

## Bitter Chocolate: The Difficult Road to a Living Income for West-African Cocoa Farmers\*

by

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**KEYWORDS.** — Ivory Coast; Child Labour; Deforestation; Certification; Organic Production; Living Income.

**SUMMARY.** — Cocoa (*Theobroma cacao* L.) is a tropical cash crop that provides income to 4.5 million farming families worldwide. In Ivory Coast, the world's largest cocoa producer (38 % of global cocoa supplies), 82 % of cocoa farmers do not earn a living income, which is the net income a household would need to earn to enable all members of the household to afford a decent standard of living. In the present paper, we explore how the cocoa sustainability initiatives of two Belgian cocoa value chain actors (Oxfam Fair Trade Belgium and Galler SA) attempt to close the gap between current cocoa farming income and a living income. They do that through (i) cocoa productivity improving initiatives; (ii) paying cocoa premium prices; and (iii) farm income diversification. We highlight the opportunities as well as risks and challenges of the specific actions undertaken in both cases and conclude that relying on one strategy alone is unlikely to significantly contribute to closing the living income gap.

**TREFWOORDEN.** — Ivoorkust; Kinderarbeid; Ontbossing; Certificering; Biologische landbouw; Leefbaar inkomen.

**SAMENVATTING.** — *Bittere chocolade: de moeilijke weg naar een leefbaar inkomen voor West-Afrikaanse cacao-boeren.* — Cacao (*Theobroma cacao* L.) is een tropisch handelsgewas dat wereldwijd inkomsten biedt aan 4,5 miljoen landbouwgezinnen. In Ivoorkust, dat 38 % van alle cacao op aarde produceert, verdient 82 % van de cacao-boeren geen leefbaar inkomen, wat het netto-inkomen is dat een huishouden nodig heeft om alle leden een fatsoenlijke levensstandaard te kunnen bieden. In dit artikel onderzoeken we hoe de duurzaamheidsinitiatieven van twee Belgische actoren in de cacao-waardeketen (Oxfam Fair Trade Belgium en Galler SA) de kloof tussen het huidige inkomen van cacao-boeren en een leefbaar inkomen trachten te verkleinen. Zij doen dit via (i) initiatieven om de productiviteit van cacao te verbeteren; (ii) het betalen van cacao-premies; en (iii) diversificatie van het landbouwincome. We belichten bij beide initiatieven zowel de kansen als de risico's en uitdagingen van de specifieke acties en concluderen dat één strategie op zichzelf waarschijnlijk niet significant zal bijdragen aan het dichten van de kloof naar een leefbaar inkomen.

### 1. Introduction

Cocoa (*Theobroma cacao* L.) is the tropical cash crop from which chocolate is made. In 2022, global cocoa dry bean production amounted to 5.88 million tonnes that were produced on 11.9 million hectares of land. Around two thirds (63 %) of that volume were produced in West Africa (38 %, 19 %, 5 % and 5 % of global cocoa were produced in Ivory Coast, Ghana,

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Nigeria and Cameroon, respectively). Outside Africa, major cocoa procuring countries include Indonesia (13 % of world production), Ecuador (6 % of world production) and Brazil (5 % of world production) (FAOSTAT, 2024).

Despite the fast emergence of cocoa industry-led efforts such as sustainability or fair trade certification schemes, cocoa production continues to be linked to deforestation and poverty (Higonnet, Bellantonio & Hurowitz, 2017; True Price, 2018). Cocoa is a smallholder crop, particularly in West Africa. In all cocoa production areas, it is produced by around 4.5 million farming families, most of which live in (extreme) poverty. Van Vliet, Slingerland, Waarts & Giller (2021) reported that in Ivory Coast, 40 % of cocoa farmers live in extreme poverty, according to World Bank definitions.

Increasing consumer demand for sustainable chocolate products as well as pressure from some European governments (Krauss & Barrientos, 2021) have triggered the cocoa industry and civil society to take initiatives to improve livelihoods of cocoa growing families. In the present paper, we analyse the historical context of cocoa farmer poverty in Ivory Coast, the world's largest cocoa supplier, and critically and qualitatively assess cocoa sustainability strategies that can be taken by actors in the cocoa supply chain which specifically aims at improving income of cocoa farmers above a living income threshold. We do this using two cocoa cases of Belgian actors in the Ivorian cocoa value chain. The research question is whether the latter strategies have a potential to close the prevailing living income gap in the Ivorian cocoa sector and whether relying on one strategy alone is sufficient. Given the considerable size of the present-day living income gap in the Ivorian cocoa sector, we hypothesize this is not the case.

## 2. The Origins of Cocoa Smallholder Poverty

For many decades, Ivory Coast was a popular immigration country for foreign non-citizens from ECOWAS countries including Mali, Burkina Faso and Liberia (Pailey, Kandilige, Shilue & Zongo, 2017). As a result, the Ivorian cocoa sector could continuously rely on young workers who were hired from the abundant market of migrant labour (Ruf, 1987). At the same time, cocoa has historically expanded in Ivory Coast by shifting cocoa cultivation to recently deforested or degraded forest areas (Clough, Faust & Tschardt, 2009), where cocoa tree growth, development and production was initially largely supported by the highly fertile tropical forest soils and shade provided by remaining forest trees. These advantages can be considered as labour (Ruf, Schroth & Doffangui, 2015) and forest rents (Odijie, 2016; Ruf & Lançon, 2004; Ruf & Schroth, 2004), respectively, and allow for cocoa production at a relatively low cost. As a result, cocoa growers could obtain a profit margin (albeit small) at low cocoa sale prices. Apart from soil fertility, forest rent, also defined as the difference in cost between planting cocoa in tropical forests compared to replanting cocoa on existing agricultural fields or fallow land, is also derived from differences in costs or efforts required for maintenance, weeding, soil fertility and disease management, which are linked to microclimatic differences between forests and replanted sites. Also, the prevalence of pests and diseases, which contributes to production costs and yields, differ between forest plantations and replanted sites (Odijie, 2016).

Over the past twenty-five years, the cocoa world market prices (FOB) have been very volatile and fluctuated around US\$ 2,500 per tonne of dry cocoa beans. Because of inflation, this implies a *de facto* decreasing price for cocoa growers. Forest and labour rents furthermore did

not encourage agronomic innovations in Ivorian cocoa production. Such innovations (agroforestry, integrated soil fertility management, improved cocoa varieties, integrated pest and disease management strategies) are badly needed to sustain cocoa production levels once the forest rent has been depleted. Low cocoa prices and therefore small cocoa profit margins, prevent cocoa growers from implementing these innovations, leading to cocoa production collapses after twenty years. New forest rents are then obtained by moving cocoa production into newly-deforested areas, a process which Clough *et al.* (2009) described as the cocoa boom-and-bust cycle.

