The 2020 Roadmap to Sustainable Indonesian Cocoa

2018 updated version – including performance review

Commissioned by the Cocoa Sustainability Partnership

COCOA SUSTAINABILITY PARTNERSHIP
CSP

NewForesight

This document contains the 2020 Roadmap created in 2013 with an update of the current state of the sector

Reading guide

1. INTRODUCTION

A brief overview is presented of the 2020 CSP roadmap strategy and targets together with a high-level overview of overall progress in the sector.

2. THE ROADMAP AND ITS DEVELOPMENT

Each of the topics of the roadmap is explored, including the consensus and the recommendations formulated in 2013, and the current state of the sector.

3. ANNEX

Further details on the process are included, along with the list of people consulted for the update of the Roadmap.

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1. INTRODUCTION

Preface

In 2013 the CSP developed a Roadmap to guide its members towards a thriving, sustainable Indonesian cocoa sector by 2020. The members decided that for this to happen, farmers needed to double their productivity (and increase their quality) in a sustainable way – without deforestation. This would attract the next generation of cocoa farmers, halting the rising average age of cocoa farmers in the sector.

It has been over four years since the formulation of the roadmap. Many things transpired in the sector, and the CSP stakeholders have all been active in making the Indonesian cocoa sector more sustainable. CSP itself is at a crossroad, and its Supervisory Board commissioned NewForesight to do a review of where the organization is and where it can go over the coming years. As part of this review:

1) Progress in the sector was reviewed. The original Roadmap called for a baseline and measurement of progress against a set of key KPIs over time. That never happened and this update is the first reference point to assess Roadmap progress. It presents data compiled on each of the building blocks to highlight progress made since 2013.

2) The 2013 Roadmap was updated and shortened. This Roadmap is an updated version of the 2013 original. In the process, the lay-out of the Roadmap was improved and the length drastically shortened. The document no longer contains much of the explanations and background research of the original. The focus is on the original consensus and the progress made.

It should be noted that this document is not a fundamental revision of that original consensus and does not contain additional focus areas. The main targets of the Roadmap remain, while some of the recommendations have been revised to take account of the current situation. In two ways mainly: First, in facilitating *access to finance* for farmers, the focus has shifted from loan-giving to savings and self-funding. Secondly, the potential of *farmer organizations* has not been realized and is no longer seen as a focal point for delivering services to farmers. Companies and NGOs have introduced other models of service delivery instead.

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The 2020 CSP Roadmap targets: a tiered approach
(as agreed during September 2013 GA)

2020 CSP Targets

Productivity	Farmer of the Future
Farmer productivity should be doubled… ***Target: double productivity***	…which will make cocoa a profitable business that will attract a young generation of cocoa farmers. ***Target: maintaining an average farmer age of 40 across the sector***

Strategic targets (KPIs)

Increase in productivity x higher quality = higher income for the farmer

Increase in productivity x no further deforestation = higher production

- The Roadmap is an ambitious answer to a difficult context of declining national production, with many (of the more talented) farmers leaving the sector for other crops like palm oil. CSP members recognize that the Indonesian cocoa sector can regain its vitality only by building a strong **business case for the farmer**. Otherwise farmers will continue to switch to other crops.
- That business case is to be built on **productivity** foremost, and on the **quality** of the beans.

- *The former was monitored quite well by different CSP members and is reviewed in this document. It was not possible to obtain credible data on bean quality or differentials sector-wide.*
- *Age data is hard to monitor within a short period, but it appears the average age remained stable at 43.*
- *Information on cocoa-related deforestation in Indonesia could not be found for the post-2013 period. Existing analysis spans the period up to 2010 only, when much of Sulawesi saw deforestation for cocoa farming.*

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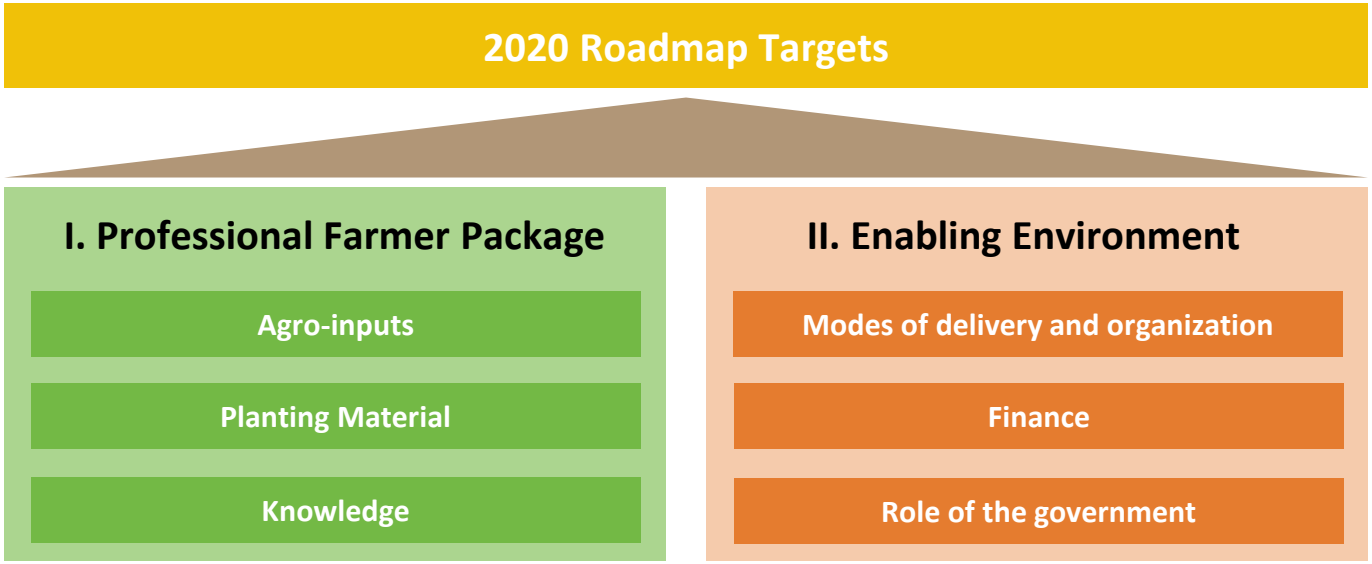
The Roadmap is divided into two tracks (focus areas): professional farmers and the enabling environment

The consensus of stakeholders is to focus on two tracks and six building blocks. The two tracks are inter-connected and together creates the necessary conditions for the business case for cocoa farmers. The main consensus points are:

- Stakeholders should **work with the top farmers in the sector** and facilitate access to the **Professional Farmer Package** consisting of:
  - **Training:** with a serious commitment to invest in training the *trainers of trainers*, which remain in undersupply. [*Members envisioned organizing farmers in cooperatives (at scale) to enable provision of training and inputs, but this proved not to be effective*]
  - **Fertilizer** is needed to unlock higher levels of productivity. The main factor in this is knowledge on proper use together with greater production and dissemination of cocoa-specific fertilizers
  - **Planting material** is widely available but new and better varieties need to be fed into the sector at scale.
- **Access to finance** will have to be addressed, and farmers should become able to pay for the fertilizer through savings and/or loans. **Business principles** will need to be a core component of training programs.



