The materials in this presentation are incomplete. For the full analysis, please consult the final project report at http://www.mim.monitor.com/articles_ideas.html.
AGENDA

Country Background

Legume Market Overview
Despite having the second lowest potential number of farmers impacted of the focus countries, Ghana is amongst the top producers of groundnut, cowpeas and soybeans; making it an important market.

**Agricultural Sector**
- The Ghanaian agricultural sector is a significant contributor to the country’s GDP and there is renewed policy focus on the sector.
- Legumes are important within this sector, and farmers are well organized:
  - 11% of total arable land is cultivated with focus legumes.
  - Legume farmers are mostly concentrated in the northern regions of the country.
  - Farmers are generally well organized into farmer organizations, making application of potential interventions easier.

**Population Impact**
- Ghana has a population of 24.4M, the third lowest of the focus countries.
- 56% of the country’s labor force is engaged in agriculture, the second lowest rate of the focus countries.
- Due to this, there is potential to impact 0.8M smallholder legume farmers.¹

**Focus Crop Production**
- Despite low population impact, Ghana has the second highest production of groundnuts of the focus countries, showing potential for impact from this crop, as well as the third highest production of cowpeas and soybeans.

Note: ¹ The percentage of smallholder farmers out of total farmers is estimated at 90%
Source: Monitor Analysis; World Bank, Nov 2011; Ministry of Food and Agriculture
SIGNIFICANCE OF AGRICULTURE

Agricultural contribution to GDP remains stable and high at approx 40%; within agriculture, crops account for 74%.

Ghana GDP Trend (Nominal)

Source: Ghana Statistical Services

Split of Agricultural GDP

Source: Ghana Statistical Services
Policy focuses on a value chain approach that seeks to promote agribusiness and link farmers to markets

### Policy and Regulatory Climate
- Currently, the Ghanaian agricultural policy space is dominated by two interests:
  - **Promoting domestic production to curb growing expenditure on food imports**
  - **Market agendas** that seek to promote agribusiness through private sector investment and linking farmers to markets
- The government has thus, with the support of multiple NGOs, launched **various projects that promote agribusiness agendas and link farmers to markets**

### FASDEP II
- In 2007, the Ministry of Food and Agriculture updated its Food and Agriculture Sector Development Policy
- FASDEP II, unlike FASDEP I, **adopts a value chain approach to agricultural development**, with value addition and market access receiving more attention
- There is also a **strong focus on food crops**, which can be seen as a response to the criticism that the government was paying too much attention to export crops and not promoting food crops, and thus food security
- **Cowpea and soybean** production figures began to be recorded in 2008 after they were stated as **focus staple crops in FASDEP II**

### Enabling Environment Drivers and Barriers Along the Value Chain

<table>
<thead>
<tr>
<th>Input Supply</th>
<th>Production</th>
<th>Aggregation</th>
<th>Processing</th>
<th>Buyers/Consumers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Execution of fertilizer subsidy program needs to be improved</td>
<td>Smallholder farmers are well organized</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

COUNTRY BACKGROUND
INFRASTRUCTURE

Ghana has poor logistical infrastructure, making the transportation of agricultural products difficult, particularly in the north, where legumes are cultivated.

Percentage of Total Roads Paved (2004)

<table>
<thead>
<tr>
<th>Country</th>
<th>Paved Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burkina Faso</td>
<td>4%</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>19%</td>
</tr>
<tr>
<td>Ghana</td>
<td>18%</td>
</tr>
<tr>
<td>Mali</td>
<td>18%</td>
</tr>
<tr>
<td>Nigeria</td>
<td>15%</td>
</tr>
<tr>
<td>Uganda</td>
<td>23%</td>
</tr>
<tr>
<td>Tanzania</td>
<td>9%</td>
</tr>
</tbody>
</table>

Road Density (2004)

<table>
<thead>
<tr>
<th>Country</th>
<th>Density (km/100 km²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burkina Faso</td>
<td>34</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>3</td>
</tr>
<tr>
<td>Ghana</td>
<td>23</td>
</tr>
<tr>
<td>Mali</td>
<td>2</td>
</tr>
<tr>
<td>Nigeria</td>
<td>21</td>
</tr>
<tr>
<td>Uganda</td>
<td>29</td>
</tr>
<tr>
<td>Tanzania</td>
<td>8</td>
</tr>
</tbody>
</table>

Ghana’s Scores on the LPI³ Parameters

- Customs
- Timeliness
- Infrastructure
- International shipments
- Logistics competence
- Tracking & Tracing

