



Rehabilitation & Renovation of crop trees in cocoa, coffee, palm oil

FINAL REPORT

COLOPHON

Title	Rehabilitation & Renovation of crop trees in cocoa, coffee, palm oil
Version	FINAL
Subtitle	Final Report
Date	October 2015
Project Number	1426
Author (s)	Elies Fongers Miranda Visser

CONTACT ADDRESS for this publication

Rabo International Advisory Services B.V. (RIAS)

Croeselaan 18
PO-box 17100
3500 HG Utrecht
Tel +31 (0)30 2163670
Fax +31 (0)30 2163677
rias@rn.rabobank.nl

© Rabo International Advisory Services B.V. (RIAS)

No part of this publication may be reproduced in any form by print, photo print or any other means without permission by Rabo International Advisory Services (RIAS) B.V.

*Rabo International Advisory Services B.V. (RIAS)
Registered Chamber of Commerce, Utrecht no. 30133013*

Table of contents

Sections

	List of definitions
	List of acronyms
I	Executive summary
II	Objectives and methodology of study
III	Description of best practices in R&R (design, structuring)
IV	Overview of key success factors based on concrete cases
V	Overview of key (financial) challenges in R&R
VI	Recommendations for scaling
VII	Recommendations for further research
VIII	Long list of schemes and projects
IX	Summary core cases
X	Annexes Case Descriptions and farmer stories

List of definitions

Rehabilitation & Renovation (R&R)

- Rehabilitation = Improving farm productivity through application of good agricultural practices and good quality inputs.
- Renovation = Improving farm productivity through the rejuvenation of the trees through (a combination of) rejuvenation pruning and/or grafting and/or replanting of the trees (see section on the techniques).

Projects and schemes

- Project = An R&R project aimed at rehabilitating and/or renovating of three crop farms by an individual farmer, a group of farmers, a farmer based organisation or a company.
- Scheme = Program that makes available (key components of) an R&R package (like GAP, plant material, finance) to support farmers in the rehabilitation and /or renovation of their farms and aimed to reach out to large numbers of farmers in a specific region and/or country. Schemes are typically set up by governments, farmer based organisations and/or commercial companies.

R&R packages & distribution mechanism

- R&R package = The components of the package offered to farmers to support them to rehabilitate & renovate their farms, examples are GAP, business advise, plant material, inputs, finance solutions.
- Distribution mechanism = Mechanism(s) used to bring (elements of) the R&R package to the farmers (typically through Coordinator of the scheme or project or farmer based organisation or combination of both).

Approaches to R&R

- One go = Rehabilitating or renovating the farm or plot in "one go" (i.e. 100% of the farm or plot).
- Phased approach = Rehabilitating or renovating the farm in different phases (i.e. an x % of the farm or plot per year). Methodology used to reduce the need for other sources of funding for investment in R&R (coffee, cocoa and palm oil) and to create ideal complex (see below).

Productivity at farm level

- Yield curve = The development of the yields over the life of a tree crop.
- Ideal complex = A farm or plot that contains trees of different ages and therefore different productivity levels such that the average age of the trees is at its economical optimum and the production levels of the farm remain stable over time. This structure is achieved by applying a phased approach to both planting and renovation. (A.o. applied for coffee given relatively short period of high productivity.)

Financials at farm level

- Revenues = Production (Units) * Price / Unit
- Investment in R&R = Investment in inputs and actual labour costs or private expenses farmers family from start of (the preparations of) R&R till the first harvest of fruits
- Operational costs = Costs of inputs and actual labour costs or private expenses farmers family from the first harvest of fruits onwards
- Net cash flow = Revenues -/- investment in R&R -/- operational costs
- Cumulative cash flow = Sum of net cash flow from start of (preparations of) R&R
- Loan = Repayment scheme of the loan (notional + interest)
- Grant = Grant component
- Period of negative cash flows = Period during which the netto cash flow is negative
- Cash needed to overcome period of negative cash flows = Estimated at maximum negative cumulative cash flow
- Period needed to repay the cash needed to overcome period of negative cash flows = Estimated at the year the cumulative cash flow becomes positive
- Net present value = Future cash flows discounted at the relevant government bond interest rate

List of definitions

The techniques: replanting, pruning and grafting

- Replanting = Cutting down trees that are either old, diseased, non-resistant and/or low yielding varieties etc. and planting new trees.
- Rejuvenation pruning = Cutting a tree just above the ground (approx. 30 – 50 cm) and letting it grow into a full tree again. In Colombia also referred to as “zoca” and in Honduras as “recepta”.
- Grafting = A number of techniques in which a section of a stem with leaf buds is inserted into the stem of a tree.
- Side grafting = A grafting technique in which the shoot of a plant, cut across obliquely into the form of a slender wedge, is inserted into the side of the bark of the stem, the cut side of the scion being next the wood of the stem.

Types of plant material:

- Clonal plant material = Plant material containing a genetic complement identical to that of another plant, produced by using the genetic material from the second plant in a non-sexual reproduction process.
- Hybrid plant material = Plant material produced from the mixture of two genetic lines through a sexual reproduction process.

List of acronyms

General

- R&R = Rehabilitation & Renovation

Units

- IDR = Indonesian Rupiah
- COP = Colombian Peso
- HNL = Honduran Lempira
- Manzana = Honduran surface area measure, equivalent of 0.69 ha

Pests & Diseases

- CPB = Cocoa Pod Borer
- CSSV = Cocoa Swollen Shoot Virus
- VSD = Vascular Streak Dieback disease (cocoa trees)

FNC

- FNC = La Federación Nacional de Cafeteros
- SICA = Sistema Información Cafetera or Coffee Information System
- PSF = Permanency, Sustainability and Future Program
- ICR = Rural Capitalisation Incentive
- FAG = Agricultural Guarantee Facility of FINAGRO
- FoNC = National Coffee Fund of FNC

IHCAFE

- IHCAFE = Instituto Hondureño del Café
- CONACAFE = National Coffee Council
- FCN = National Coffee Fund
- PAPP = Program to support Small Producers

IHCAFE (continued)

- PEEPP = Emergency Program to support Small Producers
- Credicafe = Emergency Credit Program against La Roya
- BANDESA = Banco Nacional Desarrollo Agrícola

MARS

- CDC = Cocoa Development Centre
- CVC = Cocoa Village Centre
- PRIMA = Pest Reduction and Integrated Management Program

PTPNXIII

- PTPNXIII = PT Perkebunan Nusantara XIII
- FFB = Fresh Fruit Bunch
- CPO = Crude Palm Oil
- ISPO = Indonesian Sustainable Palm Oil
- BRI = Bank Rakyat Indonesia
- NES = Nucleus Estate and Smallholder
- PIR = Perusahaan Inti Rakyat (Nucleus Estate and Smallholder)
- KKPA = Koperasi Kredit Primer Anggota (Primary Cooperative Credit for Members)
- KUD = Koperasi Unit Desa (Village Unit Cooperative)

I

Executive summary



Executive summary



Rabobank

Background assignment

Over the past years, IDH and partners have come a long way in training and organizing tree crop smallholder farmers around Good Agricultural Practices (GAP) and social and ecological performance. These efforts have been paying off: results of 10-30% yield increase have been reported. Nonetheless, it is believed that to realise a real boost of farm productivity at smallholder farm level, renovation and/or rehabilitation (R&R) of the plantations is required. This includes more intensive and appropriate use of fertilizers and other inputs, pruning/stumping/grafting and replanting of trees. For a farmer to apply these interventions and reach the desired state of improved tree productivity, he/she often needs to overcome a prolonged period of low cash flow.

In the years to come, IDH aims to boost R&R smallholder schemes with public and private partners. It therefore wishes to better understand how R&R schemes could work, especially given the challenges of the investments required at farmer level. To do this, it wishes to tap into the experiences from existing R&R models.

To gain more insight into (good) practices in R&R schemes, IDH assigned Rabo International Advisory Services (RIAS) to execute a fact-based analysis of existing R&R schemes for smallholder tree crop farming in coffee, cocoa and palm oil.

Objective of the assignment

The objective of the fact-based analysis of existing R&R schemes for smallholder tree crop farming is to get insight into the approach, main (financial) challenges and solutions – including the period of low cash flow, key success factors and how to scale and replicate such R&R activities.

The focus of the study is limited to existing R&R schemes in coffee, cocoa and palm oil smallholder farming.

Approach

The scope of the work under this assignment consisted of the preparation of a long-list of existing R&R cases (phase 1) to be narrowed down to a shortlist of cases (phase 2) for a more in-depth analysis (phase 3).

Core cases and example initiatives

For each of the three commodities, a **core case** was identified:

- Coffee – Colombia: The Permanency Sustainability and Future Programme of La Federación Nacional de Cafeteros (FNC) (**the FNC scheme**), which is considered by many to be *the* best practice in R&R in coffee;
- Cocoa – Sulawesi, Indonesia: The MARS triple productivity package and business-oriented distribution system (**the MARS scheme**) that is being rolled out in Sulawesi and Ivory Coast, and is currently being used as the basis for new schemes like the CORIP program in Ghana as well;
- Palm Oil – West, Kalimantan: PTPNXIII's Revitalisasi Programme, which is one of the first replanting schemes to be rolled out in Indonesia (**the PTPNXIII scheme**).

A number of **example initiatives** were also identified that provide interesting learnings on key elements:

- Coffee – Honduras: IHCAFE and the commercial banks Banco Continental and Banco Hondureno del Café support different segments of farmers in renovating and rehabilitating their coffee farms through dedicated financing schemes and different levels of technical support (**IHCAFE's PAPP and PEEPP programs and the CrediCafe program**);
- Coffee – South America & Caribbean: The Coffee Farmer Resilience Initiative & Fund by Root Capital & Partners that is set up to make all necessary resources to combat coffee rust available; it also contains the key building blocks of the R&R schemes studied (**the Coffee Farmers Resilience Initiative**);
- Cocoa – Brasil: The Phoenix project that is aimed at demonstrating the viability of a new technology package for the recovery of cocoa productivity, and which contains the key building blocks of the R&R schemes studied (**the Phoenix project**);
- Cocoa – Ghana: The CORIP program that aims to develop commercially viable "Rural Service Centres" to support the economic, social and environmental sustainability of cocoa farming in Ghana (**the CORIP Program**);
- Cocoa – Ivory Coast: "Dynamic Agroforestry Systems" of Barry Callebaut / Biopartenaire that focus on optimising the overall farm production system and are interesting alternatives to high input / high investment systems (**the Barry Callebaut / Biopartenaire program**);

Executive summary



Rabobank

- Palm Oil – Indonesia: The Oil Palm Replanting Programme for independent smallholder farmers by PISAGRO / SinarMas that provides a long term finance solution for independent smallholders; it mirrors the finance solution provided under the PTPNXIII scheme but specifically targets independent smallholders (**the SinarMas scheme**).
- **Effective distribution mechanisms** of both extension services and the financing schemes to reach out to large numbers of farmers and to reduce operational costs of banks and financial institutions;
- **Financing schemes** and/or grant funding are needed if the farmers start out with no or very low productivity and limited own funds.

Approach (continued)

The core cases were studied in-depth according to a detailed data-gathering format, and field visits have been conducted. The example initiatives were analysed at high level via desk research.

