



Cocoa harvest in Ghana

Photo credit: World Agroforestry



Fluctuating Tree Commodity Price: Perils and ways to reduce vulnerability

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Highlights

- Tree commodities form an essential part of many African economies, contributing to the GDP and livelihoods of smallholder farmers.
- Price fluctuations and occasional unfair pricing challenge smallholder farmers' securities and have severe economy-wide impacts on the balance of payments.
- Options to reduce vulnerability to price fluctuations include diversified and intensified farming systems, insurance mechanisms, value addition and restructuring the role of trading houses; at the international level, options such as fair pricing, price stabilization and intra-continental trade promotion may assist.
- For farmers engaging in the diversification and intensification of production at the farm level, with multiple crops, inputs, tree domestication and adoption of improved techniques has shown to be helpful, as has participation in national programs.
- Overall, action is required at the international, national, landscape, and individual levels to reduce vulnerability to price fluctuations.

1. Introduction

Tree commodities are essential agricultural export products for Africa. Among them, coffee and cocoa stand out in terms of production area, the number of livelihoods they support, and contribution to the GDP of exporting countries. These two commodities' livelihood impacts are primarily because they are produced mainly by smallholder farmers, and they impact natural resources, especially the forest. Coffee, for instance, supports over a million along its value chain in Ethiopia alone. Cocoa also contributes significantly to livelihoods in West and Central Africa. In Cameroon, located in Central Africa, cocoa remains an essential source of income

for approximately 1.4 million people. Additionally, cocoa farming is a fundamental source of foreign currency, accounting for about 15% of total annual exports revenue in 2009 (KIT 2010, Alemagi et al 2014) and 2.1% of Cameroon's Gross National Product (Armathé et al 2013).

The cocoa sector provides income to more than 1,000,000 farmers in Cote d' Ivoire (Coulibaly and Erbao 2019) and about 800,000 farmers in Ghana (Ministerie van Landbouw 2021). A large proportion of the income of these farmers is from cocoa in Cote d' Ivoire (about 90%) and Ghana (about 80%) (Waarts et al 2019). The total area of land under cocoa production in Côte d'Ivoire (CDI) and Ghana is estimated to be about 3.62 and 2.15 Mha, respectively and expansion of this crop into the forest area is one of the major causes of deforestation in these countries (Abu et al 2021). Abu et al (2021) showed cocoa plantations encroached 23% and 14.5% of protected areas in Côte d'Ivoire and Ghana, respectively.

The production of these commodity crops in Africa has fluctuated periodically depending on domestic circumstances and global economic trends because of the export market conditions (Petit 2007, Tröster et al 2019) and weather-related factors (Jassonge et al 2013, Moat et al 2017). As a result, the number of countries that rely on these commodities as their major foreign exchange earner and/or as a basis for attracting foreign direct investment has been on a decline. This is indicated by the declining share of tree commodities within the agricultural export. For instance, ICO (2017) showed that in Ethiopia, the share of coffee in total export value declined from 44% in 1990 to 18.9% in 2015. This is because countries diversify away from tree crops to other less risky commodities following the variable world market price. In the cocoa sector, the World Bank in 2017 predicted that oversupply and consequently low prices in the 2017/18 production year would lead to farmers shifting to other crops. This uncertainty in price has affected smallholder farmers, who are the main producers, disproportionately. For instance, according to Passacantilli (2006), the coffee price decline on the global market led to a loss of about US\$ 200 per household. Theoretically, farmers benefit when prices rise and lose when they fall. However, farmers in Africa hardly benefit from price rises because of inefficient market functioning, slowing down price pass-through. Local markets for tree commodities are often characterized by long intermediaries and price asymmetry, which reduces farmers' bargaining power and slow down price pass-through from the world to farmers. Hence, most commodity-producing farmers are not far off from the national poverty lines and even, in many cases, fall below the line. Despite such fluctuations, the demand for finished products from processed cocoa and coffee has not decreased. Interestingly, even the producer countries become the destinations for the processed products, out of cocoa in particular.

Compared to other continents producing the commodity crops such as Latin America and Asia, Africa has not taken full advantage of the value addition aspects to increase the earnings of smallholder farmers and government revenue. The failure to capture the better part of the export

value of the commodities is often attributed to the lack of national policies, plans, and programs. That provide appropriate support mechanisms for the smallholder farmers and key value chain players as they lack the technologies and the infrastructure needed for the value addition. If the existing policies and prevailing legal frameworks, as well as plans and programs, around industrialization are focused on adding values to the commodities, and proper incentives were provided to the smallholders to produce the commodities in an environmentally sustainable manner, the benefits both to the producer countries and the smallholders would have increased thereby reducing shocks related to fluctuating prices. However, due to the lack of such policies and support mechanisms, the burden will fall on the smallholder farmers who rather need strong livelihood support.

The objective of this chapter is to identify price fluctuation challenges affecting key tree crop commodities using cocoa and coffee as case studies and propose potential strategies that could 1) Cushion the livelihoods of the smallholder producers involved in the value chain at the micro-level and 2) Improve the macroeconomic contribution of the tree commodities at the national level. Cocoa and coffee were chosen as they are widely grown and highly demanded globally. Additionally, they play an important role in the livelihoods of the farmers producing them. Section 2 of this chapter explores and discusses coffee and cocoa price fluctuations using data from FAOSTAT. Section 3 discusses the social, economic and environmental impacts of this price variability. Section 4 looks at options available to mitigate the direct and spillover effects of this price variability. Section 5 explores whether farm diversification is the best bet before we conclude in section 6.

2. Global Commodity Price fluctuations: The case of Coffee and Cocoa

The fluctuations of the market prices of coffee and cocoa are presented in this section. To explore the price dynamics associated with the key commodities, we used data on production and export extracted from the [FAOSTAT database](#) and subjected them to basic trend analysis. The quality of data is taken as per the basic assumptions described on the FAOSTAT documentation. The market-related data of the database misses two years, 2002 and 2003. Trade data was obtained from [United Nations Conference on Trade and Development \(UNCTAD\)](#). The results were presented using basic descriptive statistics and graphical representation.