Continuous low cocoa prices are the main driver of cocoa farmer poverty. In Ivory Coast, cocoa is exclusively produced by smallholders, most of them own less than 5 ha of cropland (3 ha on average). For these smallholders and their families, cocoa is the main source of income on which they depend for their livelihood. In Ivory Coast, at the beginning of each cocoa season, the cocoa farmgate price is set by the government through the Coffee and Cocoa Council (*Conseil du Café-Cacao* – CCC). This price is influenced by global market prices, production costs, and negotiations with industry stakeholders. The aim is to ensure a fair income for farmers while maintaining competitiveness in the global market (Gilbert & Varangis, 2003). Nevertheless, 82 % of Ivorian cocoa farmers do not earn a living income (Fountain & Huetz-Adams, 2020), which is the net income a household would need to earn to enable all members of the household to afford a decent standard of living. Elements of a decent standard of living include food, water, housing, education, health care, transport, clothing, and other essential needs including provision for unexpected events (Anker, 2011; Veldhuyzen, 2019). It is estimated that under current average cocoa productivity levels in Ivory Coast (460 kg of dry cocoa beans per ha in 2020) (FAOSTAT, 2024), the cocoa farmgate price should increase to US\$ 3,160 per tonne of cocoa for Ivorian cocoa farmers to earn a living income, which is more than double the guaranteed farmgate price of US\$ 1,247 per tonne that Ivorian farmers received in the main cocoa crop season of 2021-2022 (Christensen, 2022). In 2024, cocoa prices sharply increased well above this price (up to US\$ 10,000 per tonne) because of extreme drought caused by the El Niño weather phenomenon (Tabe-Ojong, Adetumi Guedegbe & Glauber, 2024). However, Ivorian cocoa farmers benefit little from these sharp price increases as the CCC set the cocoa farmgate price at just US\$ 2,498 per tonne of cocoa (<http://www.conseilcafecacao.ci>).

Poverty in cocoa farming communities entails lack of quality education and health care. Poverty, absence of, or low access to good affordable schools and inadequate local infrastructure are the root causes of child labour that, despite cocoa company promises to reduce the worst forms of child labour, remains a major issue in the cocoa sector (Fountain & Huetz Adams, 2020). Nearly one fifth of Ivorian children aged five-seventeen are exposed to multiple forms of hazardous work, such as working with dangerous tools or harmful pesticides (UNICEF, 2018).

The cocoa boom-and-bust cycle is responsible for massive deforestation in Ivory Coast. The Ivorian primary rainforest, covering fifteen million hectares in 1960, has shrunk today to just three million hectares, into the Ivorian rainforest (Verdeaux & Alpha, 2004). According to Riano *et al.* (2016), cocoa is responsible for between 20-23 % of historic deforestation in Ivory Coast. Analysis of spatial data further shows that deforestation in Ivory Coast continues to date. Between 2019 and 2020, sixty-eight thousand hectares of primary forest (*i.e.* 2.2 % of the remaining forest) were lost in Ivory Coast. Around one fifth of the latter deforestation took place in the so-called protected forest areas (*forêts classées*) (Despretz, 2020). Deforestation

leads to loss of biodiversity, habitats and ecosystem services (such as pollination), which together with the depletion of the forest rent, threaten cocoa production in Ivory Coast and therefore will hamper cocoa yield and profit improvements in the future.

Climate change will likely decrease climatic suitability of most cocoa-growing regions, mostly because of reduced or irregular rainfall. Areas most likely to retain high suitability are in the proximity of forest reserves where future precipitation will probably remain sufficiently high (Bunn, Lundy, Läderach & Castro, 2017). This means that deforestation and climate change are mutually reinforcing stressors in cocoa production.

To conclude with, the poor institutional environment in which Ivorian cocoa farmers operate, is an important factor preventing them to escape from poverty. Most Ivorian farmers are members of a cocoa cooperative which usually groups up to several hundreds of cocoa farmers and which aim at empowering cocoa farmers and facilitating their access to extension services and capacity-building initiatives. However, Ivorian cocoa farmers generally distrust their cooperatives. According to Ruf, Uribe Leitz, Gboko & Carimentrand (2019), Ivorian cocoa cooperatives should be considered as private companies that act in the interest of their own administration and that of cocoa traders, rather than that of their members. They lack adherence to cooperative values such as collectivism and participative management, particularly of cooperative revenues and expenditures (Ruf *et al.*, 2019).

### 3. Reversing the Trend

#### 3.1. THIRD-PARTY CERTIFICATION

Civil society organizations were the first responders to cocoa sustainability problems. Fairtrade-certified cocoa guarantees a minimum cocoa price to cocoa growers and adds a premium price to that. The first fairtrade chocolate was labelled in 1994. Fairtrade cocoa is currently governed by Fairtrade International [1]\*. Since 2018, the international sustainability certifiers UTZ and Rainforest Alliance (RA) have merged into one organization (RA). It addresses deforestation, climate change, systemic poverty, and social inequity problems in agricultural commodities, including cocoa [2]. Unlike Fairtrade International, UTZ/RA does not guarantee a minimum cocoa price but pays a premium to cocoa growers who comply with a broad set of sustainability criteria.

Organic agriculture is a century-old agricultural practice attempting at increasing sustainability of agricultural production. The main elements of organic agriculture are the exclusion of chemical fertilizers and pesticides (Shi-ming & Sauerborn, 2006). For a company to market cocoa beans as ‘organic’ on the European market, it must comply with European organic legislation, which includes regulations for production, processing and trade (CBI, 2022). The volume share of organic chocolate sold in Belgium was just 1 % in 2019 but had doubled since 2016 (Vandenhaute, Gellynck, Vanhove & Boeckx, 2020). Roughly twenty thousand tons of organic certified beans were imported in 2018, with Dominican Republic as main country of origin (Timmermans & Van Bellegem, 2019). According to the Netherlands Ministry of Foreign Affairs (CBI, 2022), organic premium prices can be as high as 300 USD\$ per ton of organic cocoa.

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\* Numbers in brackets [ ] refer to the notes, p. 436.

