

# Optimal Agro-Industry Policy: A Case Study of Ghana Cocoa Processing

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# Presentation Outline

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- ❑ Constraints to Local Processing in Ghana
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# Motivation

**Agriculture's potential to contribute significantly to economic transformation in SSA cannot be overstated with over a third of GDP, about two-thirds of employment, and a large part of exports depending on it.**

**However, slow modernization of agriculture and weak linkages between agriculture and other sectors of the economy (except in South Africa). Dominated by smallholders using traditional and low-productivity methods, and the bulk of exports are in the form of unprocessed agricultural commodities.**

**Converting peasant agriculture into a modern and commercialized sector should therefore be an important part of the economic transformation agenda.**

# Motivation

We explored the potential for leveraging 8 agricultural products to achieve quick results on economic transformation in Africa.

Traditional exports where the main opportunity is in capturing greater value through processing	Non-traditional/emerging exports which offer the potential to ramp up production as well as move up the value chain	Imports that recognize the potential value of the emerging African market
<ol style="list-style-type: none"><li>1. Cocoa</li><li>2. Cotton</li><li>3. Coffee</li></ol>	<ol style="list-style-type: none"><li>4. Fruit</li><li>5. Fresh vegetables</li></ol>	<ol style="list-style-type: none"><li>6. Palm oil</li><li>7. Soybean</li><li>8. Sugar</li></ol>

- What are the value capture opportunities?
- Where are the bottlenecks in the value chain?
- What are the required steps for developing adequate agroprocessing policies?

**SHOULD GHANA PROCESS ITS COCOA BEANS  
OR EXPORT THEM?**

# Overview of Ghana's Cocoa Sector

- ❑ **Ghana is the second largest producer of cocoa beans in the world** after its neighbour Ivory Coast
  - ❑ In 2010/11 Ghana captured about 20% of the estimated \$9 billion global cocoa beans market
- ❑ **Raw Cocoa bean production has long played a crucial and strategic role in Ghana's economic development**, accounting for:
  - ❑ about 10% of GDP,
  - ❑ generating about 25% of export revenues and
  - ❑ remains an important source of rural employment

**BUT**

- ❑ **Less than 25% of Ghana's cocoa beans are locally processed leading to Ghana capturing only 5% of the estimated \$28 billion** of the global intermediate products market, and only an insignificant share of the global final consumer market of \$87 billion

