national initiatives such as the 'Net Zero' carbon economy and Mission LiFE (Lifestyle for Environment).

He said, "BioE3 policy will have a momentous impact on various sectors like food, energy and health".

Dr Singh described the policy as a significant milestone not only for India's bioeconomy but also as a game changer for the broader vision of 'Viksit Bharat @2047.'

Addressing the gathering, Dr. Singh highlighted the momentous impact of the BioE3 policy across various sectors, including food, energy, and health.

The policy is centred around six thematic areas: bio-based chemicals and enzymes, functional foods and smart proteins, precision biotherapeutics, climate-resilient agriculture, carbon capture and utilisation, and futuristic marine and space research.

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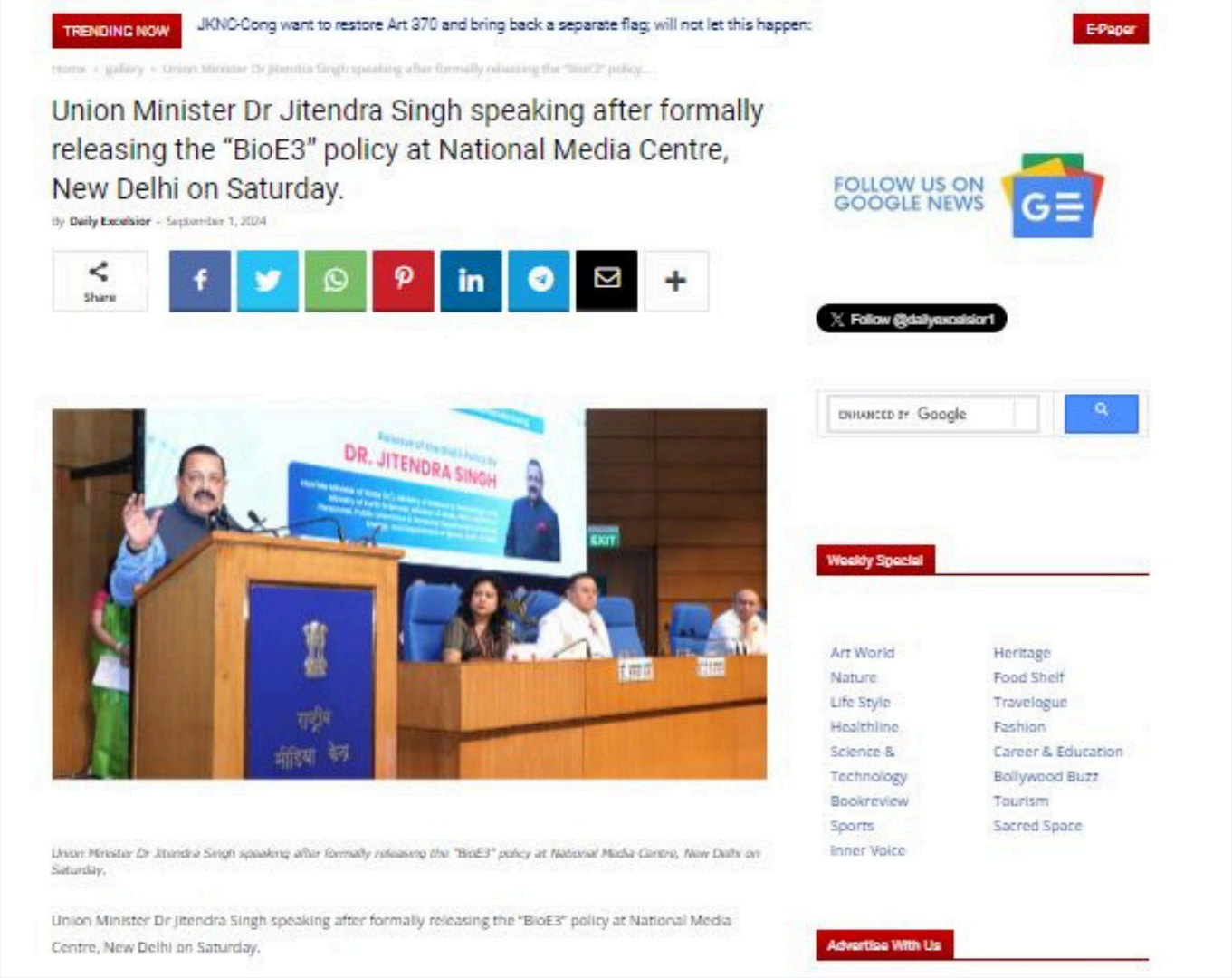

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Union Minister Dr Jitendra Singh speaking after formally releasing the "BioE3" policy at National Media Centre, New Delhi on Saturday.

By Daily Excelsior - September 1, 2024

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Union Minister Dr Jitendra Singh speaking after formally releasing the "BioE3" policy at National Media Centre, New Delhi on Saturday.

Union Minister Dr Jitendra Singh speaking after formally releasing the "BioE3" policy at National Media Centre, New Delhi on Saturday.