Coffee: Africa exported about 11,034,102 tons of green coffee between 2000 and 2017. This is equivalent to an average annual export of 692,326 tons. Two-thirds of the green coffee exported from the continent between 2000-2017 only came from three countries – Ethiopia (25.98%), Uganda (25.89%) and Côte d'Ivoire (15.16%). Together with making 52% of the export

volume from the continent, Uganda and Ethiopia are the only two countries whose coffee export volumes significantly increased with time (Figure 23.1). Except for Côte d'Ivoire, export volumes from all other countries remained unchanged over the period assessed.

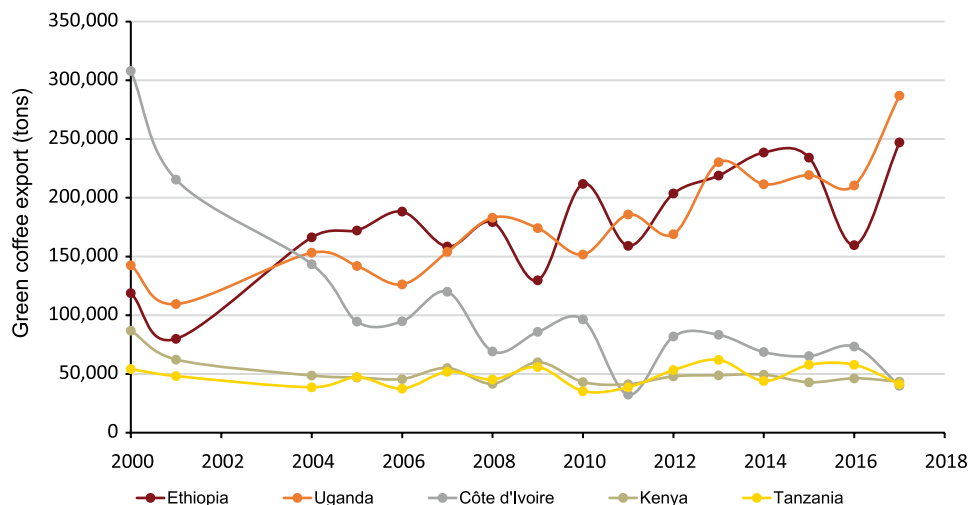


Figure 23.1: Green coffee export amount between 2000 and 2017.

Source: Authors computation from data in FAOSTAT database – Accessed June 12, 2020.

Overall, the export value of a ton of coffee has significantly increased over the years. The increase was driven mainly by the increased global demand for the specific coffee variety and the pro-export processing quality. However, at least three key moments when the coffee price fell significantly and recovered at various levels (Figure 23.2).

Period 1: This is between 2000 and 2005. The price of coffee on the global market fell in general, irrespective of the quality. For smallholder farmers dependent on coffee, this was a severe shock as the price fall lasted at least 3 years. This was one of the incidents that led to the conversion of some of the coffee farms into other fast return cash crops such as eucalyptus, *Catha edulis*, and other annual crops.

Period 2: This was only for a short period, specifically in 2009. All African coffee exporters were affected by this price fall. Though this price fall was short-lived, considering the number of smallholder farmers relying on this commodity, the impact was far-reaching.

Period 3: This global price fall period was relatively as long as the first one. It spanned from 2011 to 2014. Nonetheless, the price fall has not recovered to its initial value of 2010 even till 2017.

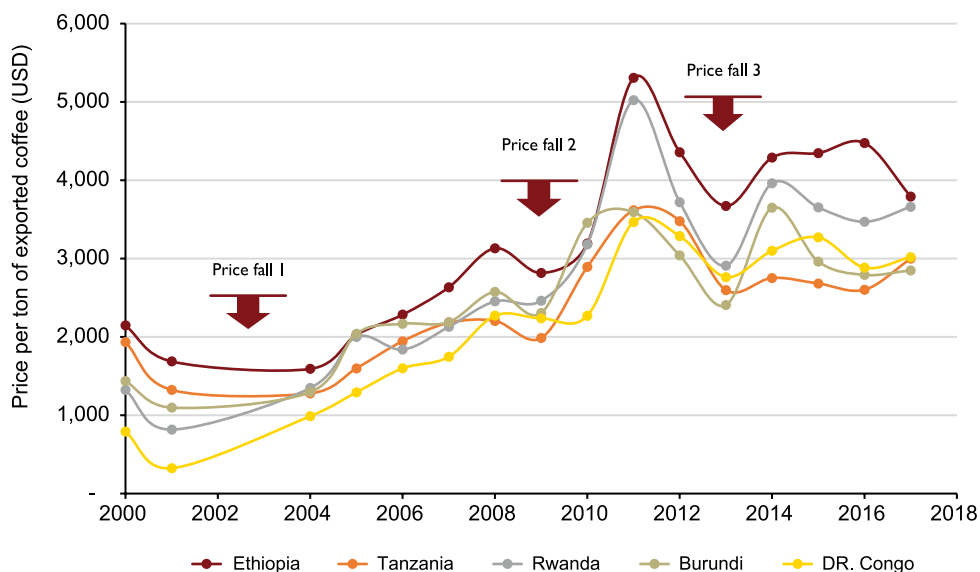


Figure 23.2: Global coffee price fluctuations.

Source: Authors computation from data in FAOSTAT database – Accessed June 12, 2020.

The consequences of global market price fluctuations mostly fall on the smallholder producers who primarily produce the coffee beans. This is because smallholder farmers are not cushioned against fluctuations, unlike the other actors who often have access to different price risk mitigation strategies. There are even cases of government support and bailouts for processors and exporters etc., when global markets sink. Even when the global coffee prices improve, the proportion of benefit that reaches farmers is almost negligible. For instance, in Ethiopia, farmgate prices are only about 61% of the Freight-On-Board (FOB) prices for coffee. This is quite low compared to other major coffee-producing countries such as Brazil and Indonesia, where farmgate prices reach over 80% of FOB. This is because of the inefficiency of the local coffee market, which benefits other value chain actors at the expense of farmers. The movements of world prices for coffee only partially transmitted to producers. Specifically, the rising prices tended to benefit the traders, while falling prices are passed on to the farmers (Gelaw et al 2017, Kuma et al 2008). This is because of the growing concentration at the trading and export stage of the value chain, where traders acquired substantial market power (Alemu and Worako 2011).

