From domestic strength to global influence: Brazilâ??s bioinput playbook

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In an exclusive interview with Agrospectrum, Mauro Heringer, Director of International Relations at ABINBIO and Member of the National Bioinputs Export Committee (ApexBrasil), outlined how Brazilâ??s dominance in tropical bioinputs is reshaping global agricultural markets. He emphasized that Brazilâ??s competitive edge lies in its â??Proof of Tropical Resilience,â? with biological solutions tested across six biomes under extreme climatic and pest pressuresâ??conditions that validate their robustness for global deployment.

Heringer highlighted regulatory harmonization, living logistics, and institutional coordination under Law 15,070/2024 as central to accelerating exports while positioning Brazil as a benchmark for sustainable agricultural biotechnology. Framing bioinputs as a matter of national security and technological sovereignty, he asserted that Brazilâ??s ambition extends beyond exports to leading a global transition toward high-performance regenerative agriculture.

From Domestic Success to Export Strategy

Brazil has built a large and sophisticated domestic bio-inputs market. What specific capabilities or lessons from domestic adoption give Brazilian companies a competitive edge when entering highly regulated international markets?

Brazilâ??s success in the bioinputs sector is not merely a function of sales volumeâ??it reflects deep biotechnological and institutional maturity that has given rise to a true â??tropical innovation ecosystem.â?•

The countryâ??s competitive advantage rests on what can be called the Proof of Tropical Resilience. Unlike competitors operating in temperate climates, Brazilian companies develop bioinputs for an environment defined by six distinct biomes within a single territory, continuous year-round cultivation cycles, intense pest pressure and high temperatures. These are among the most challenging agricultural conditions in the worldâ??and Brazil has learned to innovate within them.

This is where the real advantage lies: the tropicalization of biotechnology. Brazil does not simply â??sell the bottle.â?• It exports the expertise required to replace or complement synthetic chemistry in highly productive agricultural systems under extreme biological stress.

As a result, Brazilian companies are not commodity suppliers. They are holders of strategic intellectual property essential to advancing sustainable global food security.

The lesson is straightforward: if a biological solution performs consistently across Brazilian biomesâ??particularly in the Cerradoâ??it possesses more than enough robustness for virtually any other agricultural region in the world.

Brazil exports resilience, not just microorganisms.

Regulatory Asymmetry Across Markets

How does the export committee plan to navigate starkly different regulatory regimes for biological inputs in the EU, the United States, and Latin America, and where do you see the greatest bottlenecks to market access?

I will start from the end of the question. In my view, the biggest bottlenecks are regulatory alignment and what I call â??Living Logistics.â?•

Exporting chemicals is relatively straightforward. Exporting living organismsâ??bacteria and fungiâ??is fundamentally different. It requires cold-chain infrastructure, precision logistics and strict control over viability and shelf-life throughout transit. Maintaining biological stability over long international distances remains the most significant technical and commercial challenge.

On the regulatory front, asymmetries between countries create additional complexity. Rules, compliance standards and legal frameworks vary widely, making harmonization a strategic priority.

To address this, a formal partnership was established in mid-2025 between ApexBrasil and CropLife Brasil, which recently welcomed ABINBIO (Brazilian Association of Bioinput Industries). Together, they formed the National Bioinputs Export Committee, a platform designed to coordinate international expansion and regulatory strategy.

Navigating global markets requires differentiated approaches, as regulatory cultures are not uniform.

In the European Union, the framework is guided by the Precautionary Principle, which emphasizes intrinsic hazard. There, our strategy is centered almost entirely on demonstrating toxicological safety, purity and the absence of contaminants. We do not sell â??productivityâ?• to Europeâ??we sell food safety and the elimination of chemical residues. The positioning should resemble an â??Intel Insideâ?• for agriculture: if it carries Brazilian bio-technology, it represents sustainability and safety.