World LPI Rankings of Focus Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>LPI Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uganda</td>
<td>66</td>
</tr>
<tr>
<td>Tanzania</td>
<td>95</td>
</tr>
<tr>
<td>Nigeria</td>
<td>100</td>
</tr>
<tr>
<td>Ghana</td>
<td>117</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>123</td>
</tr>
<tr>
<td>Mali</td>
<td>139</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>145</td>
</tr>
</tbody>
</table>

Note: ¹ 2003 data for Ghana, Tanzania and Uganda; ² 2003 data for Tanzania and Uganda; ³ Logistics Performance Index (155 countries ranked); ⁴ Customs: Border control efficiency (speed, simplicity, predictability), Infra.: Trade and transport infra. quality (ports, rail, road, IT), Intl. Shipments: Ease of arranging competitively priced shipments, Logistics Competence: Competence and quality of logistics services, Tracking and tracing: Ability to track & trace consignments; Timeliness: Timely arrival of shipments

Legumes do not form a core part of the average Ghanaian diet; only 6% of protein is currently sourced from legumes

Legume¹ Contribution to per Capita Protein Intake, 2007

Legume Protein Contribution by Type, Ghana

- Legumes contribute to only ~6% of protein intake in Ghana; the lowest of all focus countries
  - Cereals are the number one source of protein (~35%)
- Groundnuts are by far the greatest source of protein amongst legumes

Notes:¹ Legumes include groundnuts, soybeans, common beans and other legumes
Source: AgDev; FAOSTAT; Monitor Analysis
LEGUME MARKET OVERVIEW

GENDER FACTORS

In contrast with most of Africa, men are more involved in farming of legumes and in the majority of cases are responsible for decision making; women have no more control over legumes than other crops

**Involvement in Farming, by Sex (2011)**

<table>
<thead>
<tr>
<th></th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full time</td>
<td>46%</td>
<td>62%</td>
</tr>
<tr>
<td>Seasonal</td>
<td>30%</td>
<td>8%</td>
</tr>
<tr>
<td>Not at all</td>
<td>12%</td>
<td>8%</td>
</tr>
</tbody>
</table>

**Control Over Land Use and Harvest (2011)**

<table>
<thead>
<tr>
<th></th>
<th>Land Use</th>
<th>Harvest — Legumes</th>
<th>Harvest — Non Legumes</th>
<th>Harvest — All Crops</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner</td>
<td>12%</td>
<td>8%</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>Wife</td>
<td>3%</td>
<td>33%</td>
<td>26%</td>
<td>26%</td>
</tr>
<tr>
<td>Both</td>
<td>2%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Husband</td>
<td>80%</td>
<td>57%</td>
<td>66%</td>
<td>65%</td>
</tr>
</tbody>
</table>

**Involvement in Farming**

- A higher proportion of men are involved in full time farming, while women are more involved seasonally
- 28% of women generate income off of the farm, compared to 20% of men
  - More than half of those women derive an income from trade or their own business

**“A Women’s Crop”**

- Anecdotal evidence suggests that groundnut is considered to be a women’s crop in northern Ghana
- However, the data indicates that women have no more control over legumes crops (8%) than they do over other crops grown by the family (7%)

Notes: 1. Proportions are indicative of people 17 years or older living in the Northern, Upper East and Upper West regions (~95% of legumes are grown in these regions); 2. Percentages refer to percentages of fields in northern Ghana, where control over decision making lies with a wife, a husband or both; 3. Owner refers to the case where land is being rented from a third party

Source: N2Africa Baseline Report, N2 Africa; Primary Interviews
The Ghanaian legume market is a $466M market dominated by groundnut; however, the highest potential for growth in the market is presented by the processing of soybeans.

**Market Size**

- **Groundnuts**: 61.1% of the market, $284.8M
- **Cowpeas**: 22.1% of the market, $102.8M
- **Soybeans**: 16.8% of the market, $78.4M

- **Note:**
  1. Market size is calculated for the 3 focus crops that are cultivated in Ghana;
  2. Market size is calculated as the product of consumption (metric tons) and producer price (USD/MT);
  3. Shares may not add to 100% due to rounding.

Consumption of legumes has steadily grown, with the largest growth coming from soybeans as a result of increased demand for processed soybean products.

Consumption of Focus Crops in Ghana\(^1\)

Note: Consumption is calculated using the formula: Consumption = Production + Imports – Exports


\(^1\) Consumption is calculated using the formula: Consumption = Production + Imports – Exports
Groundnut consumption has grown at 6.3% per annum; this consumption is predominantly for processing into oil and animal feed.

