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The BioAgri Revolution

Growth of Bioinputs in Indian Farming

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Nestled in the agricultural landscape of India, Pusa Krishi is a renowned agri-startup incubator, well-known for its cutting-edge technology, extensive industry expertise, and groundbreaking potential. Originally founded in 2014 as an incubator under ICAR-Indian Agricultural Research Institute, it grew into a DST-supported Technology Business Incubator (TBI) and a meta-incubator for agriculture under the Ministry of Agriculture & Farmersì Welfare in 2018. Serving as the exclusive nodal organisation for the Ministry of Agriculture & Farmersì Welfare, Government of India, Pusa Krishi is in charge of the biggest programme for agribusiness incubation, called Rashtriya Krishi Vikas Yojana (RKVY)-Remunerative Approaches for Agriculture and Allied Sector Rejuvenation (RAFTAAR). It oversees a network of 24 RAFTAAR Agri Business Incubators and 5 Knowledge Partners across India. Under several pre-incubation, incubation and agripreneurship development programmes, the unit has worked with more than 450 startups thus far, providing them with a wide range of services and support.

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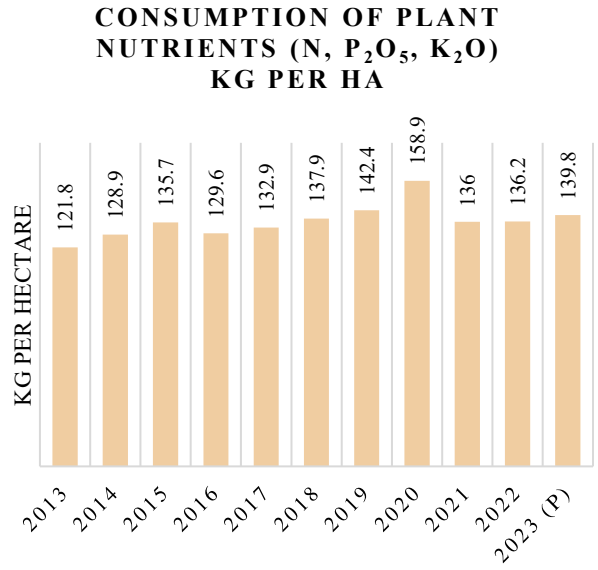
The BioAgri Revolution

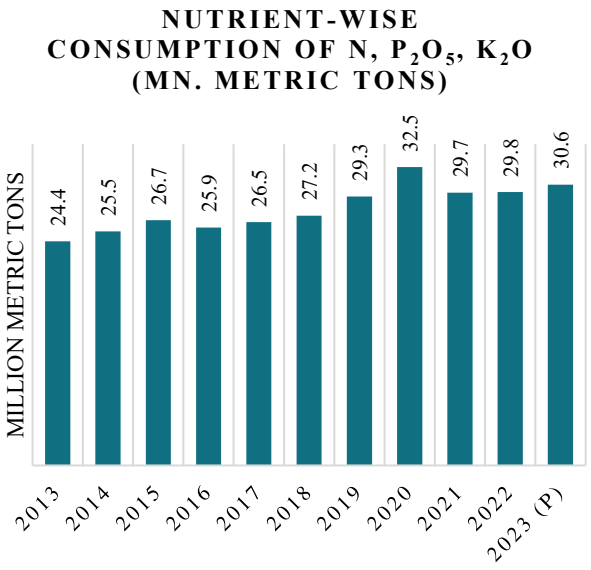
Growth of Bioinputs in Indian Farming

Introduction

Bio-inputs refer to biological substances derived from living organisms that enhance soil fertility, promote plant growth, and improve crop health. These include biofertilizers, biostimulants, biopesticides, and other natural farming inputs, offering sustainable alternatives to chemical fertilizers.

As per Fertilizer Association of India, India's per-hectare consumption of chemical fertilisers surged gradually.





(Source: Fertilizer Association of India (Fertilizer Statistics 2021-22 and Annual Review 2023-24)

The graphs indicate a steady rise in India's per-hectare consumption of chemical fertilizers (N, P_2O_5, K_2O), reaching 139.8 kg/ha in 2023 (P) from 121.8 kg/ha in 2013. Similarly, the total nutrient-wise consumption of fertilizers increased from 24.4 million metric tons in 2013 to a projected 30.6 million metric tons in 2023.

The excessive use of chemical fertilizers has negatively impacted biodiversity and human health. In response, the Government of India has been promoting organic and natural farming practices through initiatives such as the National Mission for Natural Farming. Additionally, under the GOBARdhan scheme, the government aims to establish 15,000 decentralized Bio-Input Resource Centres (BRCs) across the country to support sustainable agricultural practices.

(Source: Council on Energy, Environment and Water (CEEW) – Bio-inputs)

Organic products are gaining global acceptance, with India transitioning from the Green Revolution to an Ecological Agricultural Revolution. Bio-inputs, which are environmentally friendly and cost-effective, are increasingly recognized as crucial in sustainable farming. Initially, convincing stakeholders was challenging, but over the past two decades, bio-based products have grown at a much higher rate (14% CAGR) compared to chemicals (2%).

While still smaller in volume, bio-input industries—ranging from small to large-scale enterprises—are expanding rapidly. Many farms now integrate organic inputs with conventional methods, following a 20:20 model that enhances productivity and reduces input costs by 20%. Despite having the largest number of organic farmers, India faces productivity and market share challenges, prompting government initiatives to promote organic farming. Biological inputs, such as multimicrobial consortia, can aid in crop residue management and pollution reduction.

Over 200 companies are registered for botanical and microbial biocontrol solutions, but marketing and expansion remain key challenges. Some biostimulants, including imported seaweed extracts, have performed well, attracting global interest in the Indian market. The sector requires R&D support, quality control, and regulatory reforms, as existing laws under Fertilizer (Control) Order (FCO) 1985 and the Insecticides Act 1968, primarily address chemical-based inputs. The newly formed Biologicals Agri Solutions Association of India (BASAI) aims to improve standards and awareness.

While organic adoption is growing rapidly, chemical inputs remain relevant. A hybrid approach, supported by increasing consumer awareness, environmental concerns, and demand for cost-effective solutions, is driving organic growth in India and neighboring countries. Even small-scale farmers are swiftly adopting bio-based innovations, signalling a promising future for the industry.

