

01 SEPT. 2021 Nit'IDEAS

Promoting and funding agroforestry transitions in Ivory Coast

BY DEFINITION, AGROFORESTRY IS DIVERSE. IT IS A MIX BETWEEN CULTIVATED PLANTS OR ANIMALS AND TREES, GROWN IN HEDGES, CLUMPS OR LINES, AND IT IS THEREFORE CHARACTERIZED BY MORE OR LESS COMPLEX SYSTEMS. AGROFORESTRY PROVIDES VARIOUS ECOSYSTEM SERVICES, SOMETIMES EVEN COMPARABLE WITH SERVICES PROVIDED BY FORESTS. IT IS AN AGRICULTURAL SYSTEM WHICH LEAVES ROOM FOR FARMERS' CREATIVITY: HOW MANY TREES TO COMBINE WITH CROPS? WHICH SPECIES TO CHOOSE? WHERE TO PLANT THEM? HOW TO INTRODUCE THEM? HOW TO PRUNE THEM?



Figure 1: Agroforestry system emerging in an ageing cocoa field (Kragui, 2018, Côte d'Ivoire)

Drawing on traditional agricultural systems, agroforestry is nowadays becoming trendy. It is particularly the case in cocoa cropping. Indeed, this value chain is facing important social (producers' incomes, child labor), environmental (massive deforestation, climate change, biodiversity loss) and agronomic (soil degradation, proliferation of pests and diseases, increasing production costs) challenges. Such challenges are particularly important in cocoa's main producing country, Ivory Coast. Considering these challenges, agroforestry appears in theory as the appropriate tool to conciliate environmental aspects (flora and fauna diversity, carbon storage, water filtering), economic aspects (improving production conditions, income diversification, farms' resilience) and social aspects (risk reduction). Agroforestry is therefore at the heart of most strategies for sustainable cocoa.

For about a decade, agroforestry is arousing great interest, even in cocoa producing countries where full sun systems dominate. However, the monolithic aspect of the promoted approaches is often contrasting with the many different modalities of agroforestry. Indeed, farmers are provided with tree seedlings that are not very diverse, and pre-defined plantations' schemes are often promoted by extension services (repartition pattern, density species). The recommended trees' density is rather determined by farmers' potential acceptability than by true agronomic instructions. What's more, only a single introduction method is considered: trees' plantation from nursery. Thus agroforestry schemes are identical for every cocoa farms and do not adapt to initial, very contrasted, situations: full sun plantations, presence of a few trees, associations with fruit trees or plantations with a lot, or too much, shade.

As part of this agroforestry promotion trend, Nitidae is aiming to develop an approach that would conciliate:

- The inherent flexibility of agroforestry (strategies and creativity of producers, initial situation of the plantation, orientations of the system, local environment, etc...);
- Supporting and handholding farmers to go beyond what they could do on their own;
- Scaling up the support and funding for agroforestry transitions.

Unfold the wide range of species

In Ivorian cocoa farms, we can observe the spontaneous emergence of new forms of agroforestry. In 2018 one could find in a median plot 14 different species (varying from 9 to 20 depending on sites (Sanial, 2019)). Therefore, farmers are already combining a wide range of species with their cocoa trees. However, what is proposed to them with the distribution of tree seedlings by private sector through cooperatives is often either redundant or less diverse than what they already have in their plantations. Choosing a specie should be built on several criteria: its availability (wild seedlings, nurseries, ...), its utility (for the producer, for the cocoa tree, for the soil...), its symbolism, but also the economic system (potential market) and appropriation system (access rules, risk of appropriation by other stakeholders) in which it is embedded (Figure 2).

For instance, some species, like Acacia mangium, which were promoted and distributed several years ago, have nowadays almost disappeared from tree nurseries as they turned out to be not compatible with cocoa trees (too low, host to loranthus, ...). Sometimes farmers can also accept the seedlings and divert their original use. Such as Gliricidia sepium which has been, in the end, often used to make fences for animals and provide fodder. Others, like Niangon (Heritiera utilis), despite their great commercial value, are actually not planted by farmers who fear that it will attract timber companies' interest while the status of trees outside forests remain uncertain.



Figure 2: Agroforestry adoption factors in a post-forest context (Sources: Sanial, 2019)

Therefore, biophysical, agronomic and social dimensions are all interrelated. Working together and exchanging with farmers for choosing the species to introduce allows to embrace these three dimensions. However, it is not sufficient to only consult farmers about a list of desirable species. These discussions should be based on field's needs. The choice of species is based on a map of the plot made with the farmer, aiming to identify microzones (humid, too much shade, need for

shade, impact of mirids, black pod, hydromorphic soils). Once this plot's map is realized, the farmer can identify zones for which trees could be useful and, if needed, he is advised on relevant species: draining specie for humid soil, specie hosting ants for a zone with an impact of mirids, evergreen specie for a zone affected by droughts etc...