### 3.2. VOLUNTARY SUSTAINABILITY STANDARDS

Depleting forest rent, concomitant deforestation and accelerating climate change effects have urged also cocoa companies to act and try to reverse the unsustainability trend in the cocoa sector. Cocoa production collapse in West Africa would drive cocoa growers deeper into poverty and would increase cocoa (consumer) prices because of market shortages, as was illustrated by the sharp cocoa world market price increases in 2024 (see § 4.2.). Since the mid-2000s, cocoa trading and processing companies have therefore taken several voluntary sustainability initiatives in the form of self-regulatory corporate social responsibility (CSR) programmes (Ingram, van Rijn, Waarts & Gilhuis, 2018). Among the main cocoa traders and processors, they include (non-exhaustive list) Cargill Cocoa Promise, ADM's Socially and Environmentally Responsible Agricultural Practices (SERAP), Barry-Callebaut's Cocoa Horizons and OLAM's Grow Cocoa initiatives. Chocolate-producing companies' CSR programmes include Nestlé's Cocoa Plan, Mars' Sustainable Cocoa, Ferrero's Farming Values, Hershey's Cocoa Link, Mondelez' Cocoa Life Initiatives and Tony Chocolonely's Tony's Open Chain of some large chocolate companies. These initiatives mostly offer packages of interventions or services (such as organizing farmers into groups, training, credit, tools and farm inputs such as fertilizers, agrochemicals and cocoa seedlings) to farmers and their organizations to secure supplies of cocoa beans of specific quality, produced in specific, often traceable, environmental and social conditions (Ingram *et al.*, 2018). Apart from an evaluation of the Cocoa Challenge Fund (IDH, financed by Cargill, Barry Callebaut and the Beyond Beans Foundation), which found no impact on cocoa yield or income of the investments in fertilizers, enabled by that fund (IDH, 2021), the impact of these corporate cocoa sustainability programmes has to our knowledge not been scientifically assessed.

In addition to the latter corporate cocoa sustainability initiatives, multi-stakeholder platforms have been set up around cocoa sustainability, which include both companies and civil society organizations. They include the Cocoa and Forest Initiatives (CFI) in Ghana and Ivory Coast, the Cameroonian *Feuille de Route pour un Cacao sans Déforestation* and the International Cocoa Initiative (ICI) [3], founded in 2002 following the Harkin-Engel Protocol, an international agreement aimed at ending the worst forms of child labour in the cocoa supply chain. In 2015, the governments of Denmark, France, Germany, the Netherlands, Norway and the UK signed the Amsterdam Declaration to support private-sector and public initiatives aiming at eliminating deforestation from agricultural commodity chains.

### 3.3. SUSTAINABLE SOURCING LEGISLATION

Over the past few years, actors in the cocoa sector have urged for legislation at the European (EU) level to leverage cocoa sustainability and to create a level playing field within a supportive enabling environment for cocoa supply chain actors. Since 2019, the Cocoa Coalition, an informal group of cocoa and chocolate companies, certification organizations, NGOs and the earlier mentioned International Cocoa Initiative, has been advocating the development of relevant EU policy measures, including human rights due diligence legislation and bilateral agreements between the European Union and cocoa-producing countries (Cocoa Initiative, 2022).

In 2023, the European Parliament and the European Council adopted the “Regulation for Deforestation-free products”, whereas on 13 June 2024 they adopted Directive (EU) 2024/1760

on “Corporate Sustainability Due Diligence” (CSDDD). Both were designed to improve corporate governance practices and increase corporate responsibility in relation to human rights and environmental risks and improve access to remedy for those affected by adverse impacts of commodities globally sourced and imported to the EU (EC, 2024). Even though the CSDDD requires member states and the European Commission to develop accompanying measures geared at companies, especially SMEs, and other cocoa supply chain stakeholders (EC, 2024), there is a risk that, instead of addressing sustainability issues within their current supply chains, cocoa companies disengage from their buyers and shift cocoa sourcing to areas where *e.g.* deforestation or child labour are less prevalent. Furthermore, companies may cascade compliance requirements without adequate support for cost and risk management (Hylander, Hyske-Fischer, Gauttier & Vieira, 2014).

### 3.4. SUSTAINABLE COCOA PARTNERSHIPS

Since 2014, in Europe, multi-stakeholder platforms, such as the International Cocoa Initiative (see § 3.2.), have also been set up at national level. Such Initiatives on Sustainable Cocoa (ISCO’s) have been established in Germany (GISCO [4]), Switzerland (SWISSCO [5]), Belgium (Beyond Chocolate, since 2018 [6]), the Netherlands (DISCO, since 2020 [7]) and France (*Initiative française pour un Cacao durable*, since 2021) [8].

Although each platform operates independently, often the same multinational companies and civil society organizations are members of the national platforms. As these platforms share most of their objectives, namely to (i) contribute to a living income for cocoa farmers and their families; (ii) halt cocoa-related deforestation and promote sustainable reforestation and biodiversity; (iii) end child labour and forced labour in the cocoa value chain; and (iv) enhance the transparency in the cocoa value chain (Kakaoforum, 2022), in 2021 they signed a MoU to better align and to bundle efforts [9].

## 4. The Difficult Road to a Living Income

Cocoa sustainability is multifaceted and requires actions to reduce cocoa farmer poverty, improve cocoa labour conditions and halt deforestation and other environmental harm, all of which are mutually influencing one another. In what follows, we will exclusively focus on the strategies cocoa farmers, their associations, companies, civil society organizations and scientists, alone, or in collaboration with each another, can deploy to close the living income gap (*i.e.*, the income differential between their actual income and a living income) of cocoa farming families, as there is a wide acceptance among these actors that extreme poverty is the root cause of sustainability problems in the cocoa sector.

In this assessment, we make the simple assumption that a cocoa farmer income is determined by (i) the cocoa price; (ii) cocoa farm output (consisting of cocoa yield per ha multiplied by cocoa farm size in ha, which determine cocoa farm turnover); (iii) cocoa production costs which need to be subtracted from the latter turnover to obtain cocoa net income; and finally (iv) additional on- and off-farm income (fig. 1). We further assume that intervening on cocoa price, cocoa yield and production costs as well as on on- and off-farm income (or on a combination of the latter factors), may significantly contribute to closing the cocoa farmer house-

hold living income gap. Many Ivorian cocoa smallholders operate on a scale of just 2-3 ha. Eighty percent of Ivorian cocoa farms are smaller than 5 ha (Suh & Molua, 2022). Land scarcity, tenure issues, land-use competition and low means for investment severely restrict land-use increase. We will therefore not further consider land size as a factor on which external, non-governmental stakeholders like companies or NGOs have leverage to boost cocoa farm income.

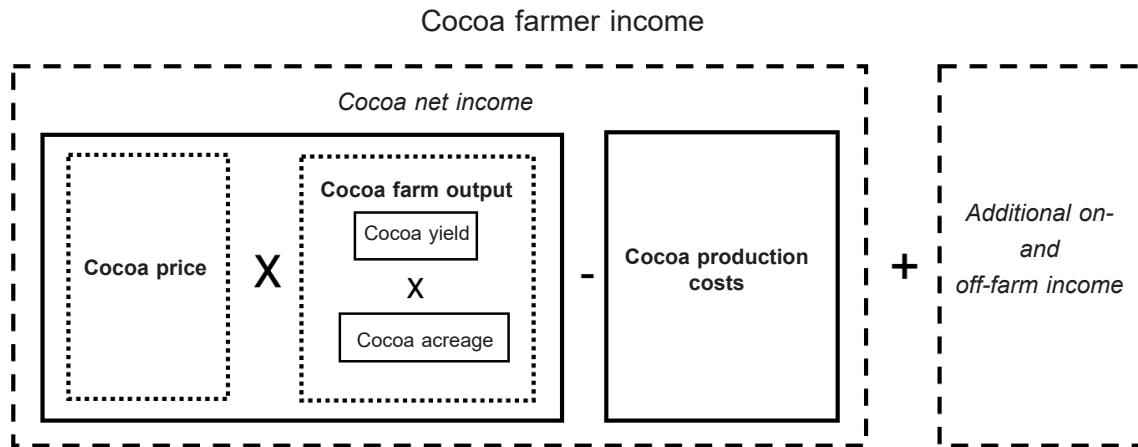


Fig. 1. — Simplified cocoa farmer income model.