The financial analysis contained in this study is based on financial models of R&R at farm level of FNC, MARS and PTPNXIII. It was not possible to verify these financial models because, during the field visits and subsequent discussions, it became clear that it was not possible to obtain (financial) data at farm level for the purpose of this study.

To be able to compare the results of the financial analysis, the financials at farm level in local currency were converted to U.S. dollars at the exchange rates around year-end 2014 (the timing of our field trips). Since that time, however, both the COP and IDR have considerably depreciated against the U.S. dollar.

Key success factors

The key success factors of the schemes and for the smallholder farmers are:

Schemes

- **Farmer segmentation is key**, as different types of farmers require different levels of (technical) support and dedicated financing solutions. This also ensures the most effective use of funds;
- **Farmer selection is important**, especially for high input systems that require considerable investments and close follow-up of agronomical advise. High input R&R schemes are not an option for all smallholders;
- **An integrated approach to R&R is critical** and comprises: coordination + GAP + business management + plant material + inputs + financing solutions;
- **Plant material is a key strategic component**; other inputs like fertilisers depend on the local availability and enabling environment;

Farmers

- Farmers need a **source of (additional) income during the low cash flow period** that can be met through pre-financing of income during this period, stimulation of intercropping, or external sources of finance such as other sources of income or informal lending from family and friends;
- Access to good quality **extension services** over a prolonged period;
- The investment in R&R needs to be an **attractive investment** in its own right and in comparison to other crops;
- **Subsidies and grants** reduce the time needed to earn back the investment in R&R, making the investment less risky and therefore more attractive;
- **Minimum farm size is required**, to enable the smallholders to generate sufficient income for their families and to save sufficient funds to overcome periods of low commodity prices, as well as to continue to invest in R&R going forward.

Key (financial) challenges

The key (financial) challenges in R&R at scheme level and for smallholder farmers are:

Schemes

- Increasing the **scale of the distribution mechanism** for technical assistance and in some cases the financing solutions;
- Development of **tailor-made financing schemes for R&R** (long-term funding with grace period and repayment schedule matching the yield curve of the crop);
- **Incentives** in the form of grants and subsidies to convince the farmers with limited funds to start R&R;

Executive summary



Rabobank

- In most cases banks require a **guarantee for the credit facilities**, which can put pressure on cash flows of guarantors in case of poor repayment records by the farmers and / or low commodity prices;

Farmers

- Overcoming the (emotional) **hurdle of cutting their old trees**;
- **Following the agronomical recommendations** closely to reach the full agronomical potential, especially in high input systems;
- **Lack of (financial) means** to overcome the period of negative cash flow;
- R&R in coffee, cocoa and palm oil result in **different levels of investment** at farm level, which are high compared to the income a farmer needs to cover private family expenses;
- Taking a **phased approach** to R&R significantly contributes to the self-financing of the investments and reduces the need for other sources of funding;
- The investment in R&R has a **long repayment period** that is linked to the tree crop and the approach taken (phased versus one go);
- The **financial models** indicate that the cocoa farmers in Sulawesi are able to accumulate most cash over the economic life of a cocoa tree, followed by the coffee farmers in Colombia, and the palm oil farmers in West Kalimantan;
- The financing schemes studied enable the farmers to invest in R&R and overcome the period of negative cash flow, by begin repaid during the period of higher productivity. As a result of **interest rates**, the farmers are able to save less money, which increases the risk at farm level;
- The grant components and interest subsidies have a positive impact on the ability to save cash over time, which reduces the risk at farm level. It makes sense to provide these **grants / subsidies** only to the smallest farmers, as they run most risk.
- The **investment in R&R per hectare has strongly increased** over the past 7 – 8 years due to increased input and labour cost (in Indonesia they have almost doubled). This puts pressure on the **business case for R&R**.

Farmers (continued)

Recommendations for scaling and replicating the schemes

The recommendations for scaling and replicating the schemes are as follows:

Scaling in the same region / country

- As the key **building blocks** (i.e. the central coordinator, agronomical approach, plant material and distribution mechanism) are in place for the FNC, PTPNXIII and MARS schemes, the R&R scheme can be scaled up in the same region / country with relatively limited effort whilst the need for long-term finance for farmers remains;
- The upscaling of the FNC and MARS schemes is currently constrained by the **availability of the extension services and distribution network**, and can be supported by additional funding and/or franchise partners;
- The upscaling of the FNC, PTPNXIII and the MARS schemes is limited by **limited investment capacity of the farmers** and can be stimulated by making more funding for grants / subsidies (Colombia) and financing schemes (Indonesia) available;
- The PTPNXIII and MARS schemes can be scaled further if more funding and **guarantees for financing schemes** for smallholders become available. Currently this limitation does not exist for FNC.

Replication in another region / country

- To replicate the schemes in another region / country, considerable investments are needed in the establishment of a **central coordinator, distribution mechanism and the financing schemes**;
- If not available yet, the **development of the agronomical approach and plant material will require large and strategic investments in R&D** over a prolonged period of time;
- The investments in key other building blocks – such as provision of inputs – depend on the **local availability and enabling environment**;
- To replicate the FNC and PTPNXIII schemes, **large amounts of funding and guarantees for the financing schemes of R&R are required**. In the case of MARS, this will also support the replication in other regions / countries;



Executive summary

Replication in another region / country (continued)

- To replicate the PTPNXIII schemes for the establishment of new smallholder plantations (i.e. the PIR and KKPA schemes), a large amount of (government) **funding is required to prepare the land for growing palm oil** and to make the necessary investments in infrastructure;
- For the MARS and other probable schemes, the **country regulations need to allow for the use of clonal material**.

IDH, corporate partners, NGOs and government organisations can stimulate R&R by playing the following roles:

- Sharing of knowledge on R&R approaches;
- Research into agronomical approaches and practices tailored for the local conditions;
- Support the establishment of monitoring & evaluation systems to capture financial and agronomical data at farmer level to assess impact over time;
- Funding for (initially high) investments to distribute agronomical knowledge on a continuous basis;
- Long-term partnerships between smallholders and buyers of core commodities (both off-take relationships and sharing risk for financing schemes);
- Supportive models that increase the appetite of financial institutions to finance smallholders (e.g. increased presence on the ground, a dedicated approval process);
- Provision of grant funding to convince smallholders with limited own funds to conduct R&R;
- (Supporting the) provision of long-term funding in countries where this is not yet available (together with local banks and DFIs);
- (Supporting the) provision of guarantees to local banks in the initial stages of financing R&R programs.

II

Objectives and methodology of study



Assignment (1)



Introduction

Rabo International Advisory Services (RIAS) is pleased to submit herewith its final report to IDH, The Sustainable Trade Initiative containing RIAS' contribution to IDH's study on existing rehabilitation and renovation schemes of smallholder tree crop farming, as agreed upon in the terms of reference and following conversations.

This report contains a brief explanation of the approach taken in this study. Furthermore an overview of the key findings of the case studies is provided in this report. The detailed descriptions of the core and supporting cases of this study can be found in the annexes.

Background assignment

Over the past years IDH and partners have come a long way in training and organizing tree crop smallholder farmers around Good Agricultural Practices (GAP) and social and ecological performance. These efforts have not been without merit as results of 10-30% yield increase have been reported. Nonetheless, it is believed that to realise a real boost of farm productivity at current smallholder farm levels requires rehabilitation and/or renovation of the plantations (R&R). This includes more intensive and appropriate use of fertilizers and inputs and rejuvenation and replanting of trees. For a farmer to apply these interventions and to receive the desired state of improved tree productivity, often implies that he/she needs to overcome a prolonged period of low cash flow.

In the years to come, IDH aims to boost R&R smallholder schemes with public and private partners; therefore wishes to better understand how R&R schemes could work given the challenges of required investments at farmer level. Hereto it wishes to tap into the experiences from existing R&R models.

To gain more insight into (good) practices in R&R schemes, IDH assigned Rabo International Advisory Services (RIAS) to execute a fact-based analysis of existing R&R schemes for smallholder tree crop farming in coffee, cocoa and palm oil.

Objective of the assignment

The objective of the fact-based analysis of existing R&R schemes for smallholder tree crop farming is to get insight into the approach, the main (financial) challenges and main solutions hereto including the period of low cash flows, key success factors and how to scale such R&R activities.

The focus of the study is limited to existing R&R schemes in coffee, cocoa and palm oil smallholder farming.

Approach

The scope of the work under this assignment consisted of the preparation of a long list of existing R&R cases (phase 1) to be narrowed down to a short list of cases (phase 2) for a more in-depth analysis (phase 3). Hereto a multi-pronged research approach was applied.

Phase 1: Long List R&R schemes

The mapping exercise of existing R&R cases has been compiled based on desk research and consultation interviews with various experts and stakeholders active in the three sectors. No specific geographical focus was applied initially, as long as it concerned an area where IDH and/or her partners are active and where major investments in R&R are expected going forward. For an overview of the schemes and projects on the longlist please refer to section XIII.

Soon during this first phase of the study, it became clear that existing, proven R&R cases are still rare as it still is the early days of R&R practices in those three sectors. Moreover, it was decided to loosen the initially defined eligibility criteria for cases within this study (a.o. track record, size, availability of financial data, market driven).

Phase 2 & 3: Short list R&R schemes & case study / analyses

Based on the long list and in consultation with IDH, a number of cases were selected for more detailed analyses. Cases have been distinguished between core cases and example initiatives. The latter have been analysed at high level via desk research. The core cases were studied in-depth along a detailed data gathering format and field visits have been conducted.

Assignment (2)



Rabobank

Phase 2 & 3: Short list R&R schemes & case study / analyses (continued)

The financial analysis contained in this study is based on financial models of R&R at farm level of FNC, MARS and PTPNXIII that in turn are based on the detailed financial models obtained from FNC and MARS and the financial information obtained from PTPNXIII .

It was not possible to verify these financial models as during the field visits and subsequent discussions it became clear that it was not possible to obtain (financial) data at farm level for the purpose of this study.

FNC avails over the best quality data at farm level as stored in its SICA database. However, for privacy reasons, FNC is not in the position to share data at individual farm level. The data are available at a higher aggregation level (i.e. sectors and departments) however since these data contain a mixed group of farmers with farms that are at different stages of development it is not possible to make a good comparison with the financial model of R&R at farm level. A solution may be to select a sample of farms that have gone through the R&R process and make a combined sample of these farmers. MARS does not have financial and agronomical data available at farm level yet as they are in the process of implementing a monitoring & evaluation system. Going forward this system will be able to provide valuable data at farm level. PTPNXIII has not shared actual yields and revenues and the actual costs and payments on the bank loans at farm level. Although this was not indicated, we expect that this may also be related to privacy issues as well.

To be able to compare the results of the financial analysis, the financials at farm level in local currency were converted to USD at the exchange rates around year end 2014 (the timing of our field trips). Since that time however both the COP and IDR have depreciated considerably against the USD.

