



# International Symposium on Cocoa Research

● 5, 6, 7 December 2022, LE CORUM, Montpellier, France ●

## PROGRAMME

# INNOVATIONS TO SUPPORT MARKET DEVELOPMENT AND PROMOTE THE SUSTAINABILITY OF COCOA FARMING FOR BETTER FARMER INCOME

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**UNIVERSITÉ DE  
MONTPELLIER**



## Sunday 4 December 2022

• 13:00 – 18:00 • Registration

## Monday 5 December 2022

• 08:00 – 09:00 • Registration

• 09:00 – 11:00 •

### OPENING CEREMONY (INAUGURAL SESSION)

#### Welcome speeches

Introduction by Master of Ceremony, Mr. Martijn ten Hoopen  
 A representative of the Ministry for Europe and Foreign Affairs  
 Mayor of the Montpellier City Council or another Local Representative  
 Narcisse Olinga - Vice Chairman of the International Cocoa Council (ICC)  
 Michel Arrion - Executive Director (ICCO)  
 Jean Paul Laclau - Directeur du département Persyst - CIRAD  
 A Representative from MUSE (Université de Montpellier d'Excellence)

#### ofi

**“Cocoa agroforestry at ofi: An opportunity for ecologically, economically and socially resilient landscapes”**

**Dr Léonie Bonnehin-Verrier, West Africa Cocoa Agroforestry Head**

#### Symposium Keynote Speaker

#### Juan Lucas Restrepo

Director General of the Alliance of Bioversity International and the International Center for Tropical Agriculture (CIAT)

• 11:00 – 11:30 • Coffee break

### SESSION 1

### COCOA CULTIVATION: INNOVATIVE APPROACHES AND PRACTICES FOR SUSTAINABLE PRODUCTION AUDITORIUM PASTEUR - PLENARY SESSION

#### BAYER

**“Maoyé, a Bayer initiative for a certified cocoa”**

• 11:30 – 12:40 •

#### Farmers living incomes

#### Christopher L. Gilbert

*The Impact on Farmers of the Cocoa Living Income Differential, SAIS Europe, Johns Hopkins University.*

#### Yuca Rosalinde Waarts

*How to achieve a living income for different types of cocoa and coffee farming families? Wageningen University & Research.*

#### Ludovic Temple

*Sustainable competitiveness of the cocoa sector in Ecuador: issues of integrated socio-ecological governance, CIRAD.*

#### Maja Slingerland

*Standardization of Living income benchmarking and knowledge gaps in farmer income assessment in cocoa farming. How to proceed? Wageningen University & Research.*

#### Hammond Mensah

*Service delivery models in the West African cocoa sector: is a smart mix able to close the income gap for cocoa farmers in a responsible and sustainable manner? Solidaridad.*

#### Q&A session

# Monday 5 December 2022



• 12:40 – 14:00 • Lunch

## AUDITORIUM PASTEUR - PLENARY SESSION

• 14:00 – 16:00 •

### Soil fertility & fertilizers

**Rich Kofi Kofituo**

*Processes for Knowledge Transfer and Related Efficiencies: A case of the CocoaSoils, International Institute of Tropical Agriculture (IITA).*

**Lotte Suzanne Woittiez**

*The CocoaSoils nutrient offtake model: preliminary results from on-farm trials, Wageningen University & Research.*

**Thomas Fungenzi**

*Evaluating long term soil organic matter dynamics of cocoa farms in Indonesia, Cranfield University.*

**Deo-Gratias J. M. Hougni**

*The role of litter decomposition in nutrient cycling in cocoa, Wageningen University & Research.*

### Q&A session

**Ekatherina Vasquez**

*Innovative data collection in collaborative cocoa fertilizer trials, Wageningen University & Research.*

**Leonard Rusinamhodzi**

*A stepwise approach to achieve the best agronomic management practices and sustainable fertilizer use in West African cocoa production, International Institute of Tropical Agriculture (IITA).*

**Joost van Heerwaarden**

*Multi-locational nutrient response trials for the development of cocoa fertilizer recommendations, Wageningen University & Research.*

### Q&A session

• 16:00 – 16:30 • Coffee break

### Keynote Speaker Session 1

**Teja Tschardt**

Professor of Agroecology at the University of Göttingen

### Q&A session

• 17:15 – 18:00 • POSTER SESSION



**Tuesday 6** December 2022

PARALLEL SESSIONS

**SESSION 1**

**COCOA CULTIVATION:  
INNOVATIVE APPROACHES AND  
PRACTICES FOR SUSTAINABLE  
PRODUCTION  
(CONTINUED)**

**AUDITORIUM PASTEUR**

**Pest and disease**

**Jacqueline Mary Barnett**

*Development of immunoassays to detect Cocoa Swollen Shoot Virus, University of West of England.*

**Marcos Javier Ramos Chera**

*A novel method for estimating pest and diseases related yield loss in cacao pods in the Peruvian Amazonia, CIRAD.*

**Régis Babin**

*The « BarCo » project: for the promotion of barrier crops to curb the expansion of the Cocoa swollen shoot virus in Côte d'Ivoire, CIRAD.*

**Uilson Vanderlei Lopes**

*Preventive Development and Testing of Clones Resistant to Frosty Pod Rot in Brazil, Cacao Research Center [CEPEC/CEPLAC].*

**Mónica Arias**

*Several enemies at the same time: interaction between two cocoa pod diseases and a cocoa pod borer and their impact in Peruvian agroforestry systems, CIRAD.*

**Lina Tennhardt**

*How does labour availability influence pesticide use on cocoa farms? Research Institute of Organic Agriculture (FiBL).*

**Ade Rosmana**

*Composted plant residue amendments in integration with *Trichoderma asperellum* suppresses above-ground diseases and improves the growth of cacao (*Theobroma cacao* L.) Hasanuddin University.*

