

# An innovative public/private partnership for a sustainable transformation of the cocoa agri-chain in the Dominican Republic

Olivier Deheuveld<sup>1</sup>, Pierre Costet, Marianne Martinet,  
Patrick Jagoret<sup>2</sup> and Stephane Saj<sup>3,4</sup>

Most of the world cocoa production (95%) comes from the 5 million smallholders and their families who depend upon cocoa cultivation for their livelihoods. In this non-mechanised cash-crop, cultivated on small surfaces between 0.5 and 3 hectares, production costs are mostly, if not only, generated by workforce and, to a lesser extent, by the use of fertilizers and pesticides. In the Dominican Republic, as in other producing countries, the increase of production is mainly the consequence of the extension of cultivated areas, and, to a lesser extent, of yield improvement. Government's strategies to improve cocoa yields traditionally rely on genetic improvement and capacity building on pests and disease management. Both strategies have proved to fail, in particular because of a lack of knowledge about actual farmer's practices. As in most producing countries over Africa, Asia and Latin America, these practices are ruled by strategies of diversification where timber and/or fruit trees are incorporated into the cocoa field and cultivated together with the cocoa trees on the same plot. This association of trees, whether they are perennial crops such as cocoa or timber/fruit species, with other annual and/or multiannual crops, form what is currently known as Agroforestry Systems (AFSs).

A recent study conducted by a public/private alliance has shown that the Dominican cocoa farmers are faced with four challenges of considerable importance:

- (i) the low education level and the ageing of cocoa farmers (72% are over 50 years old, and 80% have not studied further than primary school) and the loss of attractiveness of inland cocoa farming for the new generation that is more and more channelled by the tourism sector on the paradisiac Dominican beaches (only 20% of the cocoa farmers have their children actually living on the farm);
- (ii) the genetic heterogeneity of the ageing cocoa trees in the Dominican cocoa fields (56% are more than 25 years old), that partly explains the low yields. The lack of knowledge on this genetic diversity is also a major risk because the country will, probably sooner than later, have to face diseases having a high impact on production, such as Monilia (*Moniliophthora roreri*) or Witch's broom (*Crinipellis perniciosa*). There is no national selection program that would produce resistant or tolerant varieties, and farmers are not prepared to recognise the symptoms and have no technical knowledge for the control of these diseases;
- (iii) the high diversity of plant species associated to cocoa (more than 40 species have been inventoried), the lack of efficient design in their repartition on the plot (cocoa tree's density varies between 100 and 1600 trees per hectare, along with the density of associated plants) and the farmer's lack of knowledge, both in shade design and management adapted to cocoa production and to the strong climatic risk associated to hurricanes in particular, makes it a striking necessity to implement innovative agroforestry systems with productive shade adapted to strong winds;
- and (iv) the low production volumes and the important lack of connections to markets, especially for the products generated by the associated plants in the cocoa-based agroforestry systems, whether they are fruits or timber. More than 65% of the associated plants in the cocoa fields are producing edible fruits and only 1% is oriented to timber production. In addition, more than 30% of the associated plants are cultivated only because they provide shade to the cocoa trees, as it is the case for the

1. CIRAD, UMR SYSTEM, Lima 12, Peru.

2. CIRAD, UMR SYSTEM, F-34398 Montpellier, France.

3. CIRAD, UMR SYSTEM, F-34060 Montpellier, France.

4. IRAD, Programme Plantes stimulantes, Nkolbisson, Cameroon.

famous Dominican “Amapola” (*Erythrina poeppigiana*). Among the fruit producing species, only 6 (coffee, plantain, banana, avocados, mandarine and “sapote”) are sold locally by a small number of farmers. However, most of the fruits are either self-consumed or left to rot in the cocoa field. A better productive and multi-service shade design, but also improvements both in transportation and access to market are key issues to raise the income generated by cocoa and non-cocoa products in the Dominican agroforestry systems.