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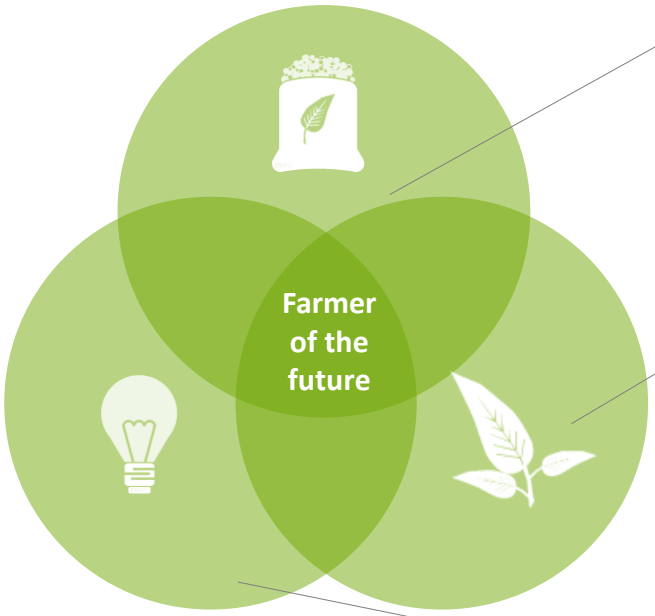
The **Professional Farmer Package** consists of three vital components for the farmer of the future

Stakeholders agree that to increase yield across the sector, farmers most be taught GAPs and business management skills in combination with the appropriate use of quality agro-inputs and planting material



Farmers using quality agro-inputs

A set of productivity-enhancing agricultural inputs (addressing availability, use and quality of), i.e.:
- Fertilizer (including compost): organic or inorganic material added to a soil to supply essential plant nutrients and improve soil health and structure;
- Pesticides: chemical or biological agents to fight and control cocoa pests (e.g. insects, fungi, weeds) and disease.

Farmers using new and improved planting material

The availability of (approved and affordable) planting material to farmers, including:
- Propagation models (e.g. seeds, grafting, cuttings, somatic embryogenesis)
- R&D of high-yielding, pest-resistant cocoa clones;
- Nursery development (for cocoa and shadow/fruit trees);
- Approval and quality control of clones and nurseries.

Farmers with knowledge on GAPs & business management

A training package providing all necessary knowledge & skills for the professional Indonesian cocoa farmer, including:
- Good Agricultural Practices (GAPs) for sustainable cocoa farming (incl. proper use of agro-inputs, planting material);
- Business & management skills (incl. financial management and farmer organization).

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To enable the future farmer, improving the **enabling environment** is vital

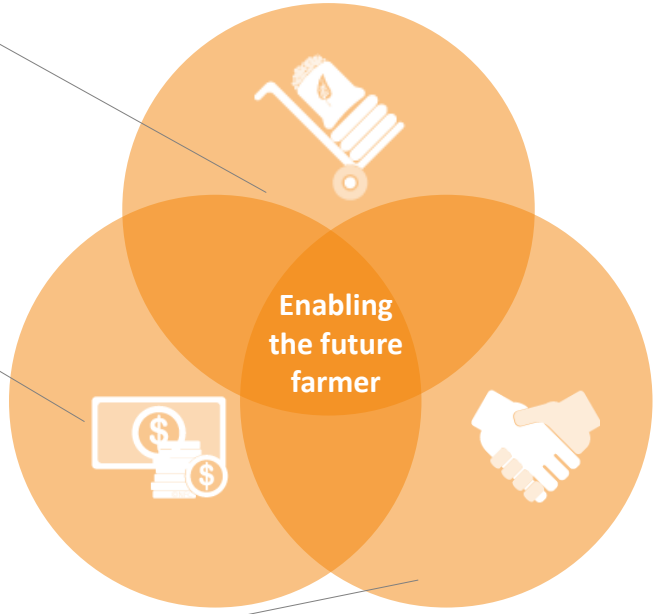
Effective organization of farmers and delivery of services (inputs & finance), together with government collaboration, is needed to enablethe farmer business case

Modes of delivery being efficient, driven by greater organization

Enable the effective, large-scale adoption of best available agro-inputs and knowledge. This includes organizational networks (e.g. extension services, farmer organization, value chain partners) as well as modes of communication and training.

Farmers having access to finance

Strengthen farmers' financial resource management and access to financial services, supporting them to finance the Professional Farmer Package and other productive (long term) investments.



Industry and government aligned and collaborating

Seek reinforcement of the CSP Roadmap by the Indonesian government where possible, including:
- Alignment and synergies with government policies;
- Sharing responsibility and resources;
- Coordination and communication with local and national government.

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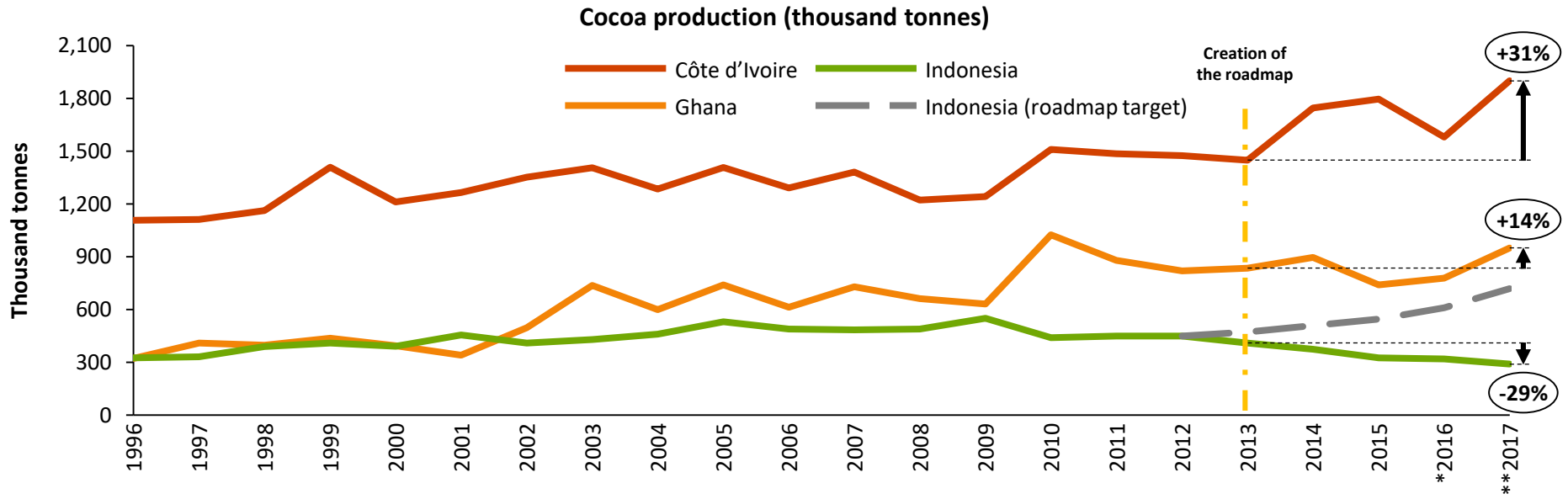
The overall state of the sector: National production in decline

