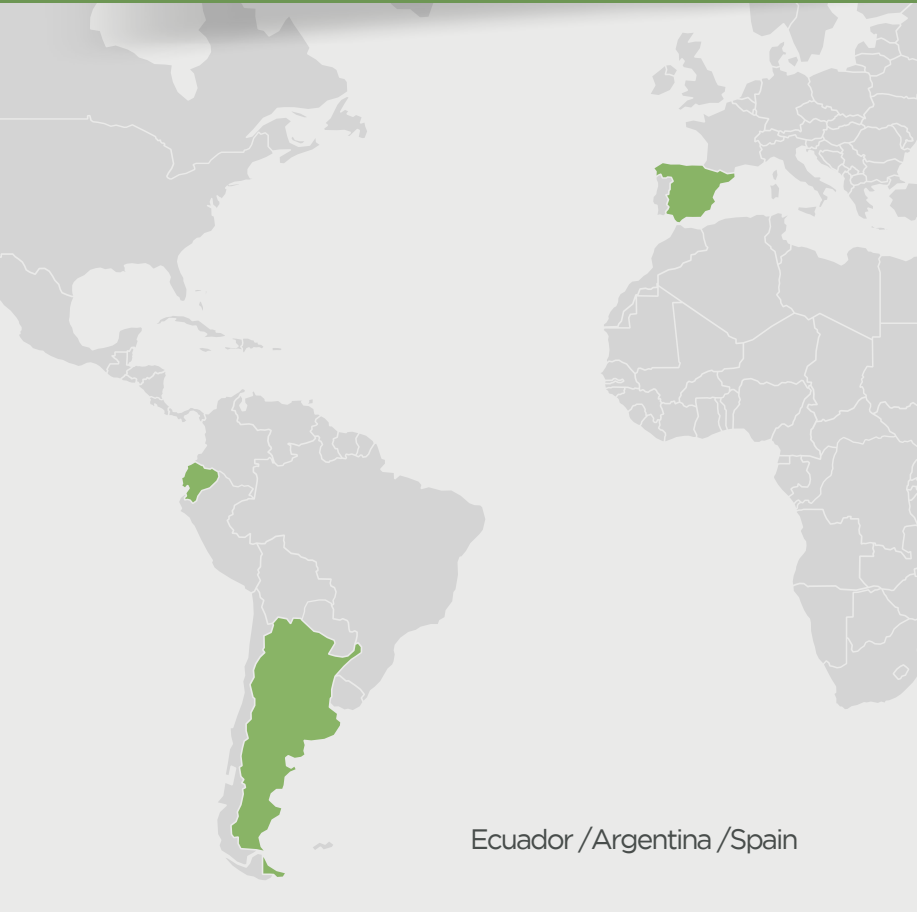


Bioprocess reducing the solubility of rhizospheric cadmiun

The project proposes an innovative, efficient, and environmentally friendly bioprocess that reduces Cd bioaccumulation. It includes scaling up for regional implementation and training for farmers and interested entrepreneurs to implement it on farms



Ecuador /Argentina /Spain



+3452
Direct and indirect beneficiaries



+8
Ongoing and defended theses



+1646
Women benefited



+20
Publications (journals/book chapters)



+3
Technological solutions



+6
Networks



+70 x
Cadmium bioaccumulation factor of the selected symbiosis



+8
Bioreactors built and validated

Main Donors



The aim of the project is to reduce the cocoa bean Cd concentration to values below 0.8 mg kg-1 dry weight in the cocoa plantations where this biotechnology will be implemented.

Initiative

The bioprocess will involve the isolation of native fungi from cocoa plantations, capable of reducing the root and aerial bioaccumulation coefficient of cadmium; validation in bioreactors and scaling up to TRLs 6 and 7 for family farmers' farms. Main Objective: To reduce Cd concentrations to values less than 0.8 mg kg-1 in cocoa beans through a bioprocess, accompanied by a protocol for application in the field. Specific Objectives:

- 1) Create an Entrepreneurship Laboratory;
 - 2) Formulate the bioprocess in bioreactors (TRL 4);
 - 3) Implement and scale up to TRL levels 6-7; and
 - 4) Manage knowledge, communication, and transfer.
- Scope: 3,150 direct beneficiaries, 3,000 indirect beneficiaries, thesis students, entrepreneurs, and other regions with similar problems.