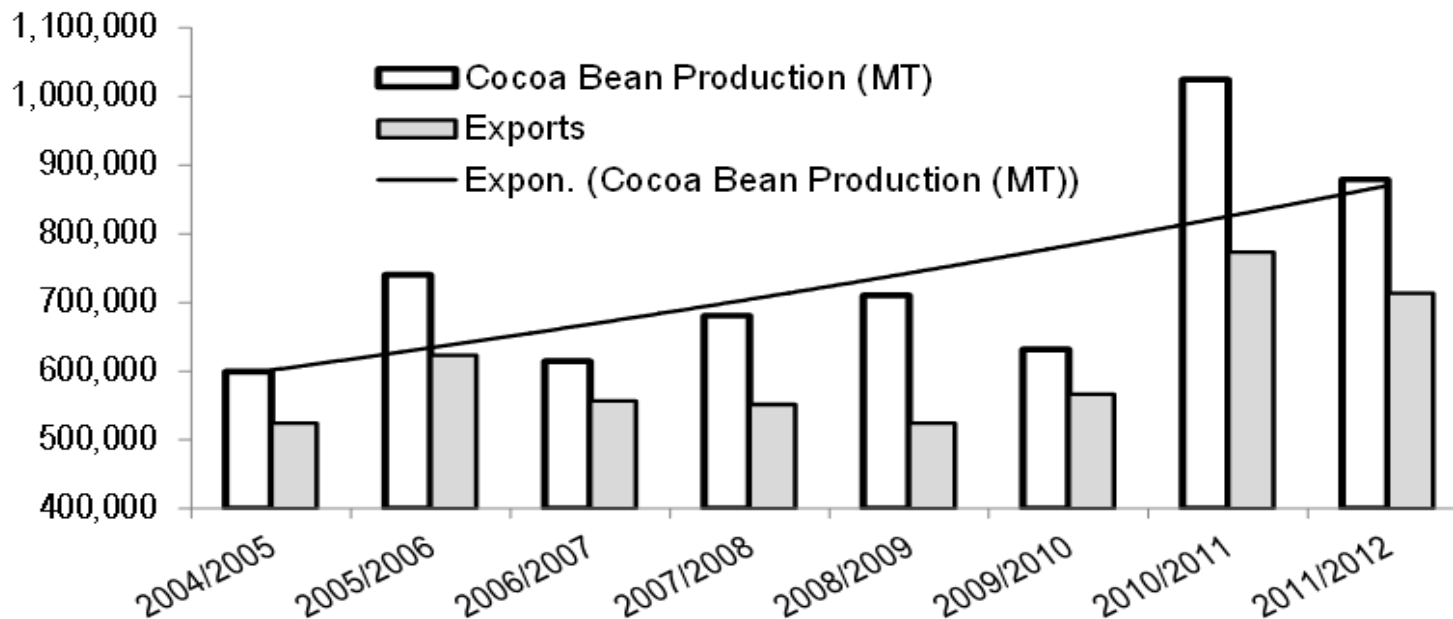


**CASE STUDY FOCUS:**

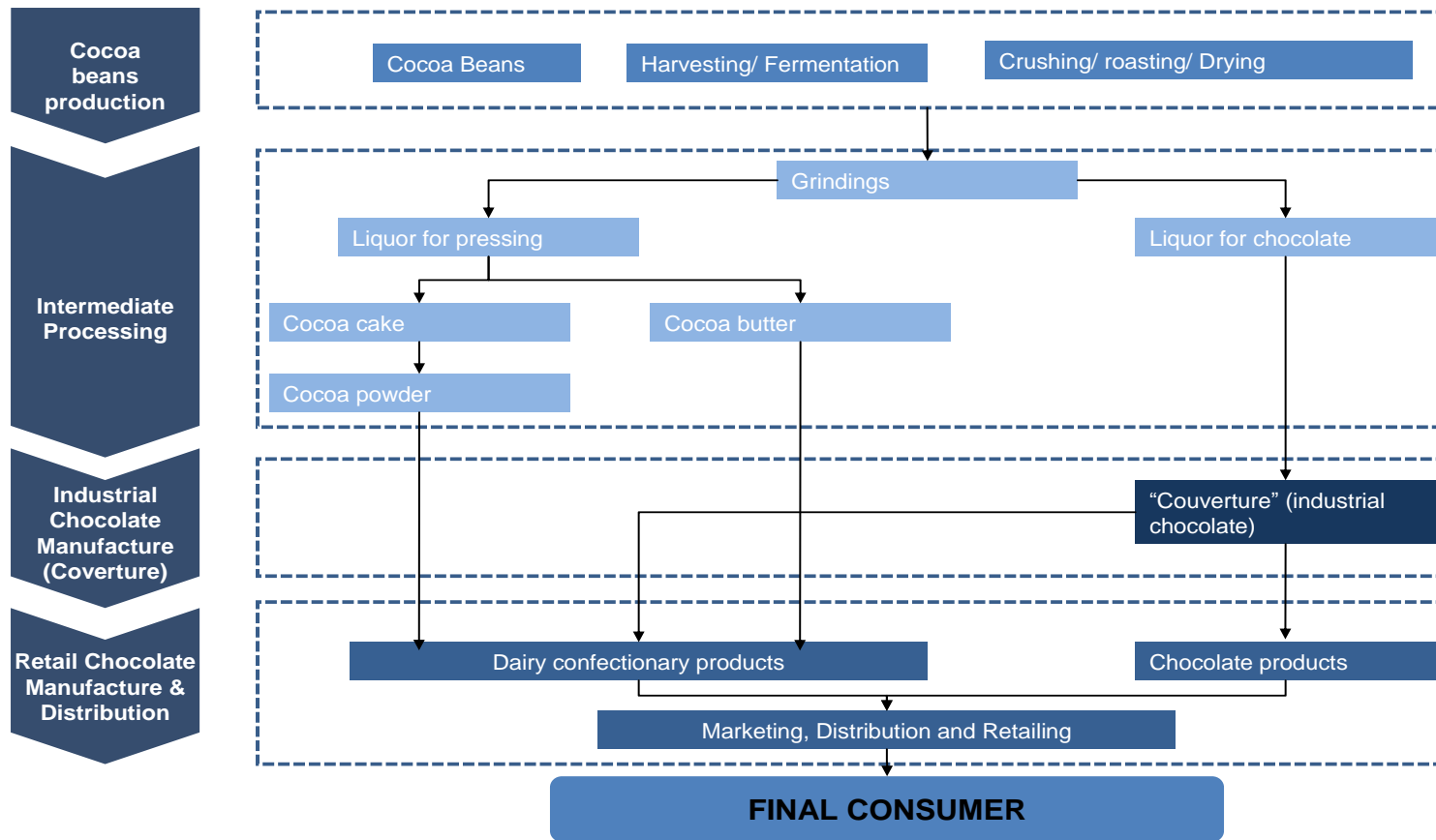
**GHANA's Cocoa Raw Bean exports and value addition dilemma? To process? Or not to Process?**