We take two Belgian cocoa sustainability initiatives as case studies to show how an NGO (first case) and a private company (second case) take actions on each of the latter three components of cocoa farming income to close the living income gap of a group of Ivorian cocoa farming families.

The first case is the “Bite-to-Fight” project of Oxfam Fair Trade Belgium (hereafter called the Oxfam case), which is performed in collaboration with the cocoa farmer cooperative CPR-Canaan which gathers cocoa farmers from around Daloa (Haut-Sassandra region, Ivory Coast). The second case includes two projects of the Belgian chocolate company Galler SA (*i.e.*, the People, Planet and Cocoa Project, financed by the King Baudouin Foundation, and the Virtuous Beans Project, financed by the Belgian Beyond Chocolate Initiative; see § 3.4.) (hereafter called the Galler case). The latter case is a collaboration between Galler SA, the chocolate SME Zoto, the Trade for Development Centre of the Belgian Development Cooperation Enabel, the Faculty of Gembloux Agro-Bio Tech (University of Liège) and the Yeyasso cocoa farmer cooperative of Man (Tonkpi region, Ivory Coast). Cocoa production in the Tonkpi region started to develop around 1920 (Plas, 2020), whereas in the Haut-Sassandra region cocoa was introduced in 1940 (Oszwald, Bigot & Brou Yao, 2003). However, in the latter region, cocoa production rapidly expanded from the 1960s onwards, whereas in the Tonkpi region, cocoa production has more recently expanded. It is therefore possible that farmers in the Galler project in the Tonki region still benefit from some remaining forest rent, which may result in a higher effect of the project interventions and thus in higher cocoa yields and consequently higher cocoa income compared to farmers in the Oxfam case. Data are lacking to check this hypothesis.

Projects in both cases aim at improving the ecological and socio-economic sustainability of cocoa farming in the intervention areas in Ivory Coast. In both cases similar project activities are performed. However, in their activities, the Oxfam project emphasizes farmer agricultural guidance and organizational capacity building, whereas the Galler projects predominantly focus on transitioning cocoa farming to agroforestry and organic cocoa production systems as well as on farm income diversification. Moreover, the Oxfam project directly intervenes on the cocoa price by paying cocoa farmers a living income premium price on top of the Fairtrade Minimum Price and Fairtrade Premium Price (see further in § 4.2.).

We assess the activities that are performed by one or several case projects. These activities include (i) agroforestry, soil management and agricultural practices to boost cocoa productivity; (ii) price premiums improving cocoa payments to farmers; and (iii) poultry farming, horticulture, staple crop production, apiculture and savings and credit schemes as a strategy to boost non-cocoa income by Ivorian cocoa farmers.

#### 4.1. COCOA PRODUCTIVITY ENHANCING ACTIVITIES

A study by van Vliet *et al.* (2021) among Ivorian and Ghanaian cocoa farmers revealed that when cocoa yields would double (*i.e.* increase from the current 300 to 600 kg of dry cocoa per ha per year), and taking into account the increased production costs to achieve such yields, the share of households that earn a net income below the extreme poverty line would reduce to just 2 and 4 % and those living below the “living income benchmark” to 25 and 32 % in Ghana and Ivory Coast, respectively. In what follows, we will present and discuss the interventions made by the Oxfam and Galler projects aiming at improving yield. We focus on agroforestry, soil management and other agricultural practices.

##### 4.1.1. Agroforestry

Despite earlier efforts of companies and NGOs to promote agroforestry systems in Ivory Coast, most Ivorian cocoa farmers produce cocoa in full sun systems, with some old remaining forest trees (*e.g.*, *Ceiba pentandra* or *Terminalia* spp.) dispersed here and there in the cocoa plots. Agroforestry has numerous agro-ecological benefits to cocoa trees that are produced in low-input agroecosystems such as those in Ivory Coast.

Cocoa agroforestry systems (i) reduce air and soil temperatures as well as wind speed (Beer, 1998); (ii) reduce fruit abortion, resulting from soil N addition through leguminous shade trees (Bos, Steffan-Dewenter & Tschantke, 2007); (iii) protect cocoa pods and trees against windborne spores of fungal diseases (Rice & Greenberg, 2000); (iv) improve buffering of high humidity levels and soil moisture availability (Beer, 1998; Schwendenmann *et al.*, 2010); (v) improve light regulation and tree nutritional status (Isaac, Timmer & Quashie-Sam, 2007); (vi) reduce excessive vegetative growth (flushing) (Beer, 1998); (vii) reduce nutritional imbalances and tree dieback (Beer, 1998; Wessel & Gerritsma, 1997); (viii) suppress weed growth (Rice & Greenberg, 2000); (ix) increase overall insect biodiversity, which improves yield through natural control of pest populations and increased pollination services (Asare, 2006; Daghele Bisseleua, Missoup & Vidal, 2009; Bos *et al.*, 2007; Sperber, Nakayama, Valverde & de Siqueira Neves, 2004; Zuidema, Leffelaar, Gerritsma, Mommer & Niels, 2005); and (x) improve soil fertility, and reduce and prevent soil erosion (Beer, 1998; Duguma, Gockowski & Bakala, 2001; Schroth, Lehmann, do Rosário Lobato Rodrigues, Barros & Macêdo, 2001; Rice & Greenberg, 2000).

Agroforestry enhances soil exploration by the trees' root system and the associated mycorrhizas. It also fosters litter fall and proliferation of soil organisms (fauna and microbes, including pest and disease antagonists) (Vanhove, Vanhoudt & Van Damme, 2016), thus creating a soil with more favourable structure, and adequate organic matter and nutrient availability (Schroth & Krauss, 2006). In addition to the agro-ecological benefits of shade trees, possible lower per yield of cocoa in agroforestry systems can be compensated by additional income from selling fruits from shade trees such as bananas (*Musa sp.*), citrus (*Citrus sp.*), avocado (*Persea americana*), coconut palm (*Cocos nucifera*) (Feintrenie, Ollivier & Enjalric, 2010; Kan Koko, Snoeck, Lekadou & Assiri, 2013; Osei-Bonsu, Opoku-Ameyaw, Amoah & Oppong, 2002) or other, local and often underutilized fruit tree species (Asare, Afari-Sefa, Osei-Owusu & Pabi, 2014; Daghela Bisseleua *et al.*, 2009; Sonwa *et al.*, 2007; Vaast & Somarriba, 2014).