However, up to now, interactions between cocoa trees and companion trees have rarely been the subject of deep scientific researches. One must rely on field observations and collect farmers' knowledge to guide this choice of species. This is why, after having worked with hundreds of farmers from East to West of Ivory Coast about interactions between cocoa trees and companion trees, and after having noticed that the collected knowledge was consistent from one farmer to another and from one region to another, we have finalized a botanical booklet which inventories companion trees species (classified by their impact: positive, negative, neutral and ambivalent) and their effects on cocoa trees (fertility, shade, soil humidity, production of pods, ...). This booklet allows spreading farmers' knowledge and supporting the choice of species to be associated with cocoa trees, depending on fields' needs.

Considering "trees' timing"

Farmers have knowledge and some of them are already practicing agroforestry and innovate. However, a wide room for improvement exists: agroforestry adoption can be accelerated, systems' performance can be improved, spreading of innovations can be facilitated, etc... Indeed, farmers' innovative practices are characterized by trials and errors, by difficulties for trees' establishment and farmers are inescapably facing the long time needed for trees' setting up and growth. In order to encourage these practices and support these with an economic incentive, Nitidae has set up an agroforestry payment for environmental services (PES). At the heart of this approach lies the following question: how to by farmers towards reward efforts made agroforestry transition, which will take several years, but without certifying farming systems that are too simple in the beginning?

This PES, described in the standard SAF-ART, is organized in two steps (Figure 3). As for organic conversion, there is a transition phase during which, even if the producer has not reached the step where his system is considered as dense and diverse enough to provide some ecosystem services, he will be able to start receiving a transition premium.

Time issues also concerns the time necessary to evaluate trees' presence and the services they are providing through long and tedious field inventories. This costly time is one of the difficulties relative to agroforestry certification: which criteria can be set for dense and complex systems without being too normative? How to ensure that they are complied with and how to measure them without doing neverending field inventories, tree by tree? The SAF-ART standard has thus selected proxies that can be easily measured in the field without losing too much information about the certified systems.

- Basal area: basal area is used as a proxy for density. More flexible and more indicative (it gives an idea of the forest environment of the plot) it is also easily measurable (few minutes only by plot).
- Trees' origin: in a cocoa farm trees can be remnant (present in the previous system, most often a forest), spontaneous/regrown (selected in natural regrowth by farmers) or planted. The species present in each of these origins are not the same, therefore the co-presence of these three origins within a single plot is strengthening overall diversity of the plot. Trees' origins, inventoried with the support of the farmer is therefore used as a proxy for diversity.



Figure 3: An agroforestry standard with two steps resting on trees' origins and basal area (Sources: SAF-ART 2021)

Actors downstream of the value chain must also engage in the support of this transition. This standard therefore also aims at understanding and testing real demand by the market for products certified with high requirements and, consequent question, what is the capacity of the private sector and consumers to fund this transition via an agroforestry premium?

In the West of the country, cocoa boom in the 1980's has led to the massive development of full sun cocoa farms. Nowadays farmers are feeling the need for trees to cope with episodes of droughts. In such an area, the challenge is rather to work on the introduction of trees adapted to the context, through a variety of methods: plantation and selection in the natural regrowth with a wide range



of species.

And finally, in the extreme West, the youngest pioneer front, production conditions are still rather favorable (soil, abundant rain...) and the interest of farmers for agroforestry is minimal. Economic incentives for trees introduction are crucial if one wants to draw farmers' interest in these areas. Such strategy can for instance build on solid partnerships with timber industry to ensure longterm substantial incomes for farmers.

Figure 4: Forests and migrations, the formation of historical cocoa regions (Sources: Nitidae, 2021)1)

Zoom out: agroforestry in the landscape

Agroforestry, even if done at plot's scale, is actually embedded into a wider landscape and depends on territorial agrarian dynamics. It can be seen as a degradation step between forest and monoculture, according to an evolutionist approach, but it can also be the reflect of the emergence of an agro-ecological trajectory after a phase of monoculture. For this reason, depending on regions and agricultural dynamics, challenges in agroforestry are not the same.

