

Fostering CLIMATE-relevant and LOW CADMIUM innovations to enhance the resilience and inclusiveness of the growing cocoa sectors in Colombia, Ecuador and Peru (Clima-LoCa)

The project Clima-LoCa (2020-2024) addresses [important challenges](#) related to the resilience, competitiveness and inclusiveness of the growing cocoa sectors of Colombia, Ecuador and Peru. Here, resilience refers to the capacity of smallholder producers, and other value chain actors, [to mitigate the negative impacts of new EU food safety regulation on cadmium in cocoa](#); and of climate change.



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What will be achieved?

The **objective** of the Action is to support the development and scaling of low cadmium and climate-relevant agronomic or agroecological solutions that fit the diverse contexts of smallholder cocoa production. This objective will be achieved, based on 4 main **outputs** that are developed around 4 interdisciplinary work packages (Fig 1).

WP1 will develop baselines and impact assessments for cadmium and climate change, and inform public policies and interventions taking into account edaphoclimatic, cacao genetic and socio-economic variation within and between the countries; **WP2** will provide scientific assessments in multilocational research trials to identify production practices and genotypes for reduced cadmium accumulation in cocoa beans, while considering effects on productivity, soil health, climate relevance and cost-benefits; **WP3** will pilot low cadmium agronomic practices and genotypes in collaboration with farmer associations, and co-develop mitigation and scaling strategies in multi-stakeholder platforms. **WP4** will strengthen regional research coordination and research capacity, and promote scientific exchange and training, including training of laboratories.

All WPs include important activities dedicated to the dissemination of the project outputs and will develop decision support tools and training materials, targeting diverse stakeholders.

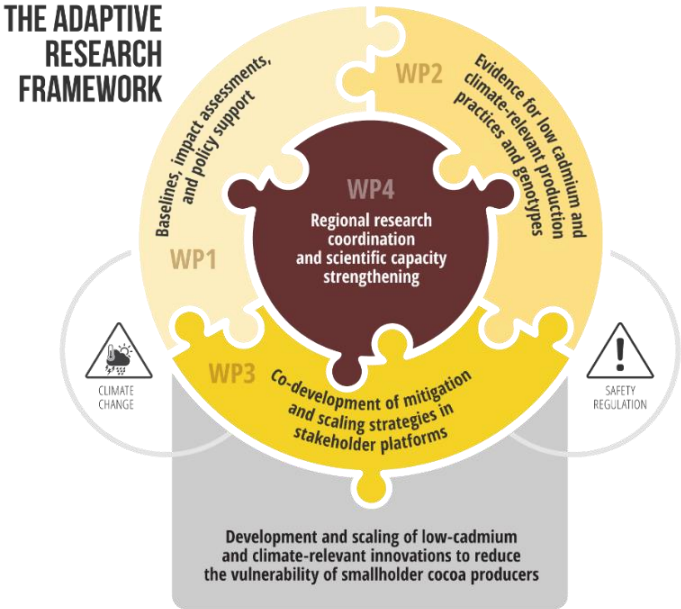


Figure 1. The research framework of the Clima-LoCa project. Four different, interrelated objectives will contribute to the overall project objective shown at the bottom of the figure.

The consortium

The project is led by the Alliance of Bioversity International and CIAT of the CGIAR and Wageningen University is an implementing partner. The international consortium¹ of partners and collaborators has unique expertise and access to field sites, germplasm collections, greenhouse and laboratory facilities and key data sets. The ambition is to develop a coherent, interdisciplinary research network, that builds on and adds value to existing knowledge, data and experiments through integration and synthesis, standardization of research protocols; as well as gap filling to address remaining knowledge needs. The Clima-LoCa project also provides a strong platform to integrate contributions from industry partners that strengthen the project impact through additional research trials, and support to piloting and dissemination.

The role of Wageningen University

¹ CIAT-BIOVERSITY ALLIANCE, AGROSAVIA (Colombia), ESPOL UNIVERSITY, INIAP (Ecuador), INIA, SENASA (Peru), WAGENINGEN UNIVERSITY, SOIL BIOLOGY GROUP (Netherlands), KU LEUVEN (Belgium), CIRAD, IRD (France), COCOA RESEARCH CENTER (Trinidad & Tobago).

