

Development and use of bio-inputs for sustainable agriculture in Latin America



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Technological solution

The implemented technological solution is based on a Regional Platform for the Co-design and Standardization of Bio-inputs, which interconnects three strategic technical axes. First, it establishes regulatory harmonization through the development of technical notes and unified quality control methodologies. Second, it accelerates technological readiness using biotechnological tools such as PCR molecular identification and sequencing, which allows for the scientific characterization and validation of phosphorus-solubilizing bacteria, nitrogen-fixing bacteria, Bacillus spp. strains, Trichoderma spp., and botanical extracts. Finally, the platform executes a systemic integration matrix that introduces holistic management models with bio-inputs per crop in maize, common bean, sweet pepper, and citrus, successfully substituting 20% of synthetic agrochemicals.



Technological description

This project establishes a regional technological platform led by INTA Costa Rica for the standardization, validation, and scaling of biological technologies. Addressing the lack of homogeneity and scientific weakness in early stages, the initiative harmonizes quality control protocols and regulatory frameworks across Costa Rica, Honduras, Panama, and Venezuela. Through experimental development, microorganisms (such as P-solubilizing bacteria, N-fixing bacteria, Bacillus, and Trichoderma, among others) and botanical extracts are characterized and validated in strategic crops (maize, common bean, sweet pepper, and citrus) to maximize biological efficiency.



Impacts and results

Technical notes integrating regulatory, commercial, and methodological criteria for biofertilizers and biocontrol agents across the four participating countries. Scientifically validated collections of promising microorganisms through molecular identification, ensuring the biological traceability of N-fixing bacteria, P-solubilizing bacteria, and biocontrol fungi such as Trichoderma spp., Beauveria spp., and Bacillus spp.. Four systemic integration schemes (one per strategic crop: maize, common bean, sweet pepper, and citrus) incorporating a minimum of five bio-inputs per model.

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