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of the United Nations

# Growth through pricing policy: The case of cocoa in Ghana

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# **Growth through pricing policy: The case of cocoa in Ghana**

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## Acronyms

<b>ASRP</b>	Agricultural Services Rehabilitation Projects
<b>CMB</b>	Cocoa Marketing Board
<b>CMC</b>	Cocoa Marketing Company
<b>CODAPEC</b>	Cocoa Diseases and Pest Control Program
<b>CRIG</b>	Ghana Cocoa Research Institute
<b>ERP</b>	Economic Recovery Program
<b>FOB</b>	Free On Board
<b>GDP</b>	Gross Domestic Product
<b>GLSS</b>	Ghana Statistical Service
<b>HT</b>	High Tech
<b>IFS</b>	International Featured Standards
<b>LBC</b>	Licensed buying company
<b>MOFA</b>	Ministry of Foreign Affairs and International Cooperation
<b>MOFEP</b>	Ministry of Finance
<b>PBC</b>	Produce Buying Company
<b>PPRC</b>	Producer Price Review Committee



## Abstract

Cocoa has and continues to play a central role in the economy of Ghana which is now the second largest producer of cocoa beans in the world. But it has not always been so. At its nadir in the early eighties, the cocoa sector was one half of what it was in the decade after independence. The paper argues that the key to this success is anchored to specific strategies put in place and managed by the state-run marketing board, COCOBOD. An important strategy was to pass on an increasing share of export prices to producers, which with growing global prices in the 2000's gave producers higher real prices. Two major government programmes – also initiated in early 2000's – offered farmers improved varieties, subsidized fertilizer and free pest and disease control. These programmes triggered a cocoa revolution by enabling farmers to more than double their yields. This transformation was inclusive because cocoa production remains traditional and labour intensive, and enabled smallholders to intensify production to a greater extent compared to large holders. Improved land productivity contributed to reduced poverty, where incidence rates among cocoa growing households have nearly halved since 2005.





# **I. Background and context**

## **a. Importance of cocoa to Ghana's development**

Cocoa has and continues to play an important role in the Ghanaian economy. The reserves that had been built up from the cocoa revenues gave the first independent administration the resources to implement an ambitious but unsuccessful import substitution industrialization strategy. Cocoa continued to be a major source of government revenue. Although Ghana has found other sources of revenue, the economy has become even more dependent on natural resources following discovery of oil in its shores.

After the economy nearly collapsed, along with the cocoa sector, in the early eighties the cause for which could be traced to policies in the agricultural sector (cocoa in particular), Ghana has made major efforts to offer adequate incentives to producers by passing on a higher share of increasing global prices.

Ghana has now become the second largest producer of cocoa in the world, and the sector growth has corresponded with significant decline in the incidence of poverty, some of which can be directly attributed to growth of cocoa.

This case study examines the role played by cocoa in Ghana's economy, by the institutions that transmit global prices to producers, growth of the sector in relation to global prices, and its association with poverty reduction. The rest of the discussion is organized in three sections. Section one provides an overview, including historical dependence on cocoa, and organization of the sector. Section two examines producers' share of export prices in the last 15 years, and the associated supply response. It also identifies some factors that have driven this growth. Poverty reduction during this period and its link with performance of the cocoa sector are presented in the section four. This also includes some discussion of aspects of sector management and cocoa production may have led to inclusive growth. The paper concludes with some reflections on the relevance of this case study for sectors and situations elsewhere.

## **b. Cocoa in Ghana's economy**

Most of world's cocoa is grown in developing countries – more than half in West Africa – essentially for export, and largely by smallholders. Cocoa sector in Ghana was the creation of local farmers and their families who cultivated a new cash crop to respond to global demand for cocoa beans.

Historically as one of Ghana's main exports, alongside gold and forestry products, cocoa has been central to the country's debates on development, economic reforms, and poverty alleviation strategies since independence in 1957.

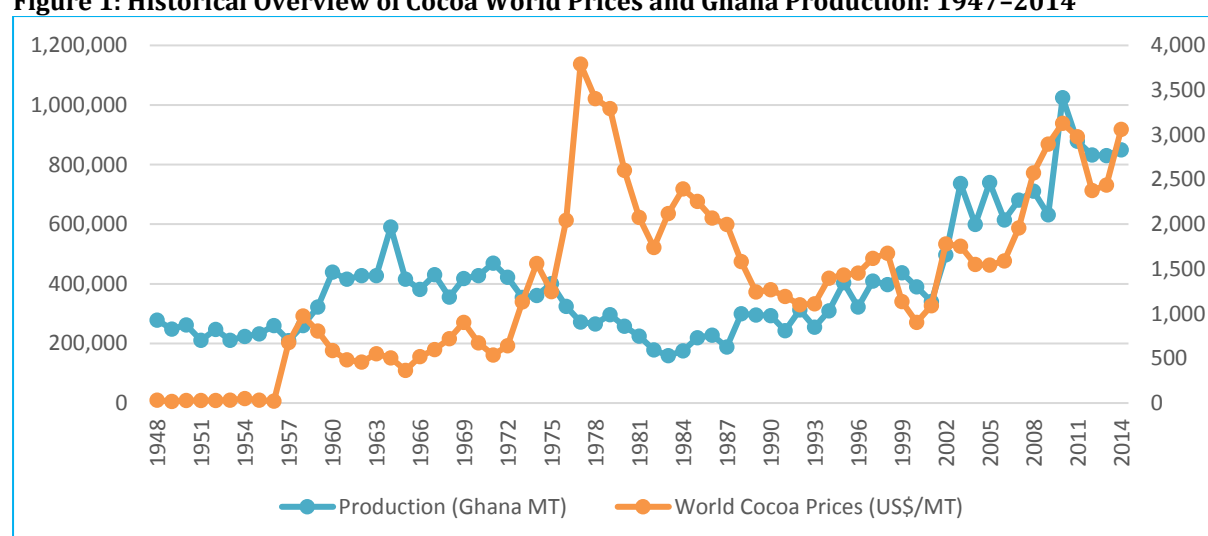
Various administrations in the country – including the colonial one – extracted cocoa revenues as taxes to secure a significant share of government revenues (Rimmer, 1992). Kwame Nkrumah, the first president in power from 1957 to 1966, used cocoa

reserves and revenues to promote an import substitution industrialization strategy (Killick, 2008). Subsequent governments in the late 1960s and in the 1970s continued in the footsteps of Nkrumah's development policy, and retained a large role of the state in managing the sector for the benefits of the entire economy instead of switching to market-oriented policies to access new sources of taxation (Killick, 2008).