**SESSION 2**

**SUSTAINABLE COCOA  
AND CLIMATE CHANGE: THE WAY  
FORWARD THROUGH MITIGATION AND  
ADAPTATION**

**AUDITORIUM EINSTEIN**

**Overview and Intro**

**Keynote Speaker Session 2  
Rolando Cerda**

*Researcher and professor in the Tropical Agricultural Research and Higher Education Center (CATIE).*

**Q&A session**

**Wiebke Niether**

*The contribution of cocoa agroforestry on yields, soil, pests, biodiversity and climate change: a multi-dimensional meta-analysis, University of Giessen.*

**Fiona Lahive**

*The importance of empirical data in accounting for the long-term and interactive effects of climate change on cocoa, University of Reading.*

**Alina Găinușă-Bogdan**

*Towards a climate-smart dynamic cocoa cropping calendar? Climate42.*

**Maja Slingerland**

*Using the Cool Farm Tool and Perennial crop model used to benchmark the climate change mitigation potential of cocoa systems, Wageningen University & Research.*

• 08:00 – 10:00 •

• 10:00 – 10:30 • Coffee break





**Tuesday 6** December 2022

### AUDITORIUM PASTEUR

#### Good Agricultural practices

##### Kam Rigne Laossi

*Impact of pruning intensities on cocoa tree productivity, pest (mirids) and disease (black pod disease) infestations on farmer field trials in Côte d'Ivoire, ofi.*

##### Stéphane N'Dah Konan

*DEXiCacao: a new tool to assess the overall sustainability of cocoa-based cropping systems, Université Félix Houphouët-Boigny.*

##### Luis Orozco Aguilar

*The MOCCA project-Cocoa Pod Survivorship Curves to Improve Yield Forecasting Method, Lutheran World Relief.*

##### Arun Kumar Pratihast

*Digital tools and Ontology: A Collaborative Pathway For Managing & Sharing Cocoa Data, Wageningen University & Research.*

##### Tatiana Inés Restrepo Quiroz

*Development of new cacao elite cultivars for the sustainability and competitiveness of the supply chain in Colombia, Compañía Nacional de Chocolates S.A.S.*

##### Abigail Tettey

*An Overview of The Potential of Regenerative Agriculture in Cocoa Production, International Institute of Tropical Agriculture (IITA).*

##### Celine Diaz

*Effectiveness of Biostimulants as a sustainable solution for improving production of cocoa trees in Ecuador: enhancing flowering and fruit setting to improve final number of pods, weight and yield by tree, Agritecno Fertilizantes S.L.*

### AUDITORIUM EINSTEIN

#### Physiology of cocoa and climate

##### Sandrine Okayo Minakou

*Leaf density, adult vegetative vigor and flushing intensity as relevant criteria for evaluating drought resistance of cocoa trees (Theobroma cacao L.), CNRA.*

##### Bénédicte Rhoné

*Deciphering the genetic basis of adaptation to environment in T. cacao using resequenced genome, CIRAD.*

##### Julian Fernando Mateus-Rodriguez

*Combined effects of elevated [CO<sub>2</sub>] and increased temperatures on cacao reproductive development, The University of Reading.*

##### Dominique Dessauw

*Agronomic and economic performances of improved cacao clones under different agro-ecological conditions in Costa Rica, CATIE/ CIRAD.*

##### Surja Chakrabarti

*Exploiting the Cocoa genetic variation for flowering time and pod development period for climate adaptation: relationship to selected yield components, Cocoa Research Centre, The University of The West Indies.*

##### Antonio Jesús Ariza Salamanca

*Vulnerability of cocoa-based agroforestry systems to climate change in West Africa, University of Cordoba.*

##### Viviana Ceccarelli

*Climate change impact on cultivated and wild cacao in Peru and the search for climate change tolerant propagation material, Bioversity International.*

12:30 – 14:00

Lunch break



# Tuesday 6 December 2022

## AUDITORIUM PASTEUR

### Botany/Genetics, breeding

#### Renaud Boulanger

Genetic bases of fruity and flora aroma of the Nacional cocoa variety, CIRAD.

#### Christian Cilas

How many years of evaluation are needed to select new productive cocoa clones? CIRAD.

#### David Guest

Mapping candidate genes for resistance to Vascular-streak dieback disease of cocoa, University of Sydney.

#### Boguinard Sahin Honorine Brigitte Guiraud

Breeding of cocoa (*Theobroma cacao* L.) genotypes tolerant/resistant to cocoa swollen shoot virus (CSSVs) in cocoa orchards infected by the disease in Côte d'Ivoire, CNRA.

#### Claire Lanaud

Past domestication of *T. cacao* in Latin America revealed by paleogenomics and analysis of methylxanthines, CIRAD.

#### Ramesh S.V.

Transcriptomic response of cocoa (*Theobroma cacao* L.) genotypes to water-deficit stress: Implications for drought tolerance-ICAR-Central Plantation Crops Research Institute.

#### Evelyn Kulesza

Unwrapping the Chocolate Transcriptome: The Gene Expression Atlas of the Tropical Crop *Theobroma cacao*, Penn State University.

• 14:00 – 16:00 •

• 16:00 – 16:30 • Coffee break

• 16:30 – 17:10 • Alexis Zambrano

Genetic origin of Venezuelan cacao (*Theobroma cacao* L.), Universidad Central de Venezuela.

#### Yves-Laurent Brou Assoua

Drone-based estimation of trees biophysical parameters in complex cocoa-based agroforestry systems, Université Félix Houphouët-Boigny.

• 17:10 – 18:00 • POSTER SESSION

## SESSION 3 INNOVATIONS TO SUPPORT THE COCOA PROCESSING & MARKET DEVELOPMENT AUDITORIUM EINSTEIN

### Cocoa by-products

#### Keynote Speaker Session 3

#### Andrea Doucet Donida

Cacao Barry Global Brand Leader

### Q&A session

#### Anna Laven

Juicy beans: an integrated concept towards cocoa pulp use and living income, independent consultant in chocolate & cacao.