These conclusions led to a public/private partnership which primary objective is to design an innovative project for the cocoa agri-chain in the Dominican Republic. Based on the identification and quantification of the products generated by the Dominican cocoa-based AFS, academic centres, fair trade and organic certification agencies and French chocolate, pastries and oil factories are joining efforts with public and private research and development institutions under the CACAO FOREST program. This program offers to:

(i) implement participatory investigation to co-design and implement with farmers, local experts, the local agro-industry and investigation centres, innovative cocoa-based cropping system with locally improved cocoa varieties and productive associated plants with enough production for local markets. These innovative cocoa AFS will be tested in the field and compared to current and intensive full sun monoclonal models, following two protocols: (a) a plot creation demonstration network, created from non-forested land uses, and (b) a path change demonstration network, where current practices will be modified to innovative practices in a 4 years’ time step-by-step process;

(ii) create and strengthen links between cocoa and non-cocoa products and local and international value chains that could absorb them, in particular in regions like touristic areas where the demand is strong. In particular, the Cacao Forest program will induce local businesses to assess opportunities for buying associated products from cocoa AFS and will encourage local cooperatives to promote such products locally and internationally;

and (iii) combine this market-oriented approach with an objective of environmental and social sustainability including the improvement of ecosystem services provided by these AFS, such as mitigation enhancement by increasing C-capture, biodiversity conservation, soil and water conservation, and pollination improvement.

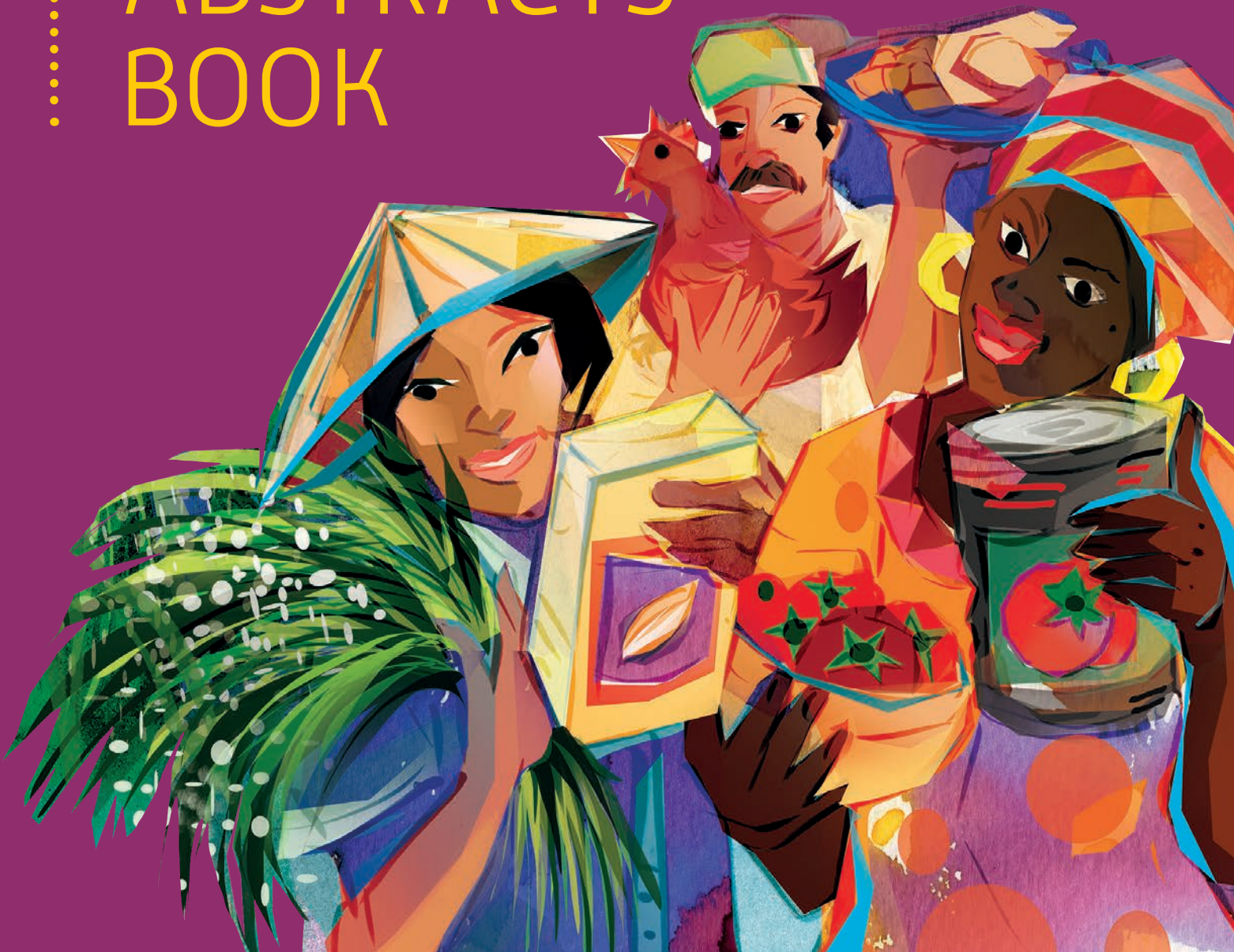
The Cacao Forest project seeks transforming the cocoa agri-chain in the Dominican Republic by making the cocoa production an attractive alternative to the tourism sector for the next generation of farmers. This 6-years long innovative program started in the Dominican Republic in 2016. It is currently being adapted to Peru, and will be starting in Ecuador, Ivory Coast and Madagascar in the coming years.