Cocoa revenues accounted on average for 30 percent of total government revenues in the 1955–1975 period (Frimpong–Ansah, 1992). The share decreased to 25 percent during the recovery phase 1985–1987, demonstrating that cocoa continued to play a central role also in the fiscal recovery, despite Rawlings' political strategy to shift away from export taxation to reduce the broad impact that cocoa taxes had on the large number of smallholders (Prichard, 2009).

During the years of Nkrumah's administration, in the decade after independence, cocoa exports grew steadily when production reached an unprecedented level of 591 000 tonnes in 1964 (Figure 1). These significant increases in production occurred in spite of major dips in world prices in 1961 and 1965, to some extent because of the cyclical nature of production from plantings made earlier. As the government committed to maintain producer prices constant, tax revenues from cocoa came down dramatically when global prices plunged in the second half of 1960s.

**Figure 1: Historical Overview of Cocoa World Prices and Ghana Production: 1947–2014**



Source: Cocobod records and IFS data.

The second drop in world cocoa prices of 1965 triggered a major downturn in the cocoa sector (Stryker, 1990). Real producer prices began to fall sharply, partly as a result of high inflation fueled by government's printing of money to compensate for the loss of cocoa revenue, and partly from an exchange rate policy that led to the heavy overvaluation of the cedi, the Ghanaian currency. By the beginning of the 1980s – when the entire economy had come to a near collapse – market exchange rates were nearly 44 times the official rate, and official records of cocoa production were half the high values of the early 1960s. The cocoa sector collapsed when cocoa prices were much higher than they were in the 1960s. The overvalued exchange rate resulted in declining shares of export prices for the producers, who received less than one-fourth of export prices.

During this time as much as 20 percent of Ghana's cocoa harvest may have been smuggled into Côte d'Ivoire (Bulíř, 2002).

The revival of cocoa began with the Economic Recovery Program of 1983. Increased producer prices were a central part of the reforms, as well as a number of production incentives set out by the Cocoa Rehabilitation Project – a program that was initiated to revamp the sector. Farm gate prices paid to Ghanaian farmers became comparable to those paid in neighboring cocoa producing countries, thus minimizing the incentive to smuggle. The cedi was devalued and returned to market level figures by the end of the eighties, and in doing so the level of implicit taxation of farmers was reduced.

Cocoa production rebounded to 400 000 tonnes by 1995/96 and productivity increased from 210 to 404 kilograms (kg) per hectare (ha) (Kolavalli and Vigneri, 2011). Sector growth has been even more pronounced from 2001, through a combination of record-high world prices, an increased share of these being passed onto farmers, and a set of interventions rolled out by the Cocobod to improve farming practices.

Ghana is presently the world's second largest producer of cocoa beans after the Ivory Coast. According to the Bank of Ghana, cocoa bean and products export receipts for the first quarter of 2011 were US\$859.4 million, accounting for about 61 percent of total export earnings as compared with US\$682.5 million at 48.8 percent in the previous year.

The economy largely depends on agriculture which accounts for nearly 30percent of GDP and 50percent of all employment, and with cocoa contributing to about 10percent of agricultural GDP.

**Table 1: Cocoa's contribution to the economy**

	<i>Share of cocoa in GDP and agriculture (2006 prices)</i>								
	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>GDP</b>					22,42	25,57	27,95		
	17,403	18,160	19,822	20,782	4	3	0	29,994	31,206
<b>Ag. GDP</b>	5,415	5,322	5,716	6,129	6,453	6,507	6,657	7,035	7,356
<b>of Cocoa</b>	537	493	509	535	677	771	699	717	748
<b>% Cocoa in GDP</b>	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02
<b>% Cocoa in Ag GDP</b>	0.10	0.09	0.09	0.09	0.10	0.12	0.11	0.10	0.10

Source: Ghana Statistical Service; Expenditure report, 2014.

### c. Organization of the cocoa sector

Cocoa is produced by nearly 800 000 households (GLSS, 2014), most of whom are smallholders, in six regions in the forest zone of southern Ghana. Spatially, the core of production has continued shifting westward in the 2000s. Overall the Western region accounted for 56percent of national production in 2011 versus 53percent in 2002. The Eastern region, which was once the centre of the cocoa industry in Ghana, saw its share of national production decline from 12 to 9 percent over this period, even as it increased its output by 20 000 tonnes. Annual growth in production was highest in the southern Western Region where the cocoa District of Enchi, already the country's largest cocoa producer in 2002, more than doubled its production. The growth in cocoa production was also substantial in the Central and Brong-Ahafo regions. In 2010/11, the country as a

whole exceeded one million tonnes of output reaching the target originally set forth for the High Tech Program (Gockowski, 2012).

Virtually every country with a major export crop in postcolonial Africa used marketing boards or *caisses de stabilisation* to directly tax farmers by fixing producer prices below world prices. Ghana was no exception to this, with a state marketing board that has played a strategic role in overseeing all operations around cocoa trade from the farm-gate to the export port. Established in 1947 by the colonial government, the Cocoa Marketing Board (CMB) played a central role in the economic pathology that developed and persisted in Ghana to create a large public sector (Frimpong-Ansah, 1992).