Cocoa: Like coffee, cocoa as an export commodity is exposed to significant influences in global market prices. Though the value of cocoa has been steadily rising, as opposed to the slow rise in coffee, after 2010, the prices became very volatile and unpredictable. It took time for it to recover, and since 2017, the second wave of price fall is still in recovery mode. As we write, it has dipped again. These global incidents exposed smallholder farmers, who are living below or around the poverty line, to additional livelihood stresses, which in some cases resulted in the abandoning of the cocoa farms.

The price decline (Figure 23.3) has affected the livelihoods of millions of smallholders producing cocoa who, by themselves or through their governments, have had little influence on the price offered at global markets (Hewitt 2010). To protest against the ‘take it or leave it’ usual practice of cocoa pricing by commodity trading houses in the importing nations, these smallholders producing cocoa have designated a minimum pricing approach fixing cocoa at US\$ 2600 per ton with an additional US\$ 400 per ton established for a minimum living differential to cushion farmers against price fluctuations. For smallholder farmers, this was a significant relief as they have no insurance other than this minimum living differential designed by the governments.

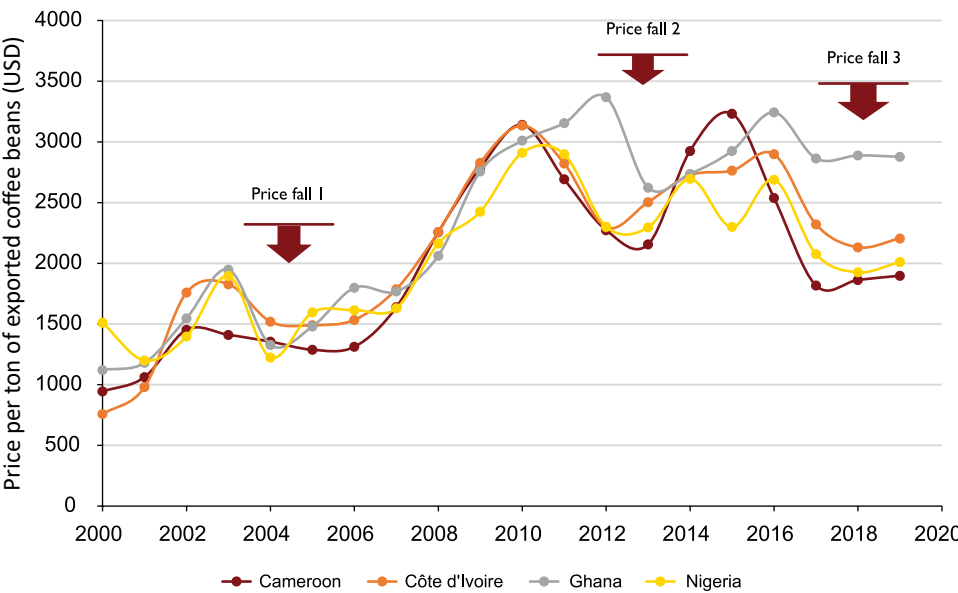


Figure 23.3: Price fluctuations of coffee beans for selected African countries.

Source: Authors computation from data in FAOSTAT database – Accessed June 13, 2020.

3. The Social, Economic and Environmental impacts of Price instability and the subsequent poor gains

Following the 1980s and 1990s liberalization of developing countries agricultural market, the price-pass through the process has become faster, which resulted in more variable producer (farmgate) prices, exposing farmers to price risk (Gilbert 2006). Farmers exposure to this risk is severe in Africa, where the market had been previously highly controlled. Local commodity markets are inefficient and characterized by weak institutional capacity, while farmers are not insulated from price risk. This unintended consequence of market liberalization, also known as the *second-generation problem*, resulted in various negative social, economic, environmental and livelihood impacts of vicious and reinforcing nature, as shown in Figure 23.4. In this section, we discuss each of these impacts in detail.

