LEGUME MARKET ANALYSIS

Tanzania

March 2012

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 Introduction
- Common Bean Market Overview
- Groundnut Market Overview
- Pigeon Pea Market Overview
Successfully intervening in the legume value chain could greatly improve SHF livelihoods, yet, despite high legume production potential, commercialization of the sector is proceeding slowly.

Agricultural Sector

- Tanzania is the only focus country that grows all five focus legumes
- 19.7% of Tanzania’s arable land is dedicated to cultivating legumes (second highest of the focus countries)
- Supportive agricultural policies are in place to stimulate growth and commercialization of the sector
  - Their success has been limited
- Successful interventions are difficult due to a number of barriers:
  - Infrastructure barriers limit SHFs access to input markets
  - Limited SHF education inhibits market participation
  - Local governments lack the capacity to provide effective extension services
  - The fragmented nature of the value chain raises overall costs due to a lack of scale at each stage of the chain

Population Impact

- Tanzania has the highest percentage of population living below the poverty line (88%), versus all focus countries
- Potential to impact 2.5 million legume farming SHFs
- Primary source of protein for most Tanzanians, accounting for 15% of all protein intake
  - An important source of income
- 34% of the population suffers from malnutrition

Focus Crops

- Groundnuts and common beans showing double digit growth in production and consumption
- Versus other focus countries:
  - Largest common beans producer
  - Second largest chickpeas producer
- Top 15 global exporter of chickpeas

Note: 1 11% of Tanzania’s land area is arable; 2 The percentage of smallholder farmers out of total farmers is estimated at 75%
Source: Monitor Analysis; World Bank, Nov 2011; FAO Country Profiles, Nov 2011; FAOSTAT, Updated May 2011
COUNTRY BACKGROUND

SIGNIFICANCE OF AGRICULTURE

Whilst agricultural contribution to GDP continues to grow in real terms, its percentage contribution has shrunk, primarily due to rapid expansion of the services sector.

- The majority of agricultural GDP generated by crops comes from staples and cash crops.
- Legumes are primarily grown for home consumption and intercropped with staples, such as:
  - Maize
  - Rice
  - Millet

Economic liberalization unlocked the private sector and opened Tanzania’s markets to foreign trade, yet, commercialization of the agriculture sector remains limited.

**1961–1986**
- Shortly after gaining independence the ruling party instituted a number of socialist reforms, including the nationalization of banks and numerous large industries.
- A steady decline in economic growth in the 1970s led to a severe financial crisis in the early 1980s.

**1986-mid-2000s**
- A change in government brought about the beginning of economic liberalization.
- Trade and pricing were gradually deregulated.
- Dominance of state-owned monopolies in the agriculture sector came to an end with reintroduction of cooperatives and deregulation of the private sector.
- Regulation of the procurement, distribution and marketing of agricultural commodities was relaxed, giving producers flexibility to export their produce directly.

**Mid-2000s to Present**
- In spite of periods of poor governance, sound macroeconomic policies have ensured relative economic stability.
- Benefits of this growth are not particularly discernible amongst rural SHFs, the majority of whom continue to live in poverty.
- Policy aimed at the commercialization of the agriculture sector has become the focal point for economic growth and improving rural livelihoods.
- Little resulting impact, as the key limiting factors have not been effectively resolved.

**Outcomes**
- The Government of Tanzania’s (GoT) Agricultural Sector Development Strategy (ASDS) and its operational program, the Agricultural Sector Development Programme (ASDP), aim to enable the commercialization of the agriculture sector.
- No policy specific to legumes has been designed, although interventions aimed at staple crops, such as maize, may indirectly benefit legumes due to their frequent intercropping.
- Frequent bans on the export of staples negatively impact the legume market, as the bans are not clear and are often incorrectly enforced by border agents, causing difficulties in the trade of legumes to outside markets.

Without government focus on legumes, efforts to stimulate the market are limited to those of NGOs and the private sector, which are proving to be insufficient.

**Policy and Regulatory Climate**

- **Legumes do not feature in government policy and continue to be largely ignored**, despite agriculture having been made the primary driver of economic growth.
- **Export tariffs on processed goods make it cheaper to export raw materials and process them elsewhere**, thus disincentivizing the domestic processing industry.
- **Export permits are difficult and costly to obtain and tariffs are high**, making formal trade unattractive to SHFs.
- **The use of informal channels to transport produce to neighboring countries is common** as it allows traders to aggregate produce and sell it at better margins.

**Enabling Environment and Agencies**

- **Limited resources and capacity at local government level** to effectively intervene in the agri-sector.
- **Tanzania ranked 100 out of 183 countries on the Corruption Perception Index for 2011**, which is indicative of the additional costs incurred by traders.