In 1984, as part of the ERP process, the board (by then renamed Cocobod) went through a major downsizing effort, which saw the removal of tens of thousands of “ghost” workers and unnecessary staff, and the elimination of non-essential roles such as building roads, processing cocoa and running plantations (Jacobeit, 1991). Ghana’s Cocoa Marketing Board was in full control of all operations along the domestic chain, and acted as a legal monopsony, setting a pan-territorial and pan-seasonal price at the onset of the main harvest season in early October. Different transactions in the domestic supply chain were carried out by a variety of Cocobod subsidiaries: 1) the Produce Buying Company (PBC), which organized purchases throughout the cocoa growing regions; 2) the Quality Control Division (QCD), responsible for the quality checks of cocoa beans at different collections points (in the villages, in district level depots, and in the ports immediately before exports); and 3) the Cocoa Marketing Company (CMC), in charge of all exports. The board, however, operated as the sole buyer in the domestic market and as a monopolist for the exports in the world market.

After the sector reforms of the early 1990s, although the producer price remained fixed both throughout all growing regions and within the two crop seasons, the structure and functioning of the internal market has seen the procurement of cocoa at the farm gate delegated to a growing number of licensed private buying traders (known as licensed buying companies or LBCs), which have entered the domestic segment of the cocoa supply chain as competitors with Cocobod holding the responsibility for issuing licenses to these companies. Since then, the LBCs are required to pay producers a price that is equal to or greater than the announced prices.

Another important element of the reforms initiated in 1992 was a further reduction of the marketing board staff employed from 10 400 employees in 1999 to just over 5 100 in 2003, which brought down its operation costs considerably. The Quality Control Division, renamed the Quality Control Company, remains responsible for ensuring that the overall quality of the beans is kept to the high standard, and the CMC remains the only exporter of Ghanaian cocoa.

From 2001, possibly driven by a combination of record-high world prices and the increased share being passed onto farmers, Cocobod has introduced several measures to improve farming practices. The most noticeable ones have been a mass spraying programs, and a number of high-tech programs to promote higher adoption rates of and more frequent applications of fertilizer among growers. Though it is unclear whether Cocobod’s costs have been reduced by “outsourcing” procurement and transport, it is pretty uncontroversial that retaining control over exports and other aspects of marketing

has enabled the board to support producers in ways that would not have been possible had it devolved these responsibilities to other private organizations.

When Cocobod gradually expanded the scope of its operations in 2001, the introduction of programmes designed to develop and expand production (the Hi-Tech or fertilizer subsidy program, and the Cocoa Diseases and Pest Control Program, a public spray program most commonly referred to as CODAPEC) have raised the share of these industry costs weighing on sector revenues from 4 percent in 1996/97 to 25 percent in 2009/10 (Kolavalli *et al.*, 2012). Because these “Industry programs” had to be financed via export revenues, the government has introduced the concept of an “administered” pricing sharing system which consists in setting aside a portion of the projected revenues from cocoa to cover the delivery of these programs to producers. The remaining net FOB is then allocated to various stakeholders, including producers and all agents involved in the domestic marketing of cocoa (i.e. the Quality Control Company and the Cocoa Marketing Company).

The way Ghana’s pricing policy has operated over time the principles of sharing world prices among different sector players needs to be understood in the context of the reforms that took place in the 1980s. The key idea of the post reform pricing policy was that prices offered to producers should reflect real production costs rather than an artificially set proportion of the FOB price. In line with this thinking, the Government of Ghana established in 1983/84 the Producer Price Review Committee (PPRC), an independent body chaired by the Ministry for Finance and Economic Planning, who would become the institution in charge of deciding how to allocate the share of the FOB using technical recommendations made by various independent members of Ghana’s political establishment.

In the last fifteen years, the price determination mechanism has worked through two key steps: the forecasting of cocoa revenues and the deliberations made by the PPRC. The technical committee of the PPRC begins its pricing exercise with projections of FOB prices in US\$, the exchange rate of the cedi to the dollar, and the crop size in the following crop year. The Cocoa Marketing Company (CMC) and the Bank of Ghana forecast prices and exchange rates. By the time CMC offers an estimate, 60 to 70 percent of the projected main crop is likely to have been forward sold. The PPRC also considers potential or actual prices in the neighboring countries in recommending a price for Ghanaian producers, and Cocobod may also revise producer prices to discourage smuggling. The PPRC recommends shares in FOB prices for all of the agents involved in production and marketing, including a combined share for Cocobod and the government. To receive its share, Cocobod must submit a budget to MOFEP for approval. Cocobod then announces the producer price just before the opening of the main cropping season in October.

The PPRC has changed over time the approach in recommending producer prices. Between 1986/87 and 1997/98, it estimated costs of production and marketing functions and set prices and compensation such that they guaranteed at least 20 percent returns to growers. The implicit understanding was that any remainder would go to the government as taxes. Following complaints that the costs and yields assumed in the process were arbitrary, the board abandoned this approach, and from 1993/94 onward, the committee paid attention to ensuring that producers would receive a decent share of

the global prices of cocoa. From 2001 the PPRC has introduced the mechanism described above of sharing the net FOB price among producers and marketing agents.

Whether this system of “netting out” export revenues to cover industry costs is benefiting producers and whether the goods and services provided are cost effective is not clear, but independently of the merits or weaknesses of this administered price sharing system, it is without doubt that one of the biggest drivers of change in the cocoa sector of Ghana in the 2000s has been the steady increase in producer price. In nominal cedis terms, the producer price per tonne of cocoa in 2010/11 was over seven times its level in 2001/2002, with an annual rate of increase equal to 16 percent. The increase in the dollar denominated producer price, which has averaged nearly 9percent over the ten year period from 2001 to 2010, reflects fundamentally higher global prices and the producer price policy described above which has committed the Government to pay 70percent of the net FOB price (instead of the 40 to 60percent share of FOB more commonly paid in the 1990s).

## II. Producer price and supply response

Ghana has made systematic efforts to increase the share of prices going to producers following economic reforms. From the time that the ERP was launched in 1983, the World Bank had offered compelling evidence to the Government of Ghana that the steady decline in real producer prices observed since the mid-1950s had been the reason for the fall in cocoa production. It recommended that a significant increase in real producer prices (in the order of 50 percent) should be approved to halt the rapid decline in cocoa production, which by then had nearly disintegrated farmers' incentives to cultivate and invest in the crop (Kolavalli *et al.*, 2012).