In the East of the country (Figure 4), the challenge is to preserve and value traditional agroforests when they still exist. This is the reason why, in the REDD+ project of La Mé, traditional cocoa agroforests more or less abandoned-normally scheduled to be replanted in full sun cocoa farms or converted into rubber plantations – have been converted into organic cocoa farms. This has led to a renewed interest from farmers regarding their ageing agroforestry plots. Higher income earned from organic cocoa allows them to consider investing more work into these plantations and valuing the existing potential. An agroforestry premium, based on basal area, had been added to the organic one.

Conclusion

The standardization of cocoa agroforestry approaches is contrasting with scientific and agronomic uncertainties that still exist: what is the optimal shade rate for an already existing full sun plantation? What is the level of water competition between trees and cocoa trees during dry periods? Is shade necessary during the dry period and should we favor evergreen species? Embracing the complexity of agroforestry and assuming its incertitude are at the heart of the process. Iterative and collaborative by definition, this methodology is still in process and in constant reshaping. It will be enriched by deepened understanding of adoption dynamics from farmers, by progress in scientific research and by the identification of new proxies to characterize, measure and monitor agroforestry systems, sticking with the permanent willingness to combine incertitude and action, flexibility and scaling up. However, in order to reach these objectives, such approach relies on real progress in terms of tenure and forest policies, which are the basis for a regulatory framework that enable agroforestry

adoption. Therefore, land tenure security for plots and property rights of trees outside forests are the pillars to meet present and future challenges.

Indscapes & value chains

ABOUT NITIDAE

Nitidae, a french organisation, is aiming at designing, developping and leading projects that preserve the environment while contributing to the local economy. It combines deep and complementary expertises (agriculture, markets and value chains on the one hand; forests, climate, REDD+ and conservation on the other hand). With a team of more than one hundred collaborators (economists, engineers, agronomists, foresters, geographers, specialists of soil carbon, GIS and remote sensing experts...), Nitidæ is currently leading around fifty projects principally in Madagascar, Burkina Faso, Mozambique and Ivory Coast. Nitidæ is also providing a technical expertise to agri-food and cosmetic companies wishing to improve the social and environmental performances of their agricultural value chains, to lessen their impacts on the environment (natural resources preservation, energy efficiency of their processing, carbon compensation for their activities) and to stimulate the local economic development in collaboration with producers' organisations.

References

Blaser et al., 2018. Climate-smart sustainable agriculture in low-to-intermediate shade agroforests. Nature sustainability 1-5 pp 234-239.

Jagoret et al., 2017. Rehabilitation practices that shape cocoa agroforestry systems in Central Cameroon: key management strategies for long-term exploitation. Agroforestry systems 92-5 15 p.

Ruf, 2011. The myth of complex cocoa agroforests: the case of Ghana. Human ecology 39 pp 373-388.

Sanial, 2019. A la recherche de l'ombre: géographie des émergents en cacaoculture ivoirienne post-forestière 340 p.

Smith-Dumont et al., 2014. Farmers in Côte d'Ivoire value integrating tree diversity in cocoa for the provision of ecosystem services. Agroforestry system 88-6 pp 1047-1066.

Useful links

Projet Cocoa4Future :

https://www.nitidae.org/actions/cocoa4future-durabilite-dessystemes-de-production-et-dynamiques-nouvelles-du-secteurcacaoyer

Référentiel SAF-ART :

https://www.nitidae.org/files/9cdad243/un_referentiel_dynamique_ developpe_par_nitidae_pour_des_systemes_agro_forestiers_de_pro duction_du_cacao_valorisation_et_transition.pdf

Projet REDD+ de La Mé : https://www.nitidae.org/actions/projetredd-de-la-me-lutte-contre-la-deforestation-et-la-degradationdes-forets-de-la-me

Projet WAKANDA : https://www.nitidae.org/actions/wakandalandscape-west-african-knowledge-for-agriculture-nature-anddevelopment-activities-gestion-participative-du-developpementdurable-en-peripherie-des-aires-protegees-du-paysage-ponasi

AGROFORESTRY TEAM :

- Ettien Rolande : r.ettien@nitidae.org
- Rabany Cédric : c.rabany@nitidae.org
- Rullier Noémie : n.rullier@nitidae.org
- Sanial Elsa : e.sanial@nitidae.org

TO QUOTE THIS POLICY PAPER :

Nitidae, 2021 Promoting and funding agroforestry transitions in Ivory Coast, Nit'ideas n°1.

Nitidae 29, rue Imbert-Colomès 69001 Lyon - France www.nitidae.org +33 (0)9 73 66 10 17