Groundnut Domestic Uses, 2007

- 45% Processing
- 26% Food
- 19% Feed
- 7% Seed
- 2% Waste

Groundnut Consumption/Demand Trends and Drivers

- Groundnut consumption grew at a CAGR of 6.3% from 2008 to 2010.
- Groundnut is primarily used for processing (45.3%) followed by human consumption (26.2%) and feed (19.5%).
  - In addition to small-scale, cottage industry processing to extract groundnut oil, there is significant commercial processing.
  - Roasted peanut, peanut butter, as well as groundnut cake are used in food preparation.
  - Both the dried groundnut haulms and groundnut hay are fed to livestock.

Note: 1 Consumption is calculated using the formula: Consumption = Production + Imports – Exports
Soybean consumption is growing, primarily driven by a growing poultry feed industry. Soybean local production meets less than 50% of local demand.

**Processing Capacity of Major Soybean Processors**

<table>
<thead>
<tr>
<th>Company</th>
<th>Metric Tons</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ghana Nuts Ltd</td>
<td>70,000</td>
<td>35%</td>
</tr>
<tr>
<td>3A &amp;K Industries</td>
<td>16,000</td>
<td>8%</td>
</tr>
<tr>
<td>Golden Web Limited</td>
<td>13,200</td>
<td>6.6%</td>
</tr>
<tr>
<td>Vester Oil Mills</td>
<td>5,000</td>
<td>2.5%</td>
</tr>
<tr>
<td>Royal Danemec</td>
<td>1,000</td>
<td>0.5%</td>
</tr>
<tr>
<td>Other</td>
<td>94800</td>
<td>47.4%</td>
</tr>
<tr>
<td><strong>Total Estimated Capacity</strong></td>
<td><strong>200,000</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

**Soybean Consumption/Demand Trends and Drivers**

- Soybean consumption grew at a CAGR of 39.2% from 2008 to 2010.
- The local market demand for soybean is 228,000 MT per annum, of which 91% is used for processing into oil or cake:
  - Roughly 50% of demand is being met by imports.
  - Those processors who can purchase in large enough quantities, import soybean.
  - Most soy processors are operating under capacity.

- Soybean is primarily in demand for the poultry feed sector in Ghana:
  - There are between 15 and 25 million broilers in Ghana, which consume the equivalent of 85 to 112,000 MT of soybeans, in soybean meal form.
  - Feed accounts for roughly 74% of the total costs of a broiler.

- Soybean meal is substitutable with fishmeal, however this can lead to a bad odor and flavor in eggs.
- Thus, there is a large and growing demand for soybeans, which is currently not being met locally.

Cowpea is primarily used for human consumption but has an underdeveloped processing industry, implying that declines in productivity have potential negative nutritional implications for the population.

Cowpea Consumption/Demand Trends and Drivers

- **Trends**
  - Cowpea consumption grew at a CAGR of 10.5% from 2008 to 2010
    - This growth was driven by a growing population as it is a key staple in Ghana

- **Drivers**
  - Cowpeas are primarily in demand for human consumption
  - There is some industrial processing of cowpea into crackers, composite flour and baby weaning foods
  - Livestock feed, wastage and seed constitute about 15% of domestic consumption of cowpea, with the balance being direct human consumption and consumption of processed cowpea products

Cowpea Production, by Region (Metric Tons)

- During the drought production of all crops declined
  - After the drought, cowpea recovered the fastest, particularly in the Northern region, where production trebled in 3 seasons
  - As cowpea is more drought-resistant than other legumes farmers have shifted their production to cowpeas

Production of legumes in Ghana is concentrated in the north of the country, primarily grown in the cereal-root crop farming system, where maize is the dominant crop.

**Primary Legume Growing Regions in Ghana**

- **Cereal-root Crop Mixed**
- **Root Crop**
- **Tree Crop**
- **Coastal Artisanal Fishing**
- **N/A**

**Primary Legume Growing Regions**

- **Common Beans**
- **Chickpeas**
- **Cowpeas**
- **Groundnuts**
- **Soybeans**

### Important traits of legume varieties available in Ghana include high yields and drought resistance, as well as early maturity for cowpea and shattering resistance for soybean