- Indonesian cocoa production has been in decline over the past years. Indonesia experienced a 29% decrease in production over 2013 to 2017, while in the same period Côte d'Ivoire and Ghana both increased national production.
- Pressure on cocoa farmers' income is driving many farmers to other crops, particularly higher earning oil palm production. 33% of farmers have left the sector since 2012.[1)]
- The pressure on income is driven by low productivity and rising costs. Productivity is decreasing (mainly) due to large amounts of old, unproductive trees (10.5% of all trees)[1)] and depleted soils. Natural soil nutrients have not been replaced, and the consistent use of less suitable fertilizers is acidifying soils.
- The current production decline is to a minor extent related to more active farm rejuvenation over the past years, with younger trees not yet reaching productive age.



Notes: 1) Indicative data, Swisscontact analysis, March 2018
Source: ICCO
* Estimates,** Forecasts

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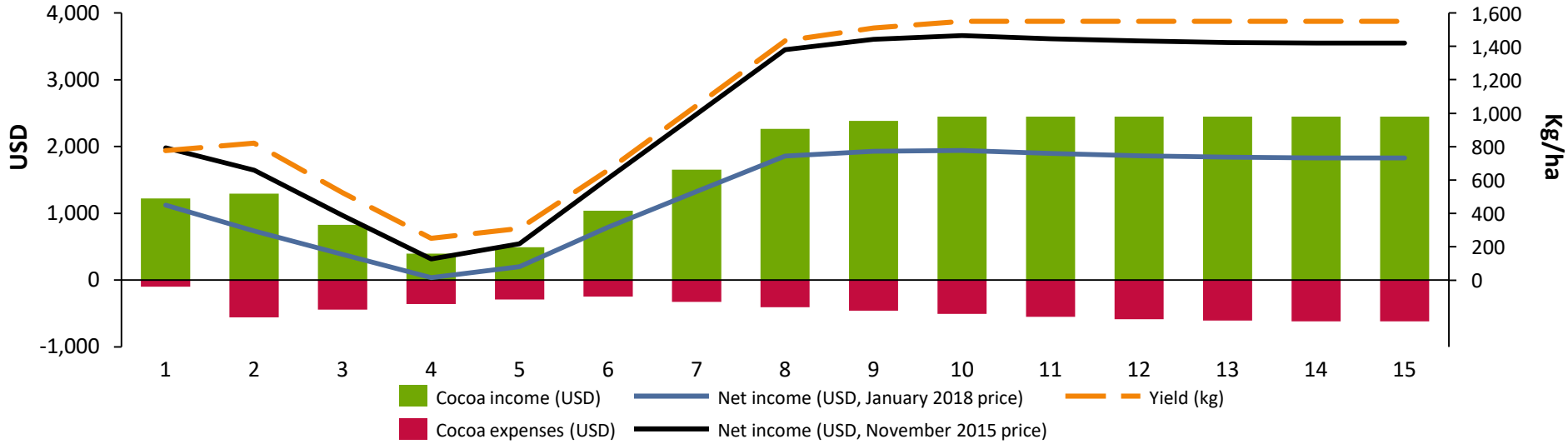
The business case for the cocoa farmer remains volatile

- In 2013, the business case for the Indonesian cocoa farmer compared unfavorably to palm oil (and other crops) with net income from cocoa generally varying between 500 and 1,400 USD/ha.
- Since then, interventions from CSP companies have proven that farmer income can be raised under the right conditions, and that a business case can be made for the farmer. In 2017, the average income for a cocoa farmer supplying a CSP company was 1,576 USD/ha.[1)] For a cocoa farmer to make a competitive profit, he has to make use of a combination of GAPs, quality inputs (notably fertilizer) and high quality planting material, i.e. the Professional Farmer Package.
- However, farmer income remains volatile and varies greatly. Company data showed incomes between 652 and 3,700 USD/ha.
- The graph below simulates the farmer business case over time adopting the professional farmer package, and shows the variation in net income in relation to world market prices (ranging from 1,975 to 3,360 USD/MT between November 2015 and January 2018). With the professional farmer package average net income, over a 15 year period, was 1,306 and 2,536 USD/ha for the low and high price environment, respectively.

Farmer business case (100% rejuvenation)[2)]



Sources: 1) NewForesight analysis from data submitted by four companies. 2) All calculations were made using the World Cocoa Foundation Farmer Economic Model available online at https://hub.cocoaaction.org/econmodel/public/. The model assumptions were adjusted for Indonesian conditions.

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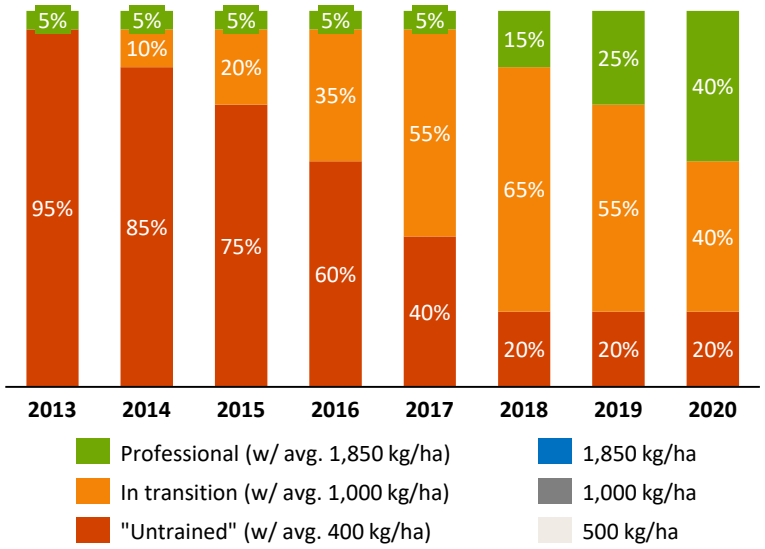
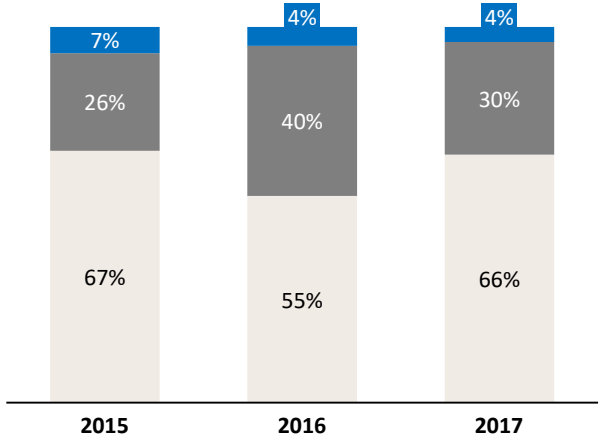
Transition pathway towards farmer professionalization