**Service Providers**

- **Inadequate rural financial service providers** and unwillingness to grant loans to SHFs.
- **Limited access to suppliers of improved seed and other inputs** to aid in the improvement of crop yields and quality.
- **Limited extension services** to promote the use of improved farming inputs and techniques.

Overall Tanzania has relatively good infrastructure, versus other focus countries, however, its limited road infrastructure is a major constraint to developing the agricultural sector.

**Percentage of Total Roads Paved (2004)**

- Burkina Faso: 4%
- Ethiopia: 19%
- Ghana: 18%
- Mali: 18%
- Nigeria: 15%
- Uganda: 23%
- Tanzania: 9%

**Road Density (2004)**

- Burkina Faso: 34
- Ethiopia: 3
- Ghana: 23
- Mali: 2
- Nigeria: 21
- Uganda: 29
- Tanzania: 8

**World LPI Rankings of Focus Countries**

<table>
<thead>
<tr>
<th>Country</th>
<th>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 and trace consignments; Timeliness: Timely arrival of shipments

AGENDA

Country Background

Legume Market Introduction

Common Bean Market Overview

Groundnut Market Overview

Pigeon Pea Market Overview

Key Barriers and Potential Interventions
Significant growth in market size has been seen, primarily due to increased consumption; potential for growth through value addition exists but has not been realized.

Market Size of Legumes in Tanzania

<table>
<thead>
<tr>
<th>Year</th>
<th>Common Beans</th>
<th>Groundnuts</th>
<th>Cowpeas</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>1,043 (56%)</td>
<td>957 (32%)</td>
<td>1,011 (7%)</td>
</tr>
<tr>
<td>2007</td>
<td>957 (37%)</td>
<td>709 (52%)</td>
<td>1,011 (7%)</td>
</tr>
<tr>
<td>2008</td>
<td>709 (31%)</td>
<td>52 (3%)</td>
<td>1,011 (7%)</td>
</tr>
<tr>
<td>2009</td>
<td>52 (3%)</td>
<td>31%</td>
<td>1,011 (7%)</td>
</tr>
</tbody>
</table>

CAGR (’06–’09)

- Common Beans: 53%
- Groundnuts: -19%
- Cowpeas: 14%

Market Size: USD 1.01B

- Common Beans: USD 538M
- Groundnuts: USD 247M
- Cowpeas: USD 140M

Note:
1. Average East Africa producer pricing has been used as a proxy for producer pricing in Tanzania;
2. Market size is calculated as the product of consumption (metric tons) and producer price (USD);
3. Shares may not add to 100% due to rounding

Sources: Ministry of Agriculture, ITC TradeMaps; Monitor Analysis

Despite what the data suggests, **pigeon peas are a more significant crop than cowpeas**. Pigeon peas are far more commercialized, primarily for export with limited local consumption, while cowpeas are more for home consumption with the leaves being consumed as an additional vegetable.

The value of the legume market has grown significantly, mostly due to increased domestic consumption, as well as growing exports.

Market size could be significantly increased through improved quality, as well as increased domestic processing.

This is true not only for common beans and groundnuts, which dominate the market, but for the remaining three focus legumes.
LEGUME MARKET OVERVIEW

DIETARY IMPORTANCE OF LEGUMES

Common beans are the most consumed legume, contributing greatly to overall protein and caloric intake

Legume\(^1\) Contribution to per Capita Protein Intake, 2007

<table>
<thead>
<tr>
<th>Country</th>
<th>Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uganda</td>
<td>25%</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>19%</td>
</tr>
<tr>
<td>Tanzania</td>
<td>19%</td>
</tr>
<tr>
<td>Nigeria</td>
<td>17%</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>16%</td>
</tr>
<tr>
<td>India</td>
<td>13%</td>
</tr>
<tr>
<td>Mali</td>
<td>9%</td>
</tr>
<tr>
<td>Ghana</td>
<td>6%</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>5%</td>
</tr>
</tbody>
</table>

Legume Protein Contribution by Type, Tanzania

- Soybeans
- Groundnuts
- Other legumes
- Common Beans

- Legumes contribute a **significant portion to overall protein consumption in Tanzania** (~19%)
  - Protein intake per capita/day is **very low** (~49 grams)
- **Common beans** provide the most protein out of all legumes consumed

Notes: 1 Legumes include groundnuts, soybeans, common beans and other legumes; 2 Other legumes includes cowpeas, chickpeas, pigeon peas, and peas
Source: AgDev; FAOSTAT; Monitor Analysis