Case / Organisation	Case type	Coffee	Cocoa	Oil palm	Country
FNC	Core case	✓			Colombia
MARS	Core Case		✓		Indonesia
PTPNXIII	Core case			✓	Indonesia
IHCAFE and Banco Continental	Example initiative	✓			Honduras
Coffee Farmer Resilience Initiative	Example initiative	✓			South America & Carribean
Phoenix	Example initiative		✓		Brazil
Barry Callebaut / Biopartenaire	Example initiative		✓		Ivory Coast
CORIP	Example initiative		✓		Ghana
SinarMas/PISAgro	Example initiative			✓	Indonesia

III

Description of best practices in R&R (design, structuring)

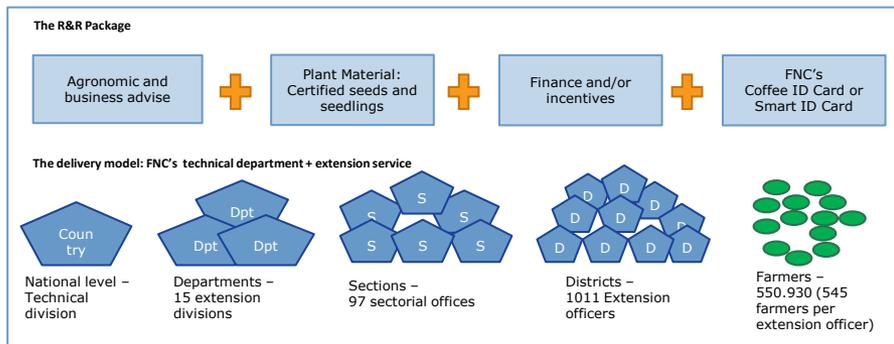


Core Case: Coffee – Colombia

FNC's Permanency Sustainability and Future (PSF) Program supporting the renovation process of smallholders and thereby increasing their productivity



Rabobank



Scheme Specs

Name:	The Permanency, Sustainability and Future (PSF) Program
Objective :	To support the renovation processes of small coffee farmers with aged cultures and unable to (self) finance the intervention due to lack of resources
Approach:	To increase crop productivity of small coffee farmers by i) increasing the planting density and ii) reducing the average age of the trees by renovation through replanting and rejuvenation pruning (zoca). The R&R package consists of a combination of agronomical and business advice, certified seedlings or seeds and dedicated finance arrangements and incentives that are delivered through FNC's extension service.
Size:	In 2007 the aim was to renovate 300.000 ha of land under traditional production and/or old technified crop over a period 5 years (60.000 ha /year). Between 2008 and 2014: 184.000 ha were renovated under the PSF program.
Total Investment:	Approx USD 600 mln between 2009 and 2014
Period:	Originally 2008 – 2013 and was relaunched in 2012 with support of the "Permanent Crop Renovation Line" managed by FNC
Performance of the loan portfolio:	7-8% of the loans is in arrears and less than 1% of the guarantees was called in
Initiator:	La Federación Nacional de Cafeteros (FNC)
Funding:	The Colombian Ministry of Agriculture, Finagro, Banco Agrario, Banco de Bogotá, Banco Divivienda, the National Coffee Fund (FoNC) and Cundinamarca and Cauca Governors

Rabo International Advisory Services B.V.
Final Report

Scheme impact at farm level

Methodology:

Renovation by replanting to increase tree density and to replace old low productive trees by planting new Roya resistant varieties

Approach:

A phased approach is advocated to realise stable production levels over time and to enable the farmer to (partly) self finance the renovation of a new section with the cash generated by an older section.

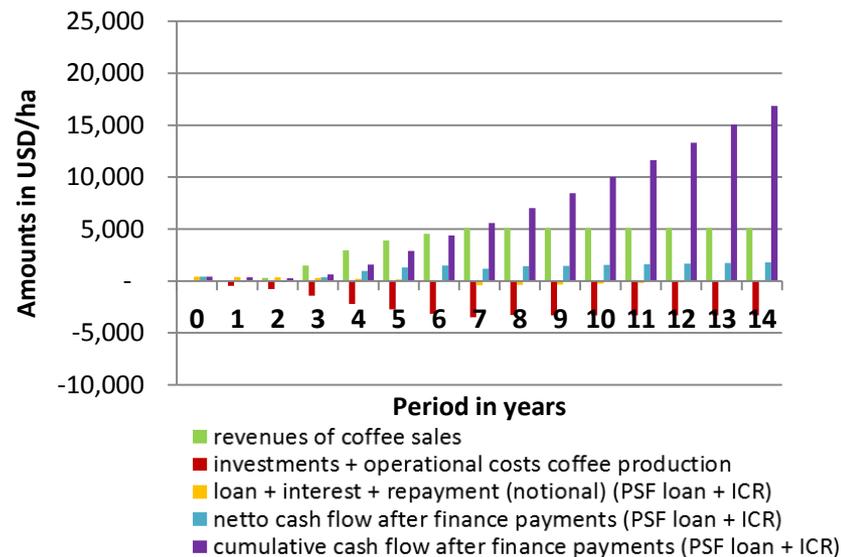
Yielding:

A tree starts to produce coffee cherries after approx 18 months and realizes maximum productivity after 4 – 6 years (depending on the production system) after which productivity starts to decline again.

Farmer financials:

According to FNC's financial model, farmers that take a phased approach to replanting can increase coffee yields from around 400 to around 1900 kg / ha. The loan + grant component (ICR) provided under the PSF program enable the farmers to bridge the negative cash flow period after replanting. Since the farmer is even able to overcome prolonged periods of lower revenues (25% drop), the PSF loan + ICR component reduces the risk at farm level and makes the investment in R&R more attractive.

Cash flow at farm level when replanting is conducted in a phased approach and financed by PSF loan + grant component



Core Case: Cocoa – Sulawesi, Indonesia

MARS' triple productivity package: turning annual yields from 650kg/ha to 2.5 MT/ha



Rabobank

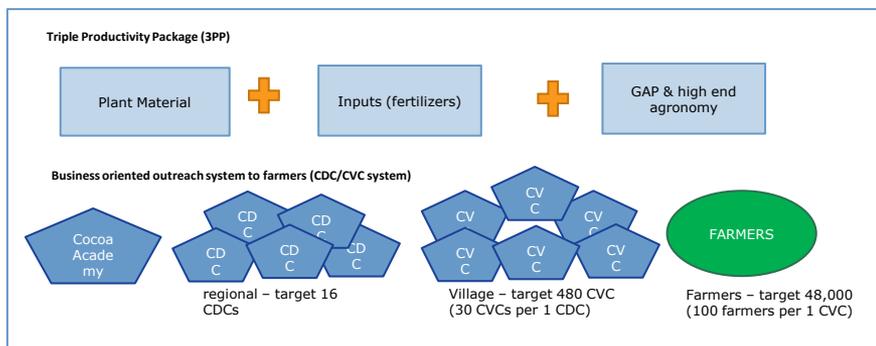
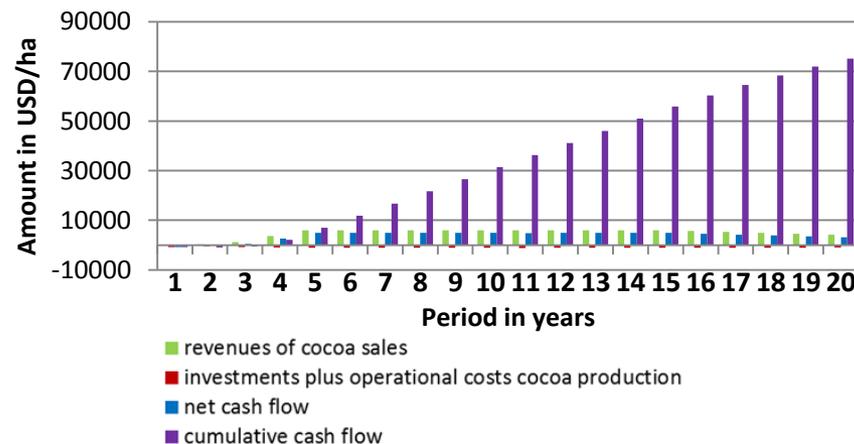
Scheme Specs

- Name:** Triple Productivity Package and related business oriented distribution system
- Objective :** Turnaround of smallholder cocoa farms by tripling current average annual yields and thereby making cocoa an economically attractive crop to grow for (young) professional cocoa farmers and boosting the supply of cocoa.
- Approach:** Rehabilitation of low yielding cocoa farms by controlling pests and diseases and increase productivity through an integrated approach consisting of: development to better plant materials, phased grafting, application of fertilizer and knowledge transfer on Good Agronomical Practices (GAP) and high end agronomic practices. Supported by a business- oriented distribution system (i.e. DCD/CVC system) to provide farmers access to the required extension services and inputs.
- Size:** aim is to reach 48,000 farmers and rehabilitate 50,000ha as of 2019
- Period:** 2013-2024
- Initiator:** MARS
- Funding:** Initial investment to develop the package and related service delivery model funded by MARS. The CDC/CVC system is designed as a self-financed system. Discussions are on the way for an input finance scheme for the farmers with BRI.

Scheme Impact at Farmer Level

- Methodology:** Grafting – (side) grafting on existing trees: adding clonal plant material onto the existing stem and pruning the old branches back fully.
- Approach:** One go (full farm) **or** phased approach (25% of the farm/year)
- Yielding:** A grafted tree starts to yield cocoa pods after 16 months and reaches maturity (full production capacity) in year 4. A cocoa tree can remain commercial production levels for around 20 years, if maintained well.
- Farmer financials:** According to the MARS financial model farmers that graft their farms in one go can achieve yields of 2500 kg / ha over a period of 5 years. If they take a phased approach to grafting (25% per year) they are able to significantly reduce the amount of funds from other sources required but it takes 8 years to reach the production levels of 2500 kg / ha. If only the actual costs of labour are taken into consideration the costs levels are slightly lower than if the private expenses of a family are taken into account as well.