#### Varieties Readily Available in Ghana, 2010

<table>
<thead>
<tr>
<th>Variety</th>
<th>Important Traits</th>
<th>Desirability of Traits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cowpea</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apagbala</td>
<td>Early maturing, brown eye</td>
<td>- Early maturing varieties are preferred because they are more likely to withstand drought and they provide food during the “hungry season” before harvests when food is scarce</td>
</tr>
<tr>
<td>Brown Eye</td>
<td>Early maturing, white seed coat</td>
<td></td>
</tr>
<tr>
<td>Bengpla</td>
<td>Early maturing</td>
<td></td>
</tr>
<tr>
<td>Bawatawuta</td>
<td>Striga resistant</td>
<td></td>
</tr>
<tr>
<td>Omondoo</td>
<td>Drought resistant, cooks faster</td>
<td></td>
</tr>
<tr>
<td><strong>Groundnut</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chinese</td>
<td>Early maturing, good taste, high oil content</td>
<td>- This is especially true for cowpea, which is an important food security crop in Ghana</td>
</tr>
<tr>
<td>Manipinta</td>
<td>High yield, good taste, high old content</td>
<td></td>
</tr>
<tr>
<td>Nkatiesari</td>
<td>Leaf spot resistant, high yielding</td>
<td></td>
</tr>
<tr>
<td><strong>Soybean</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anidaso (TGx813-6D)</td>
<td>High yielding</td>
<td>- Low shattering soybean varieties are required</td>
</tr>
<tr>
<td>Salentuya (TGx297-192C)</td>
<td>High yielding</td>
<td>- Soybean pods can shatter if the crop is not harvested as soon as it is mature</td>
</tr>
<tr>
<td>Jenguma</td>
<td>High yielding, shattering resistance</td>
<td>- Farmers could lose their entire crop to</td>
</tr>
<tr>
<td>Quarshie</td>
<td>High yielding, shattering resistance</td>
<td></td>
</tr>
<tr>
<td>TGx1834-2E</td>
<td>High yielding, trap striga, shattering resistance</td>
<td></td>
</tr>
<tr>
<td>TGx1448-2E</td>
<td>High yielding, dual purpose, drought resistant</td>
<td></td>
</tr>
<tr>
<td>TGx1904-5F</td>
<td>High yielding, rust resistant</td>
<td></td>
</tr>
</tbody>
</table>

LEGUME MARKET OVERVIEW

SEED SUPPLY SYSTEM

The Plant and Fertilizers Act of 2010 allows for greater private sector involvement in seed production, but has not yet overcome the limited seed capacity

Impacts of the Plants and Fertilizers Act (2010)

Prior to 2010

- Crops Research Institute performed the R&D for all crops
- Ghana Grains and Legumes Board produced foundation seed
- Seed Producers Association of Ghana (SEEDPAG) responsible for producing certified seed
- Private sector played little or no role in legume seed production
- The system lacked the required capacity to supply smallholder farmers
  - Production of foundation and breeder seed was the primary constraint

New Seed Environment

- Private sector encouraged to grow, sell, import and export seed
- All players are required to register with the Ghana Seed Inspection Division (GSID)
  - Compliance with GSID regulations including passing seed tests performed at the National Seed Testing Laboratory (NSTL) is required
- The new regulations have created interest among local and foreign private sector seed producers
  - However, supply still trails demand and many SHFs still do not have access to legume seeds

Key Trends in Seed Research and Development

- Seed policy is determined by the National Seed Service, which falls under the Crop Services Division of the Ministry of Food and Agriculture
- In Ghana, unlike other countries in the region, the import of seed developed in other countries has recently been permitted by new regulations

- The Crops Research Institute and Savanna Agricultural Research Institute are the crop research institutes responsible for the development of new varieties
- Varieties are developed with support from IITA and ICRISAT

- The few private sector seed companies are in their infancy and are yet to establish the capacity required by farmers
  - Previously government parastatals were responsible for all production of certified seed

LEGUME MARKET OVERVIEW

DRIVERS OF PRODUCTION

Overall, production has grown healthily due to high yield increases, with land area under legumes growing very modestly.

Source: FAOSTAT; “World Agriculture Towards 2015/2030”, FAO, 2002; Expert Interview; Monitor Analysis
LEGUME MARKET OVERVIEW

PRODUCTION OVERVIEW

Production of all three legumes has grown according to official figures, however, experts dispute reported soybean production numbers and place production at about 30,000 metric tons.