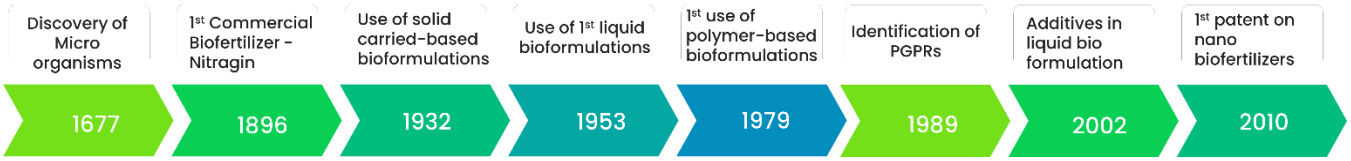
(Source: Global Agribusiness Magazine interviewed Dr. MH Mehta on "Organics in India: Moving from Green Revolution to Eco Agri Revolution")

Overview of Agri-Biological Products and Historic Timeline

Agri-biological products, as a promising and environmental-friendly innovation, have received considerable attention in the last two decades, especially due to their ability to enhance flowering, plant growth, fruit set, crop productivity, nutrient use efficiency (NUE), managing agricultural pests & diseases and crop tolerance against a wide range of abiotic stressors.

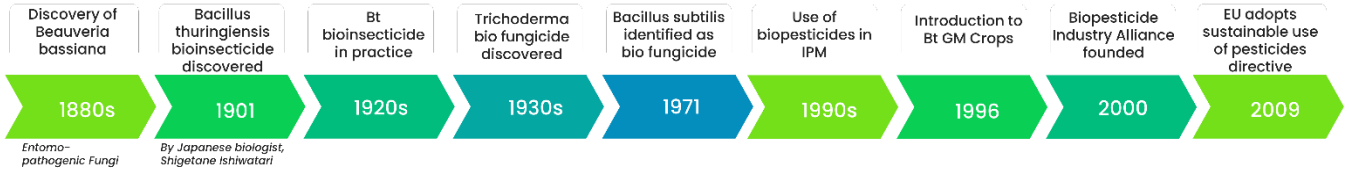
Timeline of major discoveries in the development of bioformulations for Biofertilizers, Biopesticides and Biostimulants:

- **Biofertilizers**



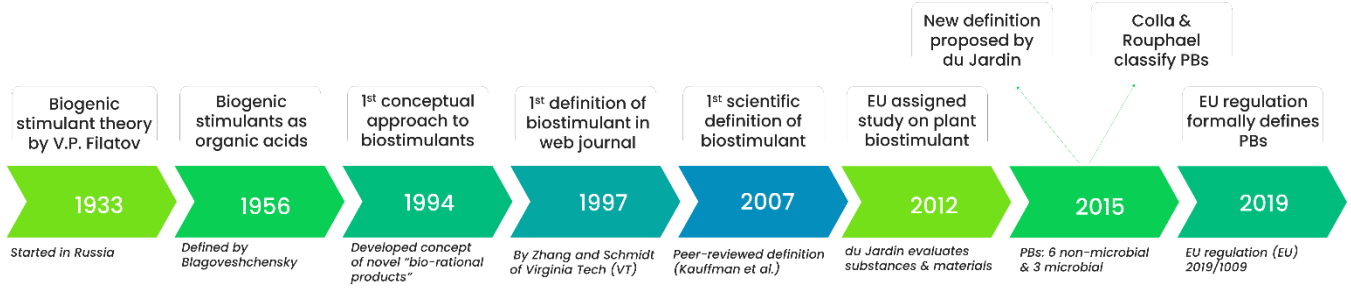
(Source: MDPI: From Lab to Field: Biofertilizers in the 21st Century)

- **Biopesticides**



(Source: AgriBusiness Global: A (Surprisingly Long) Biopesticide Timeline)

- **Biostimulants**



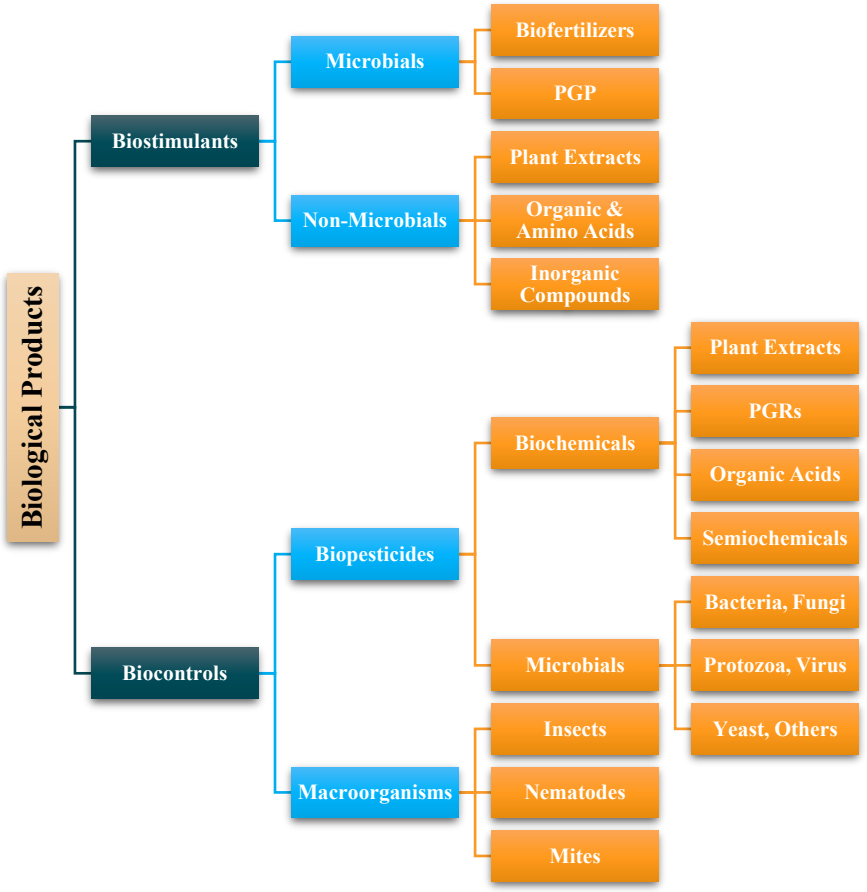
(Source: Origin and evolution of the term biostimulant) – PBs: Plant Biostimulants

Hence, biological products are broadly classified into two categories:

a. **Biostimulants**: Products which are typically classified as:
   i. Biofertilizers – (NUE: Nutrient Use Efficiency)
   ii. PGP (Plant Growth Promotion) to mitigate abiotic stress, enhance crop quality and improve nutrient assimilation.