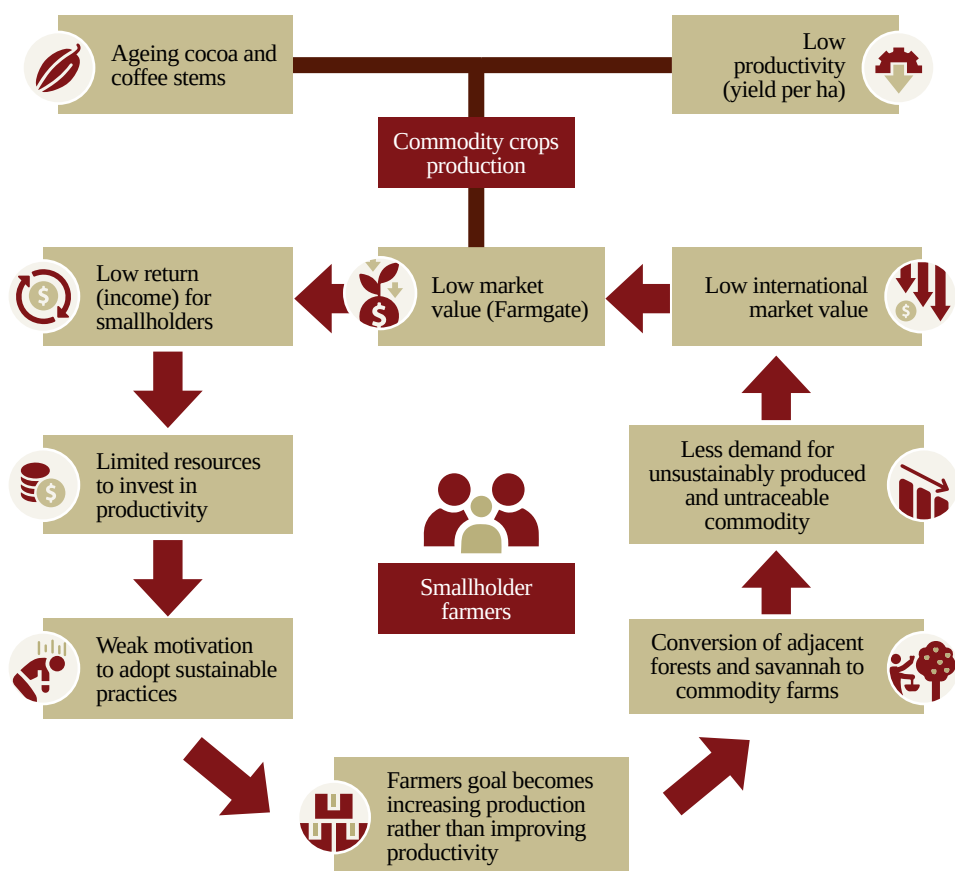


Figure 23.4: Schematic of how low market value of commodity crops affect livelihoods and adoption of sustainable practices

Economic impacts: Two streams of impacts can be attributed to the price instability and low productivity – macro and microeconomic impacts.

Macroeconomic impacts:

- *Public revenue* is among the most affected due to price instability. With price fluctuations, the tax revenue shrinks, particularly for commodity-dependent countries, significantly affecting government investments in public goods.
- *Balance of payments:* Price instability also affects the balance of payments as the country may export more volumes but get less for its produce. If the country is commodity-dependent due to the negative trade balance, it may even be forced to get expensive loans to cater for its fiscal needs.
- *Employment:* Price instability also means there may be limited investment back to the commodity sector, and hence the number of employment opportunities along the value chains may decline. Also, declining tax payments due to low income by the millions of smallholders push the government to lay off some of its employees.
- *Small and medium-sized enterprise developments (SMEs):* If the return from commodity crops shrinks, the motivation to engage in enterprises that rely on the commodities may decline.

Microeconomic impacts:

- *Farmer's income:* Unstable commodities' prices can cause loss of income by producer communities, especially if they strongly depend on the commodity, as is the case with cocoa and coffee.
- *Livelihood:* With less income, farming communities have to dwell in poverty or, more often, below the national poverty lines, as is the case in cocoa-producing countries.

Social impacts:

- *Community welfare:* With income affected due to the price instability, the general welfare of the community is affected as the cocoa producers may not have enough resources to invest in community facilities that boost their welfare level. For example, the Oromia Coffee Farmers' Union in Ethiopia invests a lot in community projects that strengthen the social capital of coffee farmers. Any decline in revenue due to price volatility means fewer investments in such community developments. In the long run, this increases community vulnerability to other factors that affect the livelihood of the farmers, such as climate change and variability, disasters and other risks.

- *Child labor*: One of the major social issues in the cocoa and coffee sector at the farm level is child labor (Luckstead et al 2019, Akoyi et al 2018). When farmers cannot afford to pay for hired labor, they engage their children, who often are underage, to do such activities. Many have proposed certifications such as Fairtrade, though the problem is strongly linked to the households' income levels. When households have sufficient income, the tendency to send their children to school is high, thereby reducing child labor problems.

Environmental impacts: The environmental impacts of commodity price fluctuations is often indirect but with immediate consequences for the farms and the landscapes.

- *Forest management*: Poor income from cocoa has been among the leading causes of forest land conversions because farmers lack the resources to intensify their existing plots to yield better. Forests adjacent to cocoa and coffee farmers suffered strongly from such acts as the conversion of the forests is seen as the easiest way to increase production and earn a little more (Gockowski and Sonwa 2011). When commodity-based income declines, communities tend to exploit adjacent resources such as forests to extract timber, produce charcoal, etc. which they could sell to earn income. When this happens, the forest is deforested and degraded, reducing its climate change mitigation and adaptation potentials.
- *Biodiversity*: In Côte d'Ivoire, where over 90% of the cocoa farms are full-sun, Tondoh et al (2015) revealed that cocoa expansion had a significant effect on plant species richness and diversity compared to the forests. The conversion of the forests also makes the converted areas unsuitable for some animals, largely frugivores that depend on wild fruits.
- *Soil management*: Soil is among the most affected biophysical attributes of cocoa and coffee production. After conversion from forests to cocoa forests, Sonwa et al (2014) found that the short-term effects on soil quality were significant but the effect reduced as the age of the established cocoa stands grew to 30 years. These results were also supported by Tondoh et al (2015), who reported declining soil quality under full-sun cocoa established after converting forest lands. When communities, landowners, or users do not have resources, they fail to invest in sustainable land management activities, affecting the sustainability of the whole production system.

The influence of price instability and poor productivity is high on the smallholder farmers, the primary producers of the commodity crops. As a result, this group of communities is trapped in a vicious cycle of poverty unless actions are taken (Figure 23.4).

4. Options to mitigate or remedy the direct and spillover effects of price instability of commodity crops

Cocoa and coffee-producing countries may adopt different options that could help them support their smallholder farmers to benefit better from the commodity crops framing. In this section, we present diverse national level options that could be considered, depending on the context of each commodity-producing country. The national options should also be complemented with international measures as the price instability is mainly caused by factors beyond the national boundaries of where the commodity crops are produced. Here, we present both the national and international options for consideration to minimize the impacts of price instability on the producer community and commodity value chain dependent livelihoods.

4.1. National Level Intervention Options

4.1.1. Increasing investment in coffee and cocoa value addition and processing

Of the top 10 countries that earned two-thirds of the global coffee and coffee products export value, there is no single African country amongst, despite the continent producing about 12% of the global coffee production, averagely between 2014 and 2018. Interestingly, 26.51% of the export value of coffee and its derived products between 2015 and 2019 was captured by countries that do not grow coffee. Ethiopia, the biggest coffee producer and exporter in the continent, stands 11th globally on the export value earned and had an average share of only 2.7% of the global export value between 2015 and 2019. Its average global green coffee beans production is about 4.87%. The runner ups are Uganda and Kenya, with 1.4 and 0.7% of the global export value of coffee in the same period, respectively. Table 23.1 provides the details and values of value-added coffee products exported and major exporter countries.