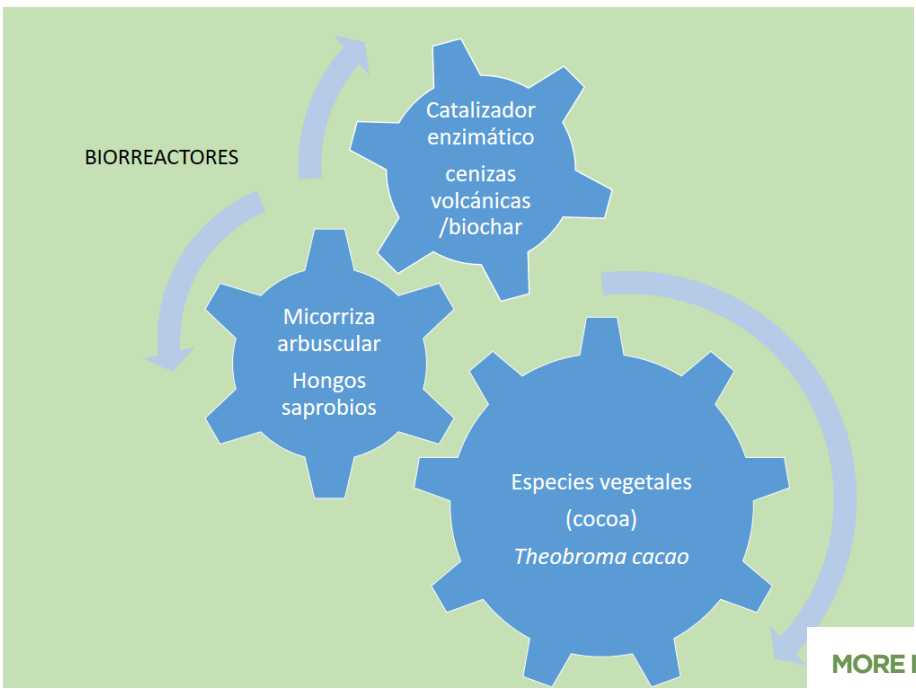
To generate a bioprocess based on a fungal consortium that will reduce the Cd content in cocoa beans.

Tech solution

This project aims to reduce cadmium concentrations in cocoa beans to values below 0.8 mg/kg dry weight through microbiota management and validation at different TRL levels up to field application. Saprobic and mycorrhizal fungi will be isolated that reduce cadmium bioavailability to the cocoa plant through fungal strategies such as exclusion, translocation, and solubilization. This bioprocess will be validated in bioreactors, adjusting

physico-hydraulic-chemical-biological conditions to make it reproducible at TRL 6 and to develop a protocol for scaling to TRL 7 for field application. The technology will be implemented in Calceta (Ecuador) and the Paria Peninsula (Venezuela) and can be adapted to other regions with similar challenges. It will improve local living conditions, increase beneficiaries' income, and place special emphasis on promoting the involvement of women.

Bioprocess reducing the solubility of rhizospheric cadmiun



Impacts and Results

975 / 5.000

The projected figures for the technical indicators were exceeded in terms of beneficiaries, technological solutions, networks formed, scientific production, and theses involved. The project's impact was greater at the scientific, environmental, social-educational, and gender levels than at the socioeconomic levels. The results are detailed in the indicator format: Publications: 10 articles in scientific journals, 10 book chapters, 21 conference presentations. 931

people trained, of whom 205 are women. Total beneficiaries: 3,452 people, of whom 1,646 are women. Theses: 1 doctoral thesis defended, 2 doctoral theses in progress, 1 undergraduate thesis defended, 4 undergraduate theses in progress. 3 technological solutions and innovations linked to arbuscular fungi: mycorrhizal symbiosis with different behavior: flower-excluding, phytostabilizing, cadmium hyperaccumulating; linked to saprobic fungi; and linked to scaling and conservation of conditions.

Organizations