#### Thomas Bickel Haase

Influence of Origin and Thermal Processing on the Aroma Quality of Cocoa Fruit Pulp for its Use as a Food Ingredient, Fraunhofer Institute for Process Engineering and Packaging IVV.

#### Simeon Deo Hannes Human

Consumer perceptions of the circular economy and the Ivorian cocoa value chain, Royal Agricultural University.

### Digital tools

#### Martin Notaro

Characterisation of the digital divide and assessment of the impact of the use and non-use of digital tools in the Ivorian cocoa sector, CIRAD.

#### Neil Slettehaugh

Applying computer vision to cocoa bean cut test images: towards an efficient and accessible tool for evaluating physical quality Cocoa of Excellence, Alliance of Bioversity International and CIAT.

**Tuesday 6** December 2022

19:00

# Gala Dinner

(participants have to register prior to the event)

Domaine des Grands Chais  
34130 Mauguio



**International  
Symposium on  
Cocoa  
Research**

# Wednesday 7 December 2022

## PARALLEL SESSIONS

### SESSION 2

#### SUSTAINABLE COCOA AND CLIMATE CHANGE: THE WAY FORWARD THROUGH MITIGATION AND ADAPTATION (CONTINUED)

##### AUDITORIUM PASTEUR

08:00 – 10:00

#### Climate Smart Cocoa

##### Ebagnerin Jérôme Tondoh

Changes in key soil health indicators in cocoa landscapes around Tene Forest Reserve, Université Nangui Abrogoua.

##### Andrew James Daymond

A Physiological Model to Quantify Impacts of Climate Change Variables on Cocoa Productivity, University of Reading.

##### Jean-Michel Harmand

Afforestation of savannah using cocoa agroforestry: impacts on ecosystem services and effects of associated tree species on soil fertility, CIRAD.

##### Christian Andres

Dynamic agroforestry – a tool for successful smallholder-grown cocoa in times of climate uncertainty, ETH Zurich / Obrobibini Peace Complex.

##### Johanna Rueegg

Cocoa and by-crop yields in three organic production systems entering mature stage, Research Institute of Organic Agriculture (FiBL).

##### Evelyne Marise Assi

Perception of climate change and adaptations of cocoa producers in the Divo production area, Centre National de Recherche Agronomique (CNRA).

##### Antoine Kouamé Kouadio

Fish farming as a way for diversifying sources of income in the cocoa sector in Ivory Coast, APDRA Pisciculture Paysanne.

### SESSION 3

#### INNOVATIONS TO SUPPORT THE COCOA PROCESSING & MARKET DEVELOPMENT

##### AUDITORIUM EINSTEIN

#### Origin, Genetics, Quality and flavour evaluation

##### Christina Rohsius

Quality of traded raw cocoa: origin specific variation, correlations of quality determining factors and development of a “cocoa quality system, Rausch Management, Cocoa and Research.

##### Louis Ban Koffi & Kassi Dorine

Physical, aromatic and sensory evaluation of cocoa beans developed by agricultural research in Côte d'Ivoire and improvement of harvesting activities and quality of cocoa beans during primary processing activities-CNRA.

##### Ariza Budi Tunjung Sari

Virgin Cocoa Butter from Modified Cocoa Bean Processing, Indonesian Coffee and Cocoa Research Institute (ICCRI).

##### Dolores Ixmucané Alvarado Rupflin

Development of cocoa physical reference samples for training and calibration of sensory evaluation panels: perspectives from a range of food products, Cocoa of Excellence, Alliance of Bioversity International and CIAT.

##### Fernando Antonio Teixeira Mendes

First Sensory Map of Cocoa Almonds in the State of Pará, Brazil, CEPLAC.

##### Lisa Ullrich

Decoding the fine flavour properties of dark chocolates, Zurich-University of Applied Sciences.

10:00 – 10:30 Coffee break



**Wednesday 7** December 2022

• 10:30 – 12:30 •

### Social Ecological Interactions and Climate

#### Bonna Antoinette Tokou

*Accompanying Research on Strategies for Income Improvement of Farming Families and Sustainable Cocoa Production in Côte d'Ivoire, University Félix Houphouët Boigny and Leibniz Centre for Agricultural Landscape Research (ZALF).*

#### Marieke Sassen

*Variation in environmental risks from cocoa expansion and intensification in West Africa requires context specific responses, Wageningen University & Research.*

#### Jean Michel Harmand

*Path Dependency and Cocoa Landscape Dynamics A Cameroon case study, World Agroforestry (ICRAF).*

#### Renée Brunelle

*Implementing agroforestry systems in cocoa production as climate change adaptation methods - Case study from Ivory Coast, SOCODEVI.*

#### Dietmar Stoian

*Diversity, resilience and market orientation: A private-sector driven approach to cocoa agroforestry in Ghana, CIFOR-ICRAF.*

#### Sholahuddin Akbar

*Analysis of farmers income on various cocoa intercropping patterns in Indonesia, Indonesian Coffee and Cocoa Research Institute (ICCRI).*

### Cadmium

#### Gideon Ramtahal

*The effect of soil and foliar Zn and Mn application on the uptake of Cd levels in cacao grown on Cd-rich soils, Cocoa Research Centre, University of the West Indies.*

#### Erik Smolders

*Is chocolate consumption truly enhancing dietary cadmium intake in the general population? A Belgian consumption survey, KU Leuven.*

#### Carlos Alberto Adarme Duran

*Ureolytic bacteria that induce carbonate precipitation from cocoa farms in Santander, Colombia: cadmium distribution, isolation and application of rhizobacteria, Universidad Nacional de Colombia.*

#### Francisco Miguel Menéndez-Burns

*Metal Transporters involved in Cd uptake and distribution in cacao: gene function, evolution, and expression, Penn State.*

#### Eduardo Francisco Chavez

*Agronomic countermeasures for reducing cadmium (Cd) uptake in cacao plantations in Ecuador, Escuela Superior Politecnica del Litoral (ESPOL).*