12-14 December 2016,  
Le Corum, Montpellier - France

# AC&SD 2016

Agri-Chains & Sustainable Development  
> *Linking local and global dynamics*

## ABSTRACTS BOOK



# WELCOME ADDRESS



© Lilian Martorell

## Welcome to AC&SD 2016

On behalf of the Scientific and Organizing Committees, it is a great pleasure to welcome you to the International Conference on Agri-chains and Sustainable Development (AC&SD 2016). This conference aspires to widen the debate about the role of agricultural value chains towards sustainable development. Year 2015 was a critical political and diplomatic milestone: the member states of the United Nations signed a new agenda for development, with the 17 Sustainable Development Goals (SDGs) placing sustainability at the core of international efforts. Development and academic actors are since then exploring new avenues for translating the SDGs into reality and implementing global and local frameworks and partnerships. Our conference aims at joining these efforts, with the consideration that agricultural value chains form spaces where local and global challenges to sustainability connect and within which local and global actors experiment and negotiate innovative solutions.

The scientific committee has assembled a very attractive program for AC&SD 2016 that seeks to cover and confront the diversity of realities behind agri-chains, from localized chains, embedded in specific places, to global value chains. In the parallel sessions, transformations of these agri-chains and their connections to sustainable development will be discussed by speakers from the academia, the civil society, the private sector and decision makers. This multi-stakeholder perspective will also be brought about in the plenary sessions. Here, world renowned keynotes and panelists to three high level round tables will discuss about the role and importance of evaluation, public and private institutions and innovations at different scales for transforming agri-chains towards sustainability transitions.

This edition gathers about 250 participants from 39 countries. AC&SD 2016 owes a lot to the scientific and organizing committees for preparing the program, and particularly to Brigitte Cabantous, Chantal Carrasco and Nathalie Curiallet for all the logistics, as well as to our support team of Alpha Visa that we warmly thank for their help.

We wish us all a fascinating, successful, inspiring and enjoyable AC&SD 2016 and we very much look forward to its result and to the strengthening of both a scientific community and a community of practice to implement the outcome!!