Table 23.1: Export of value-added coffee products between 2000-2017 from Africa

Value-added products	Value of exports (US\$) between 2000-2017	Main exporter countries
Roasted coffee	187,515,000	South Africa, Egypt, Kenya
Coffee extracts	1,792,553,000	Côte d'Ivoire, Morocco, South Africa, Egypt, Ghana
Products substitutes containing coffee	88,941,000	South Africa, Rwanda, Côte d'Ivoire, Ethiopia
Coffee husks and skins	186,989,000	Uganda, Kenya, Tanzania, Ghana

Source: Authors computation from data in FAOSTAT database – Accessed June 12, 2020.

The four countries (Côte d'Ivoire, Ghana, Nigeria, and Cameroon) that produced almost 95% of the continental cocoa production were only able to capture 16.68% of the global export value of cocoa between 2015-2019. The continent has 70% of the global cocoa production. There is a serious problem in the way cocoa is marketed because there is a wide gap between the global production volume the continent contributes and the export value it captures for the commodity. However, it is also important to note that not all that is produced is directly sold as there is some degree of local consumption, as in the case of coffee. Eight of the top 10 countries that captured almost half the global export value of cocoa are not cocoa-growing nations. These countries export cocoa by importing from the major producer countries. The re-export occurs after some value addition and processing, which is quite limited in the African countries. Though data is scanty, Africa only has a 20% share of the cocoa grinding process, according to UNCTAD (2019). Of the 20%, most are multinational companies that are not native to cocoa-producing countries (Grumiller et al 2018). Nigeria, however, has a distinct pattern of processing and using cocoa beans domestically. It has the lowest export to production ratio within the continent (Table 23.2), explained mainly by the high demand for cocoa products and, hence, value addition efforts.

Table 23.2: Export to production ratio and extent of value addition on cocoa beans in major cocoa-producing African countries

Major cocoa producing countries	Average cocoa beans export to production ratio	Aggregate weight (tons) of light value-added products from cocoa between 2000-2017			
		Cocoa butter	Cocoa paste	Cocoa powder and cake	Total value-added amount
Côte d'Ivoire	0.70	1,037,740.00	2,297,803.00	456,305.00	3,791,848.00
Ghana	0.73	329,751.00	334,577.00	361,842.00	1,026,170.00
Nigeria	0.56	178,356.00	162,128.00	114,754.00	455,238.00
Cameroon	0.81	100,048.00	18,133.00	88,636.00	206,817.00

Source: Authors computation from data in FAOSTAT database – Accessed June 13, 2020.

For cocoa and coffee, value addition is lagging by far in Africa, especially in countries that are major producers. For instance, the simple washing of coffee is not done effectively. Only about 30% of Ethiopian coffee gets washed for export, while almost all coffee from Latin America is washed (ICO 2017). Evidence has shown that just by washing and drying coffee beans, a price difference of about 20% on the global market is possible (Tamru and Minten 2016). Thus, value-addition to cocoa and coffee is a fundamental option to address price instability in the prices of these commodities. Indeed, adding value, therefore, provide an option to limit fluctuating prices. Because the more value is added to the commodity by producers, the more they gain additional income, thereby developing resilience to price fluctuation affecting the raw products.

4.1.2. Using cocoa and coffee as catalysts for agriculture-led industrialization of Africa

Agriculture is vital in Africa's development and inclusive growth since most of the population still lives in rural areas and depends directly or indirectly on agriculture. African leaders set up the New Partnership for Africa's Development (NEPAD) to speed up the development agenda of the continent. Through NEPAD, framing efforts were made to bring together the private sector, agrarian communities, and actors for good governance. Under the umbrella of NEPAD, the Comprehensive Africa Agriculture Development Programme (CAADP) was born (Badiane and Makombe 2014). The CAADP, with its implementation challenges, focused on prioritizing agriculture (including export-led agriculture) as its flagship idea for sustainable agricultural development and hence poverty reduction (Zimmermann et al 2009). Increasing rural income for the agrarian communities was among the key goals of NEPAD (Moyo 2006). Coffee in East Africa and cocoa in the west and central Africa stood out as high potential commodities.

Nonetheless, the practices largely focused on increasing production at the national level by converting forest and other unused lands to cocoa and coffee rather than improving productivity. Adding values to the commodities through infrastructural development, i.e., processing and packaging gained limited attention. As a result, the export share of the continent for the two commodities largely remained minimal. There is still a strong potential to transform Africa through value addition to these commodities and other tree crops while supporting millions of smallholder farmers and employing millions of youths through value addition investments.

4.1.3. Certifying and incentivizing sustainable coffee and cocoa production

With the growing global concerns of environmental impacts of commodity crops production, particularly on forest resources, there is a call to make the production schemes environmentally friendly. Adopting an environmentally friendly production system (Tschamtkke et al 2015) usually comes with a tradeoff of production volume and increased cost. For instance, keeping more shade trees in the coffee stand may lead to fewer coffee trees which may mean less short-term production. The benefit to the farmers for adopting environmentally friendly practices is rewarded through premium prices, which are often achieved through compliance with various certification schemes. The premium price serves as an incentive for smallholder farmers. In addition to the certification option, there is a potential for geographic labelling, especially for products that originate from high ecological and or biodiversity conservation values. Such labelling is believed to attract the market. For instance, the wild coffee of Ethiopia is produced in UNESCO registered landscape for its coffee genetic resources.

Schemes such as the minimum Fairtrade price gives the opportunity to protect farmers from deep falls in prices. With this price instituted, farmers are guaranteed a minimum price regardless of the market price of their products. While certification schemes are promoted by NGOs, governments need to institute this in their tree commodity policies as it happened during the pre-structural adjustment eras.

However, Jena et al (2012) stressed that certification alone does not change the livelihood of coffee farmers. It requires combination with other supporting schemes such as access to credit facilities and information on coffee prices, etc. Other options of incentivizing smallholders include the use of global mechanisms such as carbon sequestration potentials (Middendorp et al 2018) of the production systems, especially where there are significant shaded coffee and cocoa farms. The dense shade of cocoa systems in the West and Central Africa, and coffee agroforestry systems (Millard 2011), forest coffee and semi-forest coffee production systems of Ethiopia could legitimately qualify for such incentives. As such, agroforestry-based production systems could be attractive for payments for environmental services (PES) and within the framework of REDD+ performance-based payments (Asare et al 2014, Alemagi et al 2014).