# Overview of Ghana's Cocoa Sector

- ❑ Raw Cocoa bean production has long held a unique position in Ghana's agriculture as the most important cash crop for the nation
- ❑ Socio-economic Benefits of Cocoa bean production



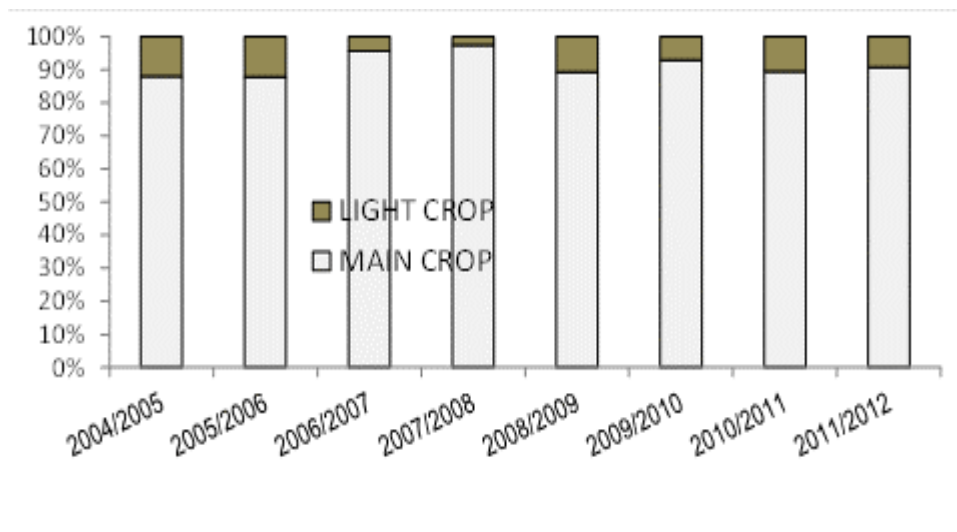
# Cocoa Value Chain





# Peculiarities of Ghana's Cocoa

- Ghana's bean production is of two types: the main crop (main season: October-June) and the light crop (minor season July-August).




- High proportion of the main crop, representing about 83% of total bean production.
- Light crop output is on the decline as a fraction of total production because of improvements in bean characteristics (through research) and cocoa varieties with improved bean size and yield per tree.