Farmer segments, 2013-2020 Roadmap targets



Farmer segments, 2015-2017 measured among SCPP farmers[1)]



- The original Roadmap envisioned a phased approach and targeting strategy to get 40% of the total farmer population to be 'Professional Farmers' and 40% 'Farmers in Transition' (in training to become professional) by 2020. The top figure shows the phased approach of the transition pathway. The numbers shown in the graph assume successful adoption of the Professional Farmer Package only.
- Measured by SCPP farmers' productivity, in 2015, the farmer segmentation was actually ahead of the roadmap targets with farmers in transition six percentage points higher and professional farmers two percentage point higher than the target.
- Since 2015, the development has not been as rapid as projected in the Roadmap with the share of farmers in transition 'only' at 30% (in contrast to the target of 55%). The share of professional farmers is consistent at 4%, a percentage point below the target.
- Given that the analysis of SCPP farmers are based on productivity alone, the lower share of farmers producing around 1,000 kg/ha ('farmers in transition') compared to the Roadmap target is likely caused by a recent increase in rejuvenation efforts, and the resulting young (unproductive) trees.
- Analysis of company data[2)] suggests that the share of professional farmers in 2017 may be higher at 10% of farmers in the companies' supply chain.

Notes: 1) NewForesight analysis of raw Swisscontact data on 12,514 SCPP farmers. Analysis include farmers enrolled into SCPP training between 2010 and 2014. 2) NewForesight analysis from data submitted by four companies.

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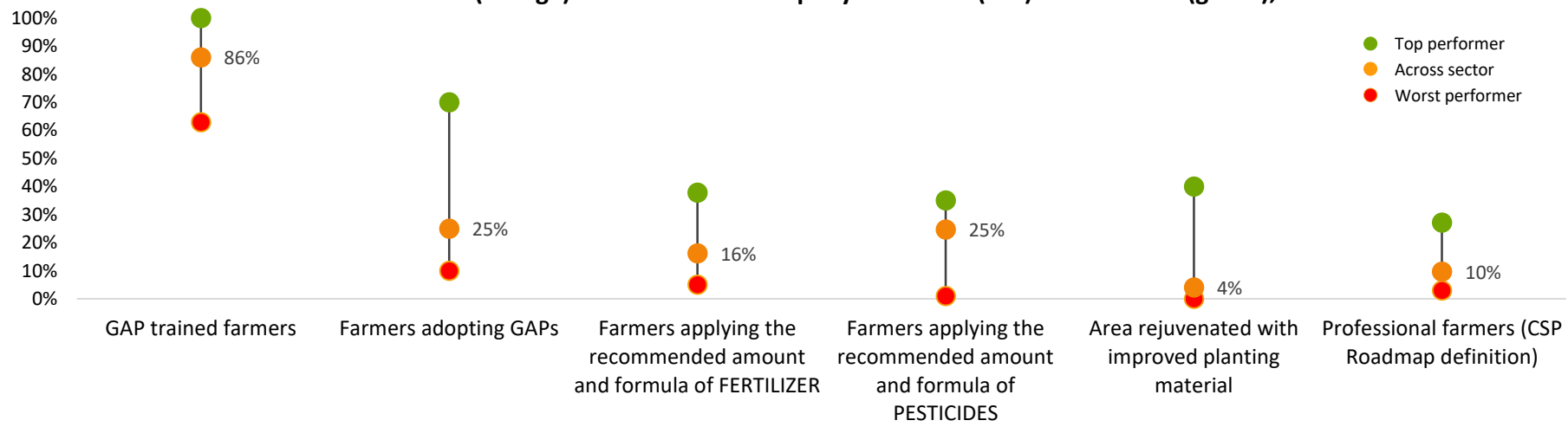
A quick look at the current situation of the Roadmap building blocks

- The graph below presents the key blocks of the Roadmap and the current state within each area based on an analysis of data submitted by CSP companies covering a total of 115,500 farmers and 105,900 hectares of cocoa production in 2017. The data has been aggregated to show the general status across the sector (the orange bullets).
- The graph also depicts the company performing best within each area (the green bullets), and the company performing relatively worst (the red bullets). No company scored best or worst in all categories.
- Overall, the majority of farmers has been trained in GAPs (86% of all farmers) with one company having trained all of its farmers (100%). It is however striking that only 25% of all farmers (including non-trained farmers) adopt GAPs.
- The share of farmers applying the company-recommended formula and amount of fertilizer and pesticides, respectively, is at 16% and 25%, indicating that agro-inputs are either not easily available or payable. Worse yet, of the total area covered (105,900 hectares), only an estimated 4% is rejuvenated with improved planting material.
- The wide range between the best and worst performing companies in each category, but relatively smaller gap between the sector-wide status and worst performing companies, suggests that the top performers are individual companies who managed to support farmers better within a specific category.

Sector-wide status (orange) and individual company minimum (red) & maximum (green), 2017



Notes: Based on data submitted by CSP member companies to NewForesight. The data is based on company self-reporting and only represents farmers supplying to the companies. Therefore, numbers **do not** represent the entire country. Numbers on country-wide status presented elsewhere in the Roadmap may therefore differ.

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2. THE ROADMAP AND ITS DEVELOPMENT

Consensus and recommendation

Knowledge and training

Consensus

- Basic GAPs (especially PsPSP) are essential for healthy cocoa farms and should be known and applied by all farmers.
- Applying GAPs could greatly increase farmer productivity without large financial investments or environmental strain.
- Business management skills are vital in order for them to treat their farms as efficient businesses.
- With business management skills farmers can learn to understand the business case of a productive cocoa farm and the investments they need to make in order to create the most efficient and productive farm.