#### Caleb Lewis

*Understanding cadmium accumulation in cacao and its implications for developing tools for mitigation of cadmium in cocoa beans, Cocoa Research Centre and Department of Life Sciences, University of the West Indies.*

• 12:30 – 14:00 • Lunch break

## Wednesday 7 December 2022

### AUDITORIUM PASTEUR - PLENARY SESSION

• 14:00 – 14:10 •

#### AFREXIMBANK

“Opportunities for Shared Services in the Cocoa Value Chain”  
Kingsley Mbah - Senior Manager, Advisory and Capital Market  
Abah Ofon - Senior Manager, Export Development Advisory

• 14:10 – 15:30 •

Presentation of session reports

15:30 – 16:30

Discussions

• 16:30 – 17:00 •

Coffee break

• 17:00 – 18:00 •

Closing Remarks of the 2<sup>nd</sup> ICSR, suggestions for the next ICSR



## Thursday 8 December 2022

• 09:00 – 18:00 •

### ICCO SPECIAL COUNCIL SESSION

Meetings of INCOCOA GROUPS  
(INGENIC, INCOPED, INCOSOM, INAFORESTA, INCOQUALITY, INCOSOCIO)



A close-up photograph of a hand holding a piece of white chocolate. The chocolate is partially unwrapped, showing its smooth, white surface. The hand is dark-skinned and positioned in the lower left. The background is a dense collection of cacao pods in various colors: yellow, orange, red, and green. The pods are slightly out of focus, creating a bokeh effect. The overall lighting is warm and vibrant.

# **Posters**

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# **Sessions**



**S1.1. Rayanne França Pereira,** Genetics resources to study *Moniliophthora perniciosa*, Universidade Estadual de Santa Cruz – UESC

**S1.2. Alexander Altamirano Salazar,** Determination of hormone efficiency for propagation of cocoa (*Theobroma cacao* L.) by twigs in microtunnels, Asociación Peruana de Productores de Cacao – APPCACAO

**S1.3. Mar Asunción Gárate Navarro,** Optimization of somatic embryogenesis expression of high-value cocoa clones in the region of san martin - peru, Asociación Peruana de Productores de Cacao – APPCACAO

**S1.4. Dr. Fatima Cerqueira Alvim,** Molecular chaperone modulation in cocoa leads to plant resistance to *Moniliophthora perniciosa*, Universidade Estadual de Santa Cruz – UESC

**S1.5. Leidy Paola Delgadillo,** Transcriptomic (RNA-seq) analysis of genes responsive to cadmium stress in *Theobroma cacao*, Colombian Corporation Agriculture Research

**S1.6. Prof. Alejandro Caro-Quintero,** Exploring the use of endophytes to improve grafting of *T. cacao* regional material with fine flavor potential, Departamento de Biología, Facultad de Ciencias, Universidad Nacional de Colombia

**S1.7. Mónica Juliana Chavarro,** Participatory methodologies for sustainable technological innovation in cocoa systems: at the Colombian southwest region, Bioversity-CIAT

**S1.8. Martin Notaro,** Innovative co-designed agro-ecological transition pathways that vary according to the historical loops of cocoa production areas, CIRAD-UMR ABSys

**S1.9. Dr. Siela Maximova,** Advances of Functional Genomics of *Theobroma cacao*'s defense against *Phytophthora palmivora*, Penn State University

**S1.10. Rolando Cerda,** Evaluation of the resistance against Frosty Pod Rot and Black Pod Rot of clones preserved in the International Cacao Collection of CATIE, CATIE (Centro Agronómico Tropical de Investigación y Enseñanza)

**S1.11. Juan Pablo Rojas Bustos,** Real-time Image detection of cocoa pods in natural environment using deep learning algorithms, CIRAD, UMR AGAP

**S1.12. Sardou Jean-Denis,** Regeneration of the cocoa agroforestry system: an innovative approach for small family farms in northern Haiti, Agronomes et Vétérinaires Sans Frontières (AVSF)

**S1.13. Dr. Régis Babin,** Infestation dynamics of mealybug vectors of the Cocoa swollen shoot virus in young cocoa plots surrounded by barrier crops in Soubré (South-West of Côte d'Ivoire), CIRAD, UMR PHIM

**S1.14. Ohôh Bernadette Assoh,** In vitro and in vivo screening and selection of microorganisms from five composts with antagonistic effects on *Phytophthora* spp., the causal agent of brown rot of cocoa pods (*Theobroma cacao* L.) in Côte d'Ivoire, Centre National de Recherche Agronomique

**S1.15. Allan Mata-Quirós,** Promissory cacao clones with high yield potential, disease tolerance and quality to increase production in Latin America, CATIE (Centro Agronómico Tropical de Investigación y Enseñanza)

**S1.16. Dr. Katharina Krumbiegel,** Sustainable Cocoa Production – Current Practices in Côte d'Ivoire and Ghana, Joint Research Centre, European Commission

**S1.17. Dr. Zokou Franck Oro,** Do abiotic soil factors influence the spread of Swollen Shoot disease in the Soubré area - South-West Côte d'Ivoire?, Université Peleforo Gon Coulibaly (UPGC)

**S1.18. Dr. Régis Babin,** Effect of temperature on the Cacao swollen shoot virus (CSSV, Badnavirus) vection by the mealybug *Planococcus citri* to cocoa seedlings in the laboratory, CIRAD, UMR PHIM

**S1.19. Dr. Adalbert Adibimé Onana,** Influence of soil physico-chemical properties and cocoa growth characteristics on yield components, International Institute of Tropical Agriculture (IITA)

**S1.20. Dr. Francois Olivier Ruf,** The “bean tegument” innovation system: bringing back to smallholders' cocoa farms the fertility lost or transferred to agro-industry, CIRAD, UMR ART-Dev