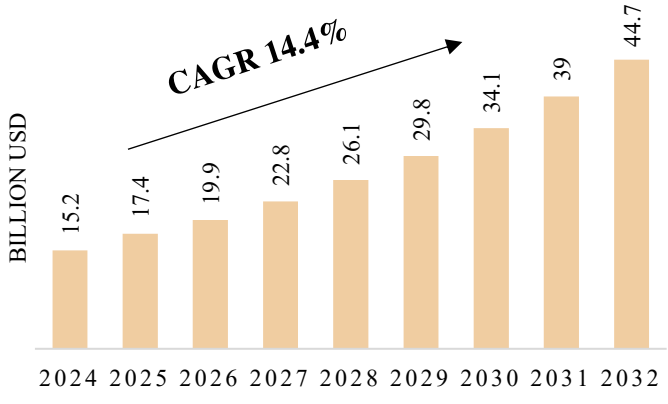
b. **Biocontrols**: Biological Control Products are products derived from natural organisms that help manage agricultural pests, diseases, and weeds. Classified as:
   i. Biopesticides (Biochemicals and Microbials)

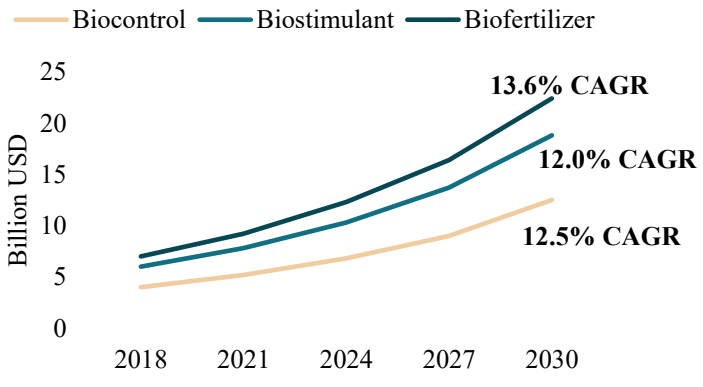
ii. Macroorganisms (Insects, Mites, Nematodes). The serve as environmentally friendly alternatives to chemical pesticides by targeting specific pests without harming beneficial organisms or ecosystems.



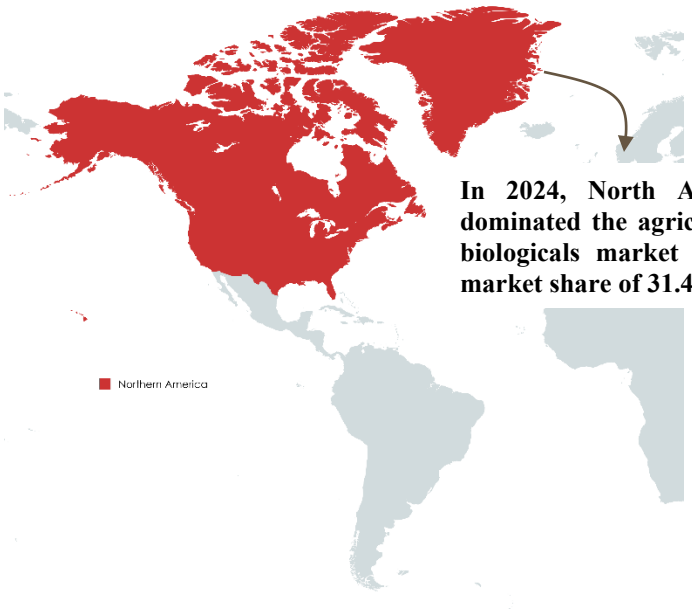
Global Agri-Biological Input Market Evolution

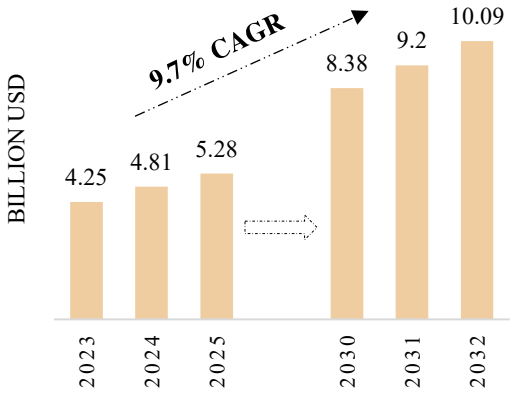
The global agri-biologicals input market size was valued at USD 15.29 billion in 2024. The market is projected to grow from USD 17.42 billion in 2025 to USD 44.70 billion by 2032, exhibiting a CAGR of 14.41% during the forecast period.





The agri-biological inputs market size in the U.S. held the largest share and is projected to grow significantly, reaching an estimated value of USD 10.09 billion by 2032, driven by increasing prevalence of plant diseases and infections and increase in registration and approval of different agricultural biological products.





- ## Market Trends & Growth Factors

1. **Rising Adoption of IPM for Sustainable Agriculture:**

The growing adoption of Integrated Pest Management (IPM) practices is driving demand for biopesticides due to their eco-friendly, less toxic nature and effectiveness in pest control. Governments are supporting this shift, like the EU's $3.61M grant in 2020 to promote sustainable agriculture with eco-friendly pesticides.

2. **Growing Crop Production Boosting Market Growth**

Rising global production of fruits, vegetables, and cereals, driven by higher disposable incomes, is increasing the demand for agricultural biologicals to improve soil fertility and yields. In 2020, fruit production reached 805.77M tonnes, while vegetables hit 1,081.43M tonnes. A study by Research Institute of Organic Agriculture, Frick, Switzerland showcased that use of Arbuscular Mycorrhizal Fungi (AMF) can help improve the yield of Naranjilla, a cash crop grown in Ecuador, Colombia, and Central America.

3. **Environmental Risks of Synthetic Chemicals Driving Biopesticide Growth**

Biopesticides, being eco-friendly and pest-specific, are gaining traction as alternatives to synthetic pesticides, which contribute to air pollution. In Europe, agrochemical use dropped by 15.9% in 2020–21, reducing air pollutant emissions by 5.5%, encouraging farmers to adopt biopesticides and integrated pest management practices.

- ## Market Segmentation Analysis

By Type Analysis

Organic Farming Driving Biopesticide Segment Growth

The biopesticides segment leads the 2024 market by 52.7% due to growing pest-resistant crop development and eco-friendly farming practices followed by biofertilizers and biostimulants. Rising investments, increased output demand, and the shift toward organic food are also driving biostimulant adoption globally.

By Source Analysis

Rising Farmer Adoption Fuels Microbial Segment Growth

The microbial segment leads the market by 60.5% due to farmers increasingly using microbials for plant protection, soil health, and higher crop productivity. Ongoing research into beneficial microbes further supports the segment's growth.

By Application Method

Foliar Spray Driving Market Growth

The foliar spray segment led the market in 2024 by 70.3% due to its simplicity and agronomic benefits, made it the preferred application method among organic and conventional farmers. Meanwhile, soil treatment is gaining traction as shrinking agricultural land and rising demand for natural food products emphasize the need for healthier soils.