- Ghana's main cocoa crop is considered to be among the finest in the world with its bigger size beans and higher butter yield. Ghana's unprocessed cocoa beans fetch about 4 to 6 percent premium on the international market because of its high quality

# Institutional Framework

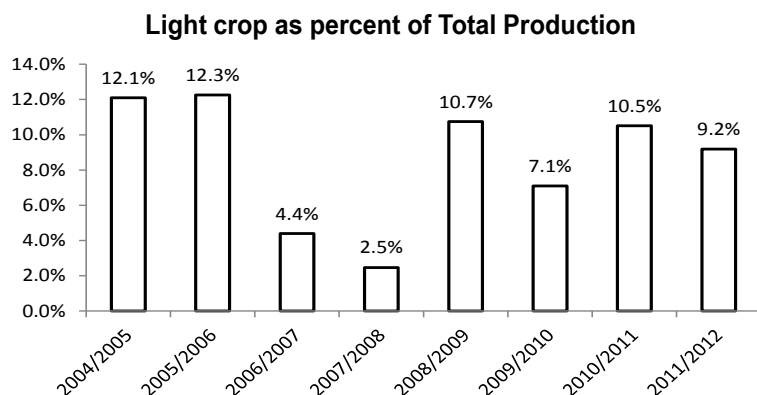
- ❑ COCOBOD is a parastatal body, and is the top national institution charged with managing and regulating the cocoa sector.
- ❑ COCOBOD provides subsidized inputs and guaranteeing purchase prices to farmers, and directly managing all exports through its wholly owned subsidiary, the Cocoa Marketing Company (CMC)

## Current cocoa value chain policies

- 
- ❑ Privatisation of input supply
  - ❑ Disease Control
  - ❑ Fertilizer applications
  - ❑ Development of hybrid cocoa seedlings with higher yields,
  - ❑ Adherence to improved farm practices,
  - ❑ Higher cocoa prices paid to farmers,
  - ❑ Rehabilitation and replanting of old farms,
  - ❑ Increased public spending on infrastructure, especially road rehabilitation works in cocoa growing areas and upgrades of the country's two primary ports at Tema and Takoradi
- ❑ Government policies more tilted toward maximizing revenue from cocoa beans sales from which the GoG and COCOBOD keep 9% of cocoa gross revenues.
  - ❑ The only policy in place for encouraging local cocoa processing is 20% discount given to the light cocoa beans harvests. But main crop beans are sold at international market rate.

# Constraints to Local Processing in Ghana

- ❑ **Local processing means immediate foregone revenue** if the additional main crop beans are sold to local processors at a discount.
- ❑ Perhaps the most significant factors are the high barriers to entry in markets for semi-processes and final products.
  - ❑ Freight costs for many processed commodities such as cocoa powder and butter generally face higher than those on primary unprocessed components such as cocoa beans.
  - ❑ High tariff walls to the export of processed products. E.g. EU levies no duties on the import of raw cocoa beans, but levies a 7.7% and 15% ad valorem duty on cocoa powder and cocoa cake, respectively



- ❑ Poor availability of affordable, quality cocoa for domestic processing
  - ❑ This has caused the diminishing supply of light crop beans as a percentage of total production, many processors operate below capacity

# Ghana's Local Processing: The Limited Impact on the Economy

## ❑ **Local Processors are largely foreign companies**

- ❑ Of the 17 registered local processors,
- ❑ 41% are wholly Ghanaian owned,
- ❑ 41% are joint ventures between foreign and Ghanaian companies and
- ❑ 17% are wholly foreign owned.