4.1.4. Commensurate insurance scheme for smallholder farmers

Except for smallholder farmers, who are the primary producers of cocoa and coffee, all other entities involved in coffee and cocoa value chains have sufficient access to insurance in case of major issues affecting their operations. Though the concept of crop insurance is getting attractive, access to this service is extremely difficult. It is important that national governments take action in improving the livelihoods of the smallholder farmers who depend on these commodity crops. This is crucial with the prevailing impacts of climate change which smallholder farmers do have not have control over. Climate change is projected to significantly impact Arabica coffee production (Davis et al 2012, Jassogne et al 2013, Craparo et al 2015). In addition, climate change might induce damage from insects (Jaramillo et al 2011, Kutuywayo et al 2013), and Ovalle-Rivera et al (2015) projected that climate change is likely to affect the growing ranges of coffee significantly. Chemura et al (2016), in a study in Zimbabwe, found that there might be a significant loss in coffee harvest areas due to the impacts of climate change. Finally, Moat et al (2017) found that 39-59% of the current coffee-growing regions of Africa may become unsuitable for coffee in the near future.

Similarly, Schroth et al (2016) found declining suitability of cocoa-growing areas due to climate change in Africa. For example, a study in Nigeria highlighted the significant burden cocoa would face considering the ongoing climatic changes (Oyekale 2012). Ruf et al (2015) found that cocoa farmers are migrating to the wetter forest zones due to increasing moisture limitation in the savannahs where they used to produce cocoa. This is creating pressure on the

forest, fueling even further forest loss in West Africa. Insurance schemes, however, can help where short-term predictability of effects is low, not where long-term trends are negative.

All the evidence implies that countries relying on coffee and cocoa need to cushion their key producers – the smallholder farmers. Weather-based crop insurance could be a starting point. One of the most promising initiatives is the ILO's Impact Insurance Facility (<http://www.impactinsurance.org>) which tries to sell insurance schemes to the lowest groups of communities who, for the longest time, have been excluded from any insurance scheme. African countries should invest in such schemes and create an enabling environment that promotes their wider adoption. Financially sustainable insurance schemes for primary producers may require long-term co-investment by other beneficiaries along the value chain.

4.1.5. Redefining the role of trading houses and empowering cooperatives in commodity markets

Even though the global commodity price dynamics is the key mechanism to explain the negative impacts of commodity dependence, the national market structure has a role to play in exposing smallholder farmers to further price risks. The local market structure can expose smallholder farmers to further risks through the low bargaining power of smallholder farmers relative to other actors, asymmetric information, and high transaction costs. Local institutions such as commodity trading houses and farmers cooperatives can play an important role in ensuring an efficient local marketing system and minimizing the risks faced by farmers. For instance, the Ethiopian Commodity Exchange (ECX), created in 2008, took center stage in national coffee marketing, providing price information, quality control, and warehouse receipts. The ECX, with its auction center in the capital and several warehouses located in the coffee-producing regions of the country, works to improve price transparency and reduce transaction costs. The objective was to improve the farmers' bargaining power and price pass-through by providing up-to-date price information. This helps the farmers to benefit, especially from the world price rise. However, the ECX has its own limitations. The strong market-based nature of ECX has accelerated price volatility as global prices are directly transmitted to local actors through ECX auction and primary transactions. Impersonalized transactions through ECX auction also made traceability impossible. Even though all local actors face the price risk, smallholder farmers with limited options for price risk mitigation and long-term decision making exceptionally bear the highest price risks. Moreover, the ECX provides the price of processed and graded coffee beans while farmers sell unprocessed cherries exposing them to an information gap. The efforts of ECX efforts to ensure market efficiency could be complemented with other national price stabilization policies, but that might require dismissing the current strong market-based pricing system at ECX.

The other option to protect farmers exposure to price volatility is to empower farmers cooperatives. In Ethiopia, a member of a farmers' cooperative earned up to 18% on top of their initial coffee sales price from 2003 to 2014 (Tröster 2015). Moreover, the presence of cooperative buyers protects smallholder farmers from private price arrangements that systematically transfer their margins to smallholder farmers. However, the farmers' cooperatives currently play a limited role representing 400,000 smallholder farmers and processing only 20% of national production. Therefore, a strategy is required to strengthen and empower farmers' cooperatives to protect smallholder farmers that are disproportionately exposed to price risks. One of these strategies is that these cooperatives can buy cocoa and coffee from the farmers at the international market price. If the prices at the international market fall, the cooperative can store these commodities in their warehouses and only sell them when the prices become high.

Strengthening the capacity of farmers through institutional intervention is another option to consider. For example, a ministry responsible for agriculture in cocoa and coffee-producing countries in Africa should provide extension workers to disseminate information to rural cocoa and coffee farmers about proper agricultural practices within cocoa and coffee farms. These could include proper soil conservation and seed multiplication techniques, regeneration of old farms, and the importance of agricultural common initiative groups (Alemagi et al 20214). These are all key strategies to increase cocoa and coffee production as well as good quality cocoa and coffee that will sell high on the global market.

4.2. Options at the International Level to Reduce Impacts of Price Fluctuations on Smallholder Farmers Livelihoods

Countries and actors could adopt numerous intervention options in the cocoa and coffee sectors. Some are discussed in the subsequent sections.