By Crop Analysis

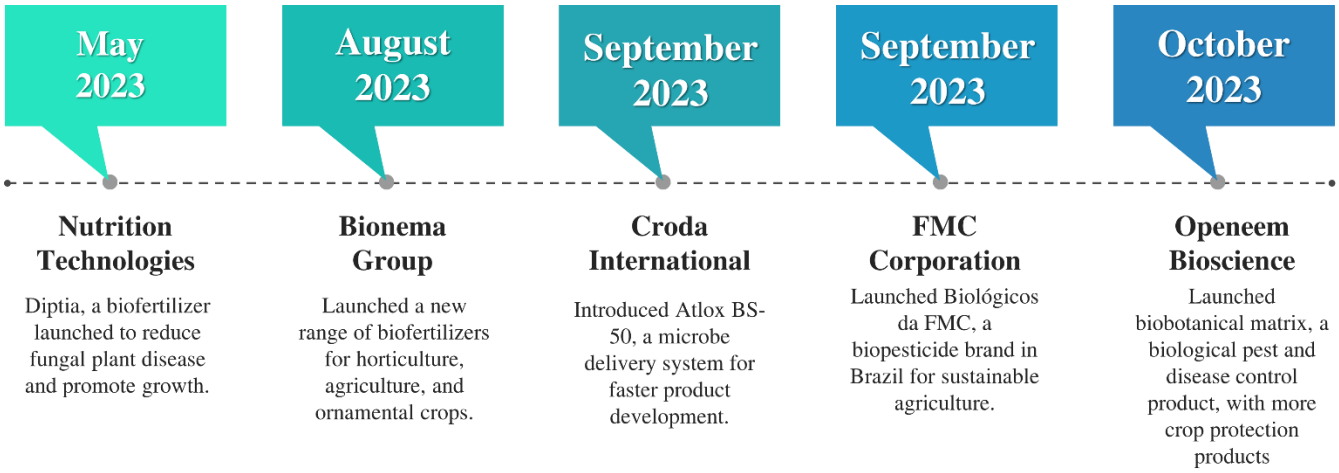
Rising Demand for Agricultural Biologicals in Row Crops

The row crops segment led the market in 2024 as consumer preference for organic foods increased, driving demand for biologicals to manage pesticide residues. Grocery retailers and food marketers face growing pressure to ensure residue-free products.

- ## Top 10 Global Agri-Input Companies with Bio-Inputs Products

Company Name	Country	Company Name	Country
Bayer AG	Germany	SEIPASA S.A.	Spain
BASF SE	Germany	Koppert Biological Systems	Netherlands
Syngenta AG	Switzerland	PI Industries	India
UPL Limited	India	Novozymes A/S	Denmark
Marrone Bio Innovations	U.S.	Gowan Group	U.S.

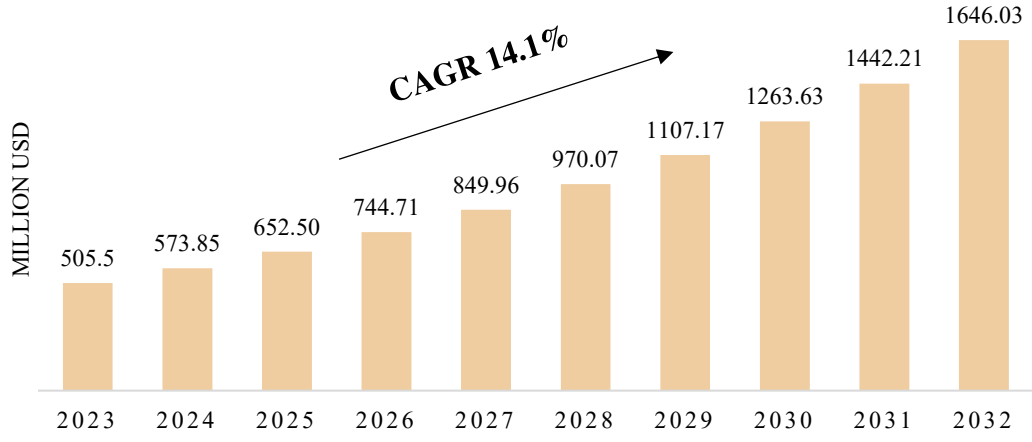
- **Global Advancement and Key Developments**



(Source: Fortune Business Insight: Agricultural Biologicals Market, Meticulous Research and Biocontrol Market Status and Trends, DunhamTrimmer)

Indian Agri-Biological Input Market Size

The Indian agricultural biological input market was valued at USD 573.85 million in 2024 and is expected to grow from USD 652.50 million in 2025 to USD 1,646.03 million by 2032, reflecting a CAGR of 14.13% during the forecast period.



The rising demand for eco-friendly products is driving market expansion, alongside supportive policies such as the National Farmer Policy, which promotes sustainable agriculture. These factors are expected to create growth opportunities for biological input manufacturers in the coming years.

- **COVID Lockdown Disrupted Supply Chain & Impacted Market Growth**

The COVID-19 pandemic adversely affected the agricultural sector, with small-scale farmers facing significant challenges due to supply chain disruptions. The prices of agricultural inputs, including biofertilizers, biopesticides, and biostimulants, surged during this period.

Farmers encountered multiple hurdles and had to adopt new strategies to manage the crisis. Movement restrictions led to labor shortages on large farms, resulting in decreased production of vegetables, flowers, and crops. Additionally, farmers in remote regions struggled to access agricultural products and services once nationwide lockdown measures were enforced.

Despite these challenges, the pandemic also created growth opportunities for Indian agricultural biological manufacturers. Prior to COVID-19, China dominated the production of such inputs, but the outbreak disrupted its manufacturing and exports. This supply chain gap allowed India to enhance its domestic production capacity and meet the rising market demand.

- ## Driving Growth Indian Agri-Biological Input Market

1. Horticulture Growth Boosting Agricultural Biologicals Market

Excessive chemical use has degraded soil fertility, increasing demand for biofertilizers that restore microbial balance. India's fruit and vegetable exports are rising, with APEDA reporting USD 770.70 million in fresh fruit and USD 864.24 million in vegetable exports in 2022-23. Whereas, biostimulants improve crop quality, supporting export potential and driving market growth.

2. Supportive Government Policies

The Indian government is promoting biological inputs through various initiatives. Subsidy programs like Paramparagat Krishi Vikas Yojana (PKVY) and Natural Mission on Natural Farming (NMNF) help farmers transition from chemical inputs, accelerating market growth. For making easy access to bio-resources like government intends to set up 15,000 Bhartiya Prakritik Kheti Bio-inputs Resources Centres (BRCs).

- ## Restraining Factors

1. Limited Shelf Life and High Costs

Biological inputs require specific storage conditions, affecting their shelf life and transportation. Additionally, high production costs for biostimulants and biopesticides make them less affordable for majority group of farmers, limiting market expansion.

- ## Market Segmentation Analysis

By Type Analysis

Biostimulants Lead the Market Due to Soil Health Benefits

The market is segmented into biofertilizers, biopesticides, and biostimulants, with biostimulants holding the largest share. They enhance nutrient absorption, root development, and soil fertility. Biofertilizers are also gaining traction, expected to grow at a 12.05% CAGR, driven by the shift toward sustainable farming and the rising demand for organic products.

