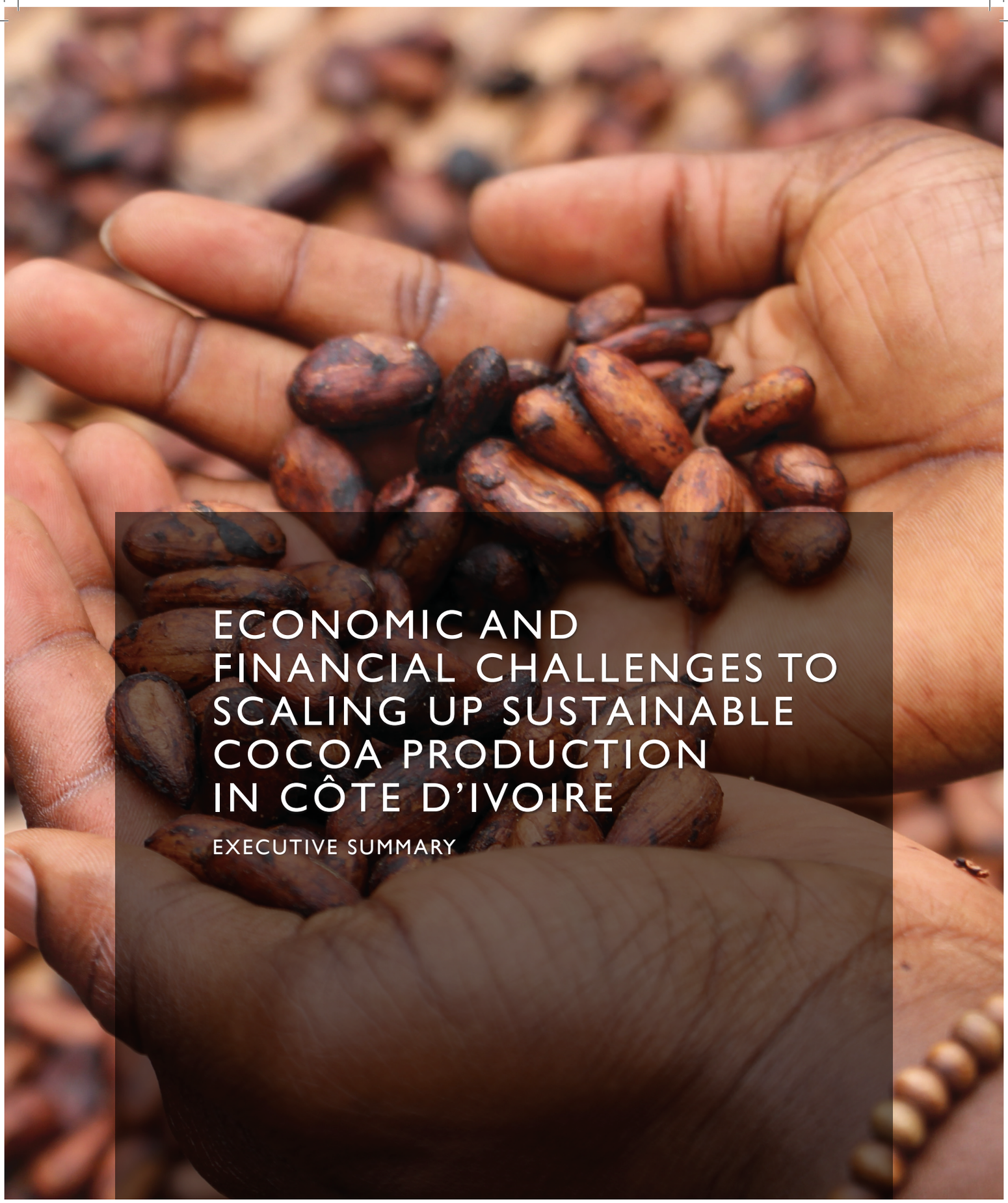


ECONOMIC AND FINANCIAL CHALLENGES TO SCALING UP SUSTAINABLE COCOA PRODUCTION IN CÔTE D'IVOIRE

EXECUTIVE SUMMARY

REDD+ CÔTE D'IVOIRE
Réduction des Emissions de gaz à effet de Serre issues de la Déforestation, et de la Dégradation des Fôrets

UN-REDD PROGRAMME
Food and Agriculture Organization of the United Nations
UNDP
UN environment