LEGUME MARKET OVERVIEW

DIETARY IMPORTANCE OF LEGUMES

Common beans are the most consumed legume, contributing greatly to overall protein and caloric intake

Legume\(^1\) Contribution to per Capita Calorie Intake, 2007

<table>
<thead>
<tr>
<th>Country</th>
<th>Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burkina Faso</td>
<td>11%</td>
</tr>
<tr>
<td>Uganda</td>
<td>9%</td>
</tr>
<tr>
<td>Tanzania</td>
<td>8%</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>6%</td>
</tr>
<tr>
<td>Nigeria</td>
<td>6%</td>
</tr>
<tr>
<td>India</td>
<td>5%</td>
</tr>
<tr>
<td>Mali</td>
<td>4%</td>
</tr>
<tr>
<td>Ghana</td>
<td>3%</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>1%</td>
</tr>
</tbody>
</table>

Notes: 1 Legumes include groundnuts, soybeans, common beans and other legumes; 2 Other legumes includes cowpeas, chickpeas, pigeon peas, and peas
Source: AgDev; FAOSTAT; Monitor Analysis
Legumes are considered “orphan crops” in Tanzania and thus have little policy or investment focused on them. Common beans are important from a food security perspective due to their cultural importance as a staple food.

**Importance of Legumes from a Policy, Farming Systems and Cultural Perspective**

**Importance of Legumes in Tanzanian Agricultural Policy**
- All legumes except common bean and pigeon pea are considered to be “minor/orphan crops”
- Government involvement in the markets for these crops is in the form of research with public research agencies developing minor crops
- As such, there is no policy or marketing focus from the agriculture ministry with regards to legumes
- Government does not purchase any legumes, nor does it stockpile legumes as they are difficult to store due to their susceptibility to storage pests

**Legume Cropping Systems**
- Legumes are generally grown under rain-fed conditions and as a secondary/additional crop
- They are mostly intercropped — common bean, cowpea and pigeon pea are intercropped with maize
  - Beans are planted twice a year in the Southern Highlands and are often monocropped
- Intercropping is favored as crops have different harvest times which spreads labor and provides a food source between harvests of primary crops

**Cultural Importance**
- Common bean is widely consumed as a staple food in Tanzania
- Beans are prepared at home from their raw/unprocessed form
- Other legume crops are not as culturally important as common bean
  - Cowpea is used as a garden crop and the green grain as well as the leaves are consumed
  - Groundnuts are consumed as a snack
  - Pigeon pea is an export crop destined for Asian markets

Sources: Monitor Analysis; Field Interviews
Tanzania’s agro-ecological makeup is suited to legume farming; each of the focus legumes is grown in a number of regions, except chickpeas, which are only grown in the Lakes Region.

Primary Legume Growing Regions in Tanzania

- Legumes grow across a number of agro-ecological zones
- They are resilient to a variety of growing conditions, highlighting their importance as a food source, particularly for rural populations

Note: 1 Chickpeas are grown throughout the Lakes Region; 2 Mbeya, Ruvuma, Rukwa are the regions with the greatest potential for soybean production.

COMMON BEAN MARKET OVERVIEW

PRODUCTION OVERVIEW (1/2)

Whilst common beans and groundnuts are grown in the largest volumes, pigeon peas and chickpeas are showing good growth

Production Trends and Drivers

- **Low but consistent growth rate**
- Driven by: Large and expanding export market, particularly in India

- **Weak overall growth**
- Driven by: Low yields leading to SHFs switching to other crops
- Primarily grown for home consumption with people eating cowpea leaves, but the grain is not as important for human consumption

- **Decline in overall growth**
- Driven by: Declining yields due to limited use of improved seed. There are limited improved groundnut varieties

- **Low but consistent growth rate**
- Driven by: Population growth and non-industrial led urbanization
  - Affordability
  - Regional demand, particularly neighboring countries

Source: Ministry of Agriculture; ITC TradeMaps; Monitor Analysis; Annual Progress Report", ICRISAT, 2009; “Global and Regional Trends in Production, Trade and Consumption of Food Legume Crops”, Akibode, 2011
Common beans and groundnuts are the most extensively farmed of the focus legumes; farmers are reliant on increasing land area under cultivation to increase production volumes.