The [Soil Biology Group \(SBL\)](#) of WU is involved in research activities, training and scientific exchange focussing on the development and monitoring of indicators for soil health and climate smartness in cocoa production systems. Through collaboration with the Soil Chemistry Group (SOC), fundamental biochemical interactions between soils and plant roots are studied. SBL & SOC researchers and students at WU are investigating different agronomic interventions in cocoa production systems on soil fertility, soil health, cacao productivity and quality (cadmium concentrations in beans) and climate resilience to achieve a system level understanding. Examples of such interventions are the use of soil amendments to reduce cadmium uptake by cacao, or system diversification using different agroforestry designs. This work is being developed in experimental field trials and on smallholder farms and contributes to WP2 and WP3. Through research collaboration and students exchange, and the organization of targeted soils courses WU also contributes to strengthening of the research capacity (WP4).

Wageningen PhD and MSc projects

So far specific Wageningen MSc and PhD thesis projects have looked at the following research topics:

- The Root Cause of Soiled Cacao - A mechanistic understanding of biochemical soil-root interactions for low-cadmium sustainable cacao production (PhD thesis Wietse Wiersma, in progress)
- The impacts of different agroforestry arrangements on productivity and soil quality in cacao (*Theobroma cacao* L.) production systems of the Ecuadorian Amazon (MSc thesis Anna Maria Vischer)
- Application of organic and inorganic soil amendments as strategies to reduce cadmium levels in cacao beans and its implications on soil health (MSc thesis Claire Morelle).
- How does genotypic variation in root exudate profiles of cacao influence Cd bioavailability under different levels of P fertility? (MSc thesis Ellen Verboom, in progress).
- How does the rhizosphere of different cacao genotypes affect the response to soil amendments used for Cd mitigation? (MSc research practical Shengkai Wang, in progress).
- Quantifying the composition of organic matter to understand the effect of soil amendments on Cd reactivity in tropical cacao soils (MSc thesis Anna Favaro, in progress).

In addition to research projects, an interdisciplinary discussion group on *Sustainable Cacao & Coffee* was set-up for PhD candidates and post-docs at WU, to explore the width of scientific research for sustainable value chains from bean to beverage.

The beneficiaries

The project aims to benefit smallholder cocoa producers in the 3 target countries, representing a total of ~ 300,000 cocoa farms, with potential to create impact in other countries facing similar challenges. We have the ambition to work directly with 450 farmer families over a period of 4 years, and impact 50,000 farmers indirectly. Other beneficiaries include national research institutes and gene banks, national and subnational government entities and other public and private institutions along the cocoa value chain, for example cacao traders, chocolate companies, development NGOs, farm extension agencies, producer federations, and certifiers.

Project funding

The project (2020-2023) is financially supported by the European Union and contributes to the objectives of the 2018 call for “Climate-Relevant Innovation through Research in Agriculture” of the EC-led platform DeSIRA (Development-smart Innovation through Research in Agriculture).

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Related websites, blogs, podcasts

Website Clima LoCa: <https://climaloca.org/>

Website EU DeSIRA: <https://europa.eu/capacity4dev/desira/wiki/clima-loc>

Video DESIRA launch: https://www.youtube.com/watch?v=6vYy0Wd_Bpw&feature=emb_title

Blog CIAT Regional research project seeks to promote the development of cacao to continue competing in the European market: <https://blog.ciat.cgiar.org/regional-research-project-seeks-to-promote-the-development-of-cacao-to-continue-competing-in-the-european-market/>

Blog CIAT Supporting Farmers and Chocolate Companies on the Implementation of the EU Cadmium Regulation: <https://www.worldcocoafoundation.org/blog/cadmium-continued-supporting-farmers-and-chocolate-companies-on-the-implementation-of-the-eu-regulation/>

Blog World Cocoa Foundation: <https://www.worldcocoafoundation.org/blog/cadmium-continued-supporting-farmers-and-chocolate-companies-on-the-implementation-of-the-eu-regulation/>

Podcast Erik Smolders: <https://soundcloud.com/biovintciat/erik-smolder-interview-clima-loc>
[project/s-un7RRPw5gDZ](https://soundcloud.com/biovintciat/erik-smolder-interview-clima-loc-project/s-un7RRPw5gDZ)

Podcast Rachel Atkinson & Mirjam Pulleman: <https://soundcloud.com/biovintciat/clima-loc>
[project/s-4h9Iz9XVBkG](https://soundcloud.com/biovintciat/clima-loc-project/s-4h9Iz9XVBkG)

Blog 12Tree is proud to be a partner of the CIAT initiative “Clima-LoCa”:
<https://www.12tree.de/blog/2020/9/22/12tree-is-a-proud-to-be-a-partner-of-the-ciat-initiative-clima-loc>