Recommendations	Actions
Determine a sector-wide supported curriculum	• Determine the broadly supported GAPs and management practices in detail • Determine how advanced GAPs should be included
Make business skills a common component of training manuals	• Include financial bookkeeping, cocoa production logbooks and general financial literacy into the standard curriculum of cocoa farmers
Uncouple training manuals from certification efforts	• Develop manuals separately from certification training programs in order to reach other farmers and focus on a greater variety of GAPs
Determine how training modules will be used	• Choose whether training modules/content is fixed per training or if some are optional • Choose for a top-down (service provider decides training curriculum) or bottom-up approach (farmer decides curriculum)

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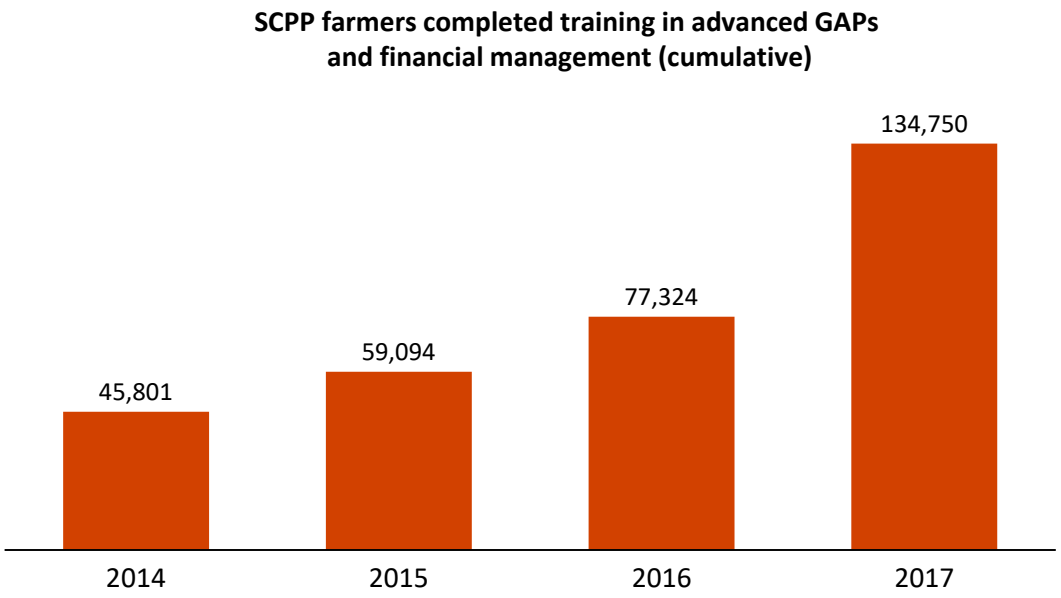
State of the sector

Knowledge and training



- There has been a great rise in farmers trained in advanced GAPs and financial management. In 2014, SCPP trained 45,800 farmers. In the three consecutive years, SCPP trained a further 89,000 farmers.
- Together with the Ministry of Agriculture and ICCRI, in February 2018 CSP launched a National Curriculum and Training Modules for Sustainable Cocoa Good Agriculture Practice and Post-Harvest.
- Companies have particularly increased focus on (training of) farmer financial management and literacy supporting the larger drive towards farmers' bankability and self-funding capacity needed to finance the implementation of farm practices taught (GAP and better input use).
- Companies have increased focus on enhancing the training capacity, focusing on training more trainers and improving infrastructure; According to company data[1)], 467 new trainers have been trained, and 112 demo plots have been created to demonstrate GAPs.

Notes: 1) NewForesight analysis from data submitted by four companies

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Consensus and recommendation
Agro-inputs: Fertilizer

Consensus

- Farmers should apply a mix of organic and inorganic fertilizers and learn how to produce organic fertilizers out of their waste products, and how to correctly apply them.
- A compound fertilizer should be designed that meets the specific needs of cocoa.
- Farmers and farmer organizations need access to financing possibilities for the appropriate fertilizers and/or to subsidized fertilizers.
- Farmers have to learn business skills to see farming as a (viable) business, and the fact that it needs inputs in order to generate outputs.

Recommendations	Actions
Invest in quality training on fertilizer use	• Make fertilizer application a prominent component of GAP package • Demonstrate effect of fertilizer use to farmer • Teach farmers about the business case for fertilizer use
Solve the problem of large-scale soil acidification	• Promote and enable soil liming of acidified cocoa farms on a large scale
Innovate in producing effective fertilizer (locally)	• Involve local actors in the fertilizer industry • Develop the proper formula for a cocoa-specific compound fertilizer
Address access to finance for fertilizer purchase	• Explore options for supply chain pre-finance (see 'access to finance' section) • Involve government to reform subsidy schemes to reach target farmers and get effective distribution
Strengthen farmer organizations to access and buy fertilizer collectively	• Stimulate farmers to be organized • Increase efforts on farmer organization strengthening
Invest in marketing of cocoa-specific fertilizer and its beneficial properties	• Find channels through which to inform farmers about the appropriate fertilizers on the market • Cooperate with farmer extension service providers • Make cocoa-specific fertilizers affordable and available to farmers

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Consensus and recommendation
Agro-inputs: Pesticides

Consensus

- There is a general concern about the current excessive and ineffective use of pesticides. These concerns involve health and environmental issues, input ineffectiveness and crop loss. All stakeholders agree that action is needed regarding these issues.
- The CSP members agree that farmers should have access to those pesticides and methods that can adequately solve their pest and disease problems, while minimizing health and environmental conditions as much as possible.
- Stakeholders recognize the need for farmers' knowledge on the following topics:
  - Identifying and understanding pest and disease;
  - Necessary skills for appropriate pesticide application (including methods that may make pesticide use obsolete on some occasions);
  - Negative health and environmental impacts.

Recommendations	Actions
Training programs should include responsible pesticide use	• Clear inclusion of responsible practices in training manuals and adaptation
Consensus on good practices	• Need for common consensus on chemical fertilizer application and maybe certain bans (e.g. within guidelines of international conventions and WHO)
Adoption of innovative methods	• Increasing attention to development and promotion of the next generation of pesticides (incl. safer and more target-specific pesticides, organic pesticides and natural predators)
Long term: move towards biological methods	• Promote the adoption of organic alternatives and natural pest predator methods