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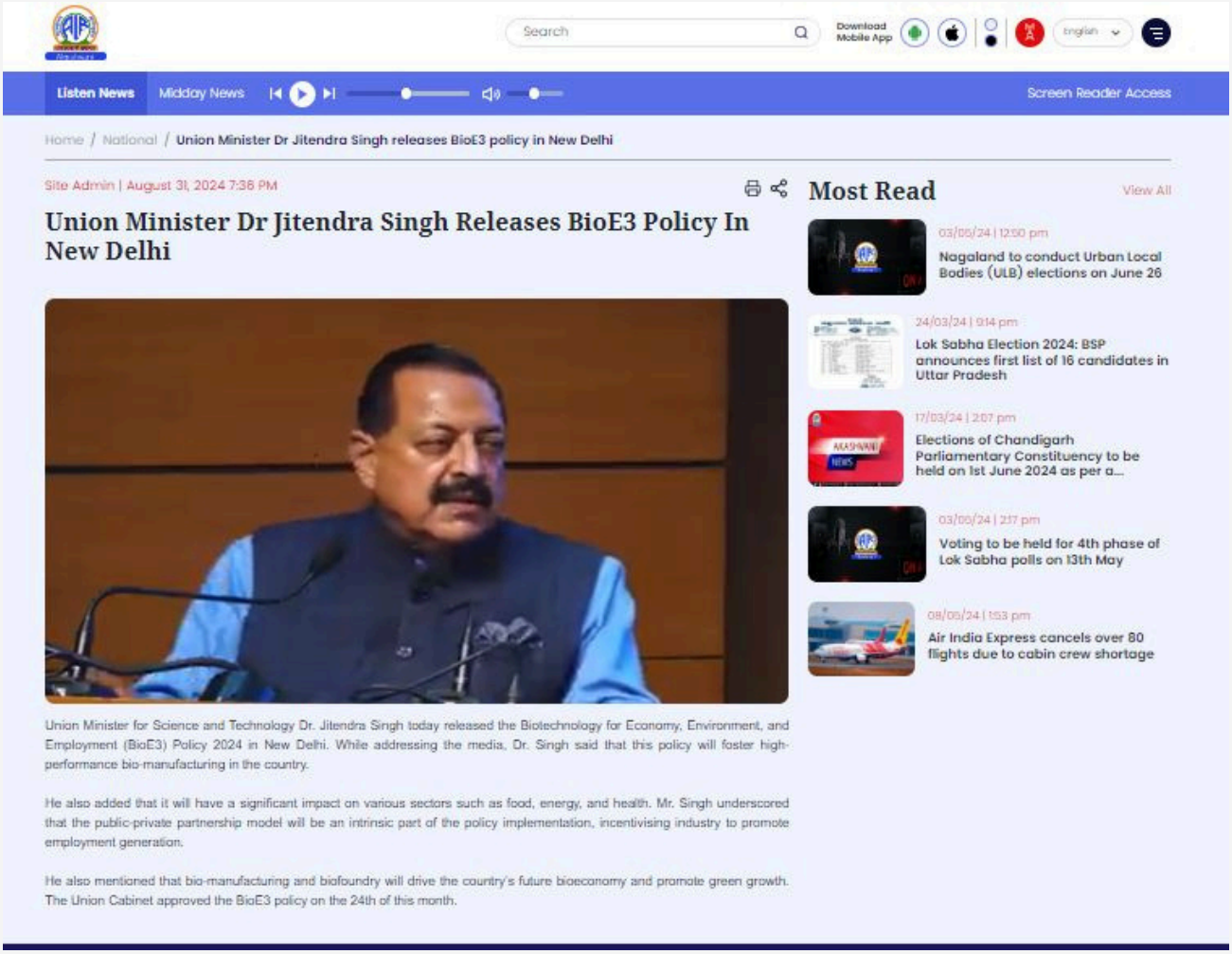

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Union Minister Dr Jitendra Singh Releases BioE3 Policy In New Delhi

Union Minister for Science and Technology Dr. Jitendra Singh today released the Biotechnology for Economy, Environment, and Employment (BioE3) Policy 2024 in New Delhi. While addressing the media, Dr. Singh said that this policy will foster high-performance bio-manufacturing in the country.

He also added that it will have a significant impact on various sectors such as food, energy, and health. Mr. Singh underscored that the public-private partnership model will be an intrinsic part of the policy implementation, incentivising industry to promote employment generation.

He also mentioned that bio-manufacturing and biofoundry will drive the country's future bioeconomy and promote green growth. The Union Cabinet approved the BioE3 policy on the 24th of this month.

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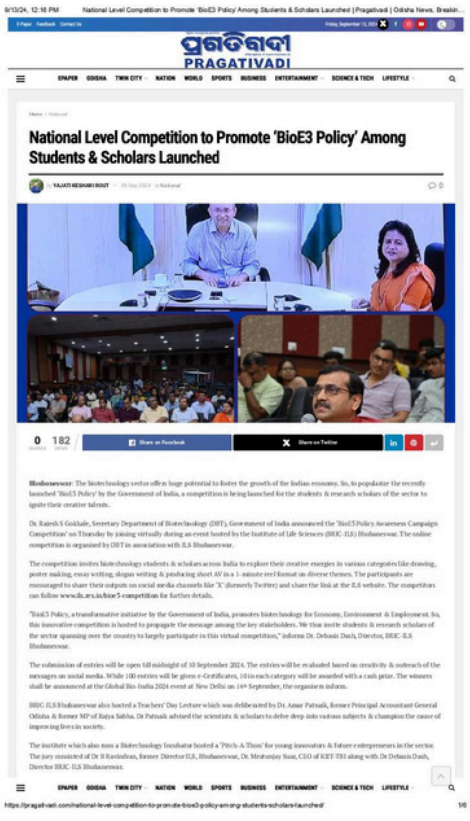

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National Level Competition to Promote 'BioE3 Policy' Among Students & Scholars Launched

YAJATI KESHARI ROUT — 05 Sep 2024 — In National

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Bhubaneswar: The biotechnology sector offers huge potential to foster the growth of the Indian economy. So, to popularize the recently launched 'BioE3 Policy' by the Government of India, a competition is being launched for the students & research scholars of the sector to ignite their creative talents.