Area Harvested of Focus Legumes in Tanzania

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Beans</td>
<td>1.3</td>
<td>1.5</td>
<td>1.4</td>
<td>1.6</td>
<td>2.2</td>
</tr>
<tr>
<td>Soybeans</td>
<td>7%</td>
<td>1%</td>
<td>7%</td>
<td>2%</td>
<td>9%</td>
</tr>
<tr>
<td>Chickpeas</td>
<td>11%</td>
<td>12%</td>
<td>6%</td>
<td>8%</td>
<td>22%</td>
</tr>
<tr>
<td>Pigeonpeas</td>
<td>25%</td>
<td>25%</td>
<td>34%</td>
<td>27%</td>
<td>2%</td>
</tr>
<tr>
<td>Cowpeas</td>
<td>51%</td>
<td>56%</td>
<td>6%</td>
<td>55%</td>
<td>55%</td>
</tr>
<tr>
<td>Groundnuts</td>
<td>1.3</td>
<td>1.5</td>
<td>1.4</td>
<td>1.6</td>
<td>2.2</td>
</tr>
</tbody>
</table>

**CAGR (’06–’10)**
- Soybeans: -0.3%
- Chickpeas: 45.1%
- Pigeonpeas: 8.0%
- Cowpeas: 13.4%
- Groundnuts: 11.7%
- Common Beans: 17.0%

**Key Producer Issues**

- **Increased production is associated with increased area under legume cultivation**
  - The potential **area available to be cultivated is limited**
    - Yield improvements are vital for further significant production increases to be achieved
- **Limited intensive farming and thus low yields**, due to:
  - **Expensive inputs** (seed, fertilizer, crop protection) beyond the means of most SHFs
    - Legumes are not considered a primary crop and so are less likely to receive additional inputs
  - Poor access to credit limits ability to invest in increasing production
  - Limited access to markets, limits attractiveness of growing legumes on large scale
  - Limited extension services to educate farmers about intensive farming practices
  - Limited capacity to employ labor to implement intensive farming practices
- **Informal cross-border trade is often more profitable**, due to:
  - High costs of aggregation and transport
  - Difficulty obtaining export permits, and high tariffs
  - Uncertainty and maladministration at border posts regarding export bans

Note: ¹ Smallholders are defined as having landholding less than 2 hectare; ² The term ‘marketed’ refers to any sale of produce be it at local village level or at an urban centre level.

Source: Ministry of Agriculture; ITC TradeMaps; Monitor Analysis; “Enhancing Grain Legumes Productivity, and Production and the Incomes of Smallholder Farmers in Drought Prone Areas of sub-Saharan Africa and South Asia”, ICRISAT, 2009; Primary Research
The legume value chain is very fragmented; few large players exist.

**Legumes Value Chain in Tanzania**

**Market**
- Domestic Market
- Local Village-Level Market
- East African Markets
- Asian Markets

**Processing**
- Small-scale processing, carried out by women and some SMEs
- Middle-men/small-scale traders
- Large-scale processing
- Large traders

**Aggregation**
- Input suppliers
  - Informal channels (Seed)
  - Government (Seed, Fertilizer Subsidies, Extension Services)
  - Input suppliers (Agro dealers)

**Production**
- Smallholder farmers (80%)
- Large commercial farmers (20%)

Source: Monitor Analysis; Field Interviews
Only ~10% of farmers use improved legume seeds from the government, private seed suppliers or NGOs; the remainder source seed through informal channels.

**Seed Distribution Systems in Tanzania**

- **Formal Seed Supply**
  - 10% share
  - Research Institutes Supported by CIAT, IITA and ICRISAT
    - Multiplication of Breeder and Foundation seed
  - Seed Producers
    - Multiplication of Foundation Seed into Certified Seed
    - Multiplication of Quality Declared Seed (QDS) overseen by TOSCI
  - Government Agricultural Seed Agency
  - NGOs Incl. development relief projects
  - Private Sector Intermediaries
  - Private Seed Suppliers

- **Informal Seed Supply**
  - 90% share
  - Local Market
  - Relatives
  - Friends/Neighbors
  - Farmer-to-farmer Exchange
  - Other Informal Networks

Source: Monitor Analysis; Field Interviews
**LEGUME MARKET OVERVIEW**

**KEY PLAYERS IN THE SEED SUPPLY SYSTEM**

There is little large-scale private sector investment; the majority of R&D is conducted by NGOs with some government support, whilst seed multiplication is dominated by ARIs

<table>
<thead>
<tr>
<th>Seed Research Institutes and Their Mandate Crops</th>
<th>Major Seed Companies for Focus Legumes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Institute</td>
<td>Common beans</td>
</tr>
<tr>
<td>Selian ARI</td>
<td>✔</td>
</tr>
<tr>
<td>Uyole ARI</td>
<td>✔</td>
</tr>
<tr>
<td>Ilonga ARI</td>
<td>✔</td>
</tr>
<tr>
<td>Naliendele ARI</td>
<td>✔</td>
</tr>
<tr>
<td>IITA NGO</td>
<td>✔</td>
</tr>
<tr>
<td>ICRISAT NGO</td>
<td>✔</td>
</tr>
<tr>
<td>CIAT NGO</td>
<td>✔</td>
</tr>
<tr>
<td>ASA²</td>
<td>✔</td>
</tr>
</tbody>
</table>

