

CACAO LIBRE DE CADMIO

Taller regional Colombia - Ecuador -
Perú

Cali, 12-14 Marzo 2018



Cocoa Production

- Worldwide : 4.466.000 tons
- America : 730.181 tons (16,4%)
- 75 % of fine and flavour cocoa

(FAO, 2016, ICCO)

2017
290.000 tons
450.000 hectares
100.000 families
(source ministerio de Agricultura y Ganadería)

2017
60.535 tons
180.000 hectares
35.000 families
(source MADR, 2017)

2016
107.000 tons
125.000 hectares
90.000 families
(source ISCR 2017)



Cadmium Regulations

COMMISSION REGULATION (EU) No 488/2014

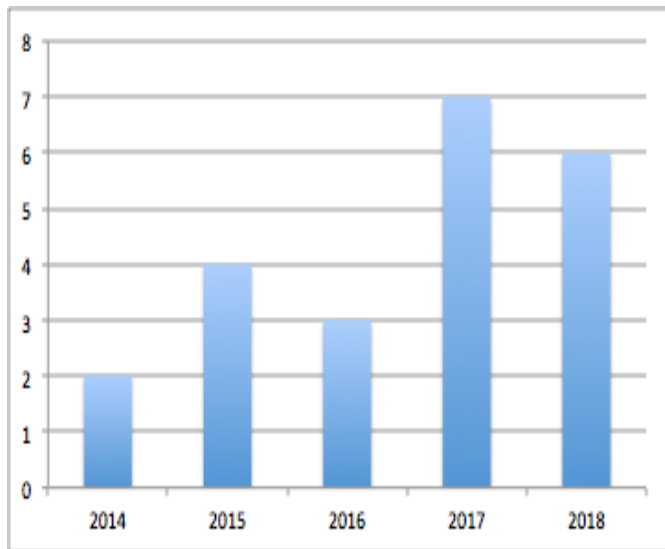
of 12 May 2014

amending Regulation (EC) No 1881/2006 as regards maximum levels
of cadmium in foodstuffs

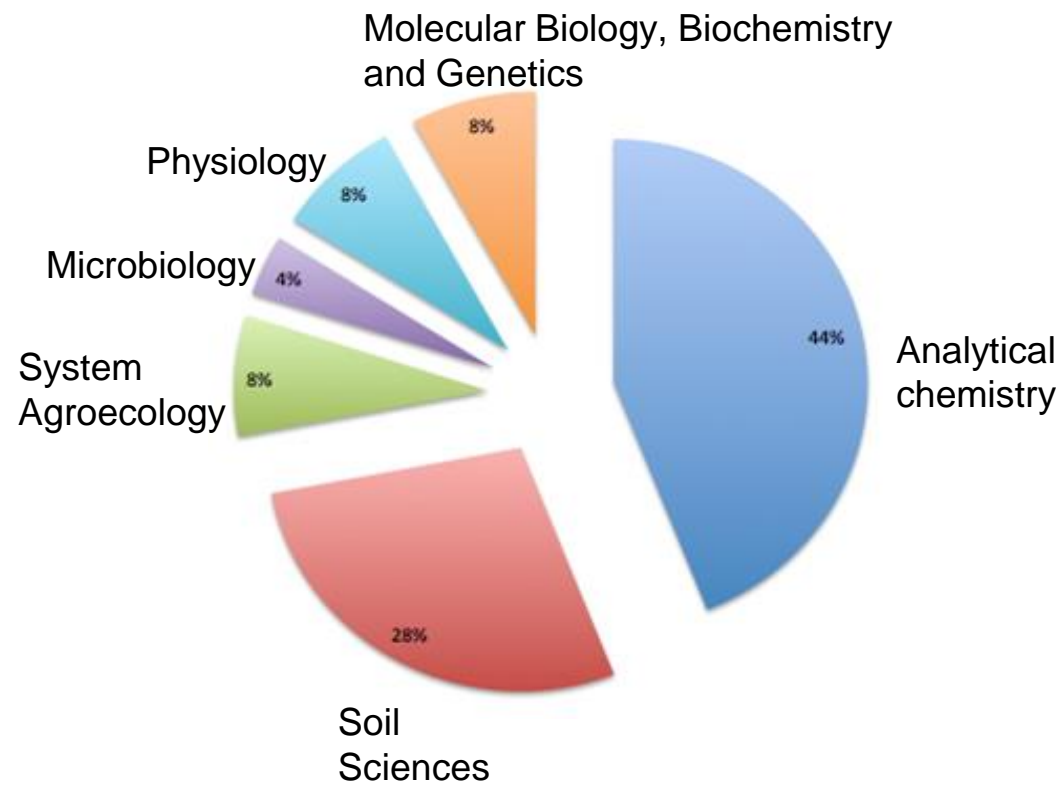
3.2.7	Specific cocoa and chocolate products as listed below ⁽⁴⁹⁾	
	— Milk chocolate with < 30 % total dry cocoa solids	0,10 as from 1 January 2019
	— Chocolate with < 50 % total dry cocoa solids; milk chocolate with ≥ 30 % total dry cocoa solids	0,30 as from 1 January 2019
	— Chocolate with ≥ 50 % total dry cocoa solids	0,80 as from 1 January 2019
	— Cocoa powder sold to the final consumer or as an ingredient in sweetened cocoa powder sold to the final consumer (drinking chocolate)	0,60 as from 1 January 2019