By Source Analysis

Biochemicals Dominate Market Due to Eco-Friendly Benefits

The market is divided into biochemical and microbial segments, with biochemicals holding the largest share as they reduce reliance on conventional chemicals and lower carbon emissions. The microbial segment is set for strong growth, supported by ongoing research from companies like UPL Limited and IFFCO.

By Application Method

Foliar Spray Leads Agri-Bioinput Market

The foliar spray segment is expected to dominate the market due to its ease of application and growing adoption across farms. Meanwhile, soil treatment is gaining traction, driven by shrinking farmland, rising organic food demand, and the need to address soil nutrient deficiencies.

By Crop Analysis

Row Crops Dominate as Demand for Residue-Free Produce Rises

The row crops segment leads the market, driven by growing consumer preference for pesticide-free, natural cereals and foods, along with export demand. Meanwhile, the fruits and vegetables segment continues steady growth, fueled by rising interest in organic produce among high-income consumers.

- ## Top 10 Indian Agri-Input Companies with Bio-Inputs Products

Company Name	Company Name
Coromandel International Limited	Ajay Bio-Tech (India) Ltd.
Som Phytopharma Limited	Biotech International Ltd.
UPL Limited	IPL Biologicals Ltd.
PI Industries Ltd	T. Stanes and Company Limited

Indian Farmers Fertilizer Cooperative Limited | Inera CropScience (Absolute)

- ## Advancement and Key Developments in India

October 2022 — Chambal Fertilizers
CFCL partnered with TERI's SMART Agrisolutions to launch UTTAM SUPERRHIZA, a Mycorrhiza-based biofertilizer.

June 2023 — IPL Biologicals
Invested $3.5 million in Uxari Agri to expand climate-ready and sustainable products.

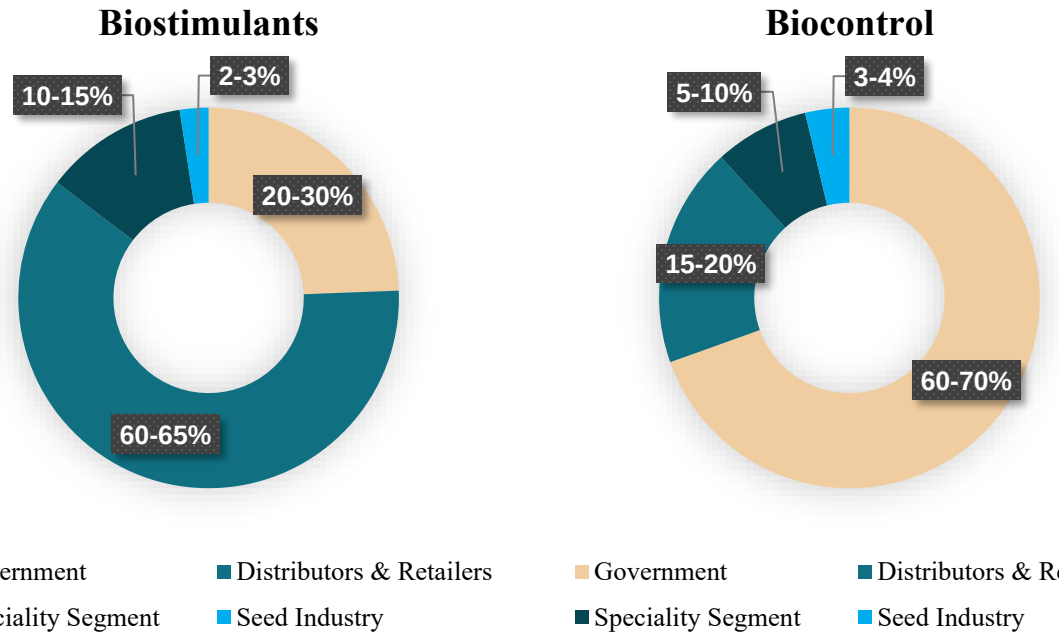
July 2023 — Dhanuka Agritech
Introduced DEFEND insecticide, featuring Triflumezopyrim 10% SC, for hopper protection.

September 2023 — FMC India
Launched Entazia biofungicide, formulated with Bacillus subtilis, to combat bacterial leaf blight in rice.

December 2023 — Inera CropScience
Unveiled range of next-gen biostimulants and seed coatings, Leiro, at COP28.

(Source: Fortune Business Insights: Indian Agricultural Biological Market and Business Insider: Inera)

- ## Biostimulant and Biocontrol Market Segments in India



- Government: Central, State, Societies, Agri-Commodity Boards | Distributors & Retailers: Conventional Marketing/ Distribution | Speciality Segment: Organic Farming, IPM Farming, Exporters, Greenhouses | Seed Industry: Seed Treatment, Seed Growing, R&D Activities

(Source: Biologicals In India – Challenges & Opportunities by KETAN K. MEHTA (Ecosense Labs. (I) Pvt. Ltd.))

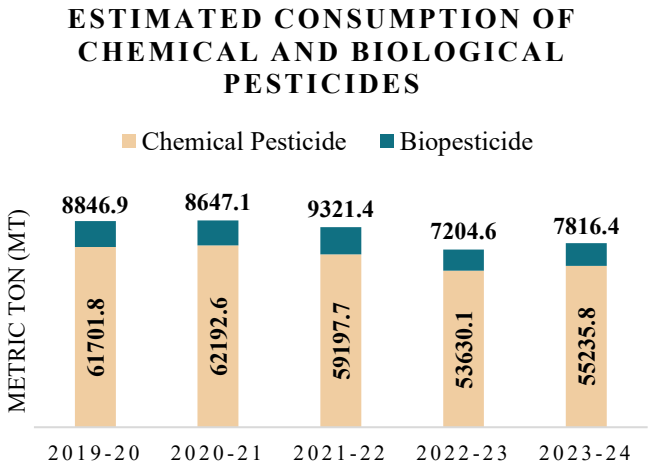
Indian Statistics of Biopesticides & Biofertilizers

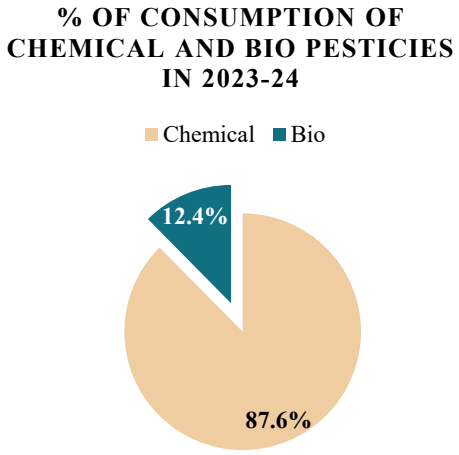
- ## Analysis of Biopesticide in India (2019-20 to 2023-24)

As per Directorate of Plant Protection, Quarantine & Storage (DPPQ&S), India has about 970 Bio-pesticide registered under Central Insecticides Board and Registration Committee (CIBRC). The registered products constitute approximately 29% (bacterial), 66% (fungal), 4% (viral) and 1% other (plant-based, pheromone-based) biopesticides respectively.