<table>
<thead>
<tr>
<th>Production of Focus Legumes in Ghana</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soybeans</td>
</tr>
<tr>
<td>2007</td>
</tr>
<tr>
<td>470.5</td>
</tr>
<tr>
<td>11%</td>
</tr>
<tr>
<td>25%</td>
</tr>
<tr>
<td>64%</td>
</tr>
</tbody>
</table>

CAGR (’08–’10)

<table>
<thead>
<tr>
<th>Soybean</th>
<th>Cowpea</th>
<th>Groundnut</th>
</tr>
</thead>
<tbody>
<tr>
<td>32.1%</td>
<td>10.5%</td>
<td>6.3%</td>
</tr>
</tbody>
</table>

2007 not used as base year due to drought skewing data

Production Trends and Drivers

- According to official Ministry of Food and Agriculture figures, soybean production in Ghana was 144,926 metric tons in 2010.
- Experts, however, dispute this and place production at closer to 30,000 metric tons.
- Soybean processing capacity in Ghana is approximately 200,000 metric tons, meaning that there is a 170,000 metric ton supply shortfall.

- Cowpea production in Ghana has recovered well after the West African drought of 2007.
- Production of cowpea in Ghana is currently challenged by the influx of foreign cowpea into the market, as well as the high susceptibility of cowpea to pests and diseases.

- Fourth largest African producer of groundnut, and second largest producer within focus countries.
- Production has grown steadily over recent years, and the general trend has been growth in production over the past 50 years.

There are approximately 0.8 million smallholder farmers of legumes in Ghana, with 11% of arable land dedicated to legume production, and area harvested growing modestly.

**LEGUME MARKET OVERVIEW**

**PRODUCTION OVERVIEW — LAND AREA**

- 11% of arable land is dedicated to legumes.
- Total land under legume production has shown very modest growth, with a 2% CAGR from 2008 to 2010.
- Farmers of legumes are generally well organized, with 40% of farmers belonging to a farmer group. This would make interventions easier to execute.

**Area Harvested for Focus Legumes in Ghana**

- **Soybeans**: 2008: 573.8 thousand hectares, 2009: 576.5 thousand hectares, 2010: 596.6 thousand hectares. CAGR ('08–'10): 11.0%.
- **Cowpeas**: 2008: 61 thousand hectares, 2009: 58 thousand hectares, 2010: 59 thousand hectares. CAGR ('08–'10): 1.8%.

**Number of Smallholder Farmers** by Crop (Millions)

- **Soybeans**: 0.5 million farmers.
- **Cowpeas**: 0.3 million farmers.
- **Groundnuts**: 0.1 million farmers.

Note: 1. Smallholders are defined as having landholding less than 2 hectares and 90% of legume cultivation is assumed to be by smallholders; 2. Totals may not add up due to rounding errors.

Source: Monitor Analysis; Ministry of Food and Agriculture; World Bank; N2Africa Baseline Report, N2Africa, 2011.
LEGUME MARKET OVERVIEW

PRODUCTION OVERVIEW — COMMERCIALIZATION

Soybeans and groundnuts are cash crops in Ghana, with most of the output being marketed, while cowpeas are more of a food crop with a high proportion being kept by farmers for home consumption.

Utilization of Legume Grain by Smallholder Farmers

<table>
<thead>
<tr>
<th></th>
<th>Soybeans</th>
<th>Cowpeas</th>
<th>Groundnuts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sold</td>
<td>62.5%</td>
<td>40.4%</td>
<td>56.3%</td>
</tr>
<tr>
<td>Kept for Seed</td>
<td>13.1%</td>
<td>13.9%</td>
<td>19.3%</td>
</tr>
<tr>
<td>Household Consumption</td>
<td>24.4%</td>
<td>45.8%</td>
<td>24.4%</td>
</tr>
</tbody>
</table>

Note: Utilization calculated using a survey of the Northern, Upper West and Upper East Regions

The dominant cropping system in Ghana is intercropping. Legume yields have generally increased, possibly due to improved agronomic practices.

### Cropping Systems Used
- **Intercropping** is the most dominant cropping system used for legumes in Ghana.
- **Soybean** is, however, also grown commercially through sole cropping and rotation with other crops.

### Main Crops Inter-cropped
- The main intercropping is of cereals with legumes:
  - Maize is most often intercropped or crop rotated with soybean.
  - Sorghum and millet are also often intercropped with cowpea and groundnut.

### Advantages and Disadvantages
- **Intercropping** allows for better use of environmental resources, improves soil fertility and can increase crop yields when practiced appropriately.
- **However**, legume crops can suffer lower yields due to resource competition with cereals.

### Average Legume Yields (MT/ha; 2008–2010)

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cowpea</td>
<td>1.21</td>
<td>1.46</td>
<td>1.90</td>
<td>25.4%</td>
</tr>
<tr>
<td>Groundnut</td>
<td>1.11</td>
<td>1.26</td>
<td>1.31</td>
<td>8.6%</td>
</tr>
<tr>
<td>Soybeans</td>
<td>1.34</td>
<td>1.44</td>
<td>1.50</td>
<td>5.9%</td>
</tr>
</tbody>
</table>

Yields have generally increased for all three legume crops over the recent past.