La investigacion



Since 2014 : 22 peer reviewed article
(("theobroma cacao" or cocoa) and
Cadmium



ISCR 2017 recommendations

- Greater coordination across countries to share best practices and knowledge on Cadmium mitigation must be pursued
- Greater funding must be generated and better coordinated. A workshop bringing all the development agencies, NGOs and research organizations is important.
- More studies are required to understand the correlation between soil, leaves and bean
- Promising investigation in lab, greenhouse and field have to be validated under various soil types and conditions



Objectives of the workshop

“Bring together a consortium of researchers representing relevant disciplines, as well as private sector partners and development agencies, to develop a **common understanding of the needs and priorities** and elaborate **research projects** in response to the Cd problem which affects the cacao sector in the target countries.

More specifically:

- i. Confirm / update the results that came out of previous meetings in Lima;
- ii. Identify the main research gaps and their corresponding research / innovation needs (short and medium term).
- iii. Formulate a regional research project, to be negotiated with agencies and private sector stakeholders



Workshop Results



Who were here?

ECUADOR:

- INIAP
- Universidad ESPOL
- Anecacao
- Ministerio de Industrias y Productividad
- Republica del Cacao

PERU:

- Instituto Cultivos Tropicales (ICT)
- Centro Innovación del Cacao
- Ministerio de Agricultura
- Alianza Cacao Peru
- Cámara Peruana de Cafe y Cacao
- Forestfinance

INTERNACIONALES

- CIAT
- CIRAD, IRD (Francia)
- Cacao Research Center (Trinidad y Tobago)
- University Leuven (Belgium)
- CEMOI (Francia)
- Penn State University (USA)
- AFD (Francia)
- European Union
- Swiss contact
- USAID, USDA (USA)
- Valrhona (Francia)
- MARS (USA)



COLOMBIA:

- Corpoica
- Universidades
- ICA
- Ministerio de Comercio, Industria y Turismo
- Consejo Nacional Cacaotero
- FedeCacao
- Casa Luker
- Mariana Cocoa Export
- Nacional de Chocolates



Products

Colombia

Ecuador

Peru

WP0 - Regional Network CacaoCdFREE with the aim to reduce mitigate high Cd levels in cacao

WP1

Hotspots, sources and soil-based mitigation of elevated Cd in cacao production systems

Regional lead: CIAT
Country lead: AGROSAVIA, ESPOL, CIC

WP2

Enhancing the use of genetic resources for reducing cadmium assimilation in cocoa