UN environment
United Nations Environment Programme

EUREDD Facility

KEY MESSAGES

- Agroforestry can play a key role in addressing the critical situation of Ivorian forests. It would also ensure the future of cocoa farming, a key sector of the country's economy.
- To that end, a national agroforestry definition including quantitative elements is needed to guide investments consistently with national policy objectives. It would also harmonise socioeconomic and environmental objectives.
- This study highlights several elements that can guide the development of this definition. The latter should consider the factors that influence cocoa yields in the arbitration between environmental and economic costs and benefits for the different actors in the cocoa value chain.
- The transition towards agroforestry can lead to a shortfall of several years. Given the plantation owners' lack of savings, compensation mechanisms for this shortfall in the first years of transition must be formulated.
- The diversification of smallholder income in the medium term through the introduction of agroforestry systems represents an opportunity to improve his/her standard of living and protect against the fluctuation of cocoa prices in monoculture.

WHY IS DECOUPLING COCOA PRODUCTION FROM DEFORESTATION ESSENTIAL?

At the current rate of deforestation, Côte d'Ivoire is in the process of irretrievably losing all its forest cover by 2034. The country is the world's largest producer of cocoa. The extension of farmland for cocoa cultivation is one of the main drivers of deforestation. Declining soil fertility, diseases, aging plantations and the lack of good agricultural practices have led small cocoa producers in Côte d'Ivoire to seek better yields on forest lands. This deforestation is facilitated by the absence of land titles.

This situation, critical for Côte d'Ivoire's biodiversity and exacerbated by the effects of climate change, is jeopardising a strategic economic sector. Cocoa farming accounts for 15% of the gross domestic product and 40% of the country's exports. It ensures the livelihoods of nearly eight million people. Ensuring the sustainability of the sector is therefore a key social, economic and environmental issue. The fight against deforestation and the restoration of the Ivorian forest cover requires sustainable agricultural intensification and the integration of agroforestry in cocoa plantations. This would break the negative spiral of environmental degradation, impoverishment of producers and food insecurity.

This decoupling of cocoa production from deforestation is also crucial to the achievement of national objectives. In particular the commitment made in 2014 under the New York Declaration on Forests to produce a zero-deforestation Ivorian cocoa in 2017 and to restore the forest cover to 20% of the national territory by 2030. This commitment is at the heart of Côte d'Ivoire's National REDD+ Strategy of 2017.

However, there are many obstacles. The low productivity of cocoa farms creates a vicious circle where small producers' incomes fall, encouraging deforestation and moving them further away from access to already limited financing solutions. Agroforestry is one of the responses advocated by actors in the sector to produce cocoa while restoring the forest cover, improving soil fertility and diversifying the income of producers. Agroforestry pilots inside cocoa plantations have been initiated by many agro-industrialists who have made ambitious international commitments to produce without deforestation by 2020.

Achieving these results implies short-term scaling up of sustainable production models, but plantation owners are not able to fully take on this transition. One should first have a better understanding of the economy of the small cocoa farmers and the potential profitability of the new production models that can be offered to them. **Scaling up sustainable cocoa production models requires economic and financial solutions that incentivise and support new production approaches at all levels of the cocoa production chain.**

This study was commissioned by the Permanent Executive Secretariat of REDD+ (PES-REDD) in Côte d'Ivoire and led by the UN Environment Programme Finance Initiative (UNEP FI) and the EU REDD Facility. Its purpose is to propose to the Ivorian Government and its partners technical and financial solutions to support the ongoing commitments of private sector and the large-scale implementation of cocoa farming associated with agroforestry. These solutions are developed on the basis of the pilot experiences of three actors in the cocoa sector.