Because of these benefits, both the Oxfam and Galler projects have a strong agroforestry component. In 2021, in the Oxfam project five thousand four hundred and forty-two shade tree plants were distributed to fifty-one cocoa farmers. They were raised in nurseries (fig. 2) under guidance of *Foncier Foresterie Agriculture* (FOA), a local forestry partner. Between 2019 and 2021, the Galler People, Planet and Cocoa Project raised and distributed fifty thousand trees to cocoa farmers in the region of Man. Species planted included *Beilschmiedia mannii* (Kplé), *Ricinodendron heudelotii* (Akpi), *Terminalia superba* (Fraké), *Terminalia ivorensis* (Framiré), *Garcinia kola* (Petit cola), *Irvingia gabonensis* and *Citrus x sinensis* (Orange), *Cedrela odorata* and *Acacia mangium*. *B. mannii* was exclusively distributed in the Galler case, whereas *C. odorata* and *A. mangium* were only distributed in the Oxfam case. All other species were used in both cases.



Fig. 2. — Shade tree nurseries in Man (People, Planet and Cocoa Project – Galler case).

Despite the numerous benefits of cocoa agroforestry in Ivorian cocoa systems and despite private and public sector efforts such as those in our case studies, to promote shade tree planting, 90 % of cocoa in Ivory Coast is still produced under light or no shade (Sanial, 2018). Obstacles for agroforestry adoption by Ivorian cocoa smallholders that were identified in the case studies include (i) perceived competition between cocoa and shade trees; (ii) shade tree planting preferences on the plantation borders; (iii) preference of timber tree species (which are cut down after ten to fifteen years); and (iv) lack of follow-up on shade tree development after seedling distribution to cocoa farmers.

Given the long period required for agroforestry systems to mature, and the difficulties for shade trees to grow above the cocoa canopy in standing cocoa plantations, it is strongly recommended that shade tree planting projects extend their activities beyond shade tree seedling growing in nurseries and seedling distribution to cocoa farmers. Shade trees require protection

from weeds, drought, pests, and diseases. Furthermore, cocoa trees around shade trees should be pruned for successful shade tree growth and development. In both case studies, agroforestry follow-up activities are adequately performed. In the long run, these projects could consider incentives (*e.g.*, premiums; see § 4.2.) for cocoa farmers not to cut down shade trees. At the same time, as current cocoa genotypes in Ivory Coast have been bred for full-sun systems, it is important to breed new genetic cocoa material that is adapted to shaded agroforestry systems with low light intensities. This is crucial to close the yield gap between monocultures and agroforestry systems, and to further promote the adoption of the latter (Armengot, Picucci, Milz, Hansen & Schneider, 2023).

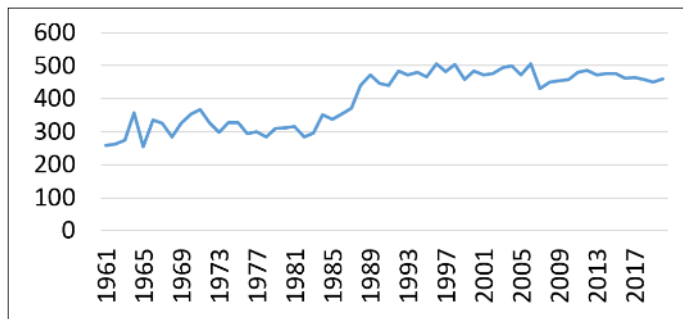


Fig. 3. — West-African cocoa dry bean yield (kg ha<sup>-1</sup>) (1960-2020) (source: FAOSTAT).

ility explains to a large extent why current average West-African cocoa yield (460 kg of dry cocoa beans per ha in 2020 [10]) (fig. 3) is far below the theoretical level of three tons of dry cocoa beans per ha that was obtained in controlled, experimental conditions (Goenaga, Guiltinan, Maximova, Seguin & Irizarry, 2015).

Cocoa smallholders have limited options to improve soil fertility. In Cameroon, it was found that just 33 % of cocoa farmers apply mineral fertilizers, whereas compost and manure were applied by even less farmers (16 % and 13 %, respectively). Farmers were mostly restricted by poor access to fertilizers, organic material to produce compost or to manure (Kenfack Essougong *et al.*, 2020). Improving soil fertility in cocoa farms should make long-lasting changes in soil structure and composition, most importantly improving soil organic matter contents as a strategy to improve soil water retention and mineral exchange capacities. The establishment of agroforestry systems is the best strategy to achieve these goals (see § 4.1.1.) (Wartenberg, Blaser, Roshetko, Van Noordwijk & Six, 2020).

Apart from agroforestry, the studied cases have developed other soil fertility improvement alternatives such as (i) compost production and application, and (ii) poultry farming, aiming at organic fertilizer production (apart from additional income from poultry meat and eggs, see § 4.3.). In the Oxfam case, compost was produced by forty smallholders. Compost heaps were 2 m x 2 m x 1.5 m (height) and consisted of organic material including leaves, hay, rice straw, sawdust, chopped branches and chopped maize stalks (fig. 4). Nitrogen sources such as weeds or plant residues from gardens, fresh or dry manure, or digested sewage sludge were also added. Compost can significantly contribute to improving cocoa farm soils' physicochemical composition. However, the largest bottleneck of compost production for Ivorian cocoa farmers is the limited supply of organic matter. It is unsure whether the small compost quantities

#### 4.1.2. Soil Management

Notwithstanding soils on which cocoa is grown are highly variable in physical and chemical properties, they are generally characterized by poor fertility (particularly lacking phosphorus), acidity and low exchange capacity of clay minerals. It is widely accepted (van Vliet & Giller, 2017) that in addition to ageing cocoa trees and lack of good agricultural practices, poor soil fer-

applied (6 m<sup>3</sup> per 2 to 3 ha farm) can significantly improve soil fertility. Moreover, if composting is done inappropriately, it might contribute to the rapid spread of black pod disease (*Phytophthora* spp.) (Amponsah-Doku, Daymond, Robinson, Atuah & Sizmur, 2022). Barriers to poultry farming (Galler case) include the investment needed for chicken cage construction, labour and chicken feed that mostly needs to be purchased.



Fig. 4. — Compost heap construction in Cailloux village (Daloa, Ivory Coast) (Oxfam case).