Dr. Rajesh S Gokhale, Secretary Department of Biotechnology (DBT), Government of India announced the 'BioE3 Policy Awareness Campaign Competition' on Thursday by joining virtually during an event hosted by the Institute of Life Sciences (IRIC-ILS) Bhubaneswar. The online competition is organised by DBT in association with ILS Bhubaneswar.

The competition invites biotechnology students & scholars across India to explore their creative energies in various categories like drawing, poster making, essay writing, slogan writing & producing short AV in a 1-minute reel format on diverse themes. The participants are encouraged to share their outputs on social media channels like 'X' (formerly Twitter) and share the link at the ILS website. The competitors can follow www.ils.res.in/bioe3-competition for further details.

"BioE3 Policy, a transformative initiative by the Government of India, promotes biotechnology for Economy, Environment & Employment. So, this innovative competition is hosted to propagate the message among the key stakeholders. We thus invite students & research scholars of the sector spanning over the country to largely participate in this virtual competition," informs Dr. Debasis Dash, Director, IRIC-ILS Bhubaneswar.

The submission of entries will be open till midnight of 10 September 2024. The entries will be evaluated based on creativity & outreach of the messages on social media. While 100 entries will be given e-Gratificates, 10 in each category will be awarded with a cash prize. The winners shall be announced at the Global Bio-India 2024 event at New Delhi on 14th September, the organisers inform.

IRIC-ILS Bhubaneswar also hosted a Teachers' Day Lecture which was deliberated by Dr. Amar Patnaik, former Principal Accountant General Odisha & former MP of Rajya Sabha. Dr Patnaik advised the scientists & scholars to delve deep into various subjects & champion the cause of improving lives in society.

The institute which also runs a Biotechnology Incubator hosted a 'Pitch-A-Thon' for young innovators & future entrepreneurs in the sector. The jury consisted of Dr B Ravindran, former Director ILS, Bhubaneswar, Dr. Mrutunjay Suar, CEO of KIIT-TBI along with Dr Debasis Dash, Director IRIC- ILS Bhubaneswar.

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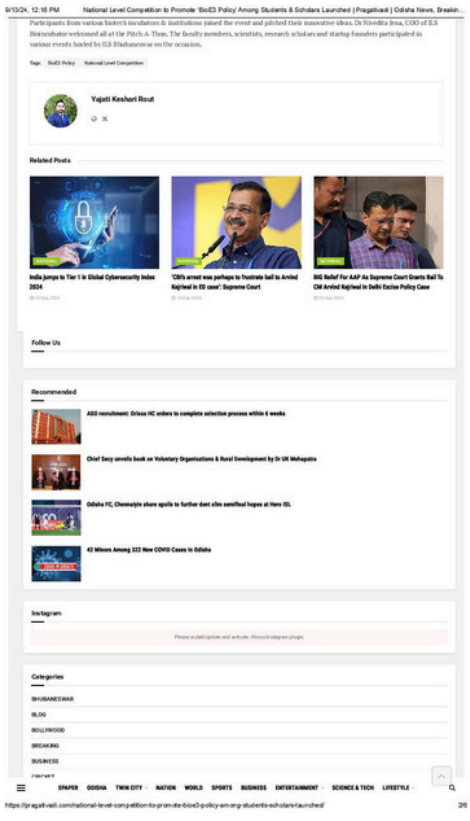

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Participants from various biotech incubators & institutions joined the event and pitched their innovative ideas. Dr Niveditta Jena, COO of ILS Biotechnology welcomed all at the Pitch-A-Thon. The faculty members, scientists, research scholars and startup founders participated in various events hosted by ILS Bhubaneswar on the occasion.

Tags: BioE3 Policy National Level Competition

Yajati Keshari Rout

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4. DIGITAL MEDIA COVERAGE

ThePrint

India

RGCB to lead Kerala towards implementation of BioE3 policy

PTI 29 August, 2024 09:46 pm IST

Kochi, Aug 29 (PTI) As the new BioE3 policy seeks to place India at the forefront of the next industrial revolution, the scientific community on Thursday foresaw the prospect of massive investments for innovation that can help the bioeconomic sector achieve a growth of Rs 25 lakh crore by 2030.

The Rajiv Gandhi Centre for Biotechnology (RGCB) began groundwork on initiating Kerala's shift from chemical-based industries into bio-manufacturing hubs that power the country's economy while tackling the challenges of food, energy and climate.

Dr Chandrabhas Narayana, Director of the Thiruvananthapuram-based RGCB, hailed the proposed shift from chemical-based industries to bio-manufacturing hubs.

A release issued by the RGCB said the institution will organise a string of programmes across Kerala to create awareness about BioE3 among various stakeholders.

At a panel discussion today with participation from top officials of Department of Science and Technology (DST), the Thiruvananthapuram-based RGCB expressed pleasure in leading Kerala towards the implementation of the path-breaking BioE3 policy.

"Approved last weekend, the policy, which stands for biotechnology for economy, employment and environment, aims to use the power of bio-manufacturing for a cleaner and greener India," the release said.

Marking the start of a state-wide drive featuring workshops and discussions around BioE3, experts noted that the policy will prove to be a major stride in the country's efforts to achieve carbon-neutrality.