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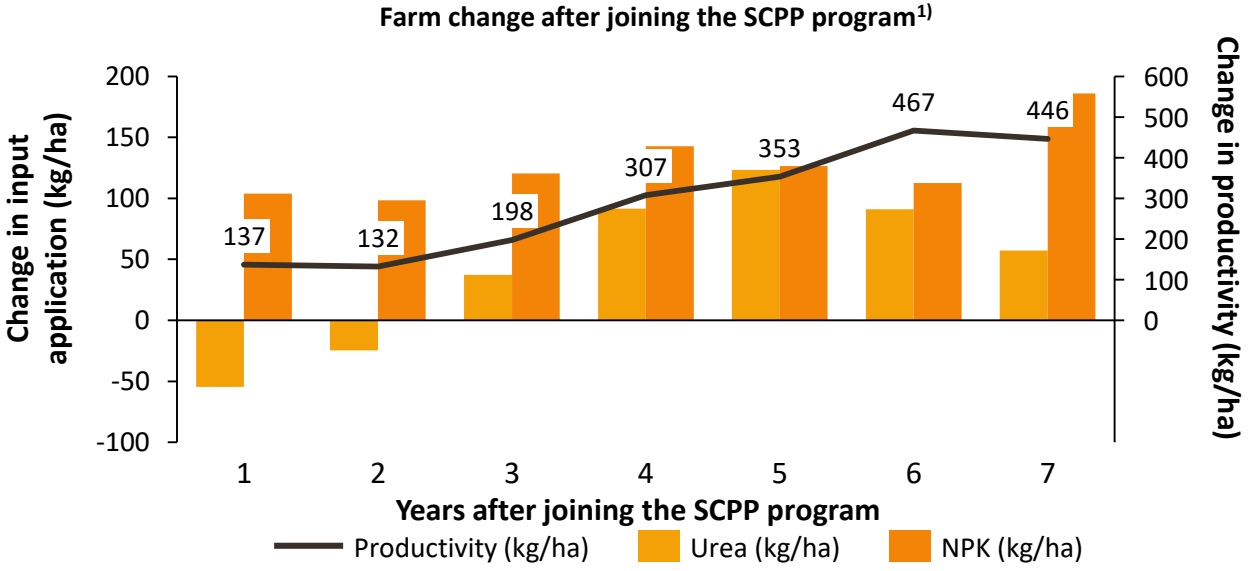
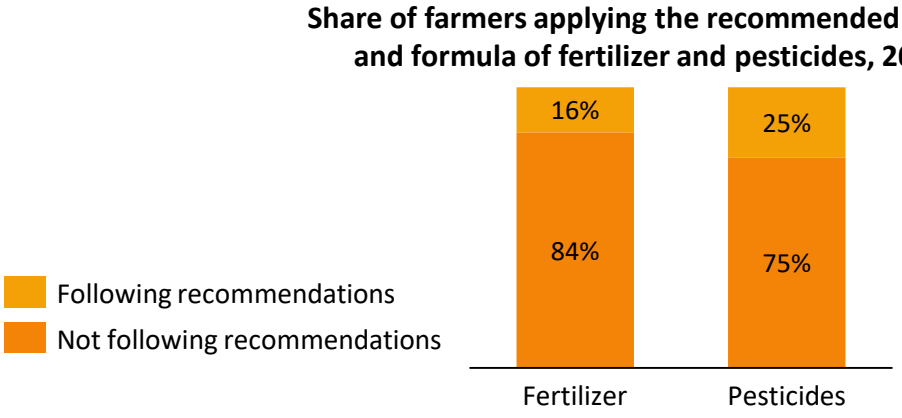
State of the sector

Agro-inputs





- NPK fertilizer is typically in 15-15-15 or 20-10-10 ratios with N applied as ammonia which leads to acidification of soils (unless off-set by lime or dolomite). Urea and NPK also do not contain secondary or micro nutrients.
- Since early 2016, a few producers of organic fertilizers started selling cocoa-specific fertilizers, the most well-known being "pupuk organic NASA" produced by PT. Natural Nusantara. However, there are no signs of significant increase in uptake of cocoa-specific fertilizer, as farmers still tend to use government-subsidized fertilizer and low cocoa prices have discouraged farmers from investing in higher quality fertilizers.
- The CSP agro-inputs task force sought to ensure a common practice on soil fertility among CSP stakeholders and in 2017 developed a fertilizer nutrient ratio for nutrient replenishment (see annex).
- Companies now have individual testing of impact underway, and some have already started small-scale production for propagation to farmers.
- Meanwhile, 16% of companies' farmers use the currently company-recommended amount and share of fertilizer, while the number is higher at 25% of farmers for pesticides.

Notes: 1) NewForesight analysis of raw Swisscontact data on 14,000 SCPP farmers. A direct relationship between fertilizer use and productivity is not inferred. 2) NewForesight analysis from data submitted by four companies. Note, interpretation of recommended amount and formula can vary among companies based on company-specific recommendations.

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Consensus and recommendation
Access to Finance

Consensus

- Farmers resource management is poor and has to be strengthened; farmers self-funding capacity has to be promoted and taught.
- Savings must be considered and promoted as an appropriate method to accumulate funds as working and investment capital.
- Commercially attractive and appropriately designed loans are needed for cocoa farmers. Identification and proper loan analysis is part of the product design.
- Farmers' lack of collateral, track record and financial illiteracy need to be addressed.
- The high interest rates of micro-sized loans typical for cocoa farmers and their struggles with repayment rates should be tackled.
- Local institutions need to be involved more, and farmer organization promoted and strengthened (including portfolio building and complementary technical assistance).
- Loan guaranties through public-private partnerships can be explored in order to develop new models.

Recommendations	Actions
Involve financial Institutions more in cocoa smallholder financing	• Strengthen the business case for financial institutions; this includes effective risk evaluation and reduction tools, proper loan analysis based on farmer cash flow and other farmer characteristics and appropriate product design • Capacity building (cocoa literacy) of financial institutions to make them understand the cocoa value chain
Explore private sector pre-financing to farmers	• Financing is not a core competency of traders and dealers, but it can serve as strategic support for their supply chain if a supply chain partner is interested, design of financing schemes should ideally include financial support and technical assistance • Risk management tools are a key part of supply chain (pre)-financing
Strengthen farmers' resource management (financial literacy, self-funding capacity)	• Promote farmer savings schemes (ensuring less exposure to shocks and external financing) • Roll out farmer training on financial literacy and farming business skills
Focus on organizing farmers	• Strong, bankable, self-initiated and self-motivated farmer groups are of paramount importance for knowledge sharing and joint efforts, e.g. stronger marketing/sales positions

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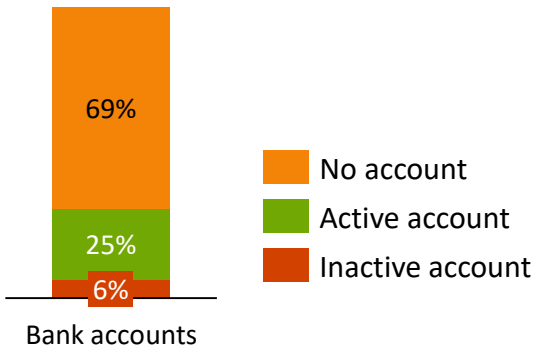
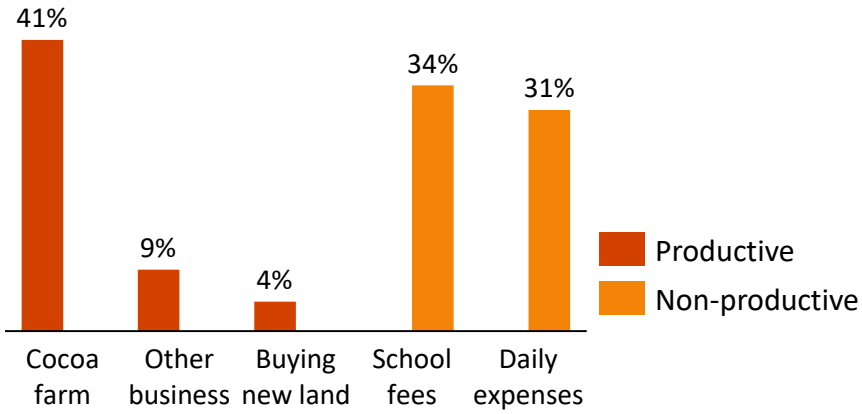
State of the sector