#### 4.1.3. Other Agricultural Practices

Good agricultural practices (GAP) in cocoa cultivation have frequently been reported for more than seventy years (Thirion, 1950; Lery, 1954; Williams, 1975; Lass, 1985; Huijsmans, 2020). These practices, which are expected to obtain optimum cocoa yield, include (i) pruning, including tree formation, maintenance pruning (shaping the tree and allowing air flow through the cocoa canopy to optimize photosynthesis and to prevent pests and diseases), and phytosanitary pruning (removal of diseased branches and pods); (ii) (integrated) pest and disease management, including the reasonable use of chemical or biological pesticides and aforementioned pruning practices; (iii) composting of diseased plant parts (to prevent spore spreading of fungal diseases); (iv) weeding; (v) soil fertility management, including fertilizer application, composting and re-introduction of crop residues (empty pod shells) or other organic (waste) material to the field (see § 4.1.2.); (vi) shade tree planting (see § 4.1.1.); and (vii) cocoa (re-) planting, including variety choice and planting density.

Despite decades of training and extension programmes by companies and NGOs, GAP adoption rates, particularly those of pruning (Obeng Adomaa, Vellema, Slingerland & Asare, 2021), are very low in West Africa (Asare, Afari-Sefa, Muilerman & Anim-Kwapong, 2018). The reasons for this remain unclear. It may be that the amount of time and capital that need to be invested in GAP outweigh the expected cocoa yield and thus income improvements. Furthermore, it may be that GAP benefits are acknowledged but that they are perceived only to occur in the long term. Cocoa farmers may prefer to allocate time and money to investments with shorter-term benefits. According to Huijsmans (2020), GAP adoption is significantly improved through training. However, she did not find a positive effect of GAP adoption on cocoa yield, which may be linked to the short evaluation period (three years) or other yield-limiting factors such as low-yielding cocoa genotypes or severe soil infertility that cannot be quickly solved by short-term GAP applications. Obeng Adomaa *et al.* (2021) underscored the need for context-specific diagnoses and adaptations, which are often lacking in NGO and company GAP training sessions.

Training is a core element of the Oxfam and Galler cases. In the Oxfam case, training is organized through four “Farmer Field Schools” (FFS), each providing training to a cooperative subsection of twenty-five farmers. Trainings take place in a plot where the trainer, in a par-

ticipatory way, teaches good agricultural as well as good environmental practices. The training methodology is based on a manual published by the German Development Agency GIZ (Dohmen, Helberg & Asiedu, 2016). FFS sessions are held fortnightly and are provided by a trainer (the same for each subsection) and a coach (one per subsection). Moreover, in each FFS, there is a “farming practices” as well as a “best practices” plot. The “farming practices” plot is managed by a cocoa farmer according to his own choice, whereas in the “best practices” plot, appropriate GAP are implemented by the trainer and the coach. During training, cocoa tree production as well as phytosanitary problems are compared between both plots. Moreover, to encourage cocoa growers to carry out GAP, participating farmers receive an agricultural kit consisting of a machete, a pair of boots, a file and a rack.

In addition to training, the coaches pay monthly visits to the cocoa farmers to discuss their individual cocoa agricultural problems, barriers to adopting the GAP and the possibilities to overcome them. Specific focus has been on guiding farmers in correctly putting compost heaps in place on their plantations as well as providing access to organic fertilizers (based on chicken manure) and biopesticides, based on Neem (*Azadirachta indica*) seed oil. Furthermore, each subsection has self-help teams, which consist of several (mostly young) cocoa growers who step in when certain GAP (particularly weeding) cannot be performed by a farmer (*e.g.*, because the farmer is incapable of doing the laborious tasks due to high age or illness). The idea behind this approach is that cocoa farms have very particular phytosanitary and other agronomic problems that consequently require solutions tailored to these specific situations. The impact of the latter strategy on cocoa yield, environmental sustainability and cocoa farming income remains to be evaluated.

#### 4.2. COCOA PREMIUMS

Cocoa prices — determined by global future markets — are too low for cocoa farmers to obtain a living income with the current cocoa production levels (see § 1). Cocoa buyers therefore often provide premiums as an incentive for cocoa farmers and traders to improve social, ecological or both sustainability aspects of their cocoa growing and trading activities.

In the Oxfam case, a Fairtrade Minimum Price (FMP) is used that is determined by Fairtrade International for Ivory Coast and Ghana. The FMP is then compared to the reference price for these countries. The difference (called differential) is paid to cocoa farmers (unless the reference price is higher than the FMP) together with a cocoa premium. Before 2019, the reference price was too often higher than the FMP (fig. 5). As a result, in October 2019, Fairtrade International raised its FMP from US\$ 2,000 to US\$ 2,400 per tonne (FOB), marking a 20 % increase. Since 1 April 2024, Fairtrade International has set the cocoa premium at US\$ 240 per tonne (Guimarães, 2024). Since 2023, cocoa prices have significantly increased with spikes exceeding US\$ 10,000 per tonne of cocoa, mainly because of global cocoa drought-induced shortages caused by the El Niño weather phenomenon (Tabe-Ojong *et al.*, 2024). For a cocoa farmer to receive the FMP differential and the Fairtrade premium, farmers, workers, traders and other stakeholders in the Fairtrade cocoa value chain must comply with minimum social, economic and environmental requirements (with focus on working conditions) plus progress requirements that encourage continuous improvement of cocoa farmer well-being (Vandenhoute *et al.*, 2020). Moreover, farmers participating in Oxfam’s “Bite-to-Fight” project receive an additional Living Income Premium of US\$ 1,068 on top of the guaranteed FMP and Fairtrade Premium Price. This means that since April 2024, farmers in the latter project receive a price of US\$ 3,708 (US\$ 2,400 FMP + US\$ 240 Fairtrade Premium + 1,068 US\$ Living Income Premium).