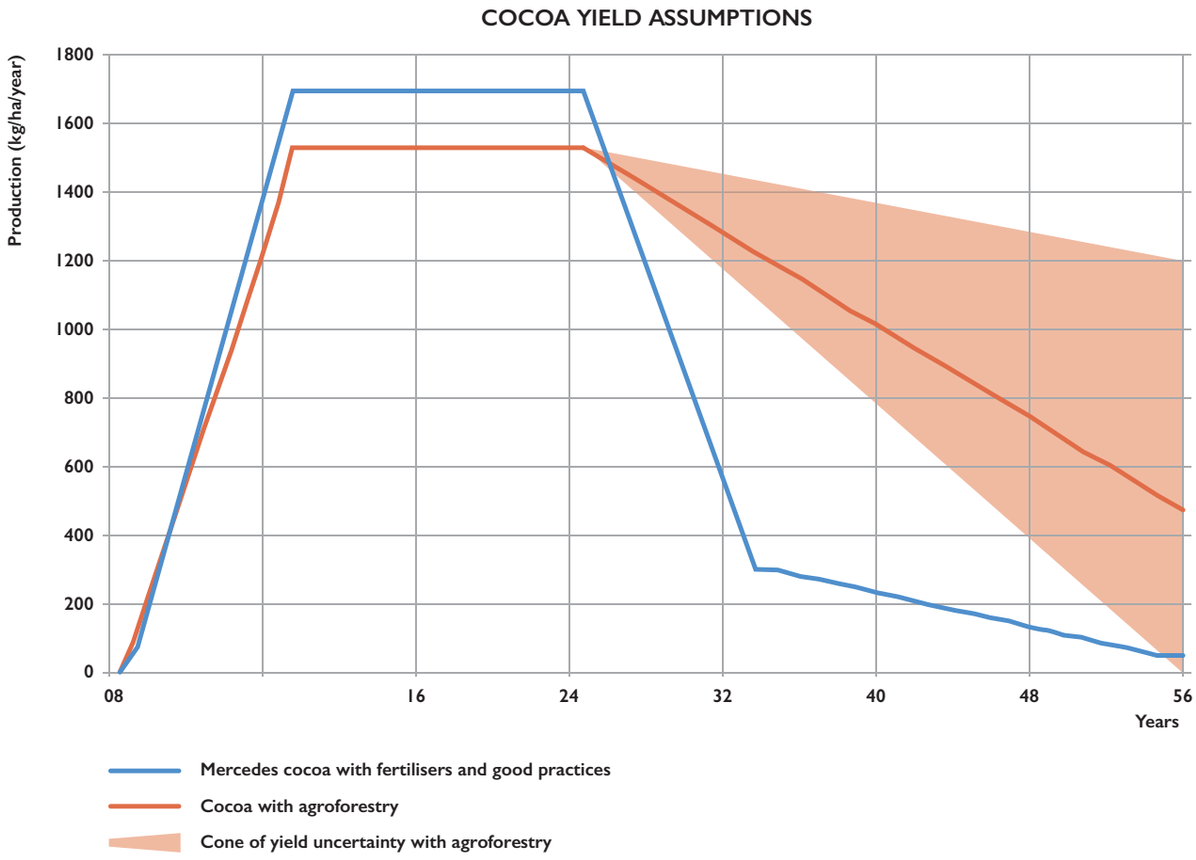
SUSTAINABLE COCOA PRODUCTION

The Ivorian cocoa farm is characterised by a mature orchard that is over 20 years old, planted following the conversion of the forest. It uses 'all-in-one' plant material (non-selected seeds) and is grown under 'direct sunlight' or under a slight permanent shade. Phytosanitary treatments and fertiliser are rarely used. The orchard therefore has low yields: about 500 kg/hectare/year on average for an average maximum value of 631 kg/hectare/year.[1]

This study is based on a review of different technical routes for sustainable cocoa production, combining intensification of production and agroforestry. Agricultural intensification is planned particularly through the regeneration of the orchard with improved plant material (Mercedes type), as well as through the use of inputs. The introduction of trees into production systems along agroforestry routes combines fruit trees, timber species and fast-growing species for firewood. Finally, the association of food crops with cocoa farming is planned, particularly at the beginning of the production cycle.

The impact of intensification of production on agricultural yields in Côte d'Ivoire has been demonstrated. A maximum yield of 2,400kg/hectare/year can be obtained for a plantation aged between 8 and 18 years if the monoculture of cocoa is associated with several actions.[2] These include the use of Mercedes cocoa with a planting density of 1,320 cocoa trees/hectare in combination with food crops in the early years, the implementation of good agricultural practices and the use of fertiliser. In the farming sector, the study assumes that the average maximum yield would reach 1,700 kg/hectare/year, i.e. 1.29 kg/tree/year.[3]

1. ASSIRI et al. (2009)
2. HANAK FREUD (2000), National Institute for Agricultural Research and Technical Centre for Agricultural and Rural Cooperation (2005)
3. Average maximum yield of Mercedes cocoa in different sources (Salvaterra (2013), National Institute for Agricultural Research and Technical Centre for Agricultural and Rural Cooperation (2005) and French Agricultural Research Centre for International Development-GRET (Professionals for Fair Development) (2002)



In Côte d'Ivoire, there is no reliable scientific data illustrating the impact of tree association on cocoa yields. This hinders the examination of the effects of agroforestry on the yields and profitability of cocoa production.