Participants noted that the new policy will enable industries to meet the country's growing demands for food and fuel while augmenting employment opportunities.

4. DIGITAL MEDIA COVERAGE

Biotech enigma: On the BioE3 proposal and beyond

Biotechnology initiatives need long-term capital investments

Updated - August 30, 2024 02:04 pm IST Published - August 30, 2024 12:10 am IST

Earlier this week the Cabinet cleared a proposal, though without specifying a budget, called BioE3 or Biotechnology for Economy, Environment and Employment. Its thrust is to boost manufacturing in the biotechnology sector. Since 1986, India has had a dedicated department for biotechnology, and which deserves substantial credit. For instance, the progress in vaccine development, diagnostics and biologicals, that has bolstered India's reputation as a 'vaccine factory', is due to the initiatives of this department. However, biotechnology did not quite spawn the equivalent of the IT revolution. There is much more to an industrialised biotechnology sector beyond vaccines. There are billion-dollar conglomerates today that rest on high-value microbes, gene-modification technologies, bio-plastics, bio-materials, and high-precision medical devices. However, despite the know-how and human resource capital, only a few Indian biotechs have global resonance, as there are few local manufacturers who can supply Indian laboratories/startups with the ingredients and devices to make products. The reliance on imports means that India loses its international competitiveness. The BioE3 policy aims to correct this.

In the last four decades, India has funded biotech research institutions but now sees that it needs to be going beyond and setting up companies, in public private partnership mode, to bolster biotechnology manufacturing. There are six verticals that this initiative envisages: bio-based chemicals and enzymes; functional foods and smart proteins; precision biotherapeutics; climate-resilient agriculture; carbon capture, and futuristic marine and space research. Futurists have been saying that the era of fossil-fuel industrialisation is over and humanity will have to rely on the natural world — for food and for making consumer products. This is to solve the global problem of non-biodegradable waste and carbon emissions. Future industries must be grounded in environmentally benign products, and this is impossible without sophisticated biotechnology. By setting up bio-foundries and bio-artificial intelligence hubs, the policy hopes there will be avenues for a variety of biotechnologists to congregate. Well intentioned this may be, but India's woes with manufacturing have chronic causes. Without establishing enabling grounds for long-term capital investment — and these have little to do with biotechnology per se — top-down initiatives will have limited impact. The BioE3 policy must be a deeply collaborative effort between Centre and States. Rather than expect quick returns, the government must provide financial and infrastructural support over the long term.

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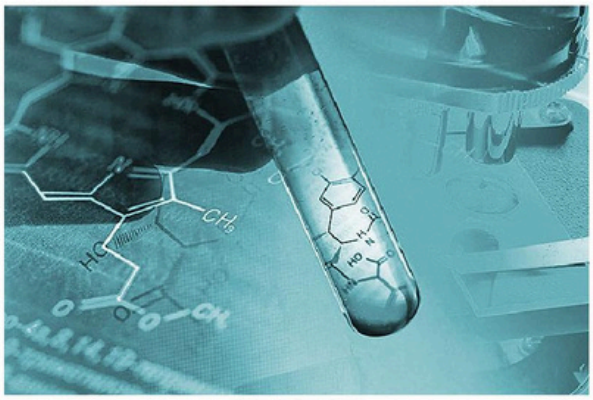
4. DIGITAL MEDIA COVERAGE

EXPRESS PHARMA

Union cabinet approves BioE3 Policy for advancing biomanufacturing in India

New policy aims to enhance biomanufacturing through R&D, technology development, and job creation

By **EP News Bureau** On **Aug 26, 2024** LATEST UPDATES



Representational image

The Union Cabinet, led by Prime Minister Narendra Modi, has approved the BioE3 (Biotechnology for Economy, Environment, and Employment) Policy aimed at fostering high-performance biomanufacturing in India. The policy is set to bolster innovation, accelerate technology development, and prioritise sustainable growth in the biotechnology sector.

The BioE3 Policy will provide innovation-driven support to research and development (R&D) and entrepreneurship across thematic sectors. The policy will also focus on accelerating technology development and commercialisation through the establishment of Biomanufacturing & Bio-AI hubs and Biofoundries.

A key feature of the policy is the prioritisation of regenerative bioeconomy models aimed at promoting green growth. The policy also aims to expand India's skilled workforce, facilitating a surge in job creation within the biomanufacturing sector.