In the United States, the regulatory philosophyâ??led by the EPAâ??is pragmatic and risk-based. The focus must therefore be on agronomic efficacy. Our dossiers emphasize large-scale performance data generated across millions of Brazilian hectares under tropical conditions. This industrial-scale validation offers something that controlled laboratory trials alone cannot replicate.

In Latin America, the priority should be regional harmonization. Here, the challenge is largely political and institutional. Alignment within Mercosur is essential, with Brazilâ??s regulatory approvalâ??already subject to rigorous scrutiny by MAPA, ANVISA and IBAMA, under one of the worldâ??s most advanced bioinput frameworksâ??serving as a regional quality benchmark.

The objective is mutual recognition: if a product has been approved by the tropical leader, Brazil, it should qualify for fast-track registration in neighboring markets such as Paraguay, Colombia and Bolivia.

In short, the pathway to global expansion requires regulatory intelligence, logistical innovation and geopolitical coordinationâ??not just technological excellence.

Branding â??Brazilâ?• in Sustainability-Driven Markets

The project emphasizes brand positioning around sustainability and bioeconomy. How do you reconcile Brazilâ??s leadership in bio-inputs with ongoing international scrutiny of its broader environmental record, particularly in land use and deforestation?

This is a fundamental question. First, it is important to adjust the premise of the question with data. Often, the narrative imposed on the sustainability issue is a distorted and uninformed view. Brazil is an agro-environmental powerhouse: we preserve more than 60 per cent of our territory with native vegetation and possess the most rigorous environmental legislation in the world (the Forest Code) and, now, modern Bioinput legislation. No other major food producer delivers these numbers.

Our leadership in Bioinputs is not an attempt to "compensate" for a problem, but rather the natural evolution of this preservationist mindset. Thanks to our tropical biotechnology (such as Biological Nitrogen, Phosphorus, and Potassium Fixation and no-till farming), we have managed to increase production by 400 per cent in recent decades while expanding the land area by only 40 per cent.

Therefore, Brazil needs to be emulated. By exporting bioinputs, we are offering the world the same technology that allows us to be the only country feeding 1 billion people while preserving the majority of its forests.

Innovation vs. Standardization Tension

Biological inputs often require localized formulations and application protocols. How does Brazil balance the need for market-specific adaptation with the efficiencies required for scalable global exports?

We solve this dilemma through a "Platform Biology" strategy. The common mistake is thinking that one exports a "ready-to-use final product" just like a chemical pesticide. Brazil has learned to export the Base Technology and Application Know-How.

In Industry Standardization (Upstream): Brazil has achieved global excellence in industrial development. Our factories produce spores and metabolites with very high concentration and purity and extended shelf-life. This is standardizable and scalable worldwide. It is the biological "hardware."

In Field Adaptation (Downstream): The "software" (how to use it) is adaptable. Our companies donâ??t just sell the jug; they sell the agronomic protocol. We have formulation technology that allows the same tested robust strain to be activated or applied differently depending on Indian or American soil. Thus, efficiency comes from the industrial scale of our fermentation; adaptation comes from the robustness of our tropical strains. If a bacterium survives the stress of Brazilian soil, it performs easily in less hostile environments.

Brazil does not export a "medicine," but rather a "treatment system." By separating the biological asset (standardized) from the application intelligence (localized), companies achieve the benefits of mass production without the risk of inefficacy in foreign soils.

Domestic Ownership as Strategic Advantage

With over 80 per cent of bio-input companies being Brazilian-owned, how does domestic ownership shape innovation, capital formation, and long-term export competitiveness compared to multinational-dominated ag-input sectors?

The fact that Brazilâ??s bioinput sector is predominantly national in capital structureâ??historically over 80 per cent â??is a positive anomaly within Brazilian agribusiness, which has traditionally been dependent on multinational chemical and seed companies. This domestic foundation has fostered a form of biotechnological sovereignty that significantly reshapes

Brazilâ??s export competitiveness.