**S1.21. Giulia Bongiorno,** *Monitoring framework of ecological performance indicators for soil health and climate smartness in cacao production systems, Wageningen University & Research*

**S1.22. Dr. Jorge Ronny Díaz-Valderrama,** *The morphological and genetic diversity of the cacao pathogen *Moniliophthora perniciosa* in the Peruvian Upper Amazon, Universidad Nacional Toribio Rodríguez de Mendoza de Amazonas*

**S1.23. Dr. Anna Laven,** *Changing gender norms for sustainable cocoa production, KIT Royal Tropical Institute / Mars Wrigley*

**S1.24. Selma van der Haar,** *Cocoa rehabilitation in Western-Ghana: Farmers' self-selection and short-term livelihood effects, Centre for International Forestry Research (CIFOR)*

**S1.25. Marine Marchetti,** *Improving cocoa bean quality in the supply chain by mitigating free fatty acid accumulation in beans through improved farm practices, ofi, Outspan Ivoire SA*

**S1.26. Dr. Laura Armengot,** *Locally selected cacao cultivars perform better than international cultivars in both agroforests and monocultures, FiBL*

**S1.27. Rich Kofi Kofituo,** *Towards a Sustainable Cocoa Production: Drivers of Adoption of Farm Management Practices among Smallholder Cocoa Farmers in West and Central Africa, International Institute of Tropical Agriculture (IITA)*

**S1.28. Urcil Papito Kenfack Essougong,** *Using decision supports tools to foster good agricultural practices among cocoa farmers, what is needed for success? A case study from Cameroon, Plant Production Systems Group, Wageningen University & Research*

**S1.29. Dr. Xavier Argout,** *Pangenome analysis of *Theobroma cacao* reveals new genes and provides new insights into the diversity of the species, CIRAD, UMR AGAP*

**S1.30. Dr. Olivier Deheuvels,** *Designing cocoa-based agroforestry systems based on farmers' perception of cultivated biodiversity, CIRAD-UMR ABSys*

**S1.31. Dr. Boguinard Sahin Honorine Brigitte Guiraud,** *Isolates of Cocoa Swollen shoot virus from tolerant/resistant cocoa trees (*Theobroma cacao* L.) collected in cocoa orchards in Côte d'Ivoire show high genetic diversity, Centre National de Recherche Agronomique (CNRA), Programme cacao, Opération Amélioration génétique*

**S1.32. Dr. Ruth Vanderschueren,** *Cadmium uptake and translocation in *Theobroma cacao* L.: A <sup>108</sup>Cd stable isotope pulse chase experiment, KU Leuven*

**S1.33. Dr. Jean-Philippe Marelli,** *Development of an in-field detection kit for Cocoa Swollen Shoot Disease in Côte d'Ivoire and Ghana, Mars Wrigley*

**S1.34. Diannefair Duarte Hernández,** *Pollination, a matter beyond the visible, Federación Nacional de Cacaoteros*

**S1.35. Dr. Franziska Ollendorf,** *Different households – different challenges? Understanding the impacts of cocoa producers' household characteristics on their ability to apply sustainable production techniques, Leibniz Centre for Agricultural Landscape Research (ZALF)*

**S1.36. Samuel Alfred Brülisauer,** *Beyond Certification: A Typology of Instruments of Private and Community-Based Sustainability Governance in Agri-Food Value Chains, Centre for Development and Environment (CDE), University of Bern; Institute of Geography, University of Bern*

**S1.37. Nana Okyir Baidoo,** *Effects of Cocoa Policies in Ghana on the Achievement of the Sustainable Development Goals (SDGs) in The Cocoa Sector, University of Ghana*

**S1.38. Dr. Andrew James Daymond,** *Procedures for Safe Movement of Cocoa Germplasm, University of Reading*

**S1.39. Dr. Mariela E. Leandro-Muñoz,** *Determining the risk of cacao pod diseases and yield losses through survival analysis and microclimate, Centro Agronómico Tropical de Investigación y Enseñanza (CATIE)*

**S1.40. Dr. Kayode Olufemi Ayegboyin,** *Genotypic responses of cocoa (*Theobroma cacao* L.) under field establishment stress in Nigeria, Cocoa Research Institute of Nigeria*

**S1.41. Leidly Paola Delgadillo,** *A dual transcriptomic in the *Phytophthora palmivora* and *Theobroma cacao* interaction, Colombian Corporation Agricultura Research-AGROSAVIA*

**S1.42. Timothée Faurie**, *Development of the DEXiCacao multi-criteria decision support tool adapted to the Vietnamese cocoa production context*, Marou Faiseurs de Chocolat

**S1.43. Dr. Pierre Walet N'Guessan**, *Inventory of ant species associated with mealybugs, vectors of cocoa swollen shoot virus at the CNRA-Divo research station*, Côte d'Ivoire, Centre National de Recherche Agronomique (CNRA)

**S1.44. Thomas Wibaux**, *Is morphological distinction of cacao trees still relevant in seedling-based hybrid populations? Study of the links between morphological descriptors, growth and yield.*, CIRAD-UMR ABSys / CEA-CCBAD

**S1.45. Dr. Norbert N'Dri Kouame**, *The insect Pseudotheraptus devastans Distant (Hemiptera: Coreidae), a new threat to cocoa production in the Haut-Sassandra region of Côte d'Ivoire*, Centre National de Recherche Agronomique (CNRA)

**S1.46. Marike Sassen**, *Understanding the links between cocoa management, productivity, biodiversity and ecosystem services in West Africa*, Wageningen University & Research

**S1.47. Thomas Wibaux**, *Farmer's perception of development opportunities of cacao agroforestry in growing cocoa-producing districts of Uganda*, CIRAD-UMR ABSys

**S1.48. Dr. Inago Caudou Trebissou**, *The level of competition between cocoa trees depends on the average diameter of the trees and their genetic origin*, Centre National de Recherche Agronomique (CNRA)