Ghanaian farmers achieve the highest groundnut yields in West Africa. Yields are particularly high in the Southern regions.

Groundnut Yield Gap¹: Ghana vs. Comparables

- Yields between 600 KG/ha and 1.5 MT/ha over the last 20 years, reaching a peak in 2010
- Yields have recovered greatly in the last 3 years after a slump from 2002 till 2006
- The northern regions of Ghana account for the vast majority of production, however greater yields are achieved in the South

Ghana Potential Groundnut Yield, Production Volume and Nutritional Impact

Note: ¹ Yield comparison is versus maximum- and minimum-yielding among countries in West Africa and maximum-yielding country in South Asia; ² Local max reflects yield of the highest-yielding region/state in Ghana
Source: Ministry of Agriculture; FAOSTAT; AgDev; Monitor Analysis
Ghanaian cowpea yields are the highest in the West African region and continue to rise

Cowpea yields (1.3 MT/ha) are considerably higher than those of other countries in West Africa as well as South Asia
- Maintaining yields at levels 32% greater than Nigeria has a positive nutritional impact of 2.8 KG per capita per annum

Note: 1 Yield comparison is versus maximum- and minimum-yielding among countries in West Africa and maximum-yielding country in South Asia
Source: Ministry of Agriculture; FAOSTAT; Monitor Analysis
Soybean yields have risen rapidly in recent years and reached 1.9 MT/ha in 2010

- Yields between 1.2 MT/ha and 1.9 M T/ha over the last 3 years; 1.9 MT/ha most recently
- In recent years, yields have risen even more quickly than those in Nigeria and South Asia

Ghana Potential Soybean Yield, Production Volume and Nutritional Impact

Note: 1 Yield comparison is versus maximum- and minimum-yielding among countries in West Africa and maximum-yielding country in West Africa; 2 Data Availability limits our analysis
Source: Ministry of Agriculture; FAOSTAT; Monitor Analysis
Legume production has increased largely as a result of increasing yield as opposed to increased area harvested. Cereal land use has increased since 2007.

Note: ¹ Cereals include maize, sorghum and millet; ² Legumes include common bean, groundnut, cowpea and soybean

Source: FAOStat Official
Exports of traditional Ghanaian legumes, particularly groundnut, have fallen over the past five years, while soybean imports have increased, primarily to supply the local processing industry.

Through official data is unavailable, it is estimated that Ghana is a net importer of cowpea.

- Cowpea is imported from Burkina Faso, Nigeria, Benin and Niger.

Note: 1 All trade reported is official data, which can be misleading due to the large amount of informal and unofficial trade; 2 Legumes include soybeans and groundnuts for which trade data was available; 3 Groundnut and soybean import and export data include trade of raw groundnut and soybean as well as processed oil and cake.

Source: International Trade Centre (ITC), Trade Map, accessed 26 February 2012; Monitor Analysis.
Ghana is an exporter of groundnuts, with significant exports to Belgium, the Netherlands and the United Kingdom, despite strict aflatoxin requirements in those markets.

Top Export Destinations by Crop, Average per Annum (2006–2010)\(^1\)

Note: 1 Average trade value is presented due to the high inconsistency in official trade volumes from year to year.

Source: International Trade Centre
Main imports are of cowpea from regional partners, such as Burkina Faso and Niger, and soybean from Argentina, Burkina Faso and the United States of America.

Top Import Destinations by Crop, Average per Annum (2006–2010)¹

- There is limited official cowpea trade data available.
- However, according to Langyituo (2003), Ghana is a net importer of cowpeas from Cote d’Ivoire, Burkina Faso, Togo and Niger.

Note: ¹ Average trade value is presented due to the high inconsistency in official trade volumes from year to year.

**LEGUME MARKET OVERVIEW**

**MAJOR LEGUME BUYERS (1/2)**

Major buyers of legumes in Ghana use legumes for export, processing and feeding programs.