Three factors influence the achievable yields in an agroforestry system compared to a plantation in direct sunlight:

1. Shade level

The shade level depends on the number and crown surface of each tree associated with the cocoa tree. The optimal shade to ensure cocoa growth has been estimated at 70–80%.[4] This study hypothesised that up to 70% shading would have no impact on cocoa yield compared to planting in direct sunlight. An increase of shade beyond 70% is likely to decrease yields. When the shade is total (100%), this yield loss can reach 70% compared to the yield in direct sunlight.

2. The density of the associated trees

In high density situations, competition between cocoa trees and associated trees has a negative effect on cocoa productivity.[5]

Therefore, this study assumes that an increase of 50 trees/hectare of density above 1,320 trees/hectare, whether associated trees or cocoa trees, would result in a 10% reduction in cocoa productivity.

3. The nature and fertility of the soil

The chemical characteristics of the soil can be corrected by adding fertiliser. In agroforestry systems, many authors argue that fertiliser input has no impact on yield in cocoa trees over

4. OKALI and OWUSU (1975)
5. JAGORET (2011)

25 years old under optimal shade (shade compensates for fertiliser at this age).[6] However, the fertilisation of cocoa trees from 10 to 24 years under shade leads to a 40% increase in cumulative yields over the same period. This study makes the conservative assumption that the absence of fertiliser in agroforestry systems results in a cocoa yield reduction of:

- 25% for cocoa trees under 10 years
- 40% for cocoa trees between 10 and 25 years
- 10% for cocoa trees over 25 years old

These three factors are likely to significantly influence the performance of an agroforestry system in terms of cocoa yields, and therefore indirectly influence producer profitability. **A national agroforestry definition including quantitative elements is needed to guide investments in line with national policy objectives**. This definition should take these factors into account in the trade-off between environmental and economic costs and benefits for the different actors in the cocoa value chain

TWO AGROFORESTRY MODELS

Agroforestry pilots in cocoa plantations are a combination of firewood, fruit trees and timber. The firewood is cut in year 4, the fruit trees come into production at the latest in year 10 and the timber is cut in year 25.

Two types of models stand out:

A. A combination firewood - timber with a high preponderance of firewood representing 75% of the associated trees (concentration). There are no fruit trees and much more timber than in the type B pilot.

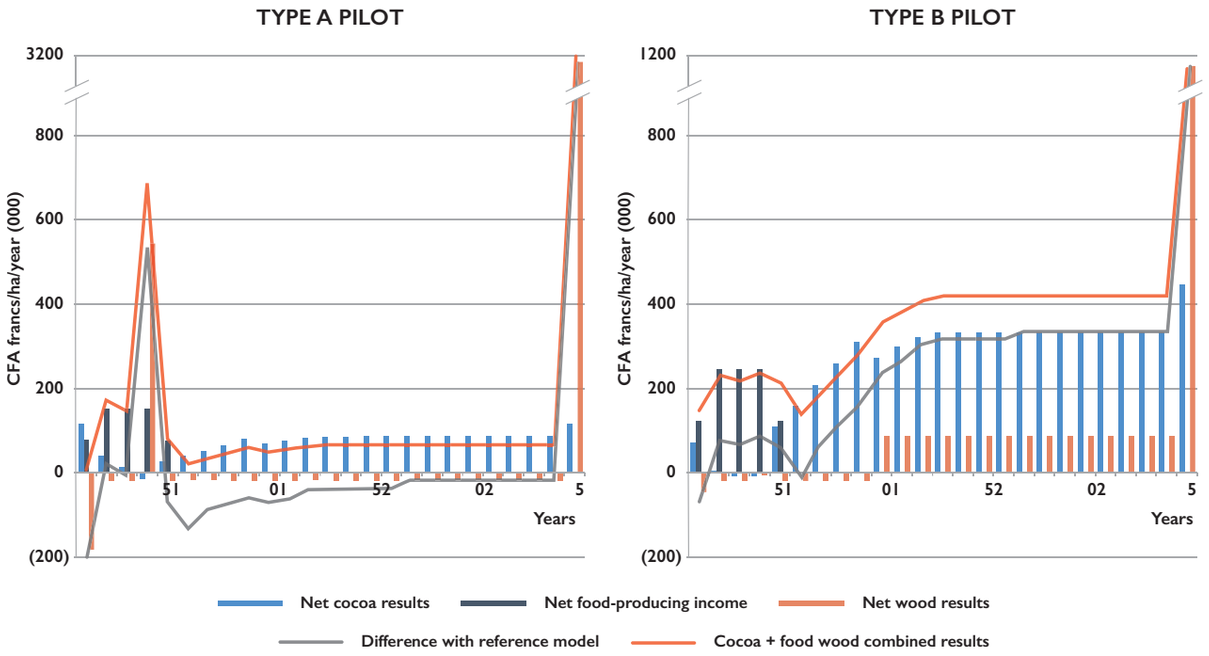
B. A firewood - fruit trees - timber combination (diversification). All categories of trees are represented.