Note: ¹ Agricultural Research Institute, falls under Ministry of Agriculture; ² Agricultural Seed Agency (parastatal)

Source: IITA; ICRISAT; CIAT; Industry Interviews

**Limited engagement** of large private seed companies — legume varieties are self-pollinating. SHFs recycle seed, thus **no incentive to large seed producers** who deal in the multiplication and distribution of preferred local varieties, including improved seeds.
### LEGUME MARKET OVERVIEW

#### IMPORTANCE OF LEGUME SEED PRODUCTION

Legume seed volumes multiplied by both the private and public sector are insignificant in comparison to crops that are considered more important, such as maize.

#### Production of Maize and Legumes Seed by Various Seed Multipliers

<table>
<thead>
<tr>
<th>Agricultural Seed Agency (ASA) Arusha Seed Farm</th>
<th>Suba Agro Trading (Subatech Engineering)</th>
<th>Meru Agro</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Crop</strong></td>
<td><strong>Seed Volume (MT, 2011)</strong></td>
<td><strong>Crop</strong></td>
</tr>
<tr>
<td>Maize</td>
<td>131.5</td>
<td>Maize</td>
</tr>
<tr>
<td>Common Bean</td>
<td>57.8</td>
<td>Common Bean</td>
</tr>
<tr>
<td>Pigeon Pea</td>
<td>0.8</td>
<td><strong>Jessica</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Lyamungo 90</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Selian 97</strong></td>
</tr>
</tbody>
</table>

Seed multipliers — both public and private sector — place little emphasis on legume seed compared to cereals such as maize. For example, the little common bean seed Suba Agro multiplies is as a security measure in case there is a shift in the market. If unable to sell seed, they will grow the grain for supply to large buyers such as the military.

Source: Monitor Analysis; Field Interviews
Government efforts to make seed more readily available to farmers and decrease lead times in new varieties being released include quality declared seed and seed harmonization respectively.

### Seed Harmonization

- **There are 10 countries** that are members of the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) **that have agreed to harmonize seed policies**
  - Each country is expected to amend its policy to comply with harmonization practices. Tanzania is currently 100% compliant with policy, but feels that other countries such as Kenya are not reciprocating efforts and may thus pull out of agreements.
- In addition to this, Tanzania is a member of SADC, where seed harmonization for member countries in East and Southern Africa (ESA) is being considered.
- Under seed harmonization agreements, **if a variety has been released in an ASARECA member country, then there need only be 1 year of field trials in Tanzania** for the variety to be released locally.
  - This would allow varieties grown in similar agro-climatic conditions to be easily released in Tanzania.

### Quality Declared Seed

- **Quality declared seed (QDS) is a system developed by FAO to allow better access to quality seed at a community level.**
- Under the QDS system, farmers multiply foundation seed under supervision and support.
  - The seed does not need to be certified, but will be quality seed with minimal impurities that farmers can then trade within their locality.
- Tanzania Official Seed Multiplication Institute (TOSCI) oversees the QDS system in Tanzania with the support of district agricultural departments.
  - The success of QDS in Tanzania stems from the system being embedded in district structures, thus being more sustainable than if it were for example NGO led.
- TOSCI has found that the most efficient way to get seeds for “orphan crops” such as legumes to farmers is through QDS because private sector players are not interested in multiplying legume seeds due to their low profitability.

Source: Monitor Analysis; Field Interviews
There are an estimated 2.5M smallholder legume farmers in Tanzania. Farmers market most of their groundnut and pigeon pea production, while keeping half of common bean for food.

There are no official statistics on the number of farmers in Tanzania, as such, an estimation is required. Population, agricultural work force participation and area allotted to legumes are used to arrive at an estimated 2.5M smallholder legume farmers in Tanzania; defined as those smallholder farmers or farming households with any volume output of legumes for subsistence, sale or both.