Estelle Biénabe, Patrick Caron and Flavia Fabiano,  
Cirad Co-chairs AC&SD 2016

# COMMITTEES

## Scientific committee

- **Estelle Bienabe**, CIRAD, France\*\*
- **Julio Berdegué**, RIMISP, Chile\*
- **Thierry Bonaudo**, AgroParisTech, France
- **Larry Busch**, Michigan State University, USA
- **Patrick Caron**, CIRAD, France\*
- **François Côte**, CIRAD, France
- **Benoit Daviron**, CIRAD, France
- **Djiby Dia**, ISRA, Senegal
- **Flavia Fabiano**, CIRAD, France\*\*
- **Pierre Fabre**, European Commission EuropeAid, Belgium
- **Bernard Hubert**, Agropolis International, France\*
- **Patrice Levang**, IRD, France

- **Florence Palpacuer**, Université de Montpellier, France
- **Felicity Proctor**, RIMISP, UK
- **Ruerd Ruben**, Wageningen UR, The Netherlands
- **Nadia Scialabba**, FAO, Italy
- **Dao The Anh**, CASRAD, Vietnam
- **Alban Thomas**, INRA, France\*
- **Jodie Thorpe**, IDS, UK\*
- **Sophie Thoyer**, Montpellier SupAgro, France
- **Maximo Torero**, IFPRI, USA

\* Member of the international organising committee

\*\* Member of the local organising committee

## Organising committees

### International organising committee

- **Karen Brooks**, IFPRI, USA
- **Jean-Marc Chataigner**, IRD, France
- **Clement Chenost**, Moringa Fund, France
- **Thierry Doré**, AgroParisTech, France
- **Ronan Le Velly**, Montpellier SupAgro, France
- **Huub Loffler**, Wageningen UR, The Netherlands
- **Philippe Pipraud**, French Ministry of Agriculture, France
- **Lilian Puech**, French Ministry of Foreign Affairs, France

### Local organising committee

- **Frédéric Bourg**, CIRAD, France
- **Brigitte Cabantous**, CIRAD, France
- **Chantal Carrasco**, CIRAD, France
- **Nathalie Curiallet**, CIRAD, France
- **Frédérique Causse**, CIRAD, France
- **Delphine Guard-Lavastre**, CIRAD, France
- **Nathalie Villeméjeanne**, Agropolis International, France

Landscape factors influencing sustainable food agri-chain innovation: The role of place in the Toronto experience of Local Food Plus .....	173
<i>Wayne Roberts [et al.]</i>	
Are food losses and waste overestimated in developing countries? .....	176
<i>Géraldine Chaboud</i>	
Vulnerability and resilience of the urban food system to extreme weather: a case study of Colombo, Sri Lanka .....	180
<i>Christina Semasinghe [et al.]</i>	
Resilience of rural-urban food flows in West Africa .....	182
<i>Pay Drechsel, Hanna Karg, Richard Kofi Appoh and Edmund Akoto-Danso</i>	

## Session 10

### ***Innovations in approaches and tools for inclusive and efficient value chain development***

Commercial and inclusive value chains: doing good and doing well .....	184
<i>Malcolm Harper, John Belt and Rajeev Roy</i>	
Factors influencing successful inclusion of small farmers in modern value chains in ACP countries .....	188
<i>Andrew Shepherd</i>	
Cross-border trade and women in value chain development .....	192
<i>Florence Tartanac</i>	
Inclusive and efficient value chains .....	195
<i>Maximo Torero</i>	
Assessing equity in value chains through a participatory guide to business models that link smallholders to markets: insights from LINK application across diverse value chain settings .....	196
<i>Mark Lundy [et al.]</i>	
Household asset endowments and implications for inclusive value chains .....	197
<i>Jason Donovan</i>	
Gender equity in value chain and livelihoods development: innovative approaches and tools .....	198
<i>Dietmar Stoian</i>	
Innovation for inclusive value-chain development, successes and challenges .....	199
<i>André Devaux</i>	
Measuring and simulating trust in value chain development .....	200
<i>Christine Plaisier</i>	

## Session 11

### ***Linking global value chains and territories: conceptual insights for understanding and ensuring sustainability at different scales***

Agri-chains and territories “zero-deforestation”: what role for the payments for environmental services? .....	202
<i>Alain Karsenty</i>	
Vulnerability and resilience modelling for sustainable food systems .....	205
<i>Paolo Prospero and Thomas Allen</i>	