In the type A model, year 1 expenditures related to associated trees (purchase of seedlings and planting loads) are significant. The cocoa results decrease during the regeneration phase and then increase when the new Mercedes plants come into production. The number of cocoa trees (833 trees/hectares) is 37% lower than the planting density recommended by the National Centre for Agricultural Research (1,320 plants/hectare). We can therefore expect lower cocoa revenues. In addition, the high number of associated trees per hectare affects cocoa yield. During the period of regeneration of plant material, the plantation owner benefits from the food income. This food income offsets the loss of cocoa revenues in the first years. There is an income peak in year 4 due to the sale of firewood. There is also a much more significant income spike in year 25 due to the sale of timber. It should be noted that until year 25 (except for year 4), the wood associated with cocoa (firewood and timber) only generates expenditure.

Compared to the reference model (a plantation of 20 years of all-in-one cocoa in direct sunlight), the shortfall is significant and lasts a long time. For this reason, without specific assistance, the financial risk associated with this type of pilot will only attract plantation owners whose cocoa is not the main source of income.

In the type B model, the density of cocoa trees is equivalent to the density recommended by the National Centre for Agricultural Research for Mercedes cocoa, but the number of associated trees is lower than in the type A model. The optimal yield of cocoa trees is therefore only slightly modified. This food income offsets the loss of cocoa revenues in the first years. The small amount of firewood does not make their sale significant for the plantation owner's income. Since there is less timber, the peak income in year 25 is less significant than in the type A model. The shortfall period from the reference model is very short. The income of the plantation owner increases greatly. This model is therefore attractive for all plantation owners.

6. LAVABRE (1959), LEITER and HARDING (2004) and SANIAL (2015)



Three common periods are identified in both types of models studied:

1. An initial period (from years 1 to 4) characterised by:
   - a. Seed or seed purchase expenses, and planting expenses in the first year. Depending on the pilot analysed, these expenses can make a farm run at a deficit in year 1. Even if the farm is profitable in year 1, the difference compared to the reference model is systematically negative during this period.
   - b. Decreasing cocoa income due to the regeneration of the plantation. The revenue declines until all the genetic material is renewed and begins to produce. The shorter the regeneration time, the lower the decline.
   - c. Food income, especially as a result of plantain banana shading young cocoa trees.
   - d. A sale of firewood in year 4.
2. An intermediate period (from years 5 to 24). The plantation owner benefits from the revenues of Mercedes cocoa at its peak of production and those of fruit trees when there are some. It should be noted that there is no more food income.
3. Year 25 is the final period, during which the planter sells his timber for a substantial sum. This sum can be broken down through a financial mechanism to compensate for the shortfall compared to the reference model for the previous years and/or serve as a pool to finance a new regeneration of the plantation.

THE ECONOMIC CHALLENGES OF SMALL PLANTATIONS OWNERS

The primary sector employs two-thirds of the working population in Côte d'Ivoire. Ivorian cocoa production comes mainly from 800,000 small farmers with an operating area ranging from two to five hectares per owner. Despite the importance of cocoa in the national economy, Ivorian planters are poor, with an average income of USD 0.50 per day (the World Bank's poverty line is USD 2 per day[7]). These low incomes prevent planters from investing and create a vicious circle where the lack of inputs favours Ivorian plantations that are unproductive and thus generate little income.

As a result, plantation owners are forced to favour the short term and cannot plan beyond a few months. Their discount rate for future income is therefore very high.