- **Estimate: 2.5M legume farmers in Tanzania**
  - Tanzania’s population was 44.8M in 2010
    - Of the total population, 88% were active labor force participants
    - Of the total labor force, 75% were engaged in agriculture
    - Used crop contribution to agricultural GDP (71%) as a proxy for number of crop farmers (excluded livestock farmers)
    - Estimate 80% of crop farmers are smallholders
    - Used proportion of arable land allotted to legumes (~16%) as a proxy for proportion of legume farmers
    - Implies ~2.5M legume farmers in Tanzania

- **A sizeable proportion of legume production is marketed; most farmers have marketable surplus**
- **The extent and nature of commercialization depends on the crop and what market opportunities exist for it**
  - Common beans are food crops; farmers interviewed were selling 48% of their produce
  - Groundnuts are cash crops; farmers interviewed were selling 83% of their produce
  - Pigeon peas are cash crops; farmers interviewed were selling 100% of their produce with a small amount being kept for seed
Legume production is dominated by women; they have substantial decision-making authority, although tend to have less say over financial issues.

### Gender Roles in Legume Farming in Tanzania

<table>
<thead>
<tr>
<th>Roles</th>
<th>Women</th>
<th>Men</th>
<th>Joint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor and Time Allocation</td>
<td>• Responsible for majority of legume production activities</td>
<td>• More involved in marketing activities</td>
<td>• Men also contribute to labor activities</td>
</tr>
<tr>
<td>Decision-making</td>
<td>• Children’s education, household nutrition, marriage and health of family members</td>
<td>• Exert greater control over economic matters</td>
<td>• Women do sometimes sell produce directly to market (e.g., at roadside)</td>
</tr>
<tr>
<td>Access to and Control Over Resources</td>
<td>• Poor access to and ownership of resources</td>
<td>• Control all income</td>
<td>• Decisions on crop production and migration</td>
</tr>
<tr>
<td></td>
<td>• Limited utilization of resources</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Livestock and small implements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information Sources</td>
<td>• Informal sources (relatives, friends, neighbors) are primary source</td>
<td>• N/A</td>
<td></td>
</tr>
</tbody>
</table>

*Beans are a major subsistence crop. The bulk of resource poor in TZ are women and so need beans to ensure that families are fed. It is primarily women who farm the local varieties — men do too but less so.*

— Expert Interview

Source: Monitor Analysis; Field Interviews; “Annual Progress Report”, ICRISAT, 2009
Although there is only official trade of common bean and pigeon pea reported, there is also significant export of pigeon pea to Asian markets.

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 common beans, chickpeas, soybeans and groundnuts for which trade data was available; 3 Groundnut and soybean import and export data include trade of raw groundnut; 4 Common Bean includes kidney, white pea, dried, adzuki, urd, mung and black/green gram beans; Cowpea trade data is unavailable.

Sources: International Trade Centre (ITC), Trade Map, Accessed 26 February 2012; Monitor Analysis.
AGENDA

Country Background

Legume Market Introduction

Common Bean Market Overview

Groundnut Market Overview

Pigeon Pea Market Overview

Key Barriers and Potential Interventions
COMMON BEAN MARKET OVERVIEW

R&D AND SEED PRODUCTION

Common bean R&D is conducted under the National Bean Research Program; the 3 research institutes involved in this program have released over 23 bean varieties

- There is no clear ruling variety for common beans
  - More than 30 varieties of bean released in Tanzania since the 1970s
- Most bean R&D happens under the National Bean Research Program (funded by CIAT)
- The program arose due to the food security importance of the Phaseolus bean and research is done collaboratively between three research stations
  - Soikone University of Agriculture (SUA) handles <1,000 masl, Selian Agricultural Research Institute (SARI) handles 1,000–1,500 masl, and Uyole handles >1,500 masl
- Combined, these institutes have released more than 23 bean varieties
  - SARI has released eight bean varieties, (5 bush varieties and 3 climbing varieties), Uyole has released more than ten varieties, while Soikone has released about five varieties
  - The need for climbing varieties arose due to land scarcity for farming on mountain slopes, such as in the Kilimanjaro region, which SARI covers
- Pasi, Fibea and Rosenda are local varieties that have been improved with disease resistance. They are preferred by farmers but are still more susceptible

Source: Ministry of Agriculture, Food Security and Cooperatives; Field Visits and Primary Interviews; Monitor Analysis
Increases in common bean production have been driven primarily by increases in area harvested; production is hampered by biotic stresses and poor use of yield-enhancing inputs.

Common Bean Production Trends and Drivers:

- **Common bean leads land area under production for legumes with production happening across the country.**
- **Low but consistent growth in production driven by population growth**
  - Regional demand, particularly neighboring countries
  - Increased area under cultivation
- **Production is not as high as it could be due to:**
  - Farmers growing **mainly local varieties**
  - Poor use of yield enhancing inputs due to unaffordability
  - Drastic **climate change** (erratic and unpredictable rainfall) forcing farmers to shift to more drought-resistant crops such as pigeon pea
  - Biotic stresses in the form of pests and diseases
    - Yield improvements are vital for further significant production increases to be achieved
- **In some parts of the country**, **common bean is a “short rain crop” planted only if the short rains come** (rains have become erratic and unreliable) and it is only planted to supplement food and income.