As a result, after the ERP was launched, the government articulated its commitment to pass on a significant share of export prices to farmers and to reduce taxes in many programs and strategies, as illustrated by the summary table below (Table 2). In 1987, as a part of the Agricultural Services Rehabilitation Project (ASRP), the producer share of world prices was set to increase to 55 percent, and this was further raised to 70 percent in the Cocoa Sector Development Strategy. Similarly, under the same set of policies, cocoa taxes were reduced to 15 percent and turned into "residual" payments to the government.

**Table 2. Targets established to increase producer share of FOB prices**

Program		Targets related to	
		Producer price	Taxes
<b>ASRP (1987)</b>	Increase from 30% of long run world price to 55% by 1988/89	COCOBOD expenditures Reduce from 30% of FOB to 15% net of retrenchment costs	–
<b>CRP (1989)</b>	Maintain above 50% of FOB	Reduce COCOBOD operating costs	–
<b>MTS/Cocoa Sector Development Strategy</b>	Raise from 65% of FOB in 1999/00 to 70% by 2004/05	–	Reduce from 25% of FOB to 15% of FOB by 2004/05
<b>Ghana Cocoa Sector Development Strategy</b>	–	–	Taxes should be residual payments

Source: Adapted from Kolavalli *et al.*, 2012, MOFA 1999 and COCOBOD 2010.

From the 1990s, Ghana's cocoa pricing policy has refocused on the principle that passing on to producers a higher share of global prices is essential to increase aggregate production, and ultimately sustain the country's position as a leading player in the cocoa industry. It has been possible to pass on a higher share of global prices to growers because cocoa taxes have declined substantially, from nearly a third in the mid-1990s to less than one twentieth in 2010/11. This reduction has been fiscally sustainable partly as a result of growing sector revenues, but also thanks to new tax sources – petroleum taxes the most noticeable ones – which have alleviated the pressure on the allocation of cocoa revenues to the government (Prichard, 2009; and Kusi, 1998).

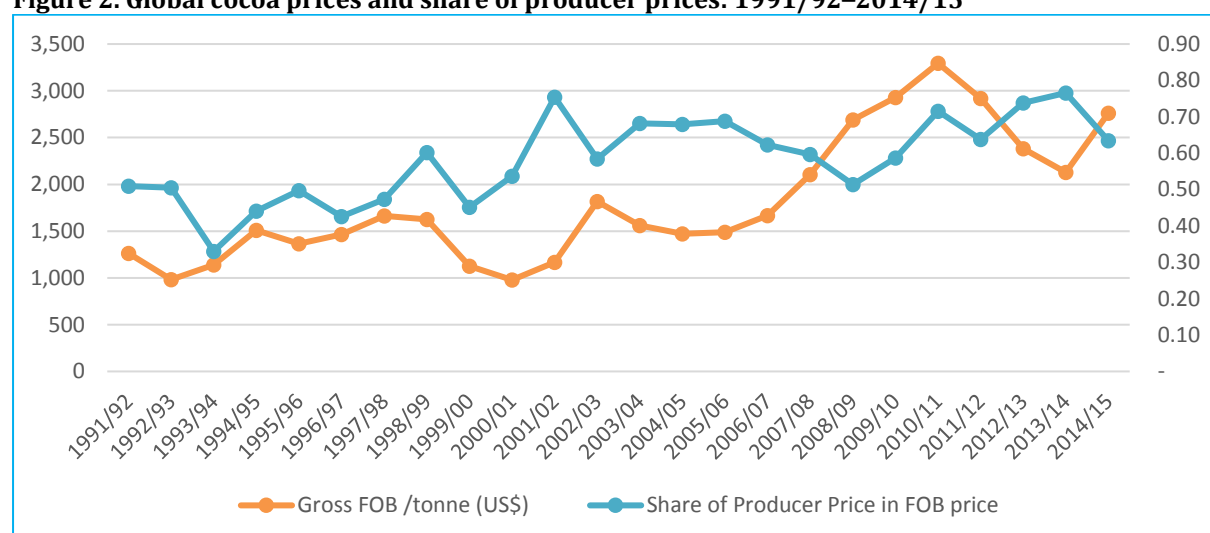
Figure 2 illustrates the evolution of global cocoa prices in the last twenty five years, and compares this to changes in the share allocated to growers.



This more recent time frame shows a positive trend in global prices, despite three major episode of downturn after 1998/99, in 2003/04, and more recently in 2011. The share of global prices being passed on to farmers' over the same period has been upward trending, averaging 47 percent in the 1990s and stepping up to an average of 67percent since 2000.

In nominal cedis terms, the producer price per tonne of cocoa in 2010/11 was over seven times its level in 2001/02, the annual rate of increase was equal to 16 percent. The increase in the dollar denominated producer price, which has averaged nearly 9percent over the ten year period from 2001 to 2010, reflects fundamentally higher global prices and the producer price policy described above which has committed the Government to pay 70percent of the net FOB price (instead of the 40 to 60percent share of FOB more commonly paid in the 1990s).

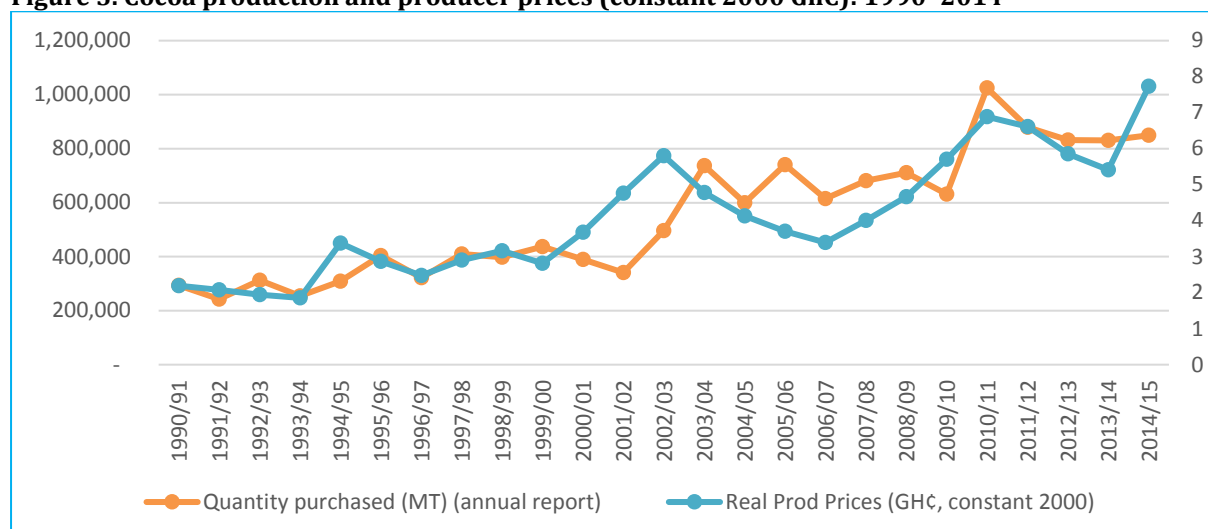
**Figure 2. Global cocoa prices and share of producer prices: 1991/92–2014/15**