This approach, linked to poverty and a low level of education (the illiteracy rate is 50% in the countryside), constitutes a major disadvantage to the transition to agroforestry. In effect, the initial shortfall is a significant obstacle to the adoption of agroforestry by the plantation owner because his standard of living falls in the short term. The prospect of economic gains from agroforestry in the medium or long term is not a sufficient incentive. It is therefore crucial to put financial mechanisms in place to compensate for the shortfall in order to stimulate the transition.

The modelling analysis results from three agroforestry pilots carried out by large companies in the sector shows us that, for the plantation owner, the transition to agroforestry is not economically positive during the first years compared to the reference model. This is no longer the case after a few years, thanks to income from firewood, fruit trees and timber. In addition, the cocoa production of the pilots surpasses that of the reference model by regenerating the plantation with new plant material. **The goal of the transition to agroforestry is to increase the income of the plantation owner through the regeneration of the plantation and his or her resistance to the volatility of cocoa prices through crop diversification.**

FINANCING CHALLENGES AND POSSIBLE SOLUTIONS

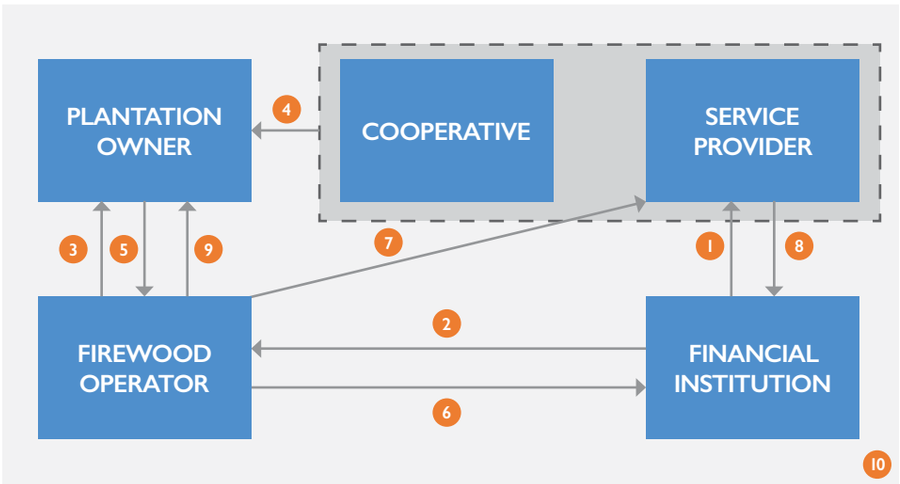
Plantation owners need funding to offset the losses incurred in the early years of the agroforestry transition. However, they face many obstacles. For example, local banks do not lend to plantation owners due to several reasons. First of all, many of them are in the informal sector and do not have a bank account. Moreover, without a financial history or assets, it is difficult for them to provide the guarantees needed to obtain bank credit. Finally, having experienced many payments defaults in the agricultural sector, local banks distrust projects in this sector. Provisions to reassure banks or replace them must therefore should be made.

7. Cocoa Barometer 2015

There are several possible financing solutions for small producers:

- A short-medium term loan (four years) can be set up to cover the expenses of year 1 and the regeneration of the plantation. The sale of firewood of year 4 in a type A pilot would be used to repay it

SHORT-TERM LOAN FINANCED BY AGROFORESTRY



1. The plantation owner, if possible organised as a cooperative, takes out a short-term loan from the financial institution. The repayment of interest and principal takes place during the sale of firewood in year 4.
2. The lender distributes part of the funds to a firewood operator to support the costs of planting and managing the wood.
3. The firewood operator uses funds paid by the financial institution to plant trees.
4. The service provider may use a cooperative to distribute the compensation payments for the shortfall for the first four years. These payments come from the sum lent..
5. In year 4, the firewood operator recovers the wood from the planter to sell it.
6. The firewood operator reimburses the equivalent of the planting and wood management costs to the financial institution.
7. The firewood operator transfers the equivalent of the amount of interest and capital to the service provider.
8. The service provider reimburses the loan to the financial institution.
9. The wood operator pays what is left over from the sale of firewood to the plantation owner.
10. The short-term lending operation is covered by a State guarantee or a bank guarantee.

- The purchase of long-term purchase contracts with the chocolatiers to smooth the plantation owner's cocoa incomes and provide them with constant income over the period.