**Note:** Based on farmer focus group in Karatu district in Northern Tanzania

Source: Ministry of Agriculture; ITC TradeMaps; Monitor Analysis; Annual Progress Report”, ICRISAT, 2009; “Global and Regional Trends in Production, Trade and Consumption of Food Legume Crops”, Akibode, 2011
**COMMON BEAN MARKET OVERVIEW**

**YIELD**

Common bean yields are significantly lower than their potential due to the use of mainly local varieties that are prone to biotic stresses as well as limited use of yield-enhancing technologies.

Common Bean Yield Gap: Tanzania vs. Comparables

- Yields are at similar levels to those achieved in 1990 and are currently declining.
- In-country, Ruvuma is the region with the highest yield, however it is only 1.003 MT/ha.

**Tanzania Potential Common Bean Yield, Production Volume and Nutritional Impact**

<table>
<thead>
<tr>
<th>Region</th>
<th>Yield (MT/ha)</th>
<th>Production (Thousand MT)</th>
<th>Consumption per Capita (KG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Africa Max</td>
<td>1.2</td>
<td>1,391</td>
<td>17.3</td>
</tr>
<tr>
<td>South Asia Max</td>
<td>1.1</td>
<td>1,376</td>
<td>17.1</td>
</tr>
<tr>
<td>Local Max</td>
<td>1.0</td>
<td>1,212</td>
<td>15.0</td>
</tr>
<tr>
<td>Tanzania</td>
<td>0.7</td>
<td>868</td>
<td>10.8</td>
</tr>
</tbody>
</table>

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 Tanzania.

Source: AgDev; FAOSTAT; CIA World Factbook; Monitor Analysis.
Common beans are the most consumed legume, primarily for home consumption; leaves are also consumed as a cheap and easily accessible vegetable.

### Consumption of Common Beans in Tanzania

<table>
<thead>
<tr>
<th>Year</th>
<th>Consumption (Million Metric Tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>0.69</td>
</tr>
<tr>
<td>2007</td>
<td>0.89</td>
</tr>
<tr>
<td>2008</td>
<td>0.57</td>
</tr>
<tr>
<td>2009</td>
<td>0.77</td>
</tr>
<tr>
<td>2010</td>
<td>0.85</td>
</tr>
</tbody>
</table>

Common beans have steady growth in consumption with an increase of +5.2% from 2006 to 2010.

- **Most consumed legume in Tanzania** with steady growth in consumption:
  - Mainly for **home consumption**, with a little surplus marketed
  - **Important source of nutrients**, especially for pregnant women and HIV positive people, as they are rich in iron and zinc
- Popularity due to **low price, good nutritional value, and traditional preferences**
- **Both leaves and grain are consumed** with leaves serving as a cheap and easily accessible vegetable
- **Selian Agricultural Research Institute (SARI)** has tried to **increase utilization of beans through creating recipe books** that show consumers how to prepare beans:
  - Recipes are sent to the lab to analyze their nutrient content
- **SARI** is also **starting to incorporate nutrients into their breeding through the “Nutribean” program** which enriches beans with minerals

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*Source: Ministry of Agriculture, ITC TradeMaps; Monitor Analysis; Annual Progress Report*, ICRISAT, 2009; “Global and Regional Trends in Production, Trade and Consumption of Food Legume Crops**, Akibode, 2011*
COMMON BEAN MARKET OVERVIEW

PROCESSING AND MARKETING

Processing is at the most basic level and confined to threshing post-harvest; there are no large buyers for beans and most marketing happens within the same general locale as production

- There is limited processing of beans with the most processing being threshing to remove beans from pods
- Threshing is carried out within the homestead only by small scale famers who live close to their farms. More often, threshing occurs on or nearby fields
- Threshing is done using sticks for small farmers but farmers with larger tracts of land may drive a tractor over beans spread on tarpaulin
- After threshing farmers transport grain to their homes for storage and use bean straw for livestock
- Traders often have to clean the grain as farmers sell them with stones and other impurities. They may also occasionally perform some very rudimentary grading of beans but this is rare