More than 63 Indian private companies with registered products. Major Indian Companies for Bio pesticides are: Pest Control (Pvt) Ltd; Multiplex Biotech Ltd., International Panacea, Biotech International Ltd; T. Stanes etc.

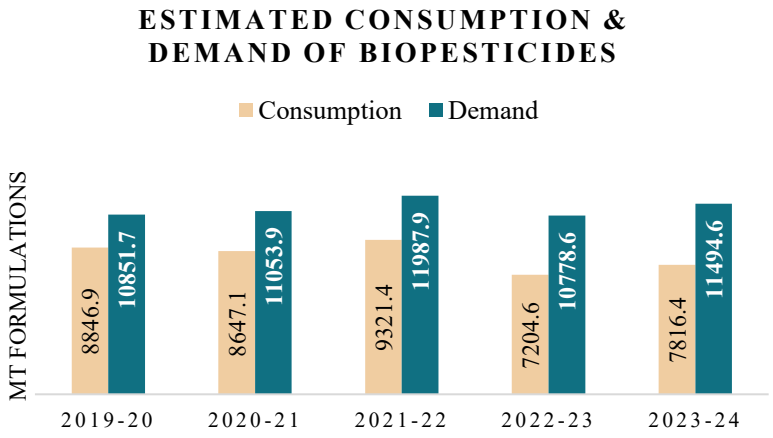
(Source: Directorate of Plant Protection, Quarantine & Storage and Biopesticides: A Sustainable Alternative to Organic Farming)





Chemical pesticide consumption has gradually decreased from 61,701.8 MT (2019-20) to 52,253.8 MT (2023-24).

This downward trend suggests a shift towards eco-friendly alternatives, stricter regulations, and increasing awareness of sustainable farming practices. Biopesticide consumption is fluctuating with highest consumption recorded in 2021-22. Despite the rise in biopesticide adoption, chemical pesticides still dominate the market with ~88% market consumption.



Whereas, in the graph we see 12.4% biopesticide consumption market with accumulating demand over the period of 2019-20 to 2023-24.

The provided graph illustrates the estimated consumption and demand trends for biopesticides from 2019-20

to 2023-24, measured in MT formulations. The data reveals a consistent demand-supply gap, indicating growing awareness and reliance on biopesticides in agriculture.

- **Key Observations:**

1. **Increasing Demand:**
    - Demand for biopesticides has steadily increased over the years, starting from 10,851.7 MT (2019-20) to an estimated 11,494.6 MT (2023-24).
    - The highest demand was recorded in 2021-22 at 11,987.9 MT.

2. **Fluctuating Consumption:**
    - While demand has shown a steady rise, consumption trends are inconsistent.
    - Consumption peaked in 2021-22 at 9,321.4 MT, followed by a sharp drop to 7,204.6 MT in 2022-23, indicating possible supply chain issues or regulatory challenges.
    - However, 2023-24 shows a recovery with 7,816.4 MT of estimated consumption.

3. **Demand-Supply Gap:**
    - There is a consistent gap between demand and consumption, suggesting:
        - Limited production capacity.
        - Regulatory constraints.
        - Adoption challenges among farmers.
    - The largest gap is seen in 2022-23, with a shortfall of 3,574 MT between demand (10,778.6 MT) and consumption (7,204.6 MT).

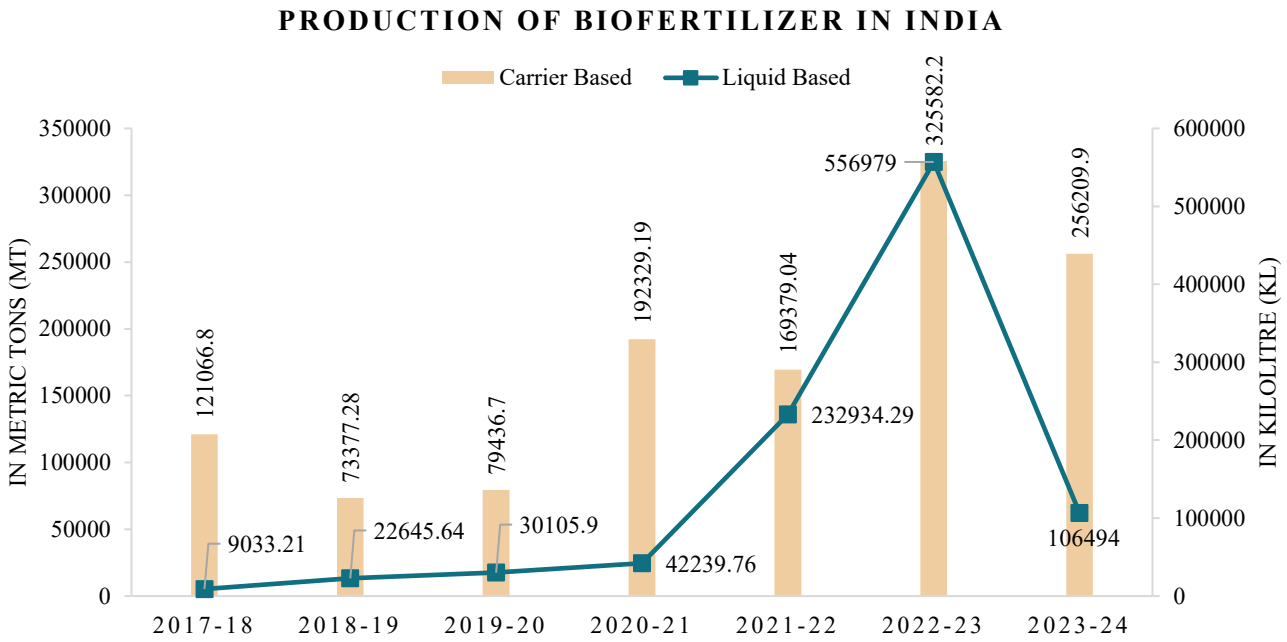
- **Conclusion & Implications:**
    - Rising demand highlights the growing importance of biopesticides as sustainable alternatives to chemical pesticides.
    - Bridging the supply gap requires improvements in production, distribution, and awareness programs.
    - Investments in research, regulatory support, and farmer adoption initiatives can help align consumption with the increasing demand, ensuring a smoother transition towards eco-friendly pest management.