**S1.49. Dr. Emmanuelle Muller**, *Identification and Distribution of Novel Badnaviral Sequences Integrated in the Genome of Cacao (Theobroma cacao)*, CIRAD, UMR AGAP

**S1.50. Patrick Henri François Jagoret**, *Cocoa4Future: A research in partnership project contributing to the agroecological and organizational transition of cocoa production in West Africa*, CIRAD-UMR ABSys

**S1.51. Karol Brighton Rubio Rojas**, *Somatic embryogenesis in native cacao from Amazonas using Thidiazuron*, Universidad Nacional Toribio Rodriguez de Mendoza de Amazonas

**S1.52. Ambra Tosto**, *The Effect of Pruning on Light capture, Flushing and Pod production in adult cocoa plants*, Wageningen University & Research

**S1.53. Ambra Tosto**, *Developing a functional-structural plant model for cocoa trees to explore pruning-shade interactions*, Wageningen University & Research

**S1.54. Nawalyath Soule Adam**, *Performance of agricultural innovation support services : the case of cocoa agroforestry in savannah in Cameroon*, CIRAD, UMR Innovation

**S1.55. Dr. Balé Françoise Gogbe-Dibi**, *Identification of new host plants of swollen shoot virus other than cocoa in Côte d'Ivoire*, Centre National de Recherche Agronomique (CNRA)

**S1.56. Dr. Ayu Kartini Parawansa**, *An investigation of species associated with stem cancer of cacao in Sulawesi under climate change*, Muslim University of Indonesia

**S1.57. M'Bo Kacou Antoine Alban**, *Screening of markers for drought tolerance in cocoa hybrids*, WASCAL/CEACCBAD Université Félix-Houphouët-Boigny (UFHB)

**S1.58. Dr. Christian Gael Nembot Fomba**, *On the use of Mathematical Modeling to improve control strategies in the cocoa and black pod disease pathosystem*, University of Yaoundé I

**S1.59. Jean Paul Nlend Nkott**, *Partnership for Delivery: A sustainable pathway to generate and transfer knowledge from research to cocoa farmers*, International Institute for Tropical Agriculture - IITA

**S1.60. Marie Ella Ahou Gbla**, *Promoting gender equality and social sustainability in cocoa-producing communities: an analysis of best-practices in Cote d'Ivoire*, Institut National Polytechnique Félix-Houphouët-Boigny

**S1.61. Simeon Human**, *Transportation inefficiencies in the cocoa value chain in Ivory Coast: Is sustainability possible?*, Bern University of Applied Sciences, School of Agricultural, Forest and Food Sciences

**S1.62. Pierre Germain Ntsoli II**, *Influence of mycorrhizal fungi, cocoa pod husk biochar and pig manure on the growth and health status of cocoa plants (Theobroma cacao L.) during nursery stage*, Faculty of Agronomy and Agricultural Sciences, University of Dschang

**S1.63. Andréanne Lavoie**, *Recommendations for the conservation of cacao intraspecific diversity based on a typology of production systems in Cusco, Junín and Piura, Peru*, Université Laval

**S1.64. Dr. Justina Olugemisi Lawal**, *Welfare dynamics: sustainable rise or fall among cocoa farming households in Southwest, Nigeria, Cocoa Research Institute of Nigeria (CRIN)*

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**S1.66. Dr. Paul Ehimare Aikpokpodion**, *Geospatial distribution of heavy metals in Cocoa Plantations across Nigeria, Cocoa Research Institute of Nigeria (CRIN)*

**S1.67. Nur Sholecha Ruseani**, *Effects of Nitrogen, Phosphorus and Potassium Fertilizers on Mature Cocoa in Indonesia, Laboratory of Tropical and Subtropical Crops and Ethnobotany, Department of Plant and Crops, Faculty of Bioscience Engineering, Ghent University*

**S1.68. Viviana Ceccarelli**, *Conservation and use of cacao genetic resources by gene banks and nurseries in six Latin American countries, Bioversity International*


**S1.69. Marine Jouvin**, *Child labor and measurement errors : social desirability bias among Ivorian cocoa farmers, University of Bordeaux*

**S1.70. Urcil Papito Kenfack Essougong**, *Determinants of the adoption of good cocoa farming practices and opportunities for increasing their uptake in the Centre region of Cameroon, Wageningen University & Research*

**S1.71. Dr. Kouamé Casimir Gboko**, *Analyzing influencing factors and incentives for producers' compliance with certification environmental requirements in cacao sector in Côte d'Ivoire, Institut National Polytechnique Félix-Houphouët-Boigny (INP-HB)*