Access to Finance

Share of SCPP farmers with bank accounts, 2016



Use of loans, 2016



Notes: 1) NewForesight analysis from data submitted by four companies

- Since the Roadmap's inception, there has been a change in focus from company-financed farm changes to strengthening farmers' resource management and savings capacity. Strong, bankable farmers is now the norm.
- There has also been a major drive from cocoa companies, the financial sector, and the government alike towards access to finance.
- Companies have worked with banks and financial institutions. A bank staff training manual has been developed with thus far 171 bank staff trained. Banks now play a more active role and participate in farmer training to raise awareness on the importance of savings and banks' loan requirements.
- Innovations include branchless banking using cocoa bean traders as banking agents, some companies have started transferring certification premiums directly to farmers' accounts, SwissContact and GrowAsia are working on a credit scoring system, and BRI has introduced a new savings product, SIMPEDES Tani, with only 10,000 IDR opening balance, no monthly fees and an ATM card.
- As a result, cocoa farmers' access to loans has increased, albeit from very low baseline with only 5.31% of farmers having had experience with formal loans, and only 1.91% of farmers currently having a formal loan outstanding. Farmers owning a savings account has increased 47%.

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Consensus and recommendation
Farmer organization and modes of delivery

Consensus

- Extension services and training play a pivotal role in achieving the roadmap's productivity targets.
- There is a high need to increase the number and capacity of trainers and extension agents by all stakeholders.
- The existent networks should be leveraged for dissemination of knowledge and inputs.
- Public-private partnerships in extension services should be promoted.
- Extension interventions should be able to provide access to all components of the Professional Farmer Package by cocoa smallholders.
- Monitoring and evaluation of the uptake and effectiveness of extension services is essential and should be a standardized practice in all programs

Recommendations	Actions
Increased training and support to extension agents	• Training the right profile of entrepreneurial business men and women • Develop self-sustaining business models around planting material and the distribution of agro-inputs • Involve public extension agents
Explore involving local trader networks and buying stations	• Stimulate buying stations to expand training to productivity increasing practices and input use • Explore the role of local trader networks and interests
Support participatory extension approaches and virtual learning	• Support farmers' own initiatives, experiments and requests • Explore using a virtual hub as a knowledge sharing platform
Monitoring and evaluation as standard practice	• Introduce M&E aspects on impact and adoption or extension services into existing programs • Make M&E standard practice on all CSP initiatives in order to evaluate effectiveness and progress

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State of the sector

Farmer organization and modes of delivery

Four modes of delivery

(Generally companies employ hybrid models – *examples are for illustration purposes*)

Community model

Example: Cocoa Life Mondelez

Works through farmer communities, including a social focus in addition to providing training on (farming) best practices and supporting technologies that enable a higher income

Farmer entrepreneurship model

Example: Cocoa Doctor, Mars

Trains farmers in agronomy and intensive business skills (marketing and management); graduates provide private extension services to other farmers and function, in some cases, as entrepreneurs selling planting material and agro-inputs

Company and NGOs extension service model

Example: SCPP, Swisscontact

Does extension work and other interventions through a paid service provider or through the own supply chain organization (or a combination)

Collector/local trader model

Example: Cargill

Chooses local collectors to deliver services to the farmers; due to the existing close relationship to farmers through trading, farmers already trust to the collectors

- The original Roadmap set out a goal of organizing an additional 20% of the total farmer population into cooperatives (up from an estimated 10% of total cocoa farmers already organized in 2013). The aim was to organize service delivery around strong farmer organizations.
- However, the potential of farmer organizations has not yet been realized with estimations of farmers currently organized in (functioning) organizations being constant, or even decreasing.
- The current business model of farmer organizations and regulatory framework (such as savings requirements for organizations) combined makes it unprofitable for farmers and organizations.
- Other issues impeding organizations from being successful include side-selling, lack of capital and cash flow restraints to function as intermediary trader, and general lack of trust. The latter remain a major issue and, as a result, farmers remain hesitant to cooperate in organizations. Culturally, organization does typically not go beyond village and blood lines, and trust to financial managers of farmer organizations is eroded due to farmers' previous experiences with corrupt authorities.
- As a result, companies have found other models of organizing farmers and delivering services (see types to the left).

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Consensus and recommendation
Improved planting material

Consensus

- CSP members agree that while the PM propagation and distribution structure in Indonesia is relatively effective the impact of using better varieties would be significant.
- Considering farmers only choose new PM every 20 years the cost of PM itself are limited. The real costs related to PM involve broader rehabilitation schemes.
- The need for rehabilitation remains high and farmers do not easily engage in rehabilitation at scale.
- Farmers should be encouraged to rehabilitate their cocoa area via demonstration of high-yielding varieties.
- The scale of rehabilitation should be determined by the financial capabilities and knowledge of the farmer.

Recommendations	Actions
Beef up research effort	• Engage in further research on PM, specifically related to pests and disease resistance; ensure precompetitive sharing of new varieties
Bring in genetic material from other countries	• Much is to be gained by introducing more varieties from abroad in Indonesia (after careful testing in local context)
Work with the capacities of farmers	• While the role of the government in certifying and the role of nurseries in distribution is acknowledged, farmers can provide grafting services for fees
Diversified nurseries	• Nurseries should provide for the entire farming operation (including shade trees)

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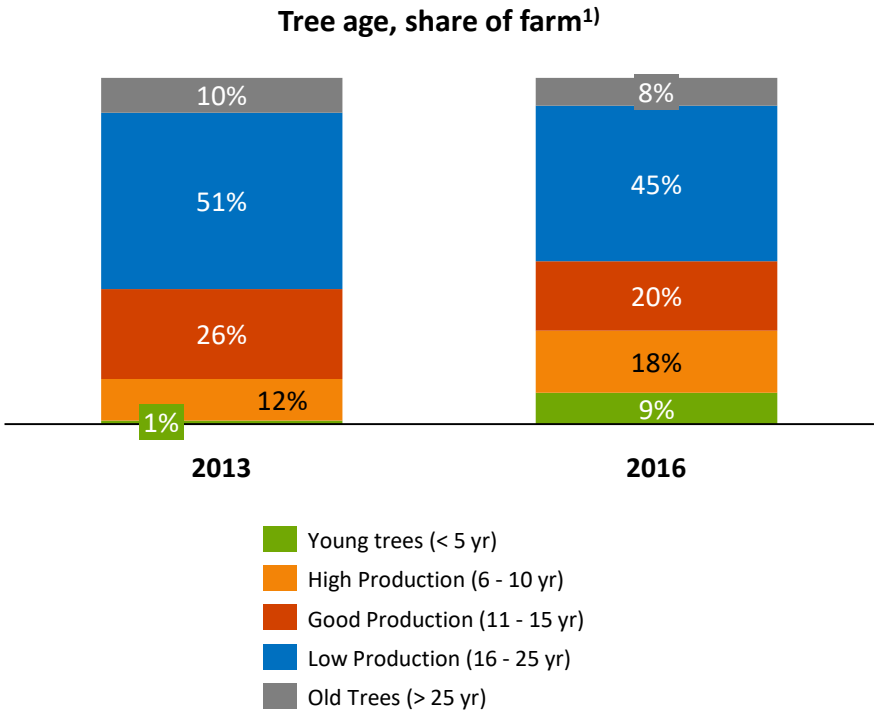
State of the sector