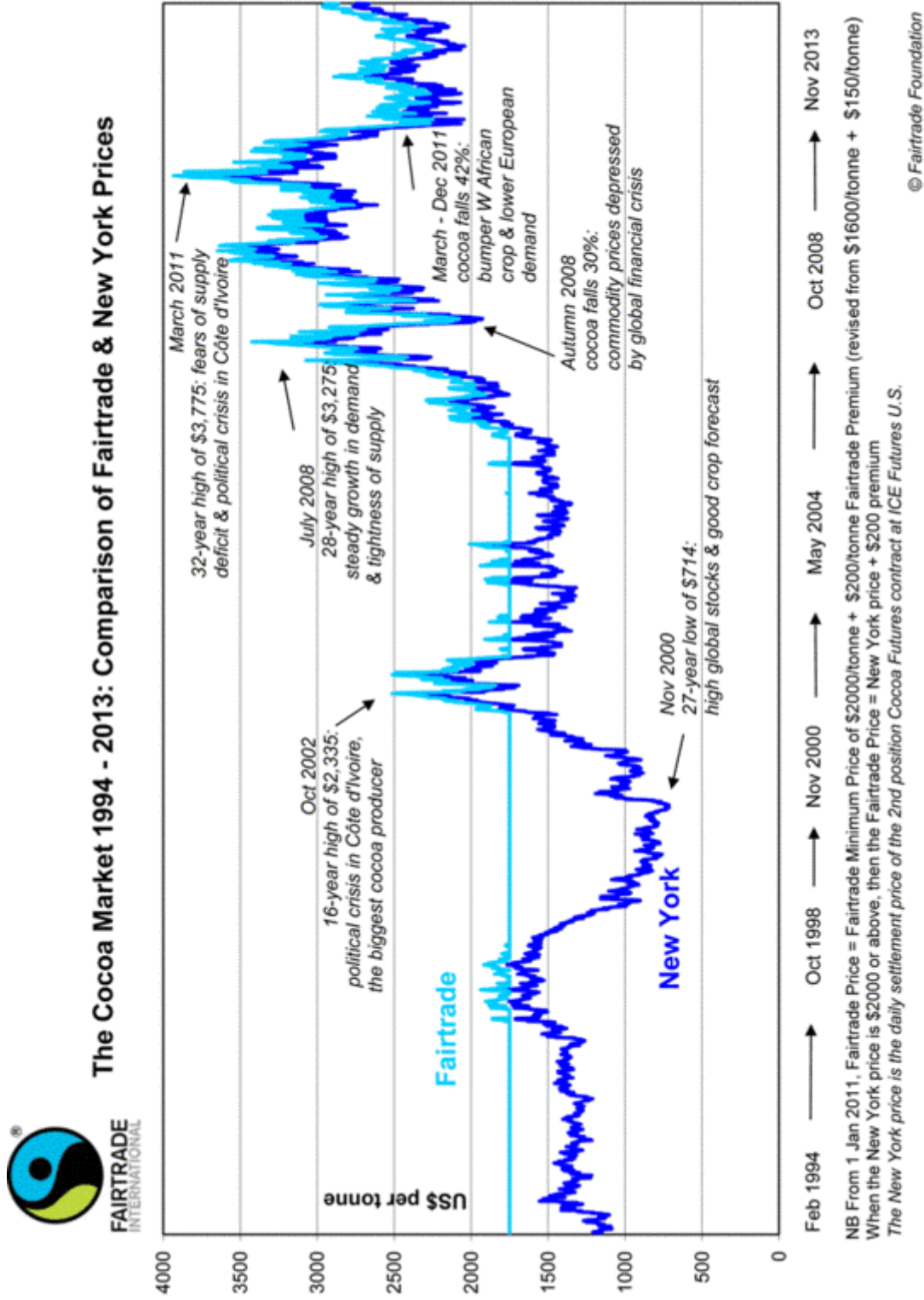


Fig. 5. — Cocoa Reference Price (dark blue line) and Fairtrade Minimum Price (FMP) (light blue line) set by Fairtrade International between 1994 and 2013 (source: Fairtrade International).

While Fairtrade offers cocoa farmers a minimum price and a fixed premium, Rainforest Alliance operates without explicitly protecting farmers from unfortunate market developments and focuses on environmental issues (Vandenhoute *et al.*, 2020).

The Virtuous Beans Project in the Galler case aims at improving cocoa quality as well as cocoa farming income through a transition to organic cocoa. It requires complete elimination of chemical pesticides from cocoa cultivation in the project area and the adoption of organic farming practices, including alternative non-chemical strategies to control pests and diseases. The latter can be done through phytosanitary pruning, composting of diseased plant parts as well as the application of organic pesticides such as neem (*Azadirachta indica*) oil. In areas with high pest and disease incidence, the sudden elimination of chemical pesticides may cause a drop in cocoa production. This is particularly the case for cocoa areas infested by the mirids *Distantiella theobroma* and *Sahlbergella singularis* whose sap-sucking nymphs and adults feed on young cocoa shoots and pods (Babin *et al.*, 2010). Mirids occur more abundantly in so-called “mirid pockets”, *i.e.* sunny patches in cocoa plantations, which frequently occur in degraded, unshaded plantations (Anikwe & Otuonye, 2015). Agroforestry practices may reduce mirid populations in West-African cocoa systems (Babin *et al.*, 2010; Gidoïn *et al.*, 2014; Daghela Bisseleua, Fotio, Yede, Missoup & Vidal, 2013). In Bolivia, Schneider *et al.* (2017) showed that the cocoa yield gap between organic and conventional systems was 47 %, but that this gap was closed to just 16 % in agroforestry systems. However, transforming a full-sun cocoa plantation to a mature agroforestry system requires several years. A sudden turn towards organic cocoa farming thus entails risks of (temporary) production decreases.

To date, the impact of the transition to organic production on cocoa yield and profit of the cocoa farmers involved in the Galler case has been slightly negative (- 1 %). According to Galler, this is mostly due to inadequate replacement of chemical pesticides by biopesticides. Moreover, the premium price cocoa farmers will receive for organically-labelled cocoa remains to be determined. As is the case in the Oxfam project, all cocoa beans produced in the Galler case are Fairtrade-certified. On top of an organic price premium, the Yeyasso producers will therefore also obtain a Fairtrade price premium. Total organic cocoa output as well as (premium) price will determine the income that farmers in the Galler case will derive from organic cocoa.

Cocoa companies could think of other premium prices or other financial incentives that reward cocoa sustainability activities which are not yet covered by organic or fairtrade standards. They may include premiums paid for cocoa trees that are adequately pruned, where black pod disease (*Phytophthora* sp.) is below certain thresholds or where other GAP have resulted in objectively verifiable sustainability results, or a premium price paid per cocoa shade tree that has reached a certain height or diameter at breast height (DBH).

So far, recent policy changes in Ivory Coast and Ghana have had the largest impact on the farmgate price that cocoa farmers receive for their cocoa beans. In 2019, both countries introduced the “Living Income Differential” (LID) policy which has made it compulsory for cocoa buyers to pay a premium of US\$ 400 per tonne of cocoa on top of the FOB price. The LID also introduces a new price stabilization fund to improve farmgate price stability across harvest seasons (Boysen, Ferrari, Nechifor & Tillie, 2023). However, soon after the LID policy came into force, it was feared that cocoa buyers would start to source their cocoa from non-LID origins (ICCO, 2021). So far, in Ivory Coast the LID has not led to substantially higher cocoa farmgate prices.

To close the living income gap at current cocoa yield and in absence of significant alternative on- and off-farm income, cocoa farmgate prices should reach at least US\$ 3,160 per tonne (see § 2). When cocoa farmgate prices are low (in the Ivorian cocoa sector, the current farmgate price of US\$ 2,500 per tonne is a record high), premiums will not close the living income gap by themselves, also because a certain increase in cocoa farmgate prices will cause a proportionally larger chocolate product price increase to the consumers. It is therefore recommended that cocoa farmers not solely rely on premiums, but also improve their cocoa yield (§ 4.1.) and diversify their income resources (§ 4.3.).