(Source: Directorate of Plant Protection, Quarantine & Storage)

- **Analysis of Biofertilizer Production in India (2017-2024)**

The provided chart illustrates the production trends of carrier-based and liquid-based biofertilizers in India from 2017-18 to 2023-24. Carrier-based biofertilizer production showcased a steady growth increasing from 121,006.8 MT (2017-18) to a peak of 325,582.2 MT (2022-23).

Compared to 2017-18, production in 2023-24 is over 2X higher, reflecting the growing adoption of biofertilizers.



Whereas, liquid-based biofertilizer showed relatively slow early growth between 2017-18 (9,033.21 KL) and 2019-20 (30,105.9 KL). But a significant increase was observed 2020-21 onwards, with a sharp surge in 2021-22 (232,934.29 KL) and a peak in 2022-23 (556,079 KL).

(Source: Biological Agri Solutions Association of India (BASAI), Lok Sabha Unstarred Question No. 1089 and National Centre for Organic and Natural Farming (NCONF) Annual Report 2022-23 & 2023-24)

Top Indian Crop Bio-Input Startups / Companies

As per Tracxn, 339 Indian companies and startups are actively manufacturing crop bioinputs and investing in R&D to come up with new farm biological products.

- **Some Key Company Metrics**

Company Name		Location	Annual Revenue	Latest Funding Round	Post Money Valuation	Investors
IPL Biologicals	IPL Biologicals	Gurugram	122 Cr as on Mar 31, 2023	$4.66M, Series A Mar 31, 2010	$9.1M as on Mar 31, 2010	KiaOra Ventures
Titan Biotech	Titan Biotech	Delhi	165.8 Cr as on Mar 31, 2024	No Funding Raised	NA	NA
Univia વિશ્વાસ આધુનિક ખેડૂતોનો	Univia	Gujarat	7.7 Cr as on Mar 31, 2023	$238K, Angel Dec 17, 2020	$1.89M as on Mar 16, 2021	Vrajlal Kalaria, Tarak Patel and other Angels

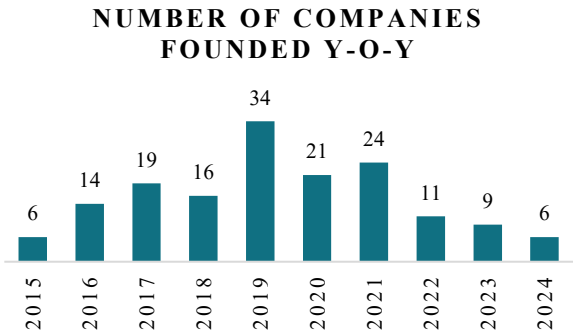
SRIBIO	Sri Biotech Laboratories	Telangana	5.48 Cr as on Mar 31, 2021	Grant Price, Mar 2011 and $9.0M, Series A, Mar 2009	NA	DBT, Rabo Equity Advisors, Angels
	Kan Biosys	Pune	16.6 Cr as on Mar 31, 2023	Seed Round (2018 & 2023)	$3.65M as on Jan 12, 2018	De Sangosse, Associated Group, others
BioPrime AgriSolutions Pvt Ltd	BioPrime AgriSolutions	Pune	4.26 Cr as on Mar 31, 2024	$6M, Series A Oct 08, 2024	$7.97M as on May 22, 2023	Omnivore, Startup Venture Centre, Inflexor etc.
CAMSON	Camson Bio Technologies	Bengaluru	8.18 Cr as on Mar 31, 2019	$10M, PE May 06, 2013	NA	CLSA Capital Partners
BIL	Biotech International	Delhi	17.6 Cr as on Mar 31, 2024	$302K, Unattributed Dec 24, 2009	$1.92M as on Dec 24, 2009	Chemical International & Angels
MiklensBio	Miklens Bio	Mumbai	7.87 Cr as on Mar 31, 2022	$24.3K, Seed Apr 01, 2018	$498K as on Apr 01, 2018	The Indus Valley
Azeedo	Azeedo	Karnataka	8.84L as on Mar 31, 2023	Grant Money (Feb 2019)	NA	NA
natura cropcare	Natura Crop Care	Karnataka	NA	Grant Money (Feb 2019)	NA	NA
vanproz	Vanproz Agrovet	Karnataka	92L as on Mar 31, 2023	Acceleration Grant (2022)	NA	Pusa Krishi & C-CAMP
	Fib-Sol Life Technologies	Chennai	1.99 Cr as on Mar 31, 2023	$81.5K, Angel Dec 28, 2020	$1.33M as on May 05, 2021	Refex Capital, C-CAMP, BIRAC, Pusa Krishi etc.

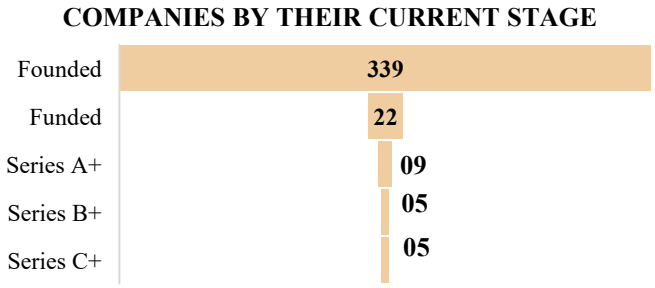
- ## Analysis of the Crop Bio-Inputs Sector in India

The Indian bio-inputs industry, including biofertilizers, biopesticides, and biostimulants, has been growing with steady investment trends, startup formations, and funding opportunities.

1. **Growth of Bio-Input Companies**

    a. The number of companies founded in the sector saw a peak in 2019 (34 companies) and 2021 (24 companies), indicating strong initial interest.
    b. However, the trend has seen a decline in subsequent years, with only 6 companies founded in 2024, suggesting either market saturation or a shift towards scaling existing ventures.



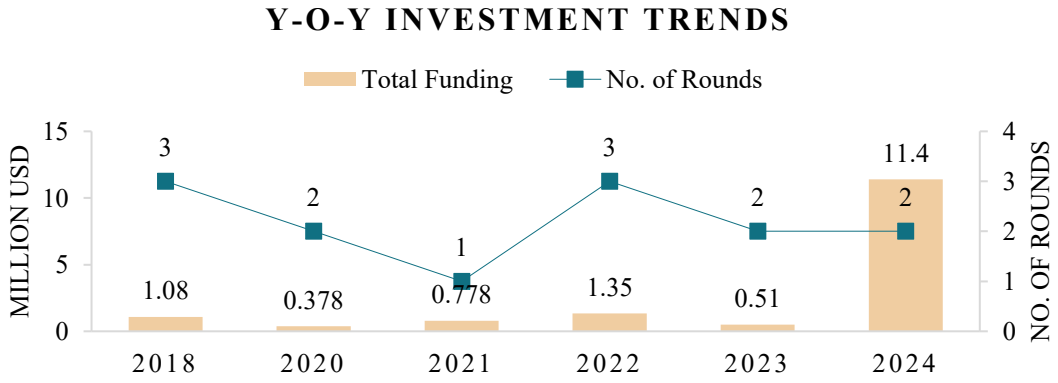


1. Current Status of Companies by Stage

a. 339 companies have been founded, out of which only 22 companies have managed to secure funding, with 9 in Series A, 5 in Series B+, and 5 in Series C+ stages, suggesting that only a few startups are scaling successfully