Cash flows at farm level when grafting the farm in one go (100% in year 1)



Core case: Palm Oil – West Kalimantan, Indonesia

PTPNXIII's Revitalisasi Program: Increasing palm oil production and smallholder incomes by revitalisation of existing and establishment of new smallholder plasma plantations



Rabobank

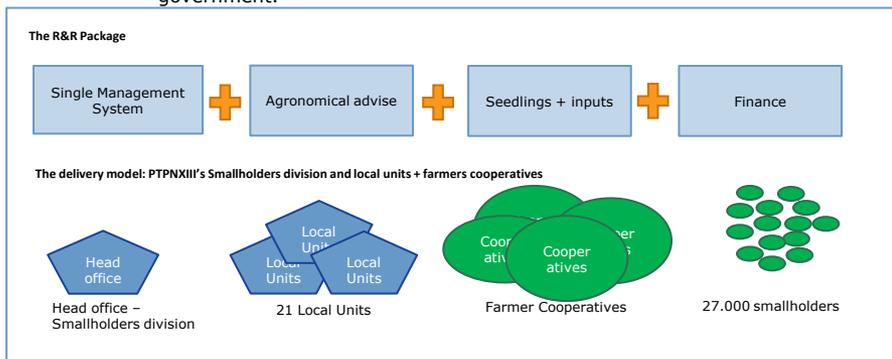
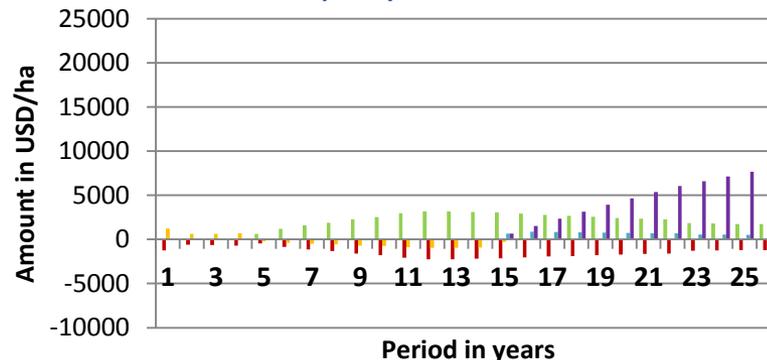
Scheme Specs

- Name:** PT Perkebunan Nusantara XIII (PTPN XIII)'s Plasma Plantation Revitalisasi Program (Revitalisasi Program)
- Objective:** To support the expansion and replanting of smallholder plasma plantations under the Single Management System of PTPNXIII
- Approach:** To revitalise and establish (new) farms of plasma smallholder by (re)planting of oil palms. The R&R package consists of farm management (Single Management System), agronomical advise, good quality seedlings and inputs that are delivered by the local units of PRPNXIII and a credit facility. PTPNXIII also provides access to markets by buying the FFB's. The credit facility finances the investment (including an income for the farmers) the compounded interest during the construction fase of 3.5 years at concessional rates and is guaranteed by PTPNXIII.
- Size:** PTPNXIII manages 58.000 ha of plasma plantations of which 29.000 ha are old (>25 years old) and 15.000 ha need to be replanted. Ultimo 2014 2700 ha were replanted and 2700 ha of new plasma farms were planted under the Revitalisasi Program.
- Performance of the loans:** Under the KKPA scheme the repayment rates by farmer coops range between 40% and 112%. On average farmer cooperatives have fulfilled 60 % of obligations.
- Total Investment:** IDR 772 bln (USD 62 mln) (excl. interest) and IDR 931 bln (USD 75 mln) (incl compounded interest during construction) to revitalise 15.000 ha of land at prices in 2014.
- Period:** The replanting was started in 2007. The total number of ha to be replanted is 15.000 ha of which 6000 ha need to be replanted during the period 2015 – 2018.
- Initiator:** PTPNXIII
- Funding:** Bank Agro has financed the first tranches under the Revitalisasi Program but is currently deciding its position a.o. based on the instructions received of the new government.

Scheme impact at farm level

- Methodology:** Revitalisation of existing and establishment of new smallholder plasma plantations by (re) planting and thereby increasing palm oil production through i) rejuvenation of plantations and establishment of new plantations and ii) planting new, more high yielding varieties.
- Approach:** (Re)planting of the smallholder plasma plantations (2 ha) in one go for reasons of efficiency
- Yielding:** A palm oil tree starts to produce FFB's when it is approx 3.5 years old and reaches its peak when it is between 11 and 12 years old. After this the productivity slowly reduces. When the trees are between 25 and 30 years old they become too high to harvest FFB's.
- Farmer financials:** According to the PTPNXIII financial model, farmers that (re) plant their oil palms can reach productivity levels of 25.600 kg of FFB's / ha. The loan that enables the farmer to repay through 30% of its revenues enables the farmer to bridge the period of negative cash flows and provides an effective means of dealing with periods of lower revenues.

Cash flow at farm level when revitalisation is financed by bank loan and repaid by allocation of 30% of revenues

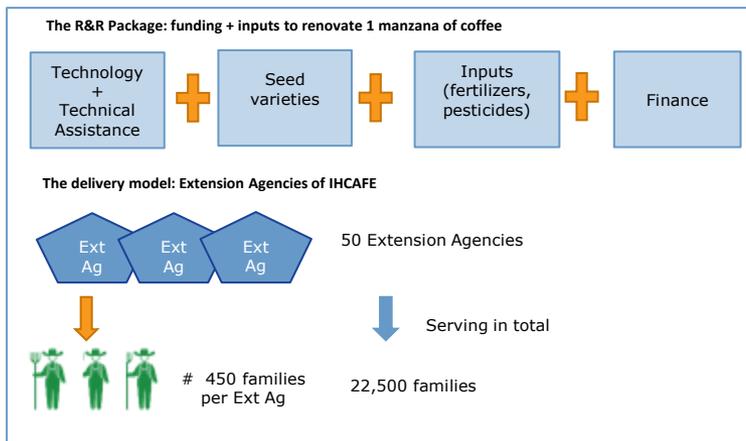


Example initiatives: Coffee



Rabobank

Honduras



Scheme Specs

- Name:** Program to support Small Producers (**PAPP**) and the Emergency Program to support Small Producers (**PEEPP**)
- Objective:** To contribute to reducing poverty by increasing coffee productivity and income generation and thereby improving the quality of life of coffee families. The objective is to increase yields from around 300 kg/ha to 3000 kg/ha.
- Approach:** Financing strategy for coffee growing families that due to their financial condition do not have access to credit and that produce less than 2000 kg /ha. Farmers can obtain up to HNL 30.000 (approx USD 1400) to buy inputs (seeds, fertilisers and pesticides) for the establishment of up to 1 manzana or 0.69 ha of coffee farm for a period of 6 years and at zero interest.
- Implementation:** IHCAFE
- Results (aimed):** November 2014: 22.500 coffee growing families (25% are headed by women)
- Investment:** Total funds available HNL 415 mln (USD 20 mln)
- Period:** Launched in 2008
- (Co-)Funding:** PAPP: IHCAFE + the National Coffee Fund and PEEPP: Banco Nacional de Desarrollo Agrícola (BANDESA) (interest payments are met by IHCAFE + National Coffee Fund)

Honduras

Scheme Specs

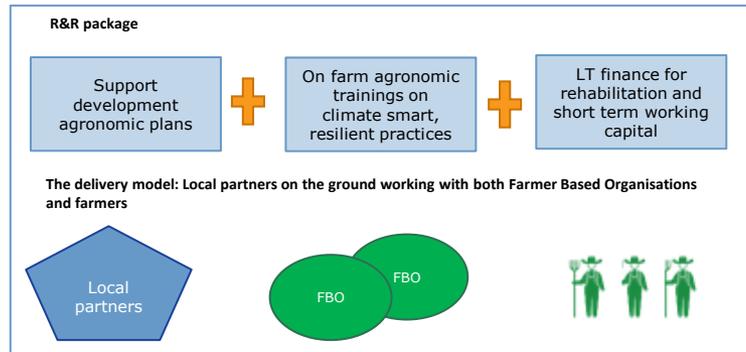
- Name:** Emergency Credit Program against La Roya (**Credicafe**)
- Objective :** To support the farmers that have been hit by la Roya to rehabilitate or renovate their farms by making available dedicated credit lines.
- Approach:** To increase the productivity and therefore the incomes of the coffee farmers that were affected by la Roya through: i) rehabilitating the farm by using appropriate of fertilisers and pesticides, ii) renovating the farm by replanting and iii) renovation of the farm by renovation pruning (recepta). The R&R package is comprised of technical assistance by IHCAFE and dedicated credit facilities by the commercial banks involved.
- Implementation:** IHCAFE provides technical assistance to the farmers and is an integral part of the credit process, i.e. proposes the applicants, visits the farm before a (new) loan is approved, supervises the use of the funds and supports the banks in the recovery process if need be.
- Results (aimed):** Ultimo 2014: Banco Continental has provided 2200 loans of total value USD 6.4 mln. Banco Hondureno del Café has provided 2900 of total value USD 11.8 mln.
- Investment:** USD 45 mln i.e. total facilities committed by the two banks
- Period:** 2 year program, launched in 2013
- (Co-)Funding:** Dedicated funding lines of Banco Hondureno para la Producción y la Vivienda (BANHPROVI) targeted at micro, small and medium producers of coffee that were affected by La Roya

The main terms of the loans for renovation and rehabilitation:

	Renovation through replanting	Renovation through pruning (recepta)	Rehabilitation
Notional	L 30.000 / manzana or USD 2025 / ha	L 20.000 / manzana or USD 1350 / ha	L 15.000 / manzana or USD 1015 / ha
Disbursement	In 2 parts based on plan of IHCAFE	In 2 parts based on plan of IHCAFE	All at once
Tenor	84 months	36 months	36 months
Grace period	36 months	24 months	None

Example initiatives: Coffee

South America & Caribbean



Scheme Specs

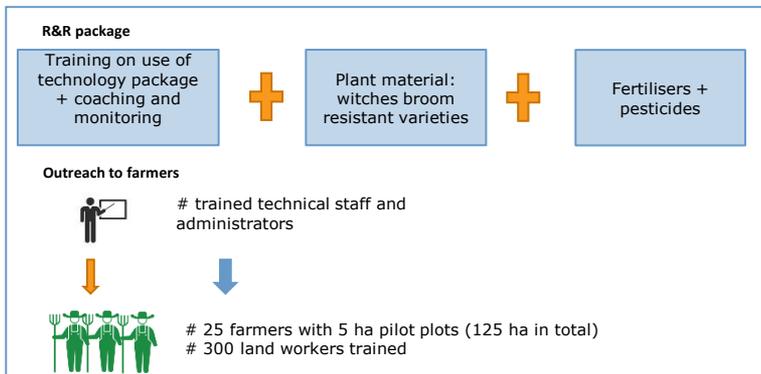
- Name:** **Coffee Farmer Resilience Initiative & FUND**
- Objective:** To combat coffee rust by unlocking new resources for coffee farmers for agronomic training, rust prevention and other resiliency investments.
- Approach:** Combination of long-term lending (to finance replanting of infected trees) with short term trade credit, financial management training, climate-smart agronomic assistance and household-level income diversification.
- Initiator:** Root Capital (in cooperation with other partners see below)
- Size:** USD 23 million
- Period:** Ongoing
- Results so far:** The initiative was launched in 2013 (by Root Capital) and a related partner-based investment pool, the 'Coffee Farmer Resilience Fund' was launched in June 2014. It is aimed for to provide financial assistance to over 40,000 farmers, reaching 200,000 family members in farming communities in Latin America.
- (funding) Partners:** Coffee Farmers Resilience Initiative : Root Capital (initiator), Skoll Foundation, Multilateral Investment Fund of the Inter American Development Bank and Keurig Green Mountain.
Coffee Farmer Resilience Fund (launched in June 2014): USAID, Keurig Green Mountain, Cooperative Coffees, Starbucks and Root Capital.