Source: Cocobod records, and IFS data.

In order to further understand the impact of these pricing policies, figure 3 looks at the relation between real producer prices and aggregate production. The two indicators have clearly moved together over the last 25 years, pointing to the high responsiveness of cocoa supply to prices changes which is extensively documented in the economic literature (Bulíř, 2002; Hattink, Heerink, and Thijssen, 1998; and Vigneri 2005).

**Figure 3. Cocoa production and producer prices (constant 2000 GhC): 1990–2014**



Source: Cocobod records and IFS data.

It is particularly interesting to note that the two largest positive increases in real prices in 2000 and in 2010 have been followed with the two highest production points recorded over the period.

#### a. Drivers of cocoa production

By the time cocoa production had nearly halted in the late 1970s, the largest interventions to restore the sector growth – as noted – came through the World Bank supported Cocoa Rehabilitation Project. This featured the distribution of improved cocoa varieties to farmers, especially in the Western region, and the reorganization of the extension services to improve the delivery of advice and the availability of the traditional pesticides to control capsids (Bloomfield and Lass, 1992; and Edwin and Masters, 2003). In the early years of its development, the government of Ghana played a critical role in sustaining production growth through a set of campaigns for the distribution of chemicals to control a the diverse number capsids and mirids that had caused substantial devastation to cocoa farms in all cocoa growing areas. The Ghana Cocoa Research Institute (CRIG), which was established in 1938 to address disease and pest problems that were affecting the sector, has made available to farmers improved varieties of cocoa seedlings.

A renewed effort to further boost growth in cocoa took place in the 2000s. Over this decade, Cocobod explicitly targeted the intensification of farming practices through the High Tech (HT) and the Cocoa Disease and Pest Control (CODAPEC) programs to reverse the decline in yields and raise production to a target level of one million tonnes of beans. Unlike the decade of the 1990s, when all of the sector growth was attributable to area expansion (Vigneri, 2005; Vigneri, 2008), the policies implemented since 2001 have generated a remarkable turnaround in land productivity. Growth in yields has accounted for 80percent of the growth in cocoa production between 2001 and 2010, with an annual growth in land productivity of 5.5percent per year over the period (Gockowski, 2012).

One important component of the high tech (HT) package has been the use of selected hybrid varieties developed by the breeding program of the Cocoa Research Institute of Ghana (CRIG) and produced through hand pollination by more than twenty Seed Production Units (SPUs) located across the cocoa growing regions of Ghana. Gockowski (2012) shows that in the Bia district of Ghana – one of the predominant areas of production – the SPU hybrids in farmers’ fields were four times as productive as local unimproved material.

However, the two major productivity drivers have been the HT program which reintroduced subsidized fertilizers, and the mass spraying of subsidized agrochemicals. Gockowski (2012) reports that total annual expenditures on fertilizer and pesticide subsidies and distribution have gone from virtually zero support in the early 2000s, an average of US\$344 million in 2010 and 2011. The effect of these programs was reinforced by two supporting policies in the early part of the same period. First – as discussed in the previous section – the commitment to pay producers 70percent of the “net” FOB price. This alone, when first implemented, immediately doubled the official producer price. Secondly, the increasing distribution of fertilizers by licensed buying companies (LBCs). Following the privatization of domestic cocoa marketing, as Cocobod continued setting a pan-territorial producer price, these buying companies – who could not compete on price – began to compete in supplying fertilizers on credit to cocoa farmers with a linkage to the sale of the farmers’ beans. This has been a very useful intermediate innovation on the road to full financial intermediation by the banking sector, allowing credit constrained small holders to benefit.

The set of reforms above have been the recipe for Ghana’s “cocoa revolution” (Gockowski, 2012); with farmers suddenly gaining access to fertilizers and agrochemicals on a significant scale, and this in turn generating a substantial growth in yields. Using farmer level data from a ten year longitudinal study conducted by Oxford University in the three most important regions, Table 3 illustrates these changes.

Although the microeconomic data above is not representative of all cocoa growing regions, and perhaps not entirely representative of the growers’ population as a whole, it is suggestive of these trends: yields have gone up by 62percent, and fertilizer adoption rates have risen by a factor of four, with underlying applications increasing from nearly none to an average of 122 kg per ha. Perhaps most surprisingly, there has been a substantial rise in labour productivity, which has more than doubled in the first decade of the 2000 – a point that will be discussed in detail in the next section.

It is interesting to note that most of the size changes described above have come about from the Western region, the production area with relatively newer and more fertile land, which also reportedly received more attention from the HT program (Gockowski, 2012).