### Overview of Major Cowpea, Groundnut and Soybean Buyers in Ghana

<table>
<thead>
<tr>
<th>Company</th>
<th>Crop</th>
<th>Description of Business</th>
<th>Source</th>
<th>End-User</th>
</tr>
</thead>
</table>
| Ghana Nuts            | Groundnuts, Cashew Nuts, Shea Nuts, Soybeans, Sesame Seeds | - Export of nuts from Ghana  
- Manufacture of edible oils, animal feed inputs and shea butter  
- The largest buyer and processor of soybeans in Ghana  
- 70,000 metric tons oil milling capacity | - Imports 8,000 to 10,000 metric tons of soybean from Brazil per quarter  
- Locally sources exclusively from SHFs | - Export market  
- Animal feed manufacturers  
- West African consumers of soy oil |
| World Food Programme  | Soybeans, Cowpea, Beans | - Procured 687 MT of beans in 2010, for distribution within the country  
- Commercial demand for cowpea comes from the World Food Program’s Purchase for Progress  
  - The WFP plans to buy about 2,000 metric tons of cowpea annually for school and household feeding programs | | - School and household feeding programs |
| 3F Africa             | Shea nuts, Cashew nuts, Sesame seeds, Copra, Groundnuts, Tigernuts, Cotton | - Exporter of quality nuts, fruit and handicrafts from West Africa | | - Export to Europe, North America, the Middle East and Asia |

Source: Expert Interviews; Ghana Nuts Website; 3F Africa Website; United Nations World Food Programme (UNWFP) Website
## Overview of Major Cowpea, Groundnut and Soybean Buyers in Ghana

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</tr>
</thead>
<tbody>
<tr>
<td>3A&amp;K Industries</td>
<td>Groundnuts</td>
<td>Capacity of 15,000 to 16,000 tons per year</td>
<td>Imports from within the region</td>
<td>Poultry Feed Manufacturers</td>
</tr>
<tr>
<td></td>
<td>Soybean</td>
<td>8% capacity utilisation because of unavailability of soybean grain</td>
<td>Locally sources exclusively from SHFs</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Company cites the lack of commercial farmers as a severe constraint to supply</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Golden Web Limited</td>
<td>Groundnuts</td>
<td>Capacity of 13,200 tons per year</td>
<td>Savanna Farmers Marketing Company</td>
<td>Poultry Feed Manufacturers</td>
</tr>
<tr>
<td></td>
<td>Soybean</td>
<td>Utilization is lower due to lack of supply</td>
<td>Local Commission Agents</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Groundnut processing has ceased since 2010 also due to lack of supply</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vester Oil Mills</td>
<td>Soybean</td>
<td>Capacity of 4,000 to 5,000 tons per year, but has no consistent supply</td>
<td>Savanna Marketing Company</td>
<td>Export to Europe, North America, the Middle East and Asia</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Outgrower Scheme</td>
<td></td>
</tr>
<tr>
<td>Royal Danemac</td>
<td>Soybean</td>
<td>Capacity of 1,000 tons</td>
<td>Purchases from central aggregators who in turn buy from local aggregators</td>
<td>Consumers, Paint Industry</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Processes and sells oil in crude form to open market and to Syrez Industry for making paint</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Expert Interviews
The legumes value chain in Ghana is dominated by many small players, with a few large processors and importers of inputs.

**Input Supply**
- Seed Supply:
  - On-farm Recycling Majority
  - Public Sector Agencies
  - Limited Private Sector Involvement
- Fertilizer, Pesticides, etc.: Primarily imported and sold by three main importers

**Production**
- SHFs Majority Well organized
- LHF Limited

**Aggregation**
- Middlemen/Small Scale Traders Majority
- Large Scale Traders Limited

**Processing**
- Mostly Basic Processing for Cowpea
- Soybeans and Groundnuts Undergo Large-scale Commercial Processing

**Buyers/Consumers**
- Average Domestic Consumption¹: 76%
  - Home
  - Market
  - Livestock Feed
- Average Exports: 24%

**Note:** ¹ Average percentage domestic consumption and exports calculated by dividing total exports by total production
Source: Ministry of Food and Agriculture; Expert Interviews; Operational Details of the 2008 Fertilizer Subsidy in Ghana — Preliminary Report”, International Food Policy Research Institute, 2009; N2Africa Baseline Report, N2Africa, 2011
### LEGUME MARKET OVERVIEW

#### ACTIVITIES ALONG THE VALUE CHAIN

*A number of intermediaries do not add any value to the end product. Their role is limited to collection and redistribution*