Example initiatives: Cocoa

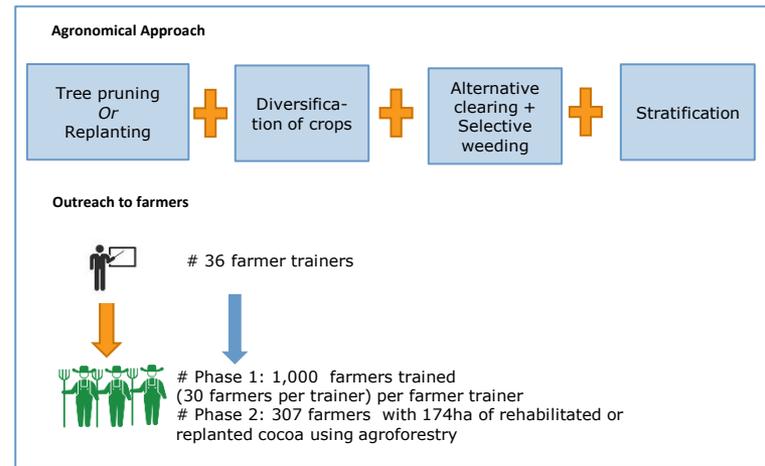
Brasil

Project Specs

- Name:** **Phoenix**
- Objective :** to demonstrate the viability of a new technology package for the recovery of productivity of cocoa cultivation in Southern Bahia.
- Approach:** the set up of demonstration areas (pilots) in sub-regions of primary cocoa growing areas of South Eastern Bahia aimed to validate a new system of cocoa production, based on the substitution with new varieties and the use of field management practices designed to promote high productivity.
- Coordination:** AIPC, the Brazilian Association of the Cocoa Grinding Industries
- Results (aimed):** - transformation from abandoned plots with little light to clean and light plots, good and healthy pod loads
-yields from 170kg/ha to 1,2kg/ha
- Due to the time needed to evaluate full grafting results, the program will take eight years before a full evaluation is done*
- Investment:** USD 1 mln (program management, technical assistance, inputs)
- Period:** 4 + 4 years, 2009- 2013 and project component related to farmer coaching continued till mid 2014, 2013 – 2017: monitoring.
- Funding:** initiating partners, Dutch Ministry of Economic Affairs through Buffer Stock Fund, farmers’ contribution (15% input cost)



Ivory Coast

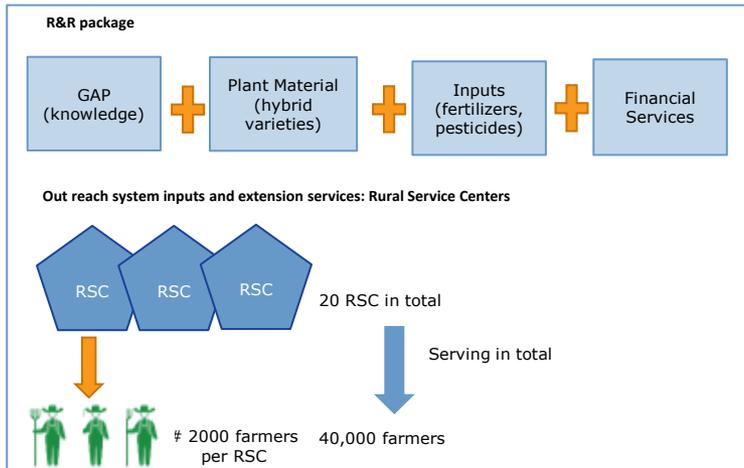


Project Specs

- Name:** **Dynamic Agroforestry Systems**
- Objective :** Improve the cocoa sustainability and productivity in the project area of Biopartenaire
- Approach:** System approach: focus on optimization of the overall farm production system in a long term taking into account food security and diversity. A key aspect of this approach is selective weeding and avoiding slash and burn for land clearing. Instead alternative clearing methods are practiced, conserving biomass for soil-fertility
- Implementation:** Biopartenaire and ECOTOP Consult
- Results (aimed):** Improve productivity of 1,000 participating farmers
- Investment:** USD 0.86 Mln
- Period:** 2012 - 2015
- (Co-)Funding:** IDH: USD 0.3 Mln

Example initiatives: Cocoa

Ghana



Name: **Ghana Cocoa Rehabilitation and Intensification Program (CORIP)**

Objective : To improve the economic, social and environmental sustainability of cocoa farming in Ghana by developing commercial business models.

Approach: To provide farmers access to inputs (planting material, fertilizer, pesticides) and extension services while at the same time developing economically viable and operationally feasible models for production support services through the cocoa Rural Service Centres (RSCs)

The RSC will be privately run and eventually be self-financing and sustainable businesses.

Implementation: Solidaridad is the lead implementation agent

Results (aimed): - establishment of 20 RSC, serving in total 40,000 farmers
- Yield improvement from 400kg to 1000kg/ha

Investment: USD 14 million

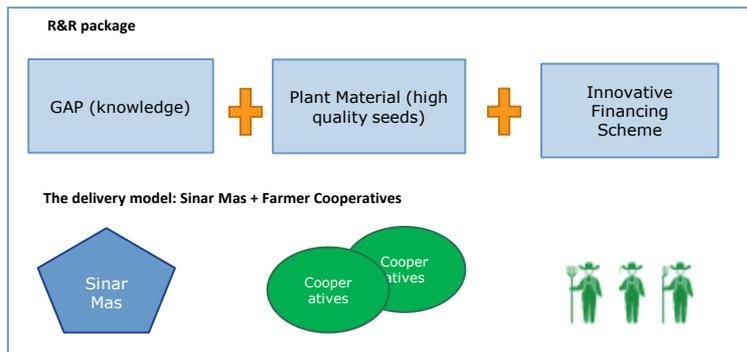
Period: 4 years program, launched June 2014

(Co-)Funding: Project Partners, IDH, Dutch Government (USD 7mln)



Example initiatives: Palm Oil

Indonesia



Name: *Oil Palm Replanting Program Independent Smallholder Farmers*

Objective : The innovative finance program aims to support independent farmers in increasing productivity and yields through the provision of affordable credit.

Approach: Via replanting with high quality seeds and implementation of Good Agricultural Practices it is expected that independent farmers can reach yields of 5- 6MT/CPO/ha/year.

Sinar Mas plays a key role since it serves as guarantor of the loans manages the plantations and off-takes the FFB's until the loan has been repaid or through out one planting rotation.

Initiators: PISAgro Palm Oil Working Group lead by Sinar Mas, members: McKinsey, Triputra, Tiga Pilar Sejahtera, GAKPI, IDH.

Results (aimed): Overall aim is to increase yields of the independent smallholder farmers, from 1.5 – 2 million up to 5-6 mln MT/CPO/ha/year.

Early 2015, around 30 farmers /approx. 100 ha joined the program.

Period: Ongoing. In October 2014 the innovative finance scheme was approved by Indonesia Ministry of Agriculture and so far 400 farmers in Riau Province, have been informed about the scheme.

(Co) Funding: In December 2014, Bank BRI signed a facility agreement of in total IDR48billion for replanting of 500 ha.

V

*Overview of key success factors based on
concrete cases*



Key succes factors



Rabobank

Scheme level

- **Farmer segmentation is key** as different types of farmers require different levels of (technical) support and different financing solutions and for effective use of funds. FNC, IHCAFE and PTPNXIII have each developed dedicated programs to support farmers with limited own funds, limited access to finance and low productivity levels.
- **Farmer selection is important**, especially for high input systems that require considerable investments and close follow up of agronomical advise. FNC, MARS and IHCAFE select the farmers they support in R&R whereas PTPNXIII is not able to do so (social function);
- **An integrated approach to R&R is needed** that is comprised of: Coordination + GAP + business management + plant material + inputs + financing solutions;
- **A scheme needs a central coordinator** with the capacity to organize (access to) good quality extension services, good plant material and good quality inputs for the smallholders at the right time during the process;
- **The agronomical approach is scientifically designed and needs to be closely followed** (i.e. FNC, MARS, Indonesian Oil Palm Research Institute);
- **Plant material is a key strategic component** of R&R schemes (i.e. FNC, IHCAFE, MARS and PTPNXIII provide seeds, seedlings or plant material);
- **Need for central coordinator to provide other inputs like fertilisers depends on local availability and hence the enabling environment** (Colombia: no, Honduras: yes, Indonesia: yes);
- **Effective distribution mechanisms for extension services** (both GAP + business management) that enable the central coordinator to reach out to large numbers of farmers. In the past the extension services were mainly financed by farmer organisations and /or government (i.e. FNC, IHCAFE, PTPNXIII) but recently also commercial models are being explored (MARS, CORIP);
- The **extension officers** of FNC and IHCAFE and the **farmer cooperatives** of plasma smallholders of PTPNXIII **play a key role in obtaining finance and thereby effectively reduce the operational costs of the banks and other financial institutions**. Banco Agrario considers FNC to be one the the KSF's for its financing scheme;
- **In case the farmers start out with no, very low productivity and limited own funds** (as was the case after la Roya struck in South and Middle America and after relocation of farmers in Indonesia) **and limited access to finance: development of financing schemes and grant funding at scheme level in order to realise access to appropriate finance at smallholder level** (FNC , IHCAFE and PTPNXIII but also the Coffee Farmer Resilience Initiative);
- **Sufficient LT funding for financing schemes and the capacity to provide guarantees;**
- If the initiator plays a role in guaranteeing the credit facilities (as is the case for FNC, IHCAFE and PTPNXIII), **grip on cash flow is key** (i.e. FNC: member bank accounts, IHCAFE: Fiduciary Fund, PTPNXIII: off-take contract FFB's).

Farmer level

- **Smallholders need to have a source of (additional) income during the low cash flow period**, either through pre-financing the income / cost of labour (FNC, PTPNXIII, Sinar Mas), stimulation of intercropping (FNC, MARS) and other sources of income i.e. from working elsewhere, other farms, businesses (FNC, MARS); or informal lending e.g. from family and friends;
- **Access to good quality extension services** that provide the farmers with good agronomical and business management advice and skills and that work with the farmers over a prolonged period of time (key steps in the production process and position of trust);

Key succes factors

Farmer level (continued)

- **Access to good quality seedlings, inputs and finance** (in case of starting from a situation of very low productivity and very limited own funds);
- **Investment in R&R needs to be an attractive investment** which in turn depends on the yield curve of the tree crop, the price of the commodity and the cost of the inputs;
- Investment in R&R needs to be an attractive investment in comparison with other crops;
- **Subsidies and grants**, in the form of interest subsidies or a grant for part of the investment in R&R, **reduce the time needed to earn back the investment in R&R and make the investment less risky and more attractive**;
- **Minimum farm size** to enable smallholders to generate sufficient income for their families and enable them to save sufficient funds as well to overcome periods of low commodity prices and to continue to invest in the farm going forward. For instance in Colombia the average farm size is around 1.8 ha and is only able to provide 40% of a families income. Hence suggesting that the farms needs to scale to around 5 ha to be able to generate a full family income. The financial model of the cocoa farm in Sulawesi indicates that a cocoa farm of one hectare is sufficient to comfortably meet the decent living index.