**Table 3: Land productivity and its underlying changes; 1991/92–2009/10**

		<b># Obs</b>	<b>Ashanti</b>	<b>B. Ahafo</b>	<b>Western</b>	<b>Total</b>
<b>Cocoa yield (kg/ha)</b>	2001/02	<i>443</i>	180	154	181	<b>179</b>
	2003/04	<i>507</i>	193	182	240	<b>223</b>
	2005/06	<i>504</i>	209	216	266	<b>241</b>
	2007/08	<i>693</i>	226	257	368	<b>307</b>
	2009/10	<i>702</i>	193	270	384	<b>290</b>
<b>Fertilizer adoption (% farmers using)</b>	2001/02		0.04	0.06	0.12	<b>0.09</b>
	2003/04		0.55	0.47	0.39	<b>0.45</b>
	2005/06		0.39	0.50	0.37	<b>0.41</b>
	2007/08		0.18	0.24	0.60	<b>0.39</b>
	2009/10		0.30	0.49	0.77	<b>0.57</b>
<b>Kg fertiliser/ha</b>	2001/02		5.20	1.65	4.79	<b>4.20</b>
	2003/04		46.24	33.42	37.01	<b>38.41</b>
	2005/06		27.21	65.15	36.40	<b>40.88</b>
	2007/08		23.11	52.34	109.84	<b>70.84</b>
	2009/10		40.06	80.95	189.59	<b>122.06</b>
<b>Labour productivity (kg cocoa/man–days)</b>	2001/02		8	10	9	<b>9</b>
	2003/04		4	7	6	<b>6</b>
	2005/06		18	11	11	<b>12</b>
	2007/08		11	18	24	<b>19</b>
	2009/10		13	17	25	<b>20</b>

Source: Ghana Cocoa Farmers Survey, Oxford University; 2001/02–2009/10.

### III. Cocoa and poverty reduction

In the last ten years, Ghana has performed remarkably in terms of poverty reduction achievements. Various studies conducted using the Ghana Living Standards survey show how the country has achieved significant reduction in poverty rates, with near halving of rural poverty between 1991/92 (64percent) and 2004/05 (39percent) (Coulombe and McKay, 2003). The nationally representative data also brought evidence that cocoa producing households have played a major role in these achievements; their poverty headcount dropped to 23.9 percent in 2005, down from 60.1 percent at the beginning of the 1990s (Table 4). In the southern forest belt of the country, where cocoa is produced, household level statistics also suggested that throughout the 1990s households who primarily cultivate cocoa, along with those engaged in the other predominantly export-oriented activities – such as forestry and mining – had experienced marked improvements in their living conditions compared to food crop farmers (Coulombe and McKay, 2003). Previous studies that have looked at cocoa farming households suggest that the cultivation of the tree crop provides for over 67 percent of income (Vigneri, 2005; Barrientos, 2008).

**Table 4. Cocoa production, revenue shares and poverty measures: 1991/92–2012/13**

	(1)	(2)	(3a)	(3b)	(4)
	1991/92	1998/99	2005/2006	2005/2006	2012/13
<b>Cocoa Production (MT)</b>	242,817	397,636	740,458	740,458	832,054
<b>Producers' Proceeds (constant, 2000GhC)</b>	2,432	5,964	11,732	11,732	23,076
<b>Poverty Headcount Index: Cocoa households</b>	60.1	36.7	23.9	33.4	26.9
<b>Poverty Headcount Index: Non-Cocoa households*</b>				34.6	32.3
<b>Poverty Headcount Index: National</b>	51.7	39.5	28.5	31.9	24.2

Notes: The poverty line used up to 2005 was GH¢370.89, this was rebased at GH¢1,314 in 2012, and recomputed for 2005 in order to compare changes occurred over the last two rounds of the Ghana Living Standards Study; 2005 and 2012.

\* These poverty rates were computed using data only from cocoa producing regions; Ashanti, Brong-Ahafo, Western, Central, Eastern and Volta.

Source: Kolavalli et al.; 2012

The predominant share of cocoa in providing for households livelihoods reflects pretty clearly in the changes in production and poverty reduction data: the upward trend in quantity produced and portion of sector revenues going to growers cocoa – derived from Cocobod data – matches the downward trend in the incidence of poverty among households reporting cultivating cocoa as one of the main sources of income as per the data from the GLSS (Ghana Statistical Service) measured in cocoa growing regions only. Between 1991 and 2005 cocoa production has tripled, and revenues going to the population as a whole have increased by a factor of 3.8.

The poverty lines used in the GLSS data were estimated using the cost of basic needs method, and measure what level of income would be required in each household in order to pay for a food basket providing 2900 kilocalories per adult equivalent (Coulombe *et al.*, 2007). It is therefore clear that poverty rates measures will be highly correlated to food security statistics. For example, using data from the 2005 round of the GLSS, Ackah and Aryeetey (2012) show that cocoa adoption exerts a positive and statistically significant effect on household income and food security, a finding that confirms that commercial farming matters for poverty reduction. Farmers adopting high

yield export crops such as cocoa are on average better off than farmers more oriented towards subsistence activities.

Looking at different rounds of the GLSS data, poverty rates among cocoa growing households have halved, even after accounting for the less dramatic fall in the national statistics observed taking into consideration the rebasing of the new poverty line (column 3b, Table 4). The last two columns of the table compare these statistics over the five year period from 2005 to 2012, suggesting that positive production trends are still associated with a decreasing incidence of poverty among cocoa households. Poverty was found to be significantly higher not just in 2005 relative to the most recent round of available data, but also among non-cocoa rural households living in cocoa producing areas. The contribution of cocoa to agriculture GDP Ghana remains substantial, and while cocoa accounted for only 10 percent of total crop and livestock production values during 2001–2005, it generated 28 percent of total agricultural growth over the same period.

It is also informative to map household level production on poverty statistics for the regions where cocoa is grown and over the 2005 to 2012 years for which comparable data exist.

#### **a. Policies for inclusive growth**

In order to understand whether and how the diverse range of sector policies implemented has had an inclusive growth effect on growers, it is useful to look at the micro evidence at the farmer level.

The discussion above has shown how public programs such as the free public spraying and the HT program subsidizing inputs, along with price stabilization within the season, have benefitted all cocoa smallholders and encouraged them to continue producing cocoa.

Table 5a describes the distribution by land size of farmers surveyed in the Oxford cocoa panel and in a more recent survey of cocoa farmers carried out in 2013/14 in some of the same areas of the panel data. A little more than three quarters of growers cultivate less than 5 ha, and even more compellingly, over time growers have cultivated the tree crop on gradually smaller landholdings.