<table>
<thead>
<tr>
<th>Role</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agri-research Institutions</strong></td>
<td>Focus on genetic improvement, pest management, and storage technology development&lt;br&gt;Major institutions include: Government, the IITA, and other research organizations</td>
</tr>
<tr>
<td><strong>Agro-dealers</strong></td>
<td>Provision of fertilizer, pesticides, and other inputs to growers</td>
</tr>
<tr>
<td><strong>Farmers</strong></td>
<td>Farmers control land and manage the production process&lt;br&gt;This includes soil preparation, planting, weeding, harvesting, threshing, and storage&lt;br&gt;Sell small quantities to rural assemblers or larger quantities directly to wholesalers and processors&lt;br&gt;Operate farmer organizations that deal with crop production, accessing inputs, credit and sale of produce</td>
</tr>
<tr>
<td><strong>Assemblers</strong></td>
<td>Aggregate small amounts of produce from numerous small-holder farmers&lt;br&gt;Sell larger aggregated quantities to urban wholesalers</td>
</tr>
<tr>
<td><strong>Wholesalers</strong></td>
<td>Supplied by assemblers or have own team of rural buyers who purchase directly from SHFs&lt;br&gt;Repackage, store and sell onwards to processors or directly to end market&lt;br&gt;Produce typically sold in bulk at local open air markets</td>
</tr>
<tr>
<td><strong>Processors</strong></td>
<td>Primarily informal small-scale processors, often women, for cowpea and groundnut&lt;br&gt;Common practices are milling, grinding and oil extraction&lt;br&gt;Large-scale processors of both soybeans and groundnuts also exist&lt;br&gt;Supply large retailers, as well as directly to consumers or industries that use the end-product in the preparation of other products</td>
</tr>
<tr>
<td><strong>Retailers</strong></td>
<td>Sale to final consumers as food products typically occurs at local markets and supermarkets, as well as at restaurants and hotels</td>
</tr>
</tbody>
</table>

Source: N2Africa Baseline Report, N2Africa, 2011
LEGUME MARKET OVERVIEW

PREFERRED PRODUCT TRAITS ALONG THE VALUE CHAIN

In general farmers want high yielding varieties that are resistant to drought and pest damage, breeders should keep in mind the specific uses of each legume

<table>
<thead>
<tr>
<th>Crop</th>
<th>Farmer</th>
<th>Commission Agents/Traders</th>
<th>Processors</th>
<th>Retailers</th>
<th>Consumer</th>
<th>Farmer Use of Grain¹</th>
</tr>
</thead>
</table>
| Cowpea | Higher grain yield, larger grain size, short cycle, drought tolerant type of varieties with short cycle, early maturity and pest and disease resistance | Taste characteristics, grain size, color (white, red/brown), eye color (black, brown gray) | Taste characteristics, grain size, color (white, red/brown), eye color (black, brown gray) | Large grains | Price, large grains, minimal bruchid damage, cooking time and water uptake for whole beans, as well as taste, texture, and appearance of dishes prepared from ground. Smooth white grains preferred.                                                                                                                                                                                                 | Kept for Seed 14%  
          |                                                                         |                           |                                         |                   |                                                                                                                                                                                                                                                                                                                                     | Home Consumption 46%  
          |                                                                         |                           |                                         |                   |                                                                                                                                                                                                                                                                                                                                     | Sold 40%               |
| Groundnut | Higher yield, drought, pest and disease resistance, more oil content, better taste, keeping quality, palatability and storability of fodder, higher price, bigger grain size for marketing | Bigger grain size, more oil content, pest and disease free, more shelling percentage, uniformity of seed and shape | Higher oil content, bigger grain size cleanliness, higher shelling percentage | Bigger grain size, cleanliness, taste | Bigger grain size, taste, clean oil color                                                                                                                                                                                                                                                                                                           | Kept for Seed 19%  
          |                                                                         |                           |                                         |                   |                                                                                                                                                                                                                                                                                                                                     | Home Consumption 24%  
          |                                                                         |                           |                                         |                   |                                                                                                                                                                                                                                                                                                                                     | Sold 56%               |
| Soybean | Higher grain yield, larger grain size, earliness of maturity and low shattering at maturity | Mature seeds; low level of impurities/foreign matter; low mould levels; limited damage by insects or other causes; high oil content; low free fatty acid content; moisture content; golden yellow color | High quality determined by protein, free fatty acid and vitamin A content | Varies according to use. Primarily dependant on quality of end product and its suitability to intended purpose, e.g., human consumption, animal feed, industrial uses | Varieties of use depend on quality of end product and its suitability to intended purpose, e.g., human consumption, animal feed, industrial uses.                                                                                                                                                                               | Kept for Seed 13%  
          |                                                                         |                           |                                         |                   |                                                                                                                                                                                                                                                                                                                                     | Home Consumption 24%  
          |                                                                         |                           |                                         |                   |                                                                                                                                                                                                                                                                                                                                     | Sold 63%               |

Note: ¹ Percentages indicate farmer decisions in the Northern, Upper East and Upper West regions, the primary legumes growing areas