IV

Overview of key (financial) challenges in R&R



Overview of key (financial) challenges in R&R



Rabobank

Scheme level

- For **FNC** the main (financial) challenges to scaling up its R&R scheme are **the number of extension officers** - which perform a key role in both the delivery of technical assistance to and the application for PSF loans and the grant component (ICR) by the farmers - **and the amount of funding for grants and subsidies** which are considered key for convincing smallholders with limited own funds to conduct replanting. Since Banco Agrario has long term funding lines and guarantee lines for the agricultural sector available and the payment record of the farmers under the PSF loans is good, **sufficient funding for its financing scheme (the PSF loans) is available.**
- For **MARS** the main challenge is the need for **a large(r) distribution network (CDC / CVC system)** to be able to reach the number of farmers needed to achieve its production targets. To be able to expand the distribution network, investments in the CDC / CVC system are needed either by MARS itself and/or franchise partners. **Another challenge is to unlock long term funding for the investments in R&R by the smallholders.**
- For **PTPNXIII** the main challenge to increasing the scale of its Revitalisasi program is to **obtain credit facilities** for the farmer cooperatives to finance the replanting and/or expansion of the plasma plantations. Although PTPNXIII has been successful in the past at raising funding from state owned banks for its previous schemes (i.e. the PIR and the KKPA schemes), it now faces challenges since one of its two main banks is reconsidering its strategy following last years change of government and the poor payment record of most of the farmer cooperatives under the KKPA scheme.
- Since **FNC's** National Coffee Fund has (partly) guaranteed the PSF loans under its R&R scheme, **pressure on prices has a negative effect on the payment capacity of the smallholders** and therefore on the **financial position of the fund** as well. In Colombia the government has provided price support from March 2013 till August 2014 when coffee prices were below the trigger price and thereby enabling the farmers to meet their obligations under the PSF loans.

- Since **PTPNXIII has guaranteed the financing schemes** under the KKPA scheme and most of the farmer cooperatives have a poor repayment record under this scheme, PTPNXIII has had to step in on a considerable scale as well. It is anticipated that these funds will be repaid in future.

Farmer level

- The farmers need to take the **(emotional) hurdle** to cut their old trees;
- **The farmers need to closely follow the agronomical recommendations** of FNC, PTPNXIII and MARS to achieve the full yield potential. Under the FNC scheme the farmers are only able to apply for finance and / or the grant components for R&R if they follow the recommendations of FNC. Under the PTPNXIII scheme the farmers are only able to obtain finance if they sign up to the Single Management System. Under the MARS scheme, the MARS Academy and the CDC's closely monitor the quality of the advise of the cocoa doctors / CVC's this is considered to be key for the success of the program. The incentive for the cocoa doctors / CVC's is to be able to keep working together with the CDC's and to be able to create more sales and therefore more income if the farmers follow the agronomical advise.
- When faced with a disease that has wiped out a large part of its tree crop and/or when moving from a low to a high input system, **the farmer needs to make both a large investment in R&R and has to overcome a prolonged period of no / very low productivity and hence negative cash flows.** If R&R is conducted in one go and based on the financial model of FNC, coffee farmers in Colombia need to overcome a period of negative cash flows of 1 – 2 years and needs around USD 3.400 / ha to overcome this period. According to the financial model of MARS, cocoa farmers in Sulawesi need to overcome a period of negative cash flows of 2 years and needs USD 2.000 / ha to overcome this period if R&R is conducted in "one go" as well. Palm oil farmers in West Kalimantan need to overcome a period of negative cash flows of 3 years and need USD 3.200 to overcome this period in the same scenario according to the PTPNXIII model.

Overview of key (financial) challenges in R&R



Rabobank

Farmer level (continued)

- **Taking a phased approach to R&R** (i.e. 14% per year in case of FNC and 25% per year in case of MARS) **significantly contributes to the self financing of the investments and thereby reduces the need for other sources of funding**. Based on the financial models of FNC and MARS, the funds needed is reduced to USD 950 / ha for coffee in Colombia and USD 800 / ha for cocoa in Sulawesi. PTPNXIII does not advocate a phased approach at individual farm level for reasons of economies of scale.
- **The investment in R&R has a long repayment period that is also linked with the tree crop and the approach to R&R** where replanting in one go results in a shorter repayment period than a phased approach. The financial models of FNC and MARS indicate that if R&R is financed with own funds and is conducted in one go, the repayment period is 3 and 4 years respectively. If a phased approach is taken the repayment periods are increased to 5 years in both cases. The model of PTPNXIII shows that if a palm oil farm is replanted in one go the repayment period of palm oil is around 10 years.
- The financial models of FNC, MARS and PTPNXIII indicate that **the cocoa farmers in Sulawesi are able to accumulate the highest amount of cash over the economic life of a cocoa tree** (20 years) (USD 70.000 / ha) **followed by the coffee farmers in Colombia** that can accumulate USD 16.500 / ha over 2 crop cycles (14 years) **and the palm oil farmers in West Kalimantan** that can accumulate around USD 12.000 / ha over the economic life of an oil palm (25 year period). The NPV of these future cash flows is USD 26.000 / ha (cocoa farmers Sulawesi), USD 9.000 / ha (coffee farmers Colombia) and USD 1900 / ha (palm oil farmers West Kalimantan).
- **To be able to overcome the period of negative cash flows, the farmer needs other sources of funds** like own funds (savings) and/or external sources of income and/or pre-financing an income during the low cash flow period (FNC, PTPNXIII) or intercropping (FNC and MARS).
- **The financing schemes studied** (i.e. the PSF loan in the FNC scheme and the credit facility of Bank Agro in the PTPNXIII scheme and the innovative finance solution in the PISAGRO/ Sinar Mas scheme) **enable the farmers to investment in R&R and (largely) overcome the negative cash flow period and are repaid during the period of higher productivity**.
- As a result of the **interest costs of the financing schemes**, the farmers are able to **save less money over time and this increases the risk at farm level** in comparison to situation that R&R can be financed with own funds. **This effect will be more pronounced for smaller farmers (due the higher fixed costs)**.
- **The grant component (i.e. the ICR) of the FNC scheme significantly reduces the amount of bank finance that needs to be obtained and therefore the interest costs as well**. Under the PAPP and PEEPP Programs of IHCAFE, no interest is charged on the 6 year loans for inputs for R&R. Both the grant and the interest subsidy have a positive impact on the ability to save cash over time thereby reducing the risk at farm level and hence making the investment more attractive. **It makes sense to only provide these grants / subsidies to the smallest farmers as these run the highest risk (combination of small farm sizes and low productivity levels)**.
- **Over the past 7 – 8 years, farmers have been faced with increasing operational costs of the farms** (i.e. cost of labour and inputs) that are not necessarily compensated by higher commodity prices and thus **making the investment in R&R more risky / less attractive**. In Indonesia the investment in R&R has (almost) doubled over the past 7 – 8 years hence putting pressure on the business case for R&R.

VI

Recommendations for scaling



Recommendations for scaling

Scaling of the schemes (in the same region / country)

- For the schemes of FNC, IHCAFE, MARS and PTPNXIII, the key building blocks (i.e. the central coordinator, the agronomical approach, the plant material, distribution mechanism and - for FNC , IHCAFE and PTPNXIII - the financing scheme) are in place and can be scaled with limited additional investments;
- The scaling of the FNC and the MARS scheme is currently limited by the availability of extension services / distribution network (CDC / CVC system) and can be supported by making available more (government) funding for the extension services and/or by finding more Franchise partners (for the CDC / CVC system);
- The scaling of the MARS and PTPNXIII schemes is also limited by the availability of other, more attractive crops (oil palm respectively cocoa in Indonesia);
- The scaling of schemes of FNC, MARS and PTPNXIII is limited by the limited investment capacity of the smallholders and can be stimulated by making available more grants / subsidies (Colombia) and funding for the financing schemes (Indonesia);
- The MARS and PTPNXIII schemes can be scaled further if more long term funding for the finance schemes for R&R is available. Currently this limitation does not exist for the FNC scheme.

Replication of the schemes (in another region / country)

- For the FNC, MARS and PTPNXIII schemes, the central coordinator, the distribution mechanism and the financing scheme can be relatively easily be replicated but will require considerable investments in infrastructure.
- If not available yet, the development of the agronomical approach and the plant material will require relatively large and strategic investments in R&D over a prolonged period of time;
- The key building blocks of the schemes in another region / country will depend on the enabling environment (i.e. in case good inputs like fertilisers are not readily available these need to be provided under the scheme as well);
- To be able to replicate the FNC and the PTPNXIII schemes, large amounts of funding and guarantees for the financing schemes for R&R are required. As for the MARS scheme, since the smallholders have limited investment capacity, the replication of the MARS scheme is likely to be facilitated by funding for financing schemes and guarantees as well;
- To replicate the PTPNXIII schemes for the establishment of new smallholder plantations (i.e. the PIR and KKPA schemes), large amounts of (government) funding are required to make the land ready for growing palm oil and make the necessary investments in infrastructure;
- For the MARS scheme and most likely for the other schemes as well, the country regulations need to allow for the use of clonal material.

Recommendations for scaling

IDH, corporate partners, NGO's and governmental organisations can stimulate R&R by playing the following roles

- Sharing of knowledge R&R approaches;
- Research into agronomical approaches and practices tailored for the local conditions;
- Support the establishment of monitoring & evaluation systems to capture financial and agronomical data at farmer level to assess impact over time;
- Funding for (initially high) investments to distribute agronomical knowledge on continuous basis;
- Long term partnerships between smallholders and buyers of core commodities (both off-take relationships and sharing risk of financing schemes);
- Supportive models that increase appetite of financial institutions to finance smallholders (f.i. increased presence on the ground, development of dedicated approval processes);
- Provide grant funding to convince smallholders with limited own funds to conduct R&R;
- Provide / support the provision of long term funding in countries where this is not available yet (together with DFI's);
- Provide / support the provision of guarantees in the initial stages of financing programs of R&R.

VII

Recommendations for further research





Recommendations for further research

Our recommendations for further research are as follows:

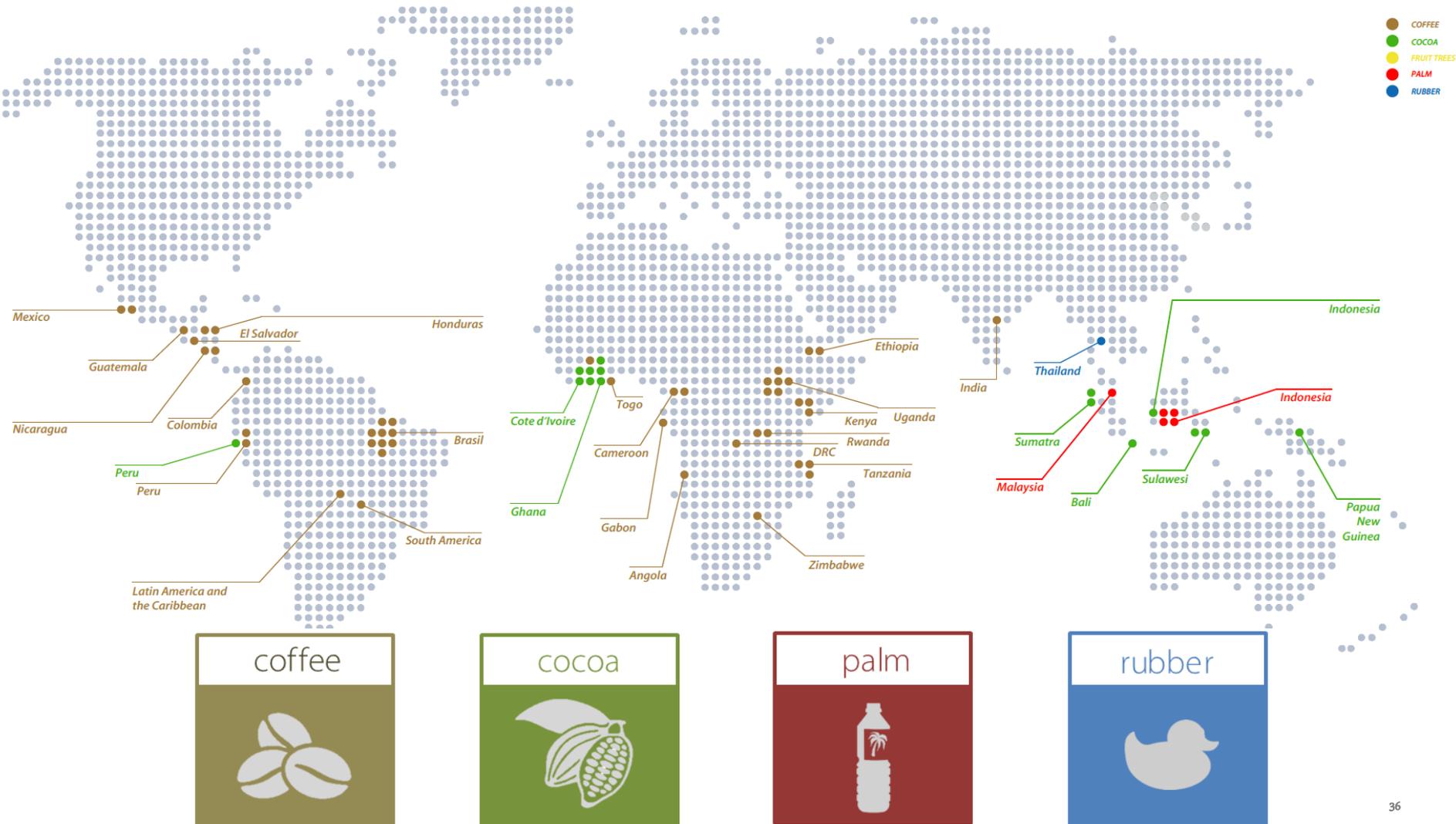
- **Need for farmer segmentation and farmer selection:** Our study indicates that farmer segmentation is key for the development of effective R&R schemes and effective use of resources. Furthermore, farmer selection is deemed very important as well, especially for high input systems that require high investments and close following of the agronomical advise. We recommend to conduct further research into farmer segmentations applied, the key characteristics of effective R&R schemes and the key success factors of farmers selection for high input systems. As can be seen in the stories of the cocoa farmers that were interviewed during our field visit to MARS in Sulawesi (see the farmer stories in section IX), interviewing farmers has provided a wealth of valuable information and is in our opinion a good method of getting to know farmers better. We also recommend to investigate the possibilities to build on the approach and the results of the Diagnostic Study of Palm Palm Oil Smallholders as was conducted by IFC.
- **Effective distribution models for extension services and financing schemes:** Since effective distribution and outreach mechanisms are one of the key success factors of R&R schemes and these distribution mechanisms require considerable investments, we recommend to conduct further research into these models in general and the necessary investments and the funding mechanisms in particular. We also recommend to closely follow the commercial models that are currently being explored (i.e. the MARS and the CORIP models) and specifically the extend to which it is possible to maintain the quality of extension services and the balance the interests of the commercial entity and the smallholders.
- **Impact at farm level:** The financial models of R&R at farmer level of FNC, MARS and PTPNXIII provide valuable insights into the impact of R&R at farm level. It was however not possible to determine the actual impact at farm level and to verify the financial models since it was not possible to obtain actual (financial) data at farm level for the purpose of this study. As a next step we recommend to discuss the possibilities with FNC, MARS and PTPNXIII and the coffee, cocoa and palm oil smallholders to obtain actual data at farm level to be able to assess the impact at farm level and verify the financial models.
- **Impact of exchange rate fluctuations on farm economics:** For the purpose of this study we have used the exchange rates around year end 2014 (timing of field visits).
- Since that time the exchange rates have significantly devalued (COP -/- 30% and IDR -/- 13% vis-à-vis USD). This impacts both the revenues and the cost of inputs at farm level. We recommend to conduct further research into the mechanisms behind this and impact on farm economics. This will be supported by analysis of actual data (see previous).
- **Minimum farm size :** To be able to maintain a highly productive farm it is essential that the farm generates sufficient cash flow to provide sufficient income for the family and to safe sufficient funds to overcome periods of low commodity prices and for future investments in the farm. We recommend further research into minimum farm sizes for different commodities in different countries that could subsequently be used as basis for developing so called "emerging farmer" programs that can support the farmers in making the steps towards this larger farm size. It is noted that increasing farm sizes will also have social consequences for the farmers that will not be able to make this step and/or will be bought out.
- **Investment rationale for R&R:** The investment in R&R has become less attractive and more risky over the past 7 – 8 years since the investment in R&R has significantly increased whilst this has not necessarily been compensated by higher commodity prices. We recommend to conduct further research into both the development of the investments in R&R over time and the expected investments going forward. This will also provide valuable insights into sustainable commodity price levels and the minimum farm size which is likely to increase over time as well.
- **Need for grant funding and/or subsidised interest rates to stimulate R&R for small farmers with limited own funds:** The programs for the smallest farmers with the limited amounts of own funds and low productivity levels typically contain a combination of financing schemes and grant funding and / or subsidised interest rates. The financial models show that these models results in considerable advantage for the farmers and reduce the risk of investing in R&R. Although subsidies and grants are considered to be key for stimulating the smallest farmers to conduct R&R, this also requires large amounts of resources. We therefore recommend to conduct more research in both the different financing schemes and possibilities of generating income from other sources.
- **Strategic investments in R&D and particularly agronomical approach and planting material:** Given the importance of the strategic investments in R&R we recommend further research in the necessary investments to be made and financing mechanisms used.