**Table 5a: The distribution of cocoa growers by land size (percent sampled farmers by land size)**

Year	# Obs	less than 2ha	between 2ha and 5ha	between 5ha and 10ha	more than 10ha
<b>2002</b>	443	0.33	0.44	0.15	0.07
<b>2004</b>	507	0.29	0.45	0.17	0.09
<b>2006</b>	526	0.29	0.44	0.18	0.09
<b>2008</b>	770	0.45	0.39	0.12	0.04
<b>2010</b>	802	0.43	0.39	0.14	0.04
<b>2013</b>	917	0.50	0.39	0.09	0.02

Source: Ghana Cocoa Farmers Survey, Oxford University; 2001/02 – 2009/10, and 2013/14 cocoa farmers' data.

In 2013 half of the sample managed less than 2 ha up from 33 percent of the sample ten years earlier; and according to the more recent survey data, nearly 90 percent of sampled producers grow cocoa on less than 5 ha.

Table 5b shows farm-level productivity indicators disaggregated by three technology levels, which were identified in the 1980s by the Ghana Cocoa Research Institute (CRIG) as guidelines to measure the existing yield gap between what cocoa producers realize and their achievable potential as observed on experimental cocoa stations (LMC, 2014).

These different technology levels were developed empirically by identifying farming practices associated with three yield ranges. The three T-levels are defined as follows: T1 traditional production, very low input levels; T2 improved maintenance, medium input levels; and T3 high input levels, yield 1.4–1.5 tonnes per ha.

Using the baseline and end line rounds of the Oxford panel data, we identified three discrete points in the survey data corresponding to each of the yield ranges. In both rounds, the majority of cocoa farmers were found to be in the lowest technology level, where yields are between 5 (in 2002) and 3.7 (in 2010) times lower than those observed on experimental farms (i.e. in T3). Although the share of low productive farmers has significantly dropped between the two surveys points, these statistics speak clear; most cocoa farmers remain far off their land productivity potential, and those who are least productive (in T1) are cultivating cocoa more extensively (with their median size of their landholding twice as large as that reported by farmers in the high technology group).

**Table 5b: Cocoa farmers' productivity by technology level**

year		T1: yields<=400	T2: yields [400–800]	T3: yields [800–1500]
<b>2002</b>	<b># Obs.</b>	<b>377</b>	<b>51</b>	<b>12</b>
	Kg Cocoa	1,028	2,691	2,194
	Ha under cocoa (med)	4.86	3.64	1.89
	Yields (med)	154.44	541.15	982.75
	Kg fert/ha	2.36	10.28	2.30
	Lab/ha	54.04	76.22	89.01
	HH	20.11	30.32	44.54
	Hired	33.94	45.90	44.47
	Lab productivity (Kg Cocoa/Lab)	6.62	21.94	20.52
<b>2010</b>	<b># Obs.</b>	<b>516</b>	<b>198</b>	<b>68</b>
	Kg Cocoa	1,134	2,473	3,040
	Ha under cocoa (med)	4.05	2.83	2.02
	Yields (med)	200.77	523.42	936.99
	Kg fert/ha	68.20	176.52	248.12
	Lab/ha	49.82	63.22	97.25
	HH	33.37	42.45	70.86
	Hired	16.45	20.77	26.39
	Lab productivity (Kg Cocoa/Lab)	13.08	22.49	29.72

Source: Ghana Cocoa Farmers Survey, Oxford University; 2001/02 – 2009/10.

Free public sprays and subsidized inputs, along with price stabilization within season, may have helped all farmers to continue producing cocoa. Moreover, the pan-territorial price setting and procurement system at the farmgate will have doubtlessly helped reach out equally to all producers, small and large, remote or close to accessible roads. However, the data presented above also suggest that even growers categorized as low technology adopters are not doing well, and their farming practices have not improved significantly over time.

But there is another dimension to the equitable growth mechanism in Ghana's cocoa sector policies; cocoa is a labor intensive crop and that may have enabled

smallholders to intensify production compared to large holders. Estimates of the labour requirements vary between 25.7 and 96.0 man-days per ha for cocoa (Bloomfield and Lass, 1992), and many smallholders have traditionally had access to adequate family labour readily available in order to cultivate the crop. There is evidence to suggest that over the last three decades the family cocoa enterprise has been progressively commercialized (Amanor, 2010). This has meant less family labour available on demand and for free, and an increasingly unaffordable supply of waged labour in the cocoa village (mostly due to cocoa becoming a very unattractive livelihood in rural areas relative to other cash crops).

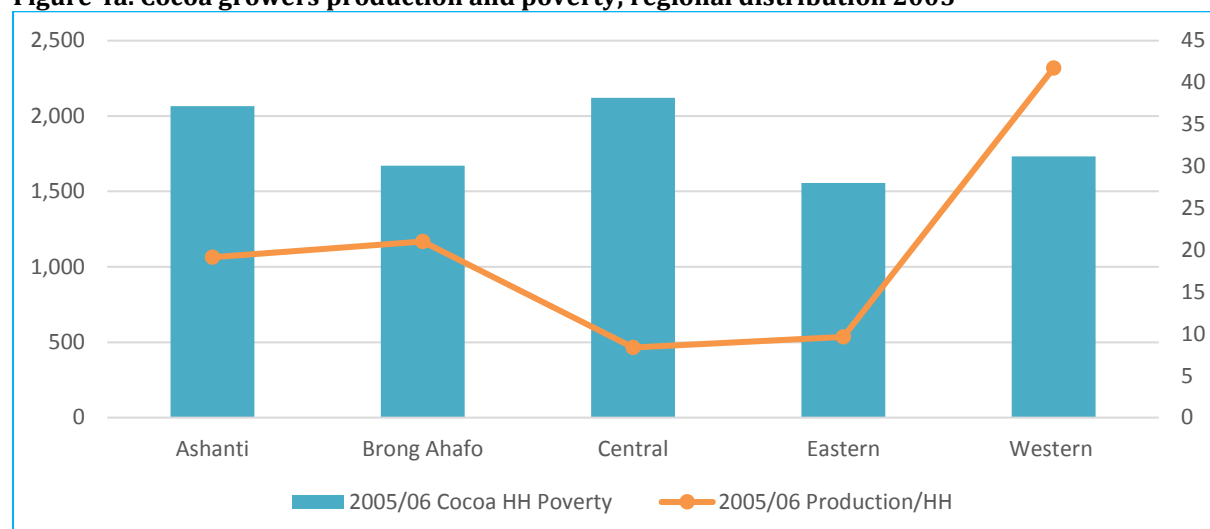
Table 5b above also suggests how the substantial rise in labour productivity reported in Table 3 has come about; farmers across all technology levels have shifted over time the composition of labour used for cocoa in favour of a relatively higher share of family labour. The share of hired labour, on the other hand, has nearly halved over the ten year period, possibly because of the rising wages charged for cocoa tasks. The net result has been a reduction in the total labour input. This has implications in the aggregate about who is more productive; labour productivity is higher on smaller/low tech farms because it is where farmers can use more affordable family labour and make the most out of the yield enhancing effect of sector policy subsidies. The most intensified producers have smaller farms than the extensive ones, however, larger producers may be constrained from adopting the intensified technologies because of their higher labour requirements and the dysfunctional labour markets for cocoa.