Regional lead: CIRAD
Country lead: AGROSAVIA, INIAP, ICT

WP3

Socioeconomic impacts and technology transfer

Regional lead: CIAT
Country lead: AGROSAVIA, Univ. S.F. de Quito/ESPOL, Alianza Cacao Perú

Partners - KU Leuven, Wageningen University, Penn State, CRC Trinidad, University of Hohenheim, IRD



WP0 - Regional Network CacaoCdFREE with the aim to reduce mitigate high Cd levels in cacao

Objetivos

- Integrar y Compartir
- Ser proactivo y referente del tema en América Latina

Funciones principales

- Intercambio de conocimiento
- Comunicar avances y métodos de investigación y noticias relevantes al tema
- Gestionar recursos incluyendo recurso humano
- Organizar eventos y talleres de capacitación

Corto plazo conseguir fondos para :

- Construir una plataforma IT básica
- Iniciar la base de contactos
- Publicar los resultados del taller



WP1 - Hotspots, sources and soil-based mitigation of elevated Cd in cacao production systems

Task 1. Inventory, synthesis and mapping of data on cadmium risks and sources in cacao production systems

State of the art

- High spatial variability in Cd concentrations
- High Cadmium in soil \neq High Cadmium in cocoa bean
- Information at departmental or national scales (e.g. maps) exists but limited

Products

- Inventory of available information on Cd contents and Cd availability in soils and cacao plants in the three countries
- Characterization of major anthropogenic sources of Cd
- Digital soil maps (DSM) for priority areas

Goals

- Careful planning of cacao expansion efforts
- Marketing strategies



WP1 - Hotspots, sources and soil-based mitigation of elevated Cd in cacao production systems

Task 2. Standardization and harmonization of laboratory procedures and experimental methods

State of the art

- Heterogeneity of protocols, methods and standards for Cd measurement

Products

- List of participating laboratories and bottlenecks
- Protocols, training materials and reference materials
- Ring test reports and training events

Goals

- Standardization and certification of Cd measurement
- Evaluation of cost-effective assessments



WP1 - Hotspots, sources and soil-based mitigation of elevated Cd in cacao production systems

Task 3. Evaluation of promising amendments and remediation strategies for reducing Cd in cacao beans

State of the art

- Soil total Cd, pH and soil organic matter content are the main soil factors
- Promising approaches exist to reduce the bioavailability of Cd
- Few field experiments and need to evaluate technology dissemination and economic feasibility

Products

- Synthesis paper and priority setting for evaluation of Cd reducing strategies
- Experiments and protocols for monitoring, database
- Annual reports on technology evaluations

Goals

- Offer solutions to cocoa farmers in regions already in production



WP2 - Low cadmium accumulating cacao genotypes

Task 1. Multisite evaluation of promising low Cd accumulation and commercial cacao genotypes

State of the art

- Green house evaluation of some genetic resources for cadmium uptake and translocation
- Large range of variability
- Need to be evaluated in field conditions

Products

- Standardized protocols for fields assessment of genotypic variations in Cd uptake and translocation
- Commercial varieties and promising genotypes assessed for Cd accumulation in the field

Goals

- Evaluate the Cd absorption property of commercial clones distributed to farmers



WP2 - Low cadmium accumulating cacao genotypes

Task 2. Screening germplasm collection and farmer's fields for low Cd accumulating genotypes

State of the art

- Cocoa Genebanks available in LAC research center
- Only few genotypes were assessed for Cadmium uptake
- Genotypes in high Cd soil concentration with low Cd content in beans

Products

- Common methodology for greenhouse Cd evaluation in cocoa
- National Genebanks assessed for Cd absorption and translocation

Goals

- Identify new sources of low Cd accumulation for breeding programs



WP2 - Low cadmium accumulating cacao genotypes

Task 3. Investigation of molecular mechanisms and specific genes involved in Cd uptake, translocation and accumulation in cacao tissues

State of the art

- Studies in plants shown ways to alter cadmium uptake
- Genetic mechanisms of Cd uptake, accumulation and translocation in cacao are widely unknown
- Needs to have prediction tools