BioE3 | biomanufacturing | biomanufacturing in India | Narendra Modi

EXPRESS PHARMA

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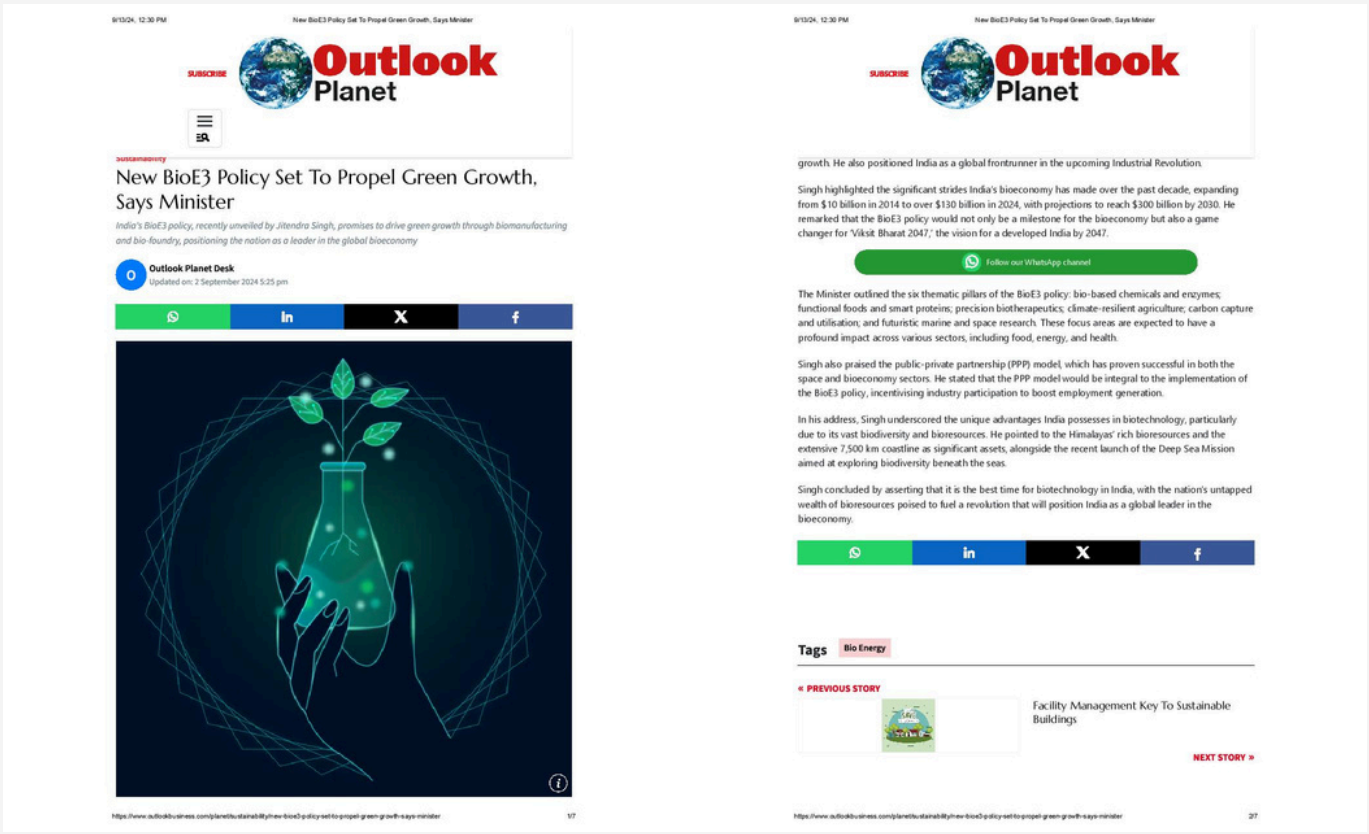

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New BioE3 Policy Set To Propel Green Growth, Says Minister

India's BioE3 policy, recently unveiled by Jitendra Singh, promises to drive green growth through biomanufacturing and bio-foundry, positioning the nation as a leader in the global bioeconomy

Outlook Planet Desk
Updated on: 2 September 2024 5:25 pm

https://www.outlookbusiness.com/planet/sustainability/new-bioe3-policy-set-to-propel-green-growth-says-minister 1/7

9/13/24, 12:30 PM New BioE3 Policy Set To Propel Green Growth, Says Minister

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growth. He also positioned India as a global frontrunner in the upcoming Industrial Revolution.

Singh highlighted the significant strides India's bioeconomy has made over the past decade, expanding from $10 billion in 2014 to over $130 billion in 2024, with projections to reach $300 billion by 2030. He remarked that the BioE3 policy would not only be a milestone for the bioeconomy but also a game changer for 'Viksit Bharat 2047,' the vision for a developed India by 2047.

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The Minister outlined the six thematic pillars of the BioE3 policy: bio-based chemicals and enzymes; functional foods and smart proteins; precision biotherapeutics; climate-resilient agriculture; carbon capture and utilisation; and futuristic marine and space research. These focus areas are expected to have a profound impact across various sectors, including food, energy, and health.

Singh also praised the public-private partnership (PPP) model, which has proven successful in both the space and bioeconomy sectors. He stated that the PPP model would be integral to the implementation of the BioE3 policy, incentivising industry participation to boost employment generation.

In his address, Singh underscored the unique advantages India possesses in biotechnology, particularly due to its vast biodiversity and bioresources. He pointed to the Himalayas' rich bioresources and the extensive 7,500 km coastline as significant assets, alongside the recent launch of the Deep Sea Mission aimed at exploring biodiversity beneath the seas.

Singh concluded by asserting that it is the best time for biotechnology in India, with the nation's untapped wealth of bioresources poised to fuel a revolution that will position India as a global leader in the bioeconomy.