LONG-TERM PURCHASE AGREEMENT

1. A long-term purchase agreement is established among the trader, the cooperative and the plantation owner. This agreement aims to smooth the plantation owner's revenue over the long term. The trader has a counterparty guarantee in the event that the plantation owner cannot supply the agreed quantity. The trader will also take the land certificate of the plantation as collateral.
2. The cooperative borrows from the financial institution for its plantation owners to pay land security as a guarantee to the merchant.
3. The financial institution pays the land operators to carry out the land security operation.
4. The planter sells his cocoa to the trader through the cooperative.
5. The trader pays the planter the physical amount delivered to the cooperative that mediates the transaction.
6. The trader pays monetary compensation to the planter when the physical amount is less than the amount contracted. The financial institution serves as an intermediary and deposits money into an online bank account.
7. When the physical amount is lower, the merchant uses part of the difference between the physical sale and the one contracted to repay the loan subscribed by the cooperative used for the land security operation.
8. The trader uses the service provider to compensate the plantation owner in the form of services.

Beyond the previous solutions, other mechanisms could also make it possible to finance the shortfall:

- A system set up by financial institutions or stakeholders in the timber sector, whereby future revenues from the sale of timber would be paid in advance and broken down over the years of shortfalls.
- The popularisation of financial tools such as warrantage. The plantation owner or a cooperative would get a loan by guaranteeing production. The warrantage system allows the producer to avoid selling at the lowest price and to have access to financing.
- The creation of insurance solutions on trees or crops to reassure banks that they accept the trees as collateral.
- Although limited, carbon finance could provide funds.
- The use of Islamic finance tools adapted to agriculture. The Islamic bank could be a partner of the plantation owner that would not charge interest but would share the profits and losses.

These solutions can be supported by the following measures:

- The partial subsidy of the shortfall of plantation owners by the actors of the sector (chocolatiers, traders, etc.) and/or by the State.
- The creation of a specialised agroforestry fund to invest in the sector and expect a return on investment over the long term (microfinance institutions and local banks cannot lend beyond four years).
- The contribution by public or parapublic finance players of derisking solutions giving local banks access to preferential funds that they would then lend to planters or cooperatives

A NATIONAL POLICY CHALLENGE

The National REDD+ Strategy and the national investment framework place the implementation of the zero-deforestation agricultural policy at the centre of the actions to be carried out in the next ten years. As part of up-scaling, the area to be converted to agroforestry is estimated at two million hectares. Based on the results of the model of this study, this would correspond to a financing requirement equivalent to a cumulative deficit of 440 billion CFA francs over the first three years.

On the other hand, Côte d'Ivoire has developed a forest rehabilitation strategy to achieve its objectives of increasing its forest cover to 20% of the national territory (6.4 million hectares) by 2030. To this end, Côte d'Ivoire is revising its normative framework. The new forest code would then see the introduction of a new category of forests, classified agroforests. These would gather the former classified forests with a degradation rate higher than 75%. This new category would include 66 classified forests, or about 1.9 million hectares, including 1.2 million hectares of cocoa plantations. The rehabilitation of these forests is estimated at 138 billion CFA francs. In addition, the same strategy plans the introduction of forest trees in 500,000 hectares of cocoa plantations. Based on the results of the model in this study, this would add 110 billion CFA francs over the first three years for a total of 248 billion CFA francs, representing 37.5% of the goal of restoring forest cover.

The scaling up of pilot agricultural intensification and agroforestry initiatives in cocoa plantations in Côte d'Ivoire must be put into perspective with the macroeconomic issues currently affecting the sector. In fact, the intensification of cocoa cultivation by replacing existing plant material with improved plant material would make it possible to maintain a constant production while decreasing cultivated areas. The freed up areas could be dedicated to other uses, such as reforestation or subsistence food crops of the plantation owner. Regeneration of the orchards in four years (25% per year) as tested by the pilots analysed by this study is difficult to scale up given the low availability of improved plant material in Côte d'Ivoire.

It is important that agroforestry be funded and combined with other solutions to effectively combat deforestation. It is crucial to be able to ensure coherence among the commitments of the Ivorian State, the sustainability strategies developed by the actors of the sector, in particular through the Action Plan of the Cocoa and Forests Initiative, and the economic reality of the small cocoa plantation owners. Consultation between the different actors in the sector is therefore necessary in order to define specific guidance for the scaling up of agroforestry and the mechanisms to be put in place to guarantee its financing.

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