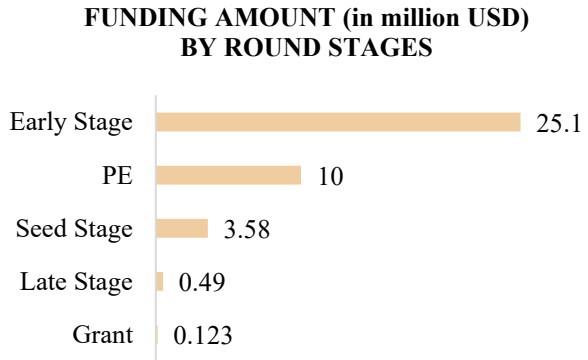
2. Investment Trends in Bio-Inputs

a. Total funding has shown fluctuations over the years, peaking in 2024 at $11.4 million.
b. The number of funding rounds has remained relatively low, with a maximum of 3 rounds in 2019 and 2021, signaling selective investment strategies by investors.

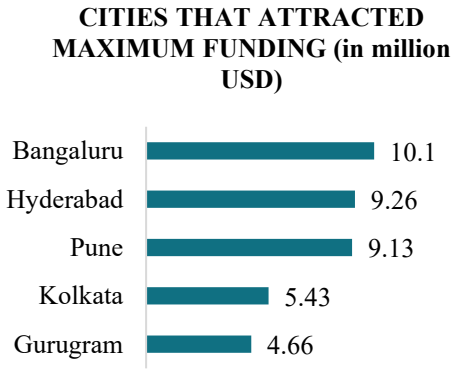


3. Funding Allocation by Investment Stage

a. The highest funding amount was secured in the Early Stage ($25.1 million), emphasizing the focus on idea and POC stage startups.
b. Private Equity (PE) investments stood at $10 million, reflecting interest from larger investors.
c. Seed-stage funding ($3.58 million) indicates startups at MVP / commercialization stage.



4. **Cities Driving Maximum Investment**



   a. Bengaluru attracted the highest funding at $10.1 million, reaffirming its status as a biotech and agri-tech hub.
   b. Pune ($9.13 million) and Kolkata ($5.43 million) also emerged as strong players in bio-input innovations.

- **Key Takeaways & Future Outlook**
   a. While the number of new startups is declining, funding amounts are increasing, indicating a shift towards scaling established players rather than investing in new entrants.
   b. Early-stage funding dominates, but limited late-stage funding suggests that many startups struggle to scale.
   c. Southern and Central India remain top destinations for agri-biotech funding, attracting a major share of investments.

(Source: Tracxn: Crop Tech > Farm Inputs > Biologicals > Diversified (Crop Biologicals))

Initiatives Taken by the Government to Promote Bioinputs

The Indian government has implemented several initiatives to promote the use of biofertilizers, biopesticides, and other bio-inputs, aiming to encourage sustainable agricultural practices and reduce dependence on chemical inputs.

1. Capital Investment Subsidy Scheme (CISS) under the National Project on Organic Farming (NPOF): Launched in 2004-05, the CISS under NPOF provides financial assistance to establish commercial production units for organic and biological inputs. The scheme offers:

- **100% assistance**: Available to State Government and Government agencies for setting up mechanized fruit and vegetable market waste compost production units, with a maximum limit of Rs. 190 lakh per unit for a capacity of 3,000 tons per annum.
- **33% subsidy**: Extended to private agencies and individuals for the same purpose, up to a maximum of Rs. 63 lakh per unit.

2. GOBARdhan Scheme: The Galvanizing Organic Bio-Agro Resources Dhan (GOBARdhan) scheme focuses on converting organic waste into wealth, promoting a circular economy. Key components include:

- **Establishment of 500 'waste to wealth' plants**: Including 200 CBG plants and 300 community or cluster-based plants, with a total investment of Rs. 10,000 crores.
- **15,000 Bio-Input Resource Centres (BRCs)**: These centers aim to provide farmers with easy access to bio-resources like Jeevamrit, Ghana Jeevamrit, and Neemastra.

3. Paramparagat Krishi Vikas Yojana (PKVY) and Mission Organic Value Chain Development for North Eastern Region (MOVCDNER): These schemes promote organic farming through financial support:

- **PKVY**: Farmers receive Rs. 15,000 per hectare for three years via Direct Benefit Transfer (DBT) for organic inputs, including biofertilizers.
- **MOVCDNER**: Provides Rs. 32,500 per hectare for three years to farmers for organic inputs, supporting organic farming in the North Eastern region.

4. National Mission on Natural Farming (NMNF): The NMNF aims to scale up natural farming:

- **Coverage of 7.5 lakh hectares**: Developing 15,000 clusters over four years with a budget of Rs. 1,584 crores.
- **Training programs**: Conducted by the National Center of Organic and Natural Farming (NCONF) and its regional centers, focusing on production biofertilizers.

5. Quality Assurance and Research Initiatives: To ensure the quality and efficacy of bio-inputs:

- **Fertilizer Control Order (1985)**: Biofertilizers are notified under this order, with specified quality standards mandatory for manufacturers.
- **Research and Development**: ICAR has developed efficient strains of biofertilizers tailored to different crops and soil types, promoting their use to reduce chemical.

Through these comprehensive measures, the Indian government is actively promoting the adoption of biofertilizers, biopesticides, and bio-inputs, fostering sustainable and eco-friendly agricultural practices.

(Source: Press Information Bureau and NABARD)

Conclusion

The BioAgri Revolution highlights the significant shift in Indian agriculture towards sustainable and eco-friendly practices through the adoption of bio-inputs such as biofertilizers, biostimulants, and biopesticides. While chemical fertilizers and pesticides still dominate, the increasing awareness of environmental concerns, government initiatives, and market demand have accelerated the growth of the bio-input sector. India is transitioning from the Green Revolution to an Ecological Agricultural Revolution, supported by policy frameworks.

The report underscores the expansion of the bio-input industry. However, challenges remain, including regulatory barriers, market penetration, and production constraints. The establishment of industry associations, increased R&D investments, and farmer awareness programs will be key to overcoming these hurdles. With continued efforts, the bio-agri sector is poised to play a transformative role in ensuring sustainable agricultural productivity while reducing dependence on synthetic inputs.

भारतीय कृषि अनुसन्धान संस्थान नई दिल्ली - ११००१२

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