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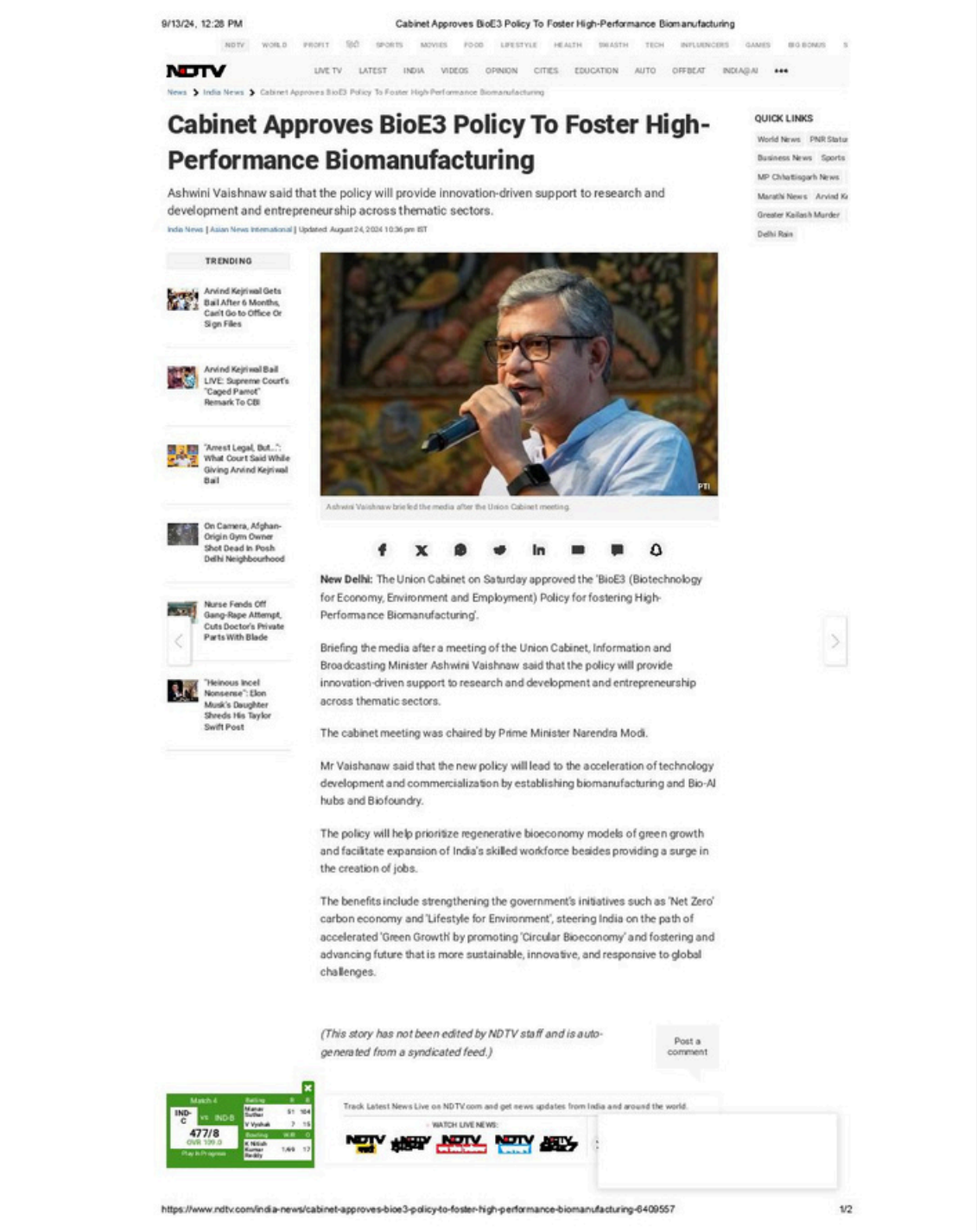

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Cabinet Approves BioE3 Policy To Foster High-Performance Biomanufacturing

Ashwini Vaishnaw said that the policy will provide innovation-driven support to research and development and entrepreneurship across thematic sectors.

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PTI

Ashwini Vaishnaw briefed the media after the Union Cabinet meeting.

New Delhi: The Union Cabinet on Saturday approved the 'BioE3 (Biotechnology for Economy, Environment and Employment) Policy for fostering High-Performance Biomanufacturing'.

Briefing the media after a meeting of the Union Cabinet, Information and Broadcasting Minister Ashwini Vaishnaw said that the policy will provide innovation-driven support to research and development and entrepreneurship across thematic sectors.

The cabinet meeting was chaired by Prime Minister Narendra Modi.

Mr Vaishanaw said that the new policy will lead to the acceleration of technology development and commercialization by establishing biomanufacturing and Bio-AI hubs and Biofoundry.

The policy will help prioritize regenerative bioeconomy models of green growth and facilitate expansion of India's skilled workforce besides providing a surge in the creation of jobs.

The benefits include strengthening the government's initiatives such as 'Net Zero' carbon economy and 'Lifestyle for Environment', steering India on the path of accelerated 'Green Growth' by promoting 'Circular Bioeconomy' and fostering and advancing future that is more sustainable, innovative, and responsive to global challenges.

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4. DIGITAL MEDIA COVERAGE

Awareness on BioE3 Policy to students of Imphal
- Date : September 2, 2024 :: Institute of Bioresources and Sustainable Development, Imphal -

IBSD organized Awareness on BioE3 Policy to the students of Imphal

In continuation of the Social Outreach Activities for the promotion of the Government of India's BioE3 Policy, the Institute of Bioresources and Sustainable Development, Imphal, Manipur organized an awareness programme on Biotechnology for Economy, Environment and Employment (BioE3) Policy released by the Government.

The Institute of Bioresources and Sustainable Development (IBSD) having its presence at Imphal; Manipur, Gangtok; Sikkim, Shillong; Meghalaya and Aizawl; Mizoram is only Institute in the North-East Region (NER) of India, under the ambit of the Biotechnology Research and Innovation Council (BRIC), Department of Biotechnology (DBT), Government of India which is working on "Bioresources development and their sustainable use through biotechnological interventions for socio-economic growth of the NER".