Products

- Identification of candidate genes involved in Cadmium accumulation

Goals

- Development of new low Cd accumulating genotypes



WP3 - Socioeconomic impacts and technology transfer

Products

- Stripe review of cocoa sector and Cd related information
- *Ex-ante* impact assessment of the regulation
- Feasibility evaluations of the Cd mitigation technologies
- Evaluation of the current agricultural innovation and technology transfer systems and development of upgrading strategies
- Communication, coordination and dissemination strategy



Funding for regional research coordination

ACTION PLAN

- EU DEVCO (pre-proposal submitted)
- Ongoing discussions with agencies and private sector partners about support to keep the network going and ensure coordination and knowledge sharing at regional level
- Development of European Training Network led by the University of Hohenheim and CIAT, together with private sector (BMBF seed money granted to UHOH – workshop in Cali 24-26 July 2018).
- Complementary grant applications that may allow for smaller projects (1 WP or 1 country only) but that can be embedded into the regional network to ensure wider dissemination



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WP1 - Hotspots, sources and soil-based mitigation of elevated Cd in cacao production systems

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Funciones principales

- Intercambio de conocimiento
- Comunicar avances y métodos de investigación y noticias relevantes al tema
- Gestionar recursos incluyendo recurso humano
- Organizar eventos y talleres de capacitación

Corto plazo conseguir fondos para :

- Construir una plataforma IT básica
- Iniciar la base de contactos
- Publicar los resultados del taller
- Negociar aportes \$\$ con diferentes agencias interesadas
- Publicar los principales resultados de investigación
- Organizar eventos de divulgación y espacios de formación



Colombia

Ecuador

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WP0 - Regional Network CacaoCdFREE with the aim to reduce mitigate high Cd levels in cacao

WP1

Hotspots, sources and soil-based mitigation of elevated Cd in cacao production systems

Regional lead: CIAT
Country lead: AGROSAVIA
ESPOL, CIC

1. Improve the availability, accessibility and utilization of information on the levels and sources of Cd in soils and cacao beans.
2. Standardization and harmonization of laboratory procedures and experimental methods
3. Evaluate promising amendments and soil-based technologies for reducing Cd accumulation in cacao beans

WP2

Enhancing the use of genetic resources for reducing cadmium assimilation in cocoa

Regional lead: CIRAD
Country lead: AGROSAVIA,
INIAP, ICT

1. Field evaluation of the potential for low Cd accumulation of the clones selected in laboratory and/or greenhouse conditions and commercial varieties
2. Increase the level of genetic diversity within the groups of genotypes with low cadmium uptake/translocation in order to enhance the probability of capturing other traits of agronomical interest
3. Utilize molecular tools for investigation of the mechanisms and specific genes involved in Cd uptake, translocation and accumulation in the cacao

WP3

Socioeconomic impacts and technology transfer

Regional lead: CIAT
Country lead: AGROSAVIA,
Univ. S.F. de Quito/ESPOL,
Alianza Cacao Perú

1. Provide an ex-ante assessment of the economic impacts of the regulation on the cacao value chain
2. Evaluate the socio-economic feasibility of the different adaptation and mitigation strategies according to producer typologies in the countries.
3. Identify and analyze the major opportunities and constraints of the current technology transfer systems in the three countries and develop recommendations on how to efficiently transfer the Cd mitigation strategies to producers