### 4.3. ADDITIONAL FARMER INCOME

In both the Oxfam and Galler cases, alternative farmer income activities are actively promoted and supported. They include (i) poultry farming; (ii) horticultural crop production; (iii) cash crop production; (iv) beekeeping; and (v) savings and credit schemes. Although these activities all have income-generating capacities, they also have a few risks and challenges, including absence of value chains for the latter products and the risk of driving cocoa farmers' efforts away from cocoa GAP. More specific opportunities and risks of alternative income-generating activities are summarized in table 1.

**Table 1**

Opportunities and risks of cocoa farmer alternative income-generating activities promoted and supported in the Oxfam (O) and Galler (G) cases

| Case | Description                                                                                                                                                                                                                                                                                                                                               | Opportunities                                                                                                                       | Risks and challenges                                                                                                                                                                                                                                                                                                         |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| G    | The Virtuous Beans Project supports several poultry farms centralized across different farmer groups in the Yeyasso cooperative.                                                                                                                                                                                                                          | Threefold income: from chicken meat, eggs and manure.<br><br>Manure is an important input for cocoa soil management (see § 4.1.2.). | High investment and labour for chicken cage construction.<br><br>Feed that mostly needs to be purchased.<br><br>Absence of buyers of chicken products (certainly if they lack purchase power).                                                                                                                               |
| O    | A horticultural project was attempted on 2 ha where the women from cocoa farming families cultivated tomatoes ( <i>Solanum lycopersicum</i> ), eggplants ( <i>Solanum melongena</i> ), watermelons ( <i>Citrullus lanatus</i> ) and okra ( <i>Abelmoschus esculentus</i> ). The project was financed by the Saving and Credits Systems (SCS) (see below). | Contribution of horticultural produce to food security (particularly micronutrient supply).                                         | Sensitivity of horticultural crops to pests and diseases.<br><br>Seasonality of the crops; <i>i.e.</i> during the main rainy season (April-July).<br><br>Top-down approach; the initiative did not come from the women themselves; lack of ownership causes neglect of the crops.<br><br>Market chains need to be organized. |

|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                   |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| G, O | Similar to the horticultural project, in both cases, a plot (around 1 ha) of cassava ( <i>Manihot esculenta</i> ) was planted by a group of women. Other cash crop projects included the production of rice ( <i>Oryza glaberrima</i> ) and maize ( <i>Zea mays</i> ).                                                                                                                                                                                                                                                                                                                                      | Cassava is a high-value cash crop.<br><br>Transformation of cassava tubers in cassava flour can further add value.                                                                                                                 | Top-down approach; the initiative did not come from the women themselves; lack of ownership causes neglect of the crop.<br><br>Market chains need to be organized.                                                                                                |
| G, O | Fifty beehives (wooden boxes) have been installed in six cocoa farms in the Oxfam case. Beekeeping activities (cleaning, priming with wax, honey harvesting, beehive relocation, etc.) are performed by eight people. Cashew ( <i>Anacardium occidentale</i> ) (Oxfam case) trees or coffee ( <i>Coffea canephora</i> ) (Galler case) (often intercropped with cocoa) are the main pollen and nectar sources (fig. 6).                                                                                                                                                                                      | Each beehive can produce up to 10 L of honey per year, which can be sold at € 4.5 to € 6 per L.<br><br>Access to organic markets if honey is produced in an 'organic' cocoa landscape ( <i>i.e.</i> where no pesticides are used). | Current insecticide use threatens bee populations.<br><br>Beekeeping is technical and requires adequate and careful management.<br><br>Beehives are pre-financed by the project; there is a risk of non-reimbursement of honey; yields are below expected levels. |
| G, O | In the Galler case, eight Saving and Credits Systems (SCS) have been established for women, whereas in the Oxfam case three female (fig. 7) and two male SCS were formed. They aim at improving financial autonomy of the cocoa farming families. SCS members make regular savings, which are then given as a loan to small-scale economic initiatives such as horticultural plots, food processing ( <i>e.g.</i> , machines to transform fermented cassava into <i>attiéké</i> granulates) or marketing equipment ( <i>e.g.</i> , tricycles, facilitating transport of produce to the market) (see above). | Financial autonomy of women is improving.<br><br>SCS act as a leverage for the local economy.                                                                                                                                      | Training in entrepreneurship is required.<br><br>Successful commercial projects require market access.<br><br>Loans might not be paid back if the projects fail.                                                                                                  |



Fig. 6. — Apiculture project in the Oxfam case (Daloa). Beehive preparation training session (left) and cashew trees (*A. occidentale*) intercropped with cocoa as a pollen and nectar supplier to the apiculture.



Fig. 7. — Gathering of one of the women Savings and Credit groups at Daloa (Oxfam case).

## 5. Conclusions

Ivorian cocoa supplies 38 % of the global chocolate market. However, Ivorian cocoa farmers are mostly poor. Around 40 % of Ivorian cocoa producers live in extreme poverty and 82 % of them do not earn a living income. If cocoa farmers were to rely on the cocoa price alone, the currently paid farmgate price should reach at least US\$ 2,500 per tonne to enable living incomes. Even when cocoa world market prices surge, as has been the case since 2024, Ivorian farmers receive a price below a living income price because of Ivorian cocoa price policies.

In the present paper, we have dealt with three strategies that can contribute to close the living income gap of Ivorian cocoa farming families: (i) cocoa productivity; (ii) cocoa premiums; and (iii) non-cocoa farm income.

The projects developed by Oxfam and Galler which are studied in the present paper make use of all three strategies. The opportunities as well as risks and challenges of the specific actions undertaken in both cases have been identified. Although the latter actions in both cases remain to be quantified and evaluated and will mostly carry out their full impact after a few years, research (van Vliet *et al.*, 2021) has revealed that relying on one strategy alone is unlikely to significantly contribute to closing the living income gap. The diversification of the living income strategies applied in both cases may therefore inspire other cocoa traders, manufacturers, governmental and civil society organizations that aim at eradicating Ivorian cocoa farmer poverty.

## NOTES

- [1] <https://www.fairtrade.net/product/cocoa>
- [2] <https://www.rainforest-alliance.org/commodity/cocoa/>
- [3] <https://www.cocoainitiative.org/>
- [4] <https://www.kakaoforum.de/>
- [5] <https://www.kakaoplattform.ch/>
- [6] <https://www.idhsustainabletrade.com/initiative/beyondchocolate/>
- [7] <https://www.idhsustainabletrade.com/initiative/dutch-initiative-on-sustainable-cocoa-disco/>
- [8] <https://www.deforestationimportee.ecologie.gouv.fr/>
- [9] <https://www.idhsustainabletrade.com/uploaded/2021/06/ISCO-Alignment-Collaboration.pdf>
- [10] <https://www.fao.org/faostat/>

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