4.2.1. Intra-continental trade potential and the unexploited opportunity

Close to 36% of the total coffee export quantity of coffee-producing African countries was imported by African countries between 2000-2017. If trade within Africa could be strengthened, the continent can create an efficient and less costly market opportunity that could help add value to the products (especially cocoa and coffee) of the smallholder farmers. With Africa's population rising significantly, there is vast market potential in the continent even far beyond the other parts of the world. Coffee and cocoa importing countries are re-exporting processed coffee and cocoa products to continents such as Africa. Also, with the rising middle-class economy in the continent, the consumption of some highly processed foods such as chocolates and other cocoa products is rising. The continent is, therefore, has a huge market potential. According to UNCTAD data, Africa imported processed cocoa valued at US\$ 3.63 billion

between 2015 and 2019, with an average annual import value of US\$ 0.73 billion. This is equivalent to 1.5% of the global cocoa import. For coffee, UNCTAD data shows that between 2015-2019, Africa imported about US\$ 3.4 billion in coffee and coffee products, which stands at 2.1% of the global coffee import value. With proper investment in value addition and market infrastructure, the continent can harness such opportunities.

The increasing population of the continent presents itself as one of the greatest opportunities for intracontinental trade for coffee and cocoa. The per capita coffee consumption of an average Ethiopian is estimated at 2.6 kg per year. However, it is lower in Kenya and Uganda, where coffee per capita consumption is around 1 kg (International Coffee Council 2017). The rising middle class, which is increasingly investing in products such as chocolates and other cocoa products, is great hope for Africa to invest in adding value to its commodity and boost trade within the region.

4.2.2. Price stabilization efforts at the global level

A number of income stabilization mechanisms were tried in the past, including STABEX and IMF-CFF (International Monetary Fund Contingency and Compensatory Financing) schemes. Investments in the two schemes were big from the 1970s to the 1990s. However, the donors later preferred to take a different pathway to the stabilization approach (Hewitt 2010).

STABEX started to be implemented in 1975 to help developing countries export commodities to the EU, including cocoa and coffee, not to be affected by the instability of export earnings associated with the commodities. It was implemented through the transfer of aid funds to developing countries that suffered losses or shortfalls to the European Union. It made a significant contribution for some countries that heavily depend on commodities for export earnings. Coffee and cacao were the two commodity crops that received more than half of the STABEX funds between 1975-1998. Côte d'Ivoire, Cameroon and Ethiopia received almost a third of this fund in the period specified. Though there were positive effects observed due to STABEX, the conclusion about its effect on export earning stabilization is mixed, as described in Aiello (2002). The effects varied depending on a country-by-country context (Aiello 1999). According to Aiello (2002), in the Lomé IV convention (article 186§2), the money from STABEX was supposed to be used by the sector in which the imbalance was happening, and a condition to pay the farmers affected by that particular sector was made for the release of funds. The early days of STABEX did not involve any of such conditions, i.e., any export earnings shortfall can justify the claim.

The IMF-CCF (IMF Compensatory Financial Facility), established in 1963, was another financial mechanism that was used for providing support to countries whose balance of payments suffers from drops in export earnings (Aiello 2002). Fundamentally different from

STABEX, the IMF-CFF dealt with the instability of national exports and not with drops of single commodity export proceeds. It was different from STABEX in that it did not deal with a commodity-specific instability but rather the general export at the national level. So, the compensation was not easily tagged to specific commodities. The funds were left in the hands of the government, and it was at their discretion to either share the money or not with producers who face the consequences of instability.

Other mechanisms such as The Trade Integration Mechanism (TIM), which were introduced in 2004, were also deployed to help countries facing trade imbalance to cater for the gaps due to liberalization policies in other countries. This mechanism, however, was about general imbalances, and the commodity level impacts could only be felt if the country relied on a specific commodity for export earnings.

Of late, there is a momentum building around the living income reference pricing and living income policy (minimum living wage) for commodity producers. Producer countries frustrated by other mechanisms that were tried in the past (e.g., STABEX, IMF-CFF, etc.) came up with this proposal in collaboration with some multinationals that wanted to invest in improving the livelihoods of the producer communities. The most exemplary in this case is what the governments of Côte d'Ivoire and Ghana did when they announced the increase in the floor price of cocoa to increase by 20%. According to Fountain and Hütz-Adams (2019), the necessary farm gate price of cocoa should be set at US\$ 3,166 per metric ton, and the scholars propose for the producer countries to enforce such pricing models if the intention is to support the producer communities in the countries. Though there are several discussions on the level of increase in the price of cocoa, there is a growing consensus that the inequality with which the producers are treated is not fair, and companies are standing up to support the living income reference pricing. Discussions for coffee farmers are yet to commence in a robust way as it is going for the cocoa producers.

4.2.3. Fair product pricing and living income issue

At the local level, smallholder farmers receive significantly lower farmgate prices for their commodity due to inefficient market structure hampering their negotiating power that subsequently led them to be in a state of poverty. The smallholders have limited access to local information and are unable to negotiate better prices, and are subject to potential market power by local traders. Due to an urgent need for cash to meet basic family needs, lack of storage facilities and value addition capacities, they give away their products at a very low price. In this case, the main beneficiaries are the middleperson (middlemen) who act as collectors and supply the products to the wholesalers or exporters in the countries. Consequently, farmgate prices are not fully integrated into the world commodity prices. Thus, the unfair pricing already starts at the farmgate where in-country actors begin to exploit the efforts of the smallholder

farmers, thereby making the farmers gain lesser rewards. Efforts to curb this situation through the formation of unions and cooperatives both for coffee and cocoa did not stop the prevailing challenge of low pricing. As for coffee, some farmers in Ethiopia are opting to sell their produces outside the arrangement by the cooperatives due to delays in payment for their deliveries which could take months.

At the global level, there is a strong need to have a negotiated price so that the international market fluctuations do not have a spillover effect on the revenues the smallholders generate. Prior to the agricultural market liberalization in the 1980s and 1990s, even though farm prices in most producing countries were set below-market price, governments often supported smallholder farmers through the marketing board by providing input and credit subsidies and price stabilization. Following agricultural market liberalization, government price stabilization measures through marketing boards have played a minor role in most countries, shifting to market-oriented policies and structural adjustment. These reforms resulted in linked domestic and global commodity prices exposing smallholders to global price volatility. However, in some countries, particularly those that are strongly dependent on a single agricultural commodity, with a high share of smallholder producers, the public regulation remained rather stronger. The top cocoa producer countries, Côte d'Ivoire and Ghana, are the two notable examples where governments are strongly involved in price-setting regulations and price stabilization for cocoa. These two countries started negotiation for the minimum pay for cocoa, though the process has not gained ground to date, especially among the international processors. Because the commodity trading houses dominate the price-setting power, the commodity-producing countries are still price-takers. If this minimum is not met, most of the smallholder farmers heavily engaged in cocoa production will continue to live below the poverty line. According to Tsowou and Gayi (2019), a farmer with a cocoa farm of 2 ha of land earns about US\$ 2.07 - US\$ 2.69 per day. According to the Cocoa Barometer 2015 (Fountain and Hütz-Adams 2015), only 6.6% of the money that is paid to every chocolate bar goes to the smallholder farmers. This is indeed pathetic.