However, intellectual honesty requires a distinction between the sectorâ??s historical structure and its current market dynamics.

The premise that the sector remains mostly national is still statistically defensible when measured by number of companies. Brazil has hundreds of registered bioinput firmsâ??many of them small and medium-sized regional agritechs. If one counts by tax ID (CNPJ), the majority are indeed Brazilian-owned.

But when the metric shifts from number of companies to revenue concentration and market share, the picture is evolving rapidly.

Multinational giants such as Bayer, Syngenta, Corteva and UPLâ??as well as foreign investment groupsâ??have accelerated acquisitions of leading Brazilian bioinput firms. Once a Brazilian company is acquired, it continues operating locally, but capital allocation decisions and long-term strategic direction shift to a global headquarters.

Why is this happening?

Because the Brazilian bioinput sector has become one of the most profitable and dynamic segments in agribusiness, turning it into a primary target for mergers and acquisitions. Many companies that began with 100 per cent national capital were acquired precisely because multinationals struggled to replicate the speed of Brazilian innovation or navigate Brazilâ??s complex regulatory and agronomic landscape as effectively as local players.

This creates a strategic paradox.

Brazil risks becoming an exceptional â??nursery of biological startupsâ?•â??a global laboratory for innovationâ??whose most successful companies are absorbed by foreign capital once they achieve maturity and export scale.

At the same time, the very factors that attract multinational interest explain Brazilâ??s competitive edge.

In global chemical conglomerates, biological products are often treated as complementary or defensive toolsâ??designed to protect or extend the lifecycle of synthetic molecules. In contrast, for national Brazilian companies, bioinputs are not an add-on; they are the core business.

That structural difference matters.

When biology is the central strategy, 100 per cent of R&D investment is directed toward biological performance. There is no internal conflict of interest, such as the risk of cannibalizing sales of high-margin synthetic fungicides. In large chemical corporations, a disruptive biological innovation can threaten existing revenue streams. In Brazilian bioinput companies, disruption is the objective.

The result is faster innovation cycles, greater technological boldness and a development pipeline focused purely on biological efficiency under tropical conditions.

This strategic clarityâ??biology as mission, not supplementâ??is what transformed Brazil into a global reference in bioinputs. The challenge now is ensuring that this innovative sovereignty is not diluted as consolidation accelerates.

Competition with Established Multinationals

As global agrochemical and biotech firms rapidly expand their biological portfolios, where does Brazil see its most defensible competitive moatâ??cost, performance in tropical systems, speed of innovation, or something else?

Our defensive moat is, without a doubt, Proven Performance in Tropical Systems. While multinationals compete by buying startups to build a portfolio, Brazil has an advantage that cannot be bought: decades of natural selection in the field.

The 'Tropicalization' Factor: Biology is context-dependent. A fungus developed in a laboratory in Europe might die in two hours under the sun in Mato Grosso (or Maharashtra). Our strains were isolated and selected under extreme thermal and water stress. They are "elite athletes" of survival.

Real Scale vs. Greenhouse: Multinationals test in controlled greenhouses. Brazil tests on 40 million hectares of commercial crops. We have the worldâ??s largest database on how bioinputs interact with the real environment.

Cost-Benefit: Since we master large-scale fermentation (on-farm and industrial), we can deliver this elite biology at a cost that makes its use viable in commodities (soybeans, corn, cotton, sugarcane, etc.), not just in expensive fruits.

Application Science and Coexistence (Compatibility): Foreign multinationals usually sell the "bottle." Brazilian companies sell the management. Brazil has learned to mix biologicals with chemicals in the same spray tank without inactivating the microorganism. This knowledge regarding formulation stability and chemical compatibility is what global producers want most today to reduce costs.

The Brazilian "Pipeline": Brazil possesses the greatest microbial biodiversity in the world. The ability to isolate, test, and register new assets with agility creates an innovation cycle that multinationals, with their global bureaucratic structures, struggle to match.