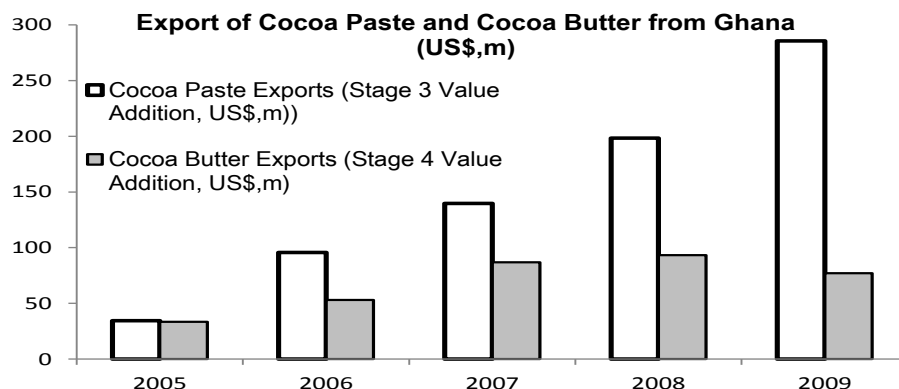
**However**, of the eight companies which are operational at the end of 2012, the top three in terms of processing capacity and production ( Barry Callebaut, Cargill and ADM) are wholly foreign owned.

## ❑ **The industry's contribution to national employment arguably has been limited**

- ❑ Accounting for the low employment is the technological innovation and automation by the companies.
- ❑ By 2013, the total number of employees engaged by cocoa processing companies was just 1,293.
- ❑ The top cocoa processing company with the highest processing capacity employed one of the least number of employees, just 99 employees.
- ❑ In 2008 of the 82 employees of one of the top three cocoa processing companies, there were only 10 nationals.

# Ghana's Local Processing: The Positive Impact on the Economy

- ❑ **The cocoa processing sector has made significant contribution to income taxes; social security contributions and training of nationals.** (As a proportion of all free zone companies in Ghana)
  - ❑ For example in 2008, seven companies contributed almost 20% of total income taxes paid by all free zones companies,
  - ❑ a little over 10% of total social security contributions from free zone companies, and
  - ❑ almost 40% of the total amount spent by free zone companies on training for Ghanaian nationals.



- ❑ Ghana's value chain is confined to the intermediate processing with the grinding of nibs into cocoa paste (Stage 3) which increased by 340 percent compared to cocoa butter exports which increased by 190 percent over the same period.

**The Increasing trends in Ghana's processing along the value chain between 2005 and 2009**

# Research Question

Almost all of the processing companies opened their factories with the understanding that Cocobod would supply them with the beans from the light crop to feed their factories. Ghana's light crop average 50,000 to about 200,000 tons compared with installed local processing capacity of over 400,000 tons. That crop output has dwindled while processing capacity has increased, leaving grinders either to pay more for main crop beans, or leave capacity idle.

	2010/2011	2011/2012
Estimated Installed capacity (MT)	353,500	431,000
Processed beans (MT)	141,900	230,000
Unutilized capacity (MT)	211,600	201,000
Capacity Utilization (percent)	40.1	52.6

- **Is giving a discount on the main crop bean an ideal policy for boosting Ghana cocoa value chain?**
- **If yes, what is the optimal discount rate?**

# Policy Options

## Option 1: Export Raw Beans (No processing)

### i. Rationale

- Ghana has been able to solidify its reputation as a reliable supplier of top quality cocoa.
- Ghana's raw beans sell at a premium, although this may be diminishing because of growing competition from Nigeria and Cote d'Ivoire.
- Maximizes immediate direct revenue contribution to government
- Government revenue through cocoa export duty is more predictable than corporate income taxes from processors

### ii. Counter-Arguments

- Raw bean exports mean minimum job creation beyond direct farming, harvesting, transportation and warehousing.
- Loss of opportunity to maximize value addition that come with processing along the global value chain
- Increases fiscal vulnerability associated with commodity price volatility.

# Policy Options

## Option 2: Export raw beans but do intermediate processing

### i. Rationale

- On a weighted average price basis, intermediate processed outputs earn a relatively stable premium of approximately 200 percent over raw cocoa beans.
- Has potential for job creation and for expanding manufacturing base through light manufacturing.
- Maximize the installed capacity of existing firms..
- Potential additions to tax revenue through payroll and corporate taxes on the long run.

### ii. Counter-Arguments

- Automation of production means low level local employment, low contribution to personal income tax and social security.
- Since most processing firms are located in free zones they are exempt from corporate taxes for the first ten years. The tax rate after 10 years of 8% currently falls well below the tax rate of 25%.
- Companies also enjoy tax exempt status for imports and therefore there is potential loss of revenues.
- Processed products face high tariff walls in European markets.
- On average higher processing costs per ton weakens Ghana's competitiveness compared to European factories.