Productivity growth has come about partly via intensification of land use, and partly through the substantially higher use of fertilizer on cocoa farms. Suboptimal farming practices and farmers' financial constraints – which have historically hindered the adoption of technological improvements – remain, as well as the long term problems of scale inefficiencies in the sector.

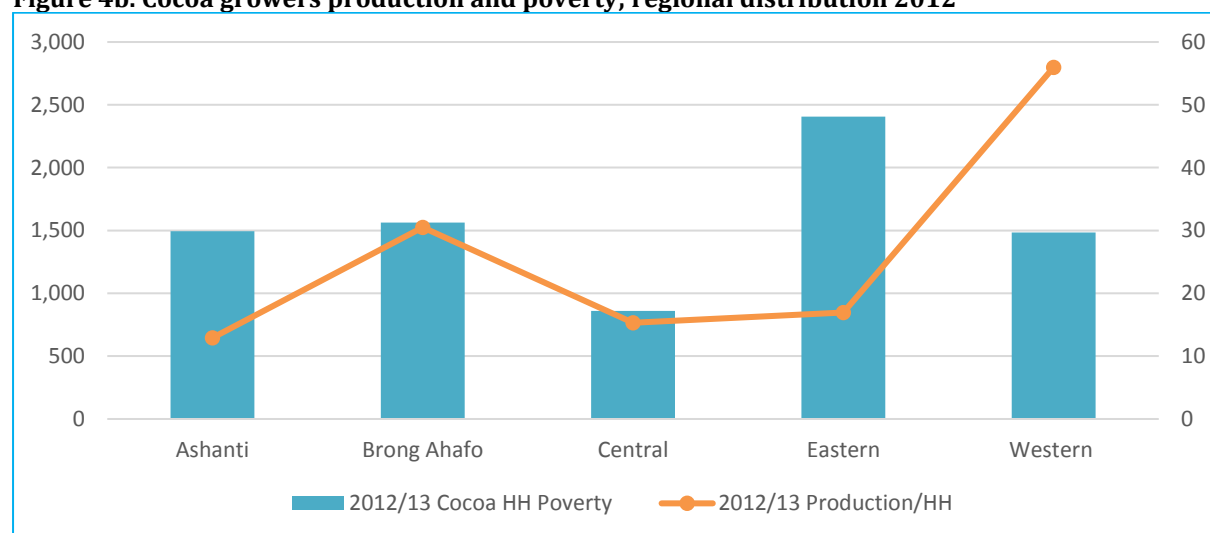
A visual inspection of this regional breakdown – as provided in Figures 4a and 4b – suggest that with the exception of the Central region, higher quantities of cocoa production per household are associated with lower incidence of poverty headcount in the general population. There seems to be a remarkable correlation among the two indicators which would suggest that even regionally, higher cocoa production areas correspond with reduced poverty incidence.



**Figure 4a. Cocoa growers production and poverty; regional distribution 2005**



**Figure 4b. Cocoa growers production and poverty; regional distribution 2012**



Sources: Authors' calculations from the Ghana Living Standards Survey, 2005, and 2012.

## IV. Policy implications and conclusions

Just as Ghana does, many African countries such as Kenya, Tanzania, Rwanda and Uganda, have tree crops sectors (coffee and tea, for example) that play a significant role in their rural economies, although the countries have tried to diversify away from commodity exports. They are benefitting from favourable prices in the last decade or so.

Sector specific strategies that have included pan-seasonal pricing and investments in research and provision of public type of goods, implemented with producer revenues in the case of Ghana, appear to have enabled smallholders to benefit from commodity exports.

Cocoa has remained a labour intensive crop and efforts to invest in cocoa production on estates have not been successful in Ghana. This has enabled, as noted earlier, smallholders to intensify production to a greater extent than larger producers have. While it advantages smallholders, the labor requirement could become a limitation to intensification as rural wage rise.

The total quantity produced by smallholders and the incomes they generate from it are not significant enough to clearly push them out of poverty, although substantial poverty reduction has been observed among cocoa farmers. Increasing land productivity would clearly be important for making crops like cocoa effective instruments of poverty reduction. Higher productivity to date has been achieved mostly with sprayings and increased use of fertilizers. To maintain productivity growth, there is need for sustained investments in research to maintain soil fertility and improve the capacity to respond effectively to climate changes.

Improved productivity and price transmission have definitely contributed to reduced poverty, but this has happened in an atmosphere of rising world prices. It is unlikely that the poverty gains, and productivity growth too, would have been so high if the prices had been falling. To be able to maintain producer incentives and make necessary investments in public goods and services under less favourable price regime, the marketing system will have to become more efficient to pass on even greater share of export prices to farmers. It will have to halve the share of marketing costs from around 20 percent to about 10 percent in fully liberalized sectors in other countries.

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