Institutional Coordination and Governance

What concrete mechanisms will ensure that the export committee translates coordination into measurable outcomesâ??such as export growth or regulatory approvalsâ??rather than remaining a symbolic platform?

The Committee began its work at the end of 2025. To ensure the export committee does not become a "symbolic platform" without practical delivery, the governance of the bioinput sector in Brazil is being structured on technical execution mechanisms and commercial diplomacy.

Law No. 15,070/2024 provides the legal basis, but the translation into measurable results depends on three pillars of institutional coordination. The committee does not act only in commercial promotion, but in the convergence of standards. The concrete mechanism is the creation of joint working groups with bodies such as EFSA (Europe) and the EPA (USA), aiming to reduce registration time abroad through the acceptance of data generated in Brazil (mutual recognition).

The committee utilizes the rigor of the new legal framework to advocate that biological efficacy dossiers approved by MAPA (Ministry of Agriculture) be accepted as technical proof in other countries, eliminating the need to repeat field tests that last years.

Institutional coordination involves ApexBrasil, the Ministry of Foreign Affairs, and the Ministry of Agriculture, Livestock, and Supply in a market segmentation program. Examples such as the creation of an export "Bio-Pipeline" can be cited. The committee identifies biotechnological bottlenecks in partner countries and can directly connect Brazilian companies that have the specific solution through diplomatic missions, trade fairs, events, and through agricultural attachÃ©s at Brazilian embassies in key countries.

Another aspect to prevent Brazilian products from being blocked by subjective sustainability issues is the implementation of Certification and Traceability Support within a Bioinput Conformity Seal system. Audits will ensure that the exported input meets bioeconomy and low carbon emission requirements, integrating them into the national bioinput program.

Long-Term Market Transformation

Do you view Brazilâ??s push into biological inputs primarily as an export opportunity, or as part of a broader effort to reshape global crop protection and fertility markets away from synthetic inputsâ??and how does that ambition influence policy and investment priorities?

This is the question that defines the "endgame" for Brazil. The strategic answer is that export is merely the vehicle, but the global paradigm shift is the destination. Brazil doesnâ??t just want to be the largest exporter of bioinputs; it intends to be the architect of the new era of world agriculture.

This is, undoubtedly, a global paradigm shift. Export is just the economic consequence; the cause is the survival necessity of modern agriculture. Brazil doesnâ??t just want to sell a substitute for chemicals; we want to lead the transition to the Era of High-Performance Regenerative Agriculture.

We are positioning ourselves to be the "Saudi Arabia of Green Chemistry." Just as the Middle East was indispensable in the oil era, Brazil will be indispensable in the bioeconomy era. We are not just "moving away" from synthetics; we are integrating biological tools to create a smarter and more resilient system.

This vision changes everything. Our investment priorities have shifted from the logic of "technology importation" to "technological sovereignty." The National Bioinput Plan and the APEX Brasil Bioinput Export Committee Project are proof that

the Brazilian State has decided that biotechnology is strategic for national and global security.

The Brazilian offensive aims to reposition synthetic inputs (especially fossil-based nitrogen fertilizers and high-toxicity pesticides) as high-risk assets with high environmental costs. The vulnerability revealed by global crises (such as the fertilizer shortage in 2022) accelerated the National Fertilizer Plan and the Bioinput Legal Framework (Law 15,070/2024). Brazil treats bioinputs as a matter of national security. The ambition is to reduce external dependence on mineral fertilizers by up to 50 per cent in the coming decades.

By proving this is possible on a continental scale, Brazil creates a "demonstration effect" for the rest of the world, leading a movement for biotechnological food sovereignty. We are redesigning the architecture of food production. The future is biological, and Brazil is the laboratory where this future has already begun.

I invite India to join us on this journey. Together, as leaders of the Global South, we have the responsibility and the capacity to define how the world will feed itself over the next 50 years: with more biology, more biotechnology, and more respect for our tropical soils and the people who are here and their future generations.

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