# Policy Options

## Option 3: Export raw beans but exhaust the entire value chain of further processing to retail markets

### i. **Rationale**

- Arguments for Option 2 apply
- Expand processing beyond intermediate products
- Potentially maximizes the highest value added and profitability.
- With notable success in attracting foreign direct investment into its processing sector, Ghana can begin to influence the global value chain in its capacity as the second largest and renowned quality raw beans producer.

### ii. **Counter-Arguments**

- Counter arguments of option 2 apply plus more.
- The risk of high capital barriers to entry
- Within the global context, chocolate manufacturing is dominated by few US and European corporations. The competitiveness of large operators, vertically integrated, create huge barriers to entry. Ghana would be competing at a great disadvantage with multinational giant processors.
- The higher up the global value chain of exports, the higher the tariff walls.
- The higher up the value chain of final products, the more vital is the nearness to market of final consumers because of quality standards and storability.
- High cost of doing business in Ghana

# Conceptual framework

$\tau^m$  = Discount rate on main crop

$\tau^l$  = Discount rate on light crop

$P_w$  = International cocoa price

$X^m$  = Quantity of main crop sold

$X^l$  = Quantity of light crop sold

$\theta^m$  = Maximum quantity of main crop sold to local processors

$\theta^l$  = Maximum quantity of light crop sold to local processors

$T$  = Tax revenue

$\alpha$  = Discount light crops from international market

$\epsilon$  = Measure of spillover from processing

Expected revenue loss from the discount:  $\mathbf{L} = \tau^m P_w (\theta^m X^m) + \tau^l P_w \alpha (\theta^l X^l)$

Revenue from processing and exporting:  $\mathbf{R} = P_w X^m (1 - \theta^m) + P_w \alpha X^l (1 - \theta^l) + T + \epsilon$

# Conceptual Framework

$$\begin{aligned} \max_{\tau^m, \theta^m} & P_w X^m (1 - \theta^m) + P_w \alpha X^l (1 - \theta^l) + T + \epsilon \\ \text{s.t.} & \tau^m P_w (\theta^m X^m) + \tau^l P_w \alpha (\theta^l X^l) \leq T \end{aligned}$$

# Optimal Midterm Policy Formulation

The value of the cocoa sector in period  $t$ , given discount  $\tau_t^m$ , quota  $\theta_t^m$ , and quantity of main crop cocoa sold  $X_t^m$ , satisfies the Bellman equation such that

$$V_t(\tau_t^m, \theta_t^m, X_t^m) = \max_{\tau_t^m, \theta_t^m} \{R_t - L_t + \delta EV_{t+1}(g(\tau_t^m, \theta_t^m, X_t^m))\}$$

Where:  $X_{t+1}^m = g(\tau_t^m, \theta_t^m, X_t^m, Production_t^m)$

$$L_t = \tau_t^m P_w (\theta_t^m X_t^m) + \tau_t^l P_w \alpha (\theta_t^l X_t^l)$$

$$R_t = P_w X_t^m (1 - \theta_t^m) + P_w \alpha X_t^l (1 - \theta_t^l) + T + \epsilon$$

$\delta$  = Time discount factor

# Connection to Literature

- Providing tax incentives to one group of firms rather than another violates one of the principle tenets of a good tax system (Shah, 1995).
- The justification most often given for special incentives is that there are market failures surrounding the decision to invest or stay in business in certain sector which necessitate government intervention.
- Well et al (2001) argue that in developing countries, incentives are often used to respond to government and market failure.
  - However, much of the literature suggests that they have not been able to make up for the market failures.
  - Firms in a particular sector may benefit from other incentives targeted to many sectors that adding additional incentives may prove to be less efficient.
- Testing the effectiveness of tax incentives in remedying market failures

Thank you!