VII

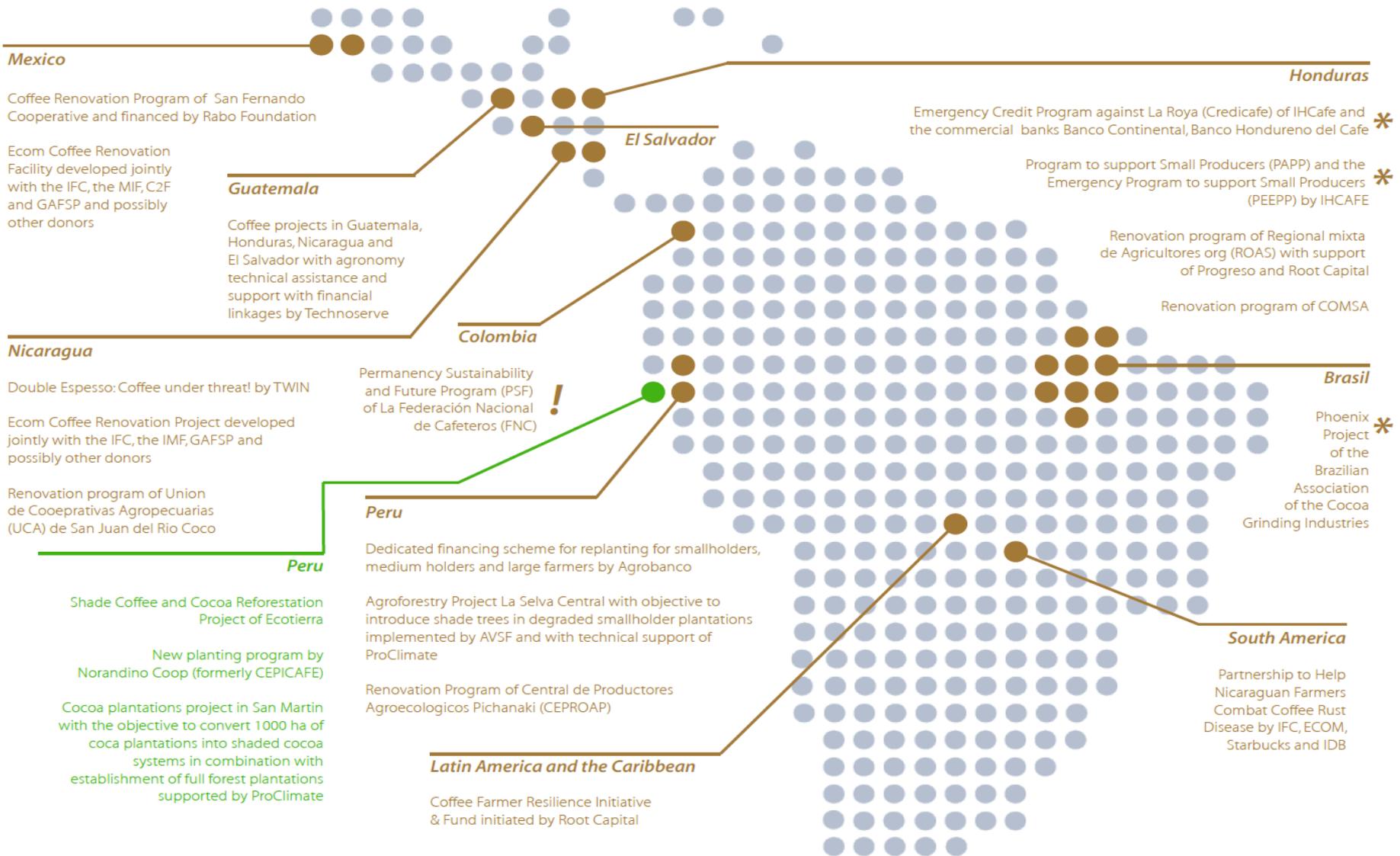
Long list of schemes and projects



The location of the R&R schemes and projects on the long list



R&R schemes and projects in Central and Latin America



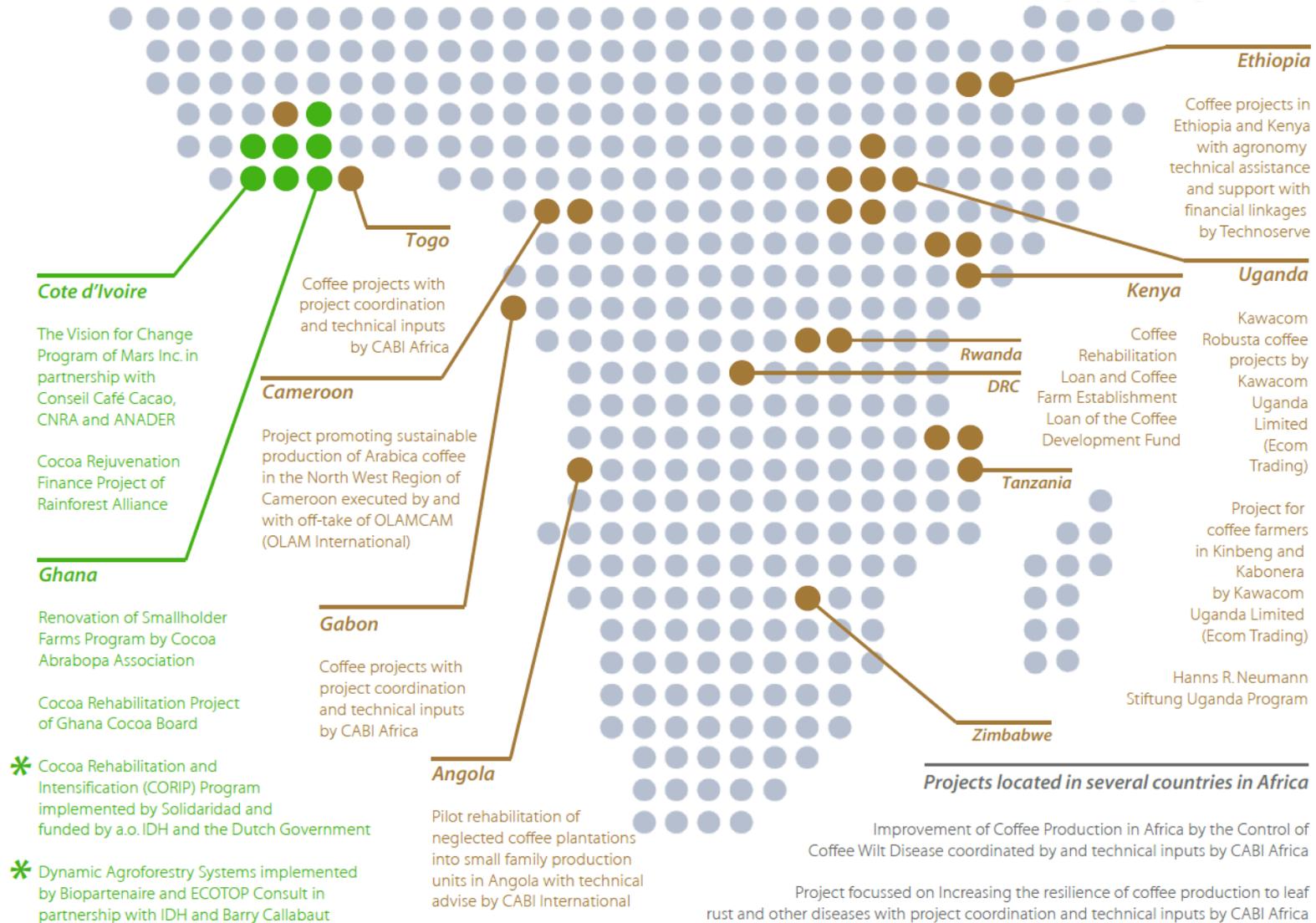
! = core case

* = example initiative

● COFFEE

● COCOA

R&R schemes and projects in Africa



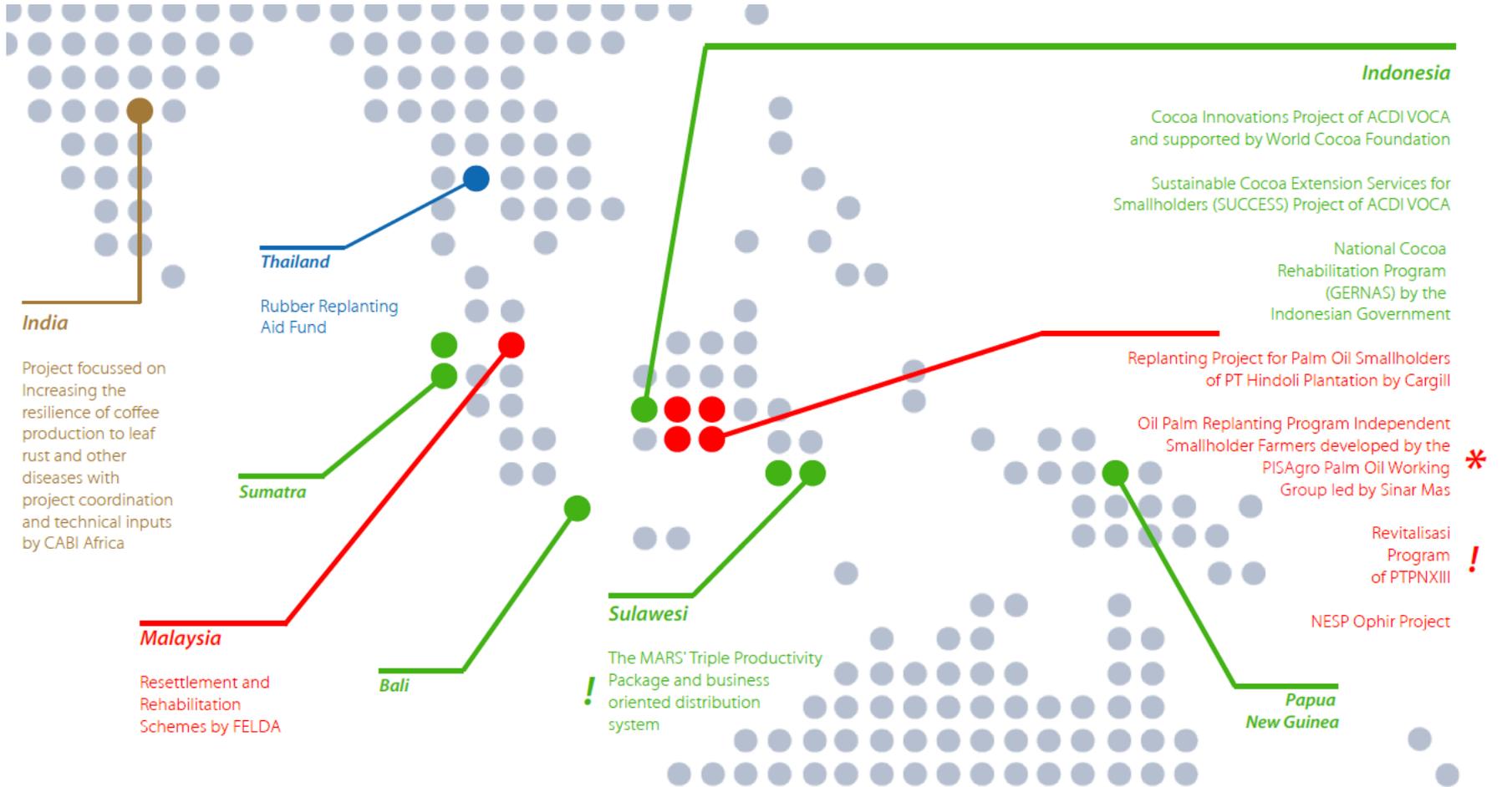
! = core case

* = example initiative

● COFFEE

● COCOA

R&R schemes and projects in Asia



! = core case

* = example initiative

● PALM

● RUBBER

● COFFEE

● COCOA

VIII

Summary Core Cases



Summary Core Cases (1)



	FNC	IHCAFE	MARS	PTPN XIII
Scheme Facts				
Country	Colombia	Honduras	Sulawesi, Indonesia	West-Kalimantan, Indonesia
Crop	Coffee	Coffee	Cocoa	Palm Oil
Lead	Farmer Based Organisation	Farmer Based Organisation	Privately owned company	State owned company
Name scheme	The Permanency, Sustainability and Future Programme		Triple Productivity Package and business oriented distribution mechanism	Revitalisasi program
Number of smallholder farmers	230000 (PSF) t.b.d. (Competividad) t.b.d. (others)	22500 (PAPP) 5100 (CrediCafe Programme)	48000 (by 2024)	2700 farmers of approx 38.000
Area (ha)	178.000 ha (PSF, Nov 2014) t.b.d. (Competividad) t.b.d. (others)	t.b.d.	50000 ha	5400 ha (2700 ha replanted and 2700 ha newly established) of 15.000 ha
Scheme rationale	Low productivity / loss trees due to La Roya	Low productivity / loss trees due to La Roya	Low quality supply, low productivity due to poor GAP/P&D control, reduction of cocoa farm area (shift to other crops)	Low productivity due to aged trees

Summary Core Cases (2)



Rabobank

	FNC	IHCAFE	MARS	PTPN XIII
Agromomic Approach				
<i>Development of varieties and agronomical knowledge</i>	FNC's R&D	IHCAFE's R&D	MARS R&D	Indonesian Palm Oil Institute
<i>Methodology</i>	Replanting, renovation	Rehabilitation and renovation	Grafting and/or replanting	Replanting
<i>Phasing</i>	Ideal complex, phased 11-20% p.a./farm, ongoing	One go (due to urgency)	25% p.a./farm(4 year period) ideally: one go	one go (due to economies of scale)
<i>Intercropping</i>	Yes, actively promoted	No	No specific focus , shade tree management	No
R&R Package & providers				
Agronomists /GAP training	FNC	IHCAFE	CVC's *) linked with MARS	Supervisors / agronomists local units
Planting Material supply	FNC supplies seedlings to farmers	IHCAFE supplies seeds to farmers	MARS supplies clonal material to CVCs. CVCs sell seedlings and grafting services to farmers	PTPNXIII provides seedlings
Inputs	Third party	IHCAFE / Third party	CVC's linked with MARS	PTPNXIII

*) CVC , cocoa village center, is an economically independent Enterprise

- Rabo International Advisory Services B.V.
- Final Report

Summary Core Cases (3)



	FNC	IHCAFE	MARS	PTPN XIII
Finance				
Finance arrangements	Banco Agrario guaranteed by FNC + FinAgro	Papp: IHCAFE CrediCafe: Banco Continental + Bahncafe guaranteed by Fiduciary Fund	Not yet	BRI guaranteed by PTPN XIII
<i>Payment record</i>	Guarantees called in <1% since 2008	Not available	N.A.	KKPA scheme: PTPNXIII has made approx 33% of finance payments
Subsidy element	FNC's Competividad Programme + Equity investment by FinAgro	Papp: 6 year loan for inputs, no interest payments CrediCafe: lower ROI of banks compared with other facilities	N.A.	Subsidised interest rates investment period
<i>Finance needs for (upscaling) scheme</i>	Finance needs covered by current arrangements	Need for additional funding to reach more farmers	Need for funding investments CDC-CVC network and at farmer level input/investment finance	Need for funding of the replanting activities
<i>Low cash flow period</i>	Phased approach + active promotion of intercropping + labour is financed during investment period	Other sources of income.	Phased approach + temporarily intercropping to generate cash + informal loans + input finance	Farmer income is financed during construction period + other sources of income

Annexes Case Descriptions and farmer stories



Annex

A	Description Core Case : Coffee – Colombia - FNC
B	Description Core Case: Palm Oil – Indonesia - PTPN XIII
C	Description Core Case: Cocoa - Indonesia - MARS
D	Example Initiatives: Coffee (IHCAFE, Coffee Farmer Resilience Initiative), Cocoa (Phoenix, CORIP, Barry Callebaut / Biopartenaire), Palm Oil (SinarMas/PISAgro)
E	Stories of cocoa farmers in Sulawesi

Contacts



Rabobank

Rabobank

Office address – NL
Croeselaan 18/28
3521 CB Utrecht

Postal address
P.O. Box 17100
3500 HG Utrecht
The Netherlands

RABO DEVELOPMENT/RIAS Agribusiness

Hans Bogaard
Head Agribusiness
T. +31 30 21 30073
M.+ 31 6 515 03468
Hans.Bogaard@rabobank.nl

Elies Fongers
Senior Project Manager
M. +31 6 13 49 13 60
Elies.Fongers@rabobank.nl

Miranda Visser
Project Manager
Miranda.Visser@rabobank.com