5. Could the adoption of Diversified and Intensified farming systems be the best bet?

In the preceding sections, various options were described to reduce the impact of commodity price instability on tree commodity-dependent livelihoods. The outcome of such measures depends on how best the right mix of options is considered and the support for implementing the measures put in place. For the smallholder farmers, the nature of bureaucracies involved in effectively cushioning them against price instability increases the risk levels they encounter.

What the smallholders could implement at their own level to reduce the risks to their livelihoods is diversifying and intensifying their production system so that they can produce multiple products rather than specializing in one single commodity crop whose price is determined by numerous factors beyond their control. Box 23.1 highlights the context of risk and how to diversify and intensify.

For example, adopting cocoa or coffee agroforestry systems also generate additional income and biodiversity conservation (Asare et al 2014), as well as contribute to climate change mitigation and adaptation. Intensification and diversification of cocoa and coffee agroforestry systems, with fruits and timber producing trees, among others, can create another income stream, which can enable the farmers to absorb or adapt to the fluctuating cocoa and coffee prices. However, the push for such diversified and intensified systems is also growing from

Box 23.1

Portfolio theory applies to smallholders, trading houses and insurance

The risk depends on the scale and can be unevenly distributed in value chains, with the options for producers, processors/traders, and consumers to utilize diversity to manage risk differing in character. The basic tradeoff is between being a specialist (high efficiency, high risk) and a generalist (medium efficiency, medium risk) in risk management. In food webs, as well as economic supply chains, a sequencing of specialists creates (too) high risk, a sequence of generalists misses out on efficiency (van Noordwijk and Ong 1999). The question for both smallholders and actors in the supply chain is how to avoid being trapped in the risk exposure of specialization. As counter-intuitive as it may sound, it is possible to use components with high variability into a stable portfolio, as long as components can be found with low-positive or negative correlations in performance over time. Two elements with correlation coefficient -1 can even be used in a perfectly stable mix. This result of economic portfolio theory (Markowitz 1991) is relevant for smallholders (whose risk in reliance on a single commodity can be balanced by maintaining other options, e.g. fruit or timber trees, or livestock; Reeves and Lilieholm (1993), for trading houses (that have access to commodities produced in different parts of the world to reduce their risk), and to insurance companies that function best if the events insured remain weakly correlated (otherwise they need to have their re-insurance deals that add to the premiums). Nonetheless, with diversification, it is important to note that the production volumes may be affected by space competition by other crops grown in the farms. Changes in the production volume may then affect the volume of commodities that can be locally processed for further value addition to minimize the market fluctuation risks.

Adopting the portfolio approach also helps to reduce economy-wide exposure. For instance, value addition through domestic processing creates different revenue streams by creating diversified products that are usable/consumable within the producer countries and generating income even when the global price falls. Thus, increasing value by processing the cocoa and coffee into multiple products would generate more money and secure the income of the smallholder farmers. Creating a portfolio of products can therefore be an option worth considering by producer countries.

the certification point of view. The major challenge in the cocoa and coffee systems from a biodiversity angle as it involves the use of chemicals (e.g., fertilizers and pesticides), affecting pollinator species like bees and other insects. With a diversified and intensified system, the habitat value of the production system improves, thereby reducing the impact of the production system on the fauna. This approach is attracting a better price premium, for example, for cocoa through the Rainforest Alliance/ UTZ (RA/UTZ) certification schemes. This certification scheme requires the maintenance of at least five native tree species on farms to qualify for the certification. In fact, evidence from Gockowski et al (2013) showed that RA/UTZ certified cocoa farms that generated food, cocoa and timber benefits that are compelling to the farmers at times of unstable market situation.

Governments need to develop policies to encourage cocoa and coffee farmers to diversify into other crops to rely on other commodities in case the prices of cocoa and coffee drop. In Cameroon, for example, farmers integrate fruit trees into their cocoa and coffee systems. This has the double advantage of not only providing alternative revenues to farmers but also providing environmental services. Farmers then thus benefit from the PES scheme to absorb shocks from low prices.

6. Concluding Thoughts

Being among the major continents producing coffee and cocoa, Africa has suffered several times due to price instability. The most affected are the smallholder farmers, who are the most important producers. The impacts had multidimensional effects from social, economic and environmental aspects. Though the results are acknowledged by many, effective measures to address the consequences are scanty. Various measures were tried in the past to cushion the smallholder farmers; however, they were not that effective. Often the measures failed to address the root causes of the issues that affected the net gains of the smallholder farmers. For example, some countries tried the trading houses approach, which in many cases was marred with lengthy bureaucratic processes that discouraged farmers. There were also price stabilization efforts through STABEX and other IMF supporting schemes. Still, it is no longer in operation unless countries invest in such mechanisms to safeguard their producers.

Several options were proposed in this document for policymakers and practitioners to choose the best option or mix of options that they could experiment with to make the commodity sector attractive enough to the main producers - smallholders. These efforts should not only involve the national governments of the commodity-producing nations and smallholder farmers. Still, they should also actively involve the international actors, who are active in the commodity value chains.

The continent should also make a deliberate investment in value addition, especially on coffee and cocoa, as the consumer base in the continent is rapidly rising with the increasing population. This requires policy actions to assign resources and ensure effective governance is put in place so that the benefits trickle down to the smallholders too.

At the farmers level, in addition to the numerous national and international efforts, they should also consider diversifying and intensifying their farming systems to reduce their exposure to price volatility resulting from global factors.

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