IBSD has been working towards development of bioeconomy from bioresources under avail leadership of Prof. Pulok K. Mukherjee, Director, IBSD. BRIC-IBSD has been doing such outreach activities to empower and nurture young minds of students.

A group of students and teachers visited to all the laboratories of the institute and interacted with the scientists and researchers. Scientists and research scholars of BRIC-IBSD enlightened them about sophisticated equipment available and different ongoing research activities of the institute towards generating bioeconomy from bioresources of the region.

The interactive lab visit was followed by a lecture and video showcasing various activities of the institute. While addressing the students, Prof. Pulok Kumar Mukherjee, Director, IBSD highlighted on the new BioE3 (Biotechnology for Economy, Environment and Employment) policy which is a landmark initiative of DBT, Govt. of India.

He and other scientists of IBSD encouraged the students to opt for the challenges in the area of biotechnology and also mentioned how the new policy of the Government of India on BioE3 will be contributing bioeconomy from bioresources which will be a transformative shift in India's biomanufacturing sector and boost the economy, innovation, jobs and clean environmental.

* This information was sent to e-pao.net by Dr. S. Indira Devi (Scientist, IBSD Imphal)
(HoD CSE & HoS Students' Affairs, Indian Institute of Information Technology (IIIT) Manipur) ,
who can be contacted at sidevi1(AT)yahoo(DOT)co(DOT)in
This article was webcasted on September 03 2024 .

4. DIGITAL MEDIA COVERAGE

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Bhubaneswar, 06 September 2024: Biotechnology sector offers huge potential to foster the growth of Indian economy. So, to popularize the recently launched 'BioE3 Policy' by the Government of India, a competition is being launched for the students & research scholars of the sector igniting their creative talents.

Dr. Rajesh S Gokhale, Secretary Department of Biotechnology (DBT), Government of India announced the 'BioE3 Policy Awareness Campaign Competition' on Thursday by joining virtually during an event hosted by the Institute of Life Sciences (BRIC-ILS) Bhubaneswar. The online competition is organised by DBT in association with ILS Bhubaneswar.

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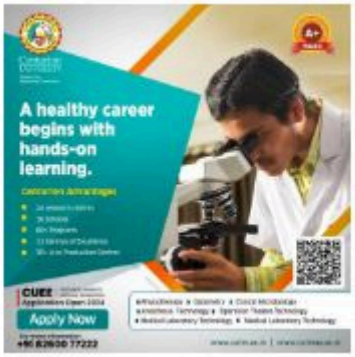
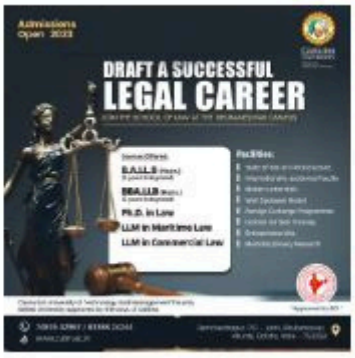
The submission of entries will be open till the midnight of 10 September, 2024. The entries will be evaluated on the basis of creativity & outreach of the messages on social media. While 100 entries will be given e-Certificates, 10 in each category will be awarded with a cash prize. The winners shall be announced at Global Bio-India 2024 event at New Delhi on 14th September, the organisers inform.





4. DIGITAL MEDIA COVERAGE

The Sentinel

National News

Bio-manufacturing, bio-foundry will promote India's green growth: Dr. Jitendra Singh

Bio-manufacturing and bio-foundry, which are part of the new BioE3 (Biotechnology for Economy, Environment and Employment) policy, will drive India's green growth, said the Union Minister of State (Independent Charge) for Science and Technology, Dr. Jitendra Singh.

Sentinel Digital Desk

Published on: 02 Sep 2024, 9:55 am

NEW DELHI: Bio-manufacturing and bio-foundry, which are part of the new BioE3 (Biotechnology for Economy, Environment and Employment) policy, will drive India's green growth, said the Union Minister of State (Independent Charge) for Science and Technology, Dr. Jitendra Singh.

He said this while formally releasing the path-breaking new Bio-economy policy at L Media Centre in the national capital. Approved recently by the Union Cabinet, the Bio E3 policy aims to drive high-performance bio-manufacturing aligned with initiatives like "net zero" carbon economy.

"Bio-manufacturing and bio-foundry will drive India's future bio-economy and promote green growth," Singh said.

Singh also hailed India as the global torchbearer of the next Industrial Revolution.

"BioE3 policy will prove to be a milestone not only for the bio-economy but a game changer for Viksit Bharat 2047," Singh said, highlighting the progress of the country's bio-economy in the last decade -- from $10 billion in 2014 to over $130 billion in 2024.

It is projected to reach $300 billion by 2030, he said. He noted that biotechnology has a huge potential for driving the next revolution of 21st generation.

"The IT revolution was west driven, the biotechnology revolution will be India-driven," the Minister said, adding that the "BioE3 policy will have a momentous impact on various sectors like food, energy and health."

The Science and Technology Minister highlighted the six thematic themes: bio-based chemicals and enzymes; functional foods and smart proteins; precision bio-therapeutics; climate resilient agriculture; carbon capture and its utilisation; and futuristic marine and space research.

Singh also underscored the public-private-partnership (PPP) model, as seen in the success achieved in the space and bio-economy sectors. He said the PPP model "will be an intrinsic part of Bioe3 Policy implementation, incentivising industry to promote employment generation."

Noting it is the best time for biotechnology in India, he emphasised the country's "huge wealth of bio-resources, an unsaturated resource waiting to be harnessed."