Marketing

- There is some marketing of beans but only surplus beans are marketed, once household needs have been accounted for
  - On average, farmers interviewed marketed ~48% of their common bean output
  - Farmers also kept half a bag (~50kg) of bean output for seed
- There were a number of routes to market for farmers:
  - For farmers who are members of a group, they bring produce to the group’s offices/collection point. In some cases they are issued with a receipt to redeem when prices are higher. In other cases, they are paid cash immediately at prevailing market prices
  - Farmers take their produce to the closest market and sell to traders there
  - Farmers sell to middlemen who come to the farm gate
  - Farmers sell to each other
    - A number of factors will determine which route a farmer chooses, including membership of a farmer group, proximity to markets and prevailing prices

There are no large buyers of common beans in Tanzania. Middlemen and small scale market traders are the primary buyers. They subsequently sell on to end consumers, few local level supermarkets or to traders from neighboring countries such as Kenya, the DRC, Malawi or Zambia

Source: Field Visits and Primary Interviews; Monitor Analysis
COMMON BEAN MARKET OVERVIEW

PREFERRED TRAITS

Traits of beans are considered under three broad categories: Production, marketing and culinary; preferences are vastly different across the country with no uniform trait preferences.

<table>
<thead>
<tr>
<th>Farmer</th>
<th>Traders</th>
<th>Retailers</th>
<th>End Consumers</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Yield</td>
<td>• Color</td>
<td>• Cooking time</td>
<td>• Preferred traits differ by region. As an example, in the north black beans are unacceptable but in the northwest they are preferred. Researchers use Participatory Variety Selection (PVS) and Participatory Breeding in order to understand both market preferences as well as preferences for home consumption from the perspective of farmers and consumers.</td>
</tr>
<tr>
<td>• Size</td>
<td>• Size</td>
<td>• Palatability</td>
<td></td>
</tr>
<tr>
<td>• Shape</td>
<td>• Bruchid damage</td>
<td>• Storage time</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>– For home consumption, taste and texture of leaves is also important as these are used as vegetables</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Despite numerous varieties in the country, three varieties are more prominent in different regions and for different reasons:

- Kablankete in the Southern Highlands, Morogoro and Ngeta — sweet and soft with a short cooking time
  - Observed in all markets visited — popular due to its taste and the fact that it has low flatulence impact
  - In the Northern regions, the variety is called "Soya"
- Bambara Nut — mainly for UK export
- Njugumawe (Central Zone) — drought resistant with higher nutritional content
- International markets also play a role in the bean production
  - Large seeds — good for the market, even across borders: Red mottled beans — good market in Congo, whitish beans (e.g., Fibea) — good market in Malawi/Zambia
- Medium seed — sell across TZ
- Small seed — mainly for home consumption

Source: ICRISAT, Annual Progress Report, 2009; Field Visits and Primary Interviews; Monitor Analysis
The bulk of common bean trade is within East African (and informal) with Kenya being a key destination for Tanzanian common bean; India is also a significant importer of Tanzanian beans.

Overview of Tanzanian Common Bean Trade

- Trade data for common beans in Tanzania is likely to underestimate the real picture on the ground and the importance of local markets is likely underrepresented due to large volumes of informal and unrecorded informal cross-border trade with countries such as Kenya, Malawi, the DRC, Zambia.

- Informal trade is driven by the high level of bureaucracy involved in exporting agricultural produce:
  - A large number of documents are required before one can export produce, e.g., export permits, documents of origin, phyto-sanitary clearance, etc. Most traders are not aware of the full list of documents and also the documents are not obtained in one central location.

- Tanzania is a net exporter of common bean, suggesting that current demand is being met by domestic production:
  - The bulk of imports from within the East African region are likely to be informal, within border regions and related to varietal preferences as the tribes around border regions tend to be the same people despite being in different countries.
**COMMON BEAN MARKET OVERVIEW**

**VALUE CHAIN ECONOMICS**

Labor is the highest cost facing SHFs at 56% of total production costs for common bean; seed alone constitutes the remaining 44%, also a significant cost to farmers.

**Farmer Value Chain Economics for Common Bean in Tanzania, 2012 (USD/Ha)**

(Assuming 48% of Output Is Marketed)

<table>
<thead>
<tr>
<th>Labor Costs²: 29% of Total Production Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seed</td>
</tr>
<tr>
<td>126</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

-25%

**Farmer Value Chain Economics for Common Bean in Tanzania, 2012 (USD/Ha)**

(Assuming 80% of Output is Marketed)

<table>
<thead>
<tr>
<th>Labor Costs²: 29% of Total Production Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seed</td>
</tr>
<tr>
<td>126</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

-25% +25%

**Note:** ¹ Transport costs refer to the cost of transporting harvested crop from the field to the homeestead/village level storage facility; ² Labor costs stated by the farmers were divided by three as farmers plant maize, pigeon pea and common bean in close proximity — assumes equal labor burden across all three crops; ³ Based on farmer focus group interviews