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- S.2.1. Eltson Eteckji Fonkeng**, *Afforestation of savannah with cocoa agroforestry systems: impacts on different soil organic carbon pools, soil carbon stocks and other soil properties*, World Agroforestry Cameroon (CIFOR-ICRAF)
- S.2.2. Dr. Ramon Eduardo Jaimez**, *The effect of water deficit on water relations and chlorophyll fluorescence of rootstock-scion combinations of cacao*, Universidad Técnica Manabí
- S.2.3. Olivier Fouet**, *Genetic diversity analysis of a large cocoa trees collection from the Ecuadorian Amazon safeguarded for local and sustainable cocoa production*, CIRAD, UMR AGAP
- S.2.4. Karen Castañeda Pelaez**, *Monitoring of aerial biomass for reforestation processes in cacao agroforestry systems*, Colcocoa SARL
- S.2.5. Ulf Schneidewind**, *Organically managed cacao agroforestry systems increase soil organic carbon and nitrogen stocks and microbial biomass concentration within six years after establishment*, Georg-August University, Department of Landscape Ecology and Physical Geography
- S.2.6. Barbora Tůmová**, *Participatory agroforestry design – a flexible approach for locally adapted agroforestry systems*, Research Institute of Organic Agriculture (FiBL)
- S.2.7. Dr. Roxana Yockteng**, *Understanding the micro-ecosystem of wild cacao in Colombia: the case study of the Cacao Colombia BIO expeditions*, AGROSAVIA
- S.2.8. Prof. Constant Yves Adou Yao**, *Diversity and uses of non-timber forest products in organic cocoa base agroforests in the south-east of Côte d'Ivoire*, UFR Biosciences, Université Félix Houphouët-Boigny/CSRS
- S.2.9. Affia Sonmia Francia Kossonou**, *Women and contribution of products from species associated with cocoa trees to the food security of cocoa bean-producing households in central Côte d'Ivoire*, Biodiversity and Valuation of Ecosystem Services (BioValSE) research team, Laboratory of Botanic, UFR Biosciences, Université Félix Houphouët-Boigny
- S.2.10. Venance-Paques Gniayou Kouadio**, *Economic profitability of cocoa-based agroforestry systems in the transition zone in central Côte d'Ivoire*, Biodiversity and Valuation of Ecosystem Services (BioValSE) research team
- S.2.11. Dr. Christopher James Turnbull**, *Improving access to information on cocoa planting material to benefit farmers: an introduction to the updated international cocoa germplasm database*, University of Reading
- S.2.12. Edith Moreno Martinez**, *Rootstocks: A key tool in adapting to climate change*, Federación Nacional de Cacaoteros
- S.2.13. Vincent Bernard Johnson**, *Standardisation of physiological trait measurement protocols for identifying cacao climate resilience*, Bioversity-CIAT Alliance
- S.2.14. Prof. Lucie Félicité Temgoua**, *Conservation and introduction of woody species into cocoa-based agroforestry systems for biodiversity conservation, production diversification and climate change mitigation in Cameroon*, University Of Dschang, Faculty Of Agronomy And Agricultural Sciences
- S.2.15. Claudia Mercedes Ordoñez Espinosa**, *Agroforestry systems and the incidence on water status of cacao trees*, Servicio Nacional de Aprendizaje
- S.2.16. Ignacio Sotomayor Cantos**, *Osmotic adjustment of cocoa genotypes (*Theobroma cacao* L.) of Ecuador's national variety in an environment with drought seasonal*, Instituto Nacional de Investigaciones Agropecuarias (INIAP)
- S.2.17. Roxana Yockteng**, *Genomic insights into the origin, evolution, and local adaptation of cacao populations*, AGROSAVIA
- S.2.18. Dr. Gnion Mathias Tahi**, *Selection of new varieties of cocoa (*Theobroma cacao* L.) adapted to the effects of climate change in Côte d'Ivoire*, Centre National de Recherche Agronomique (CNRA)
- S.2.19. Paulina Ansaa Asante**, *How to boost cocoa yield in Ghana? – quantifying the cocoa yield gap and identifying its drivers (CocoaSoils project)*, Wageningen University & Research



**S.2.20. Tsotso Mathe Djodji**, *From living wage to living income: economic analysis of the cocoa value chain in Ghana*, Berner Fachhochschule, School of Agricultural, Forest and Food Sciences HAFL

**S.2.21. Germain Batsi**, *Structure and composition of cocoa agroforests in the Yangambi biosphere reserve in the Democratic Republic of Congo (DRC)*, Faculty of Management of Renewable Natural Resources, University of Kisangani

**S.2.22. Genaro Andres Agudelo**, *Physiological, productive and health performance of regional cocoa genotypes with tropical fine woods, Agrosavia model*, AGROSAVIA


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- S.3.1. Dr. Marycarmen Utrilla-Vázquez**, *Revaluation of cocoa cultivation: physicochemical characterization of the pod and mucilage of three main types of cocoa in Chiapas, Universidad Politécnica de Tapachula-Ingeniería Agroindustrial*
- S.3.2. Julie Lestang**, *Rapid characterization of the chemical profiles of cocoa beans fermented with anti-fungal co-cultures, Laboratory of Food Biochemistry, Department of Health Sciences and Technology, ETH Zürich*
- S.3.3. Zachary Dashner**, *Breaking off a piece of cadmium uptake in T. Cacao, Penn State University*
- S.3.4. Prof. Alejandro Caro-Quintero**, *Metagenomics and expression analysis reveals that members of the Erwiniaceae and Enterobacteriaceae are active players in the initial steps of cocoa fermentation, Departamento de Biología, Facultad de Ciencias, Universidad Nacional de Colombia*
- S.3.5. Viviana Alexandra Carvajal**, *The global cocoa and chocolate value chain: key players and opportunities for developing countries, CIESTAAM*
- S.3.6. Leidy Machado Cuellar**, *Organoleptic quality assessment of Theobroma cacao L. in cocoa farms in northern Huila, Colombia, Centro de Formación agroindustrial - Regional Huila - Servicio Nacional de aprendizaje SENA*
- S.3.7. Kathryn Yadira Guzman Pacheco**, *Digital QR classification system for cocoa trees, Servicio nacional aprendizaje - SENA*
- S.3.8. Prof. Ramiro Ramirez**, *Effect of soil characteristics on cadmium absorption and plant growth of Theobroma cacao L. seedlings, Universidad Nacional de Colombia, sede Medellin*
- S.3.9. Santiago Guzman Penella**, *Link between volatile composition of cocoa beans and the use of yeast starter culture during fermentation, CIRAD, UMR Qualisud*
- S.3.10. Dr. Ralph Armah**, *Organizational innovations along Ghana's Cocoa Value Chain, Institute of Statistical, Social and Economic Research (ISSER), University of Ghana*
- S.3.11. Jesse Dekeyrel**, *Improving the institutional capacity of Colombia and Ecuador to mitigate trade barriers due the high cadmium levels in cacao, KU Leuven*
- S.3.12. Anna Bruederle**, *Cash transfers to increase cocoa farmer resilience and protect children – Evidence from Ghana, International Cocoa Initiative*
- S.3.13. Gloria Abaidoo**, *Impact of cocoa pod maturity and storage on cocoa quality, Nestlé*
- S.3.14. James Butubu**, *Manufacture of Craft chocolate using local technological innovations and supportive Cocoa Regulation, ABG Department of Primary Industry*
- S.3.15. i Gusti Agung Ayu Widiastuti**, *Strengthening cacao market development through added value innovation [fermentation] for cocoa farmers in Jembrana - Bali - Indonesia, Non Government Organisation (NGO)*
- S.3.16. Dr. Angel Avadí**, *The quest for quality of Ecuadorian cocoa: Certification and traceability, CIRAD Unité recyclage et risque*
- S.3.17. Simon Perrez Perrez Akoa**, *Impact of pollen genetic origin on compatibility agronomic traits and content of bioactive compounds in cocoa, Department of Biochemistry, Faculty of Science, University of Yaounde I*
- S.3.18. Prof. Irene Chetschik**, *Novel time- and location-independent postharvest treatment of cocoa beans: "moist incubation" of unfermented and dried cocoa nibs, Zurich University of Applied Sciences - Institute of Food and Beverage Innovation*
- S.3.19. Dr. Da Lorn**, *Yeasts potential interactions influencing the formation of fine aromas during cocoa fermentation process, QualiSud, Université de Montpellier*
- S.3.20. Dr. Lydie Besançon**, *Is transfer of precursors and aroma compounds produced by yeast during cocoa bean fermentation influenced by the tissue bean structure?, CIRAD*