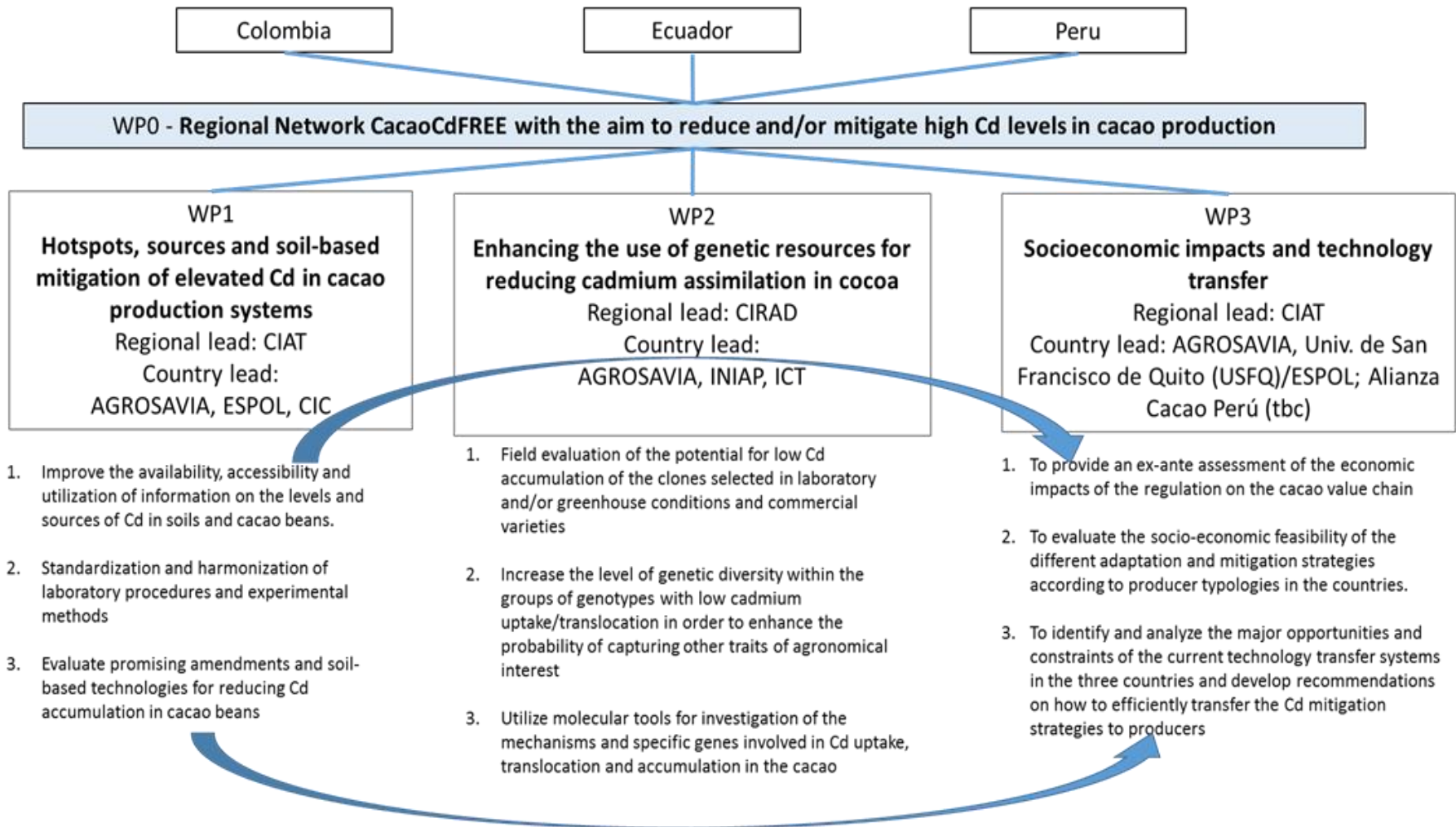
Partners - KU Leuven, Wageningen University, Penn State, CRC Trinidad, University of Hohenheim, IRD

Products

- A regional network of researchers with capacity to collaborate to improve knowledge and develop solutions for the cadmium issue in cacao.
- A report of the outcomes of the workshop, with a executive summary and accompanying powerpoint presentation.
- First outlines of two research proposals to be developed, one focused on short term and one on medium term solutions
- Action plan for project elaboration and funding approaches



Products



International partners - KU Leuven, Wageningen University, Penn State, CRC Trinidad, University of Hohenheim, IRD