Improved planting material



- The use of improved high-quality planting material across the sector is not happening as foreseen in the Roadmap (75% of farmer population to rehabilitate 100% of their land by 2020).
- Government policies still complicate the issue of nurseries and propagation of improved planting material. Due to government distribution of low-quality seedlings to farmers, producers of higher quality seedlings cannot compete on price. Moreover, the distribution of free seedlings decreases the overall demand for planting material putting further downward pressure on prices. Finally, current government regulation that requires certification of seeds, seedlings and nurseries constrains setting up nurseries and distribution channels.[2)]
- This might reduce availability of planting material in the future. Considering that there is not enough planting material available already now, this could hamper the sector seriously.
- Problems also remain as planting density is still too low; farmers have an average of 777 trees/ha in contrast to the optimum of 1,100 trees/ha, and the average age of farms is only down one year from 17 to 16 years over the period 2013-17.
- Yet, farmers are slowly rejuvenating and the share of young trees is increasing (see left graph). Companies have also increased efforts and since 2013 established 2,458 nurseries (of which 2,419 are farmer-owned), produced over 1.5 million improved plantings, and created 21,123 trial plots with improved planting material.[3)]

Notes: 1) SwissContact (2013). Preliminary Baseline Report for CSP Roadmap (2013); SwissContact (2016). Rejuvenation of Indonesian Cocoa Farms: Boosting Productivity and Sustainability by Raising Superior Cacao Seedlings in Commercial Farmer-led Nurseries. 2) Swisscontact (2016). Rejuvenation of Indonesian Cocoa Farms. 3) NewForesight analysis from data submitted by four companies

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Consensus and recommendation
Role of the Government and M&E

Consensus

- One of the main keys to the success of this roadmap is the alignment with the Indonesian government through constant dialogue with the relevant government departments at national and local levels. Of specific relevance are the government-led district clusters, whereby local fora mobilize a coalition around action plans to improve the viability of the cocoa sector in a certain district.
- For the respective chapters of the roadmap, policy support should be sought. Specifically this is relevant for the agro-inputs chapter (on fertilizer), the planting material chapter (research and regulation), and the modes of delivery (inclusion of extension services in training activities).
- Good data is key, and a CSP baseline should be established. Getting the government involved in working on data gathering and sharing (with regards to the CSP baseline) will be crucial to successful measurement of roadmap implementation performance.

Recommendations	Actions
Integrate extension services into training delivery	• Training programs should integrate government extension services, building up their capacity to provide independent quality service delivery
Work with the government on district-level policy formulation	• Work with the government on convening local cocoa sector stakeholders at the district level to formulate cocoa cluster action plans
Set up a data gathering working group	• Convene a working group that includes the government to focus on improving joint data gathering/reporting
Integrate action plans of CSP roadmap and government agenda	• Convene a high-level government working group (preferably permanent) that aligns the roadmap with the government agenda; existing bodies such as PISAgro could be employed for this purpose.

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3. ANNEX

List of people consulted
Original roadmap

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List of people consulted
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Farmer business case calculations

All calculations were made using the World Cocoa Foundation Farmer Economic Model available online at https://hub.cocoaaction.org/econmodel/public/. The model assumptions were adjusted for Indonesia conditions.

The assumptions of the business case were as follows:

- Farmer starts GAPs in year 1 and fertilizer use in year 2
- Farmer starts rejuvenating 25% of his/her farm in year 3
- A further 25% is rejuvenated in each of the three following years, amounting to 100% rejuvenation, following the Roadmap trajectory in the Professional Farmer Package
- Planting density in year 1 is 775 trees/ha (the actual average Indonesian density) and 1,100 trees/ha (the optimal density) after full rejuvenation
- Average age of farm is 16 years (the average Indonesian tree age)
- Rejuvenation is done via grafting with costs of 0.375 USD/graft
- Farm-gate prices are calculated as 80% of ICCO world market price. The world market price in November 2015 (peak price) was 3,360.84 USD/tonne. The world market price in January 2018 is 1,973.94 USD/tonne
- Input use is set at 450 USD/ha and crop protection at 75 USD/ha
- It is assumed that all labor need is covered by the household

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The CSP recommended ratios for cocoa nutrient replenishment fertilizer

Parameter	Unit	Thresholds	
		Low	High
Macronutrients			
No3- (in Nitrate form	% in blend	12	18
P2O5	% in blend	12	20
K2O	% in blend	15	25
Secondary nutrients			
MgO	% in blend	3	8
CaO	% in blend	5	high
S	% in blend	3	10
Micronutrients			
B	% in blend	0.6	1
Zn	% in blend	0.4	0.9
Mn	% in blend		
Mo	% in blend		
Fe	% in blend		
Cu	% in blend		

There is a range of government-subsidized fertilizers available to farmers. However, all fertilizers are NPK in ratios such as 15-15-15 or 20-10-10 which acidifies the soil and does not contain secondary or micro nutrients. Despite this, the fertilizer is popular among farmers due to it being relatively cheap.

To restore nutrient availability to an acceptable balance, a cocoa nutrient replenishment fertilizer needs to be applied. This also maintains the current nutrient availability in soils that already have an acceptable level and balance of nutrients. A nutrient replenishment fertilizer can form the basis of a soil fertility optimization, combined with other fertilizer, to increase yields to its maximum potential.

The ratios in the CSP recommendation (see left) is based on a measure of nutrients removed in cocoa beans and cocoa pod husks. The ratios give a range within which the formula can be adjusted to cater for soil type and activities (i.e. seepage or leakage of different nutrients) and typical chemical interactions in the soil.

Sources: CSP (2017). Fertilizer Nutrient Ratio for Nutrient Replenishment: Guidelines and Principles for the Choice of Appropriate Fertilizer for Cocoa. Prepared by Task Force Agro Input and Planting Material Cocoa Sustainability Partnership

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