- S.3.21. Pierre Marie Theodore Etoa Abena**, *Improving the wellbeing of Congolese by promoting cocoa made in Congo: assessing challenges limiting good market access of its cocoa beans*, *Projet d'Appui à la Relance du Secteur Agricole (PARSA)\_TEREA*
- S.3.22. Verina Ingram**, *Transparent and collective-voices in modelling a a nation-wide cocoa traceability system for Cameroon, from farmgate to port of exit*, *Wageningen University & Research*
- S.3.23. Brigitte Laliberte**, *Cocoa quality and flavour: Towards a common language for increased value and market access.*, *Cocoa of Excellence, Alliance of Bioversity International and CIAT*
- S.3.24. Lucette Adet**, *Physiological traits, yield, yield components and bean dynamics relationship of different cocoa genotypes under drought*, *Wageningen University & Research*
- S.3.25. Santiago Hilarión Pastor-Soplín**, *Utilization of cocoa genetic resources in Peru from university research (2016-2021)*, *Universidad Científica del Sur*.
- S.3.26. Dr. Fernando Teixeira Mendes**, *Official rural credit for cacao in the amazon: problem or solution?* *CEPLAC*
- S.3.27. Daniel Kofi Abu**, *The dynamics of sustainability and traceability of cocoa production in Ghana: inventory and analysis*, *Tropenbos Ghana*
- S.3.28. PROAmazonia**, *Cartographic strategy of traceability*, *PROAmazonia*
- S.3.29. Dr. Patrick Descombes**, *Detection and analysis of Cacao Swollen Shoot Virus by Capture Sequencing – a universal method*, *Nestlé*
- S.3.30. Filippo Roda**, *Cocoa price forecasting as a tool to increase future contracts potential in managing farmers' price volatility risk.*, *Areté - The Agri-food intelligence company*
- S.3.31. Thao Thi Thu Pham**, *Farmer segmentation: An approach to find aspiring cacao inter-croppers from a population of coconut farmers*, *Alliance of Bioversity International and the International Center for Tropical Agriculture (CIAT)*
- S.3.32. Nathalie Ciara Walker**, *A direct sourcing model based on key quality metrics for Costa Rican cocoa*, *School of Agricultural, Forest and Food Sciences, Bern University of Applied Sciences (BFH)*
- S.3.33. Dr. Elodie Jean-Marie**, *Guiana (amazonian endemic cocoa) : Chemical composition and biological potential*, *Laboratoire COVAPAM UMR QUALISUD*
- S.3.34. Alexis José Zambrano**, *New smells and flavours of Venezuelan cocoa (Theobroma cacao L.)*, *Universidad de Los Andes*
- S.3.35. Alexis José Zambrano**, *Sensory and chemical quality of Venezuelan cocoa (Theobroma cacao L.)*, *Universidad de Los Andes*
- S.3.36. Edward Amankwah**, *Tracking green commodities, Ghana Beyond Aid and cocoa-based agro -tourism in Ghana: the nuances of certification and chocolate consumption*, *Center for Environmental Governance (CEGO)*
- S.3.37. Dr. Erasmus Khj zu Ermgassen**, *Harnessing publicly available data to improve transparency in cocoa supply chains*, *UCLouvain*
- S.3.38. Pierre Poirot**, *Development and selection of new yeast starters for cocoa beans fermentation – effect of different Saccharomyces cerevisiae yeast strains on the volatile profile and sensory attributes of resulting chocolates*, *Lallemand SAS*
- S.3.39. Tobias Lohmueller**, *Quality and yield management during winnwoing*, *Hamburg Dresdner Maschinenfabriken GmbH*
- S.3.40. Cristian Díaz-Muñoz**, *Steering cocoa fermentation, a fine-scale follow-up of mixed-strain starter cultures*, *Vrije Universiteit Brussel, Research Group of Industrial Microbiology and Food Biotechnology*
- S.3.41. Prof. Luis Javier López-Giraldo**, *Mathematical prediction of sensory properties in cocoa liquor using volatile compounds composition*, *Universidad Industrial de Santander*
- S.3.42. Jennifer Jackeline Garcia**, *Kinetics of cadmium bioaccumulation in seeds of five cacao varieties*, *Universidad Nacional Agraria - La Molina*
- S.3.43. Abiodun Oluwasola Ajewole**, *Effect of inclusion of cocoa powder on proximate composition chemical, mineral and sensory qualities of Unripened cheese- 'Warankashi'*, *Cocoa Research Institute of Nigeria (CRIN)*

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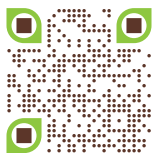
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