This has "an advantage in biotechnology, especially due to the vast biodiversity and the unique bio-resources in the Himalayas," Singh said.

Then there is "the 7,500 km long coastline and last year we launched the Deep Sea Mission which is going to dig the biodiversity beneath the seas," he said. (IANS)

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BioE3 Policy: Biotechnology for Economy, Environment and Employment

by Guest Author — September 3, 2024 in Opinion 0

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by: Dr. Jitendra Singh

In a landmark initiative with far reaching futuristic implications, the Union Cabinet headed by Prime Minister Narendra Modi has approved the BioE3 (Biotechnology for Economy, Employment and Environment) Policy of the Department of Biotechnology (DBT) to foster high-performance biomanufacturing for a clean, green, prosperous, and self-reliant Bharat. This will ensure for India a pioneering role in the global arena as one of the earliest torch-bearers of world's future economic growth.

The unsustainable pattern of material consumption, excessive resource utilization and waste generation have led to global cataclysms such as forest fires, melting glaciers, and declining biodiversity.Keeping in view the national priority of steering India on the path of accelerated 'Green Growth', the integrated BioE3 (Biotechnology for Economy, Environment and Employment) Policy is a positive and decisive step towards sustainable growth in the challenging backdrop of climate change, depleting non-renewable resources, and unsustainable waste generation.

A major aim of this policy is to stimulate the transition of chemical-based industries to more sustainable bio-based industrial models. It will also promote a circular bioeconom and provide an impetus to achieving net-zero carbon emissions by encouraging the utilization of waste from biomass, landfills, green house gases, etc. by microbial cell factories to produce bio-based products.

In addition, the BioE3 Policy will create novel solutionsfor fostering the growth of India bioeconomy, facilitating scale-up and commercialisation of bio-based products; reducir reusing, and recycling waste materials; expanding India's cohort of a highly skilled workforce; driving a surge in job creation; and intensifying entrepreneurial momentum

Salient features of the Policy include: 1) Encouragement and support to indigenous rese and development-focused entrepreneurship across thematic sectors such as high-value based chemicals, biopolymers & enzymes; smart proteins & functional foods; precision biotherapeutics; climate resilient agriculture; carbon capture and its utilization; and m and space research;2) Accelerationof technology development &commercialization by establishing bio manufacturing facilities, bio foundry clusters, and bio-artificial intellig (Bio-AI) hubs; 3); Prioritizing regenerative models of economic growth and job creation with an emphasis on ethical & biosafety consideration; 4) Harmonizing regulatory refo with global standards.

India has demonstrated strong economic growth in the past decade and has tremendou potential to be amongst the global leaders of the 4th industrial revolution. Our bioecon has grown 13 folds from $10 billion in 2014 to over $130 billion in 2024. It is further expected to reach a market value of $300 billion by 2030. The implementation of BioE3 Policy across diverse sectors is likely to further boost the country's bioeconomy, while promoting 'Green Growth'.

The foundation for this will be laid by leveraging emerging technologies and innovationsthat result from nurturing the country's high-performance biomanufacturing initiatives.Biomanufacturing is primed to become an important pillar of the 'Make in India' initiative and will provide a transformative approach to meet the demands of 21st century. As a multidisciplinary endeavour, it has the power to unlock the potential of microbes, plants, and animal cells including human cells to develop bio-based products cost-effectively with a minimal carbon footprint.

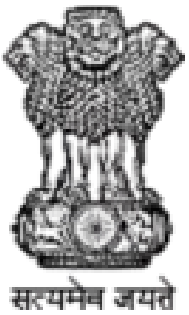
It is envisioned that biomanufacturing hubs will serve as centralized facilities that catalyze the production, development, and commercialization of bio-based products through advanced manufacturing technologies, and collaborative efforts.

Thiswill create a community where resources, expertise, and technology can be shared to drive scalability, sustainability, and innovation of biomanufacturing processes. These biomanufacturing hubs will bridge the gap between 'lab-to-pilot' and 'pre-commercial scale' manufacturing of bio-based products. Start-ups will play a pivotal role in this process by bringing and developing novel ideas and feeding them into small and medium-sized enterprises (SMEs) and established manufacturers.

Biofoundry refers to the creation of advanced clusters for making biological engineering processes scalable – from the initial design and testing stages to pilot and pre-commercial production. Large-scale manufacturing of mRNA-based vaccines and proteins for a wide variety of applications are some appreciable examples for which biofoundries could be valuable. These clusters will specialize in designing, constructing, and testing biological systems and organisms using standardized and automated processes.

Bio-AI hubswill serve as a focal point for encouragingand incentivizing the integration of AI in researchand development. These Bio-AI hubs will provide biotechnological expertise, cutting-edge infrastructure, and logistical support for the integration, storage, and analysis of large-scale biological data using AI and machine learning. Making these resources accessible to experts from various disciplines (biology, epidemiology,computer science, engineering, data science, for example.)willfacilitate the creation of innovative bio-based end products – be it a new variety of gene therapy, or a new food processing alternative.

Through these coordinated initiatives, the BioE3 policy will bring a surge in employment, particularly in tier-II and tier-III cities, where bio manufacturing hubs are proposed to beset up due to their proximity to biomass sources. By investing in India's economy, environment, and employment, this comprehensive policy will contribute towards the nation's sankalp of 'Viksit Bharat'. This policy will serve as a benchmark that highlight show an effective science policy can actively contribute towards nation-building and development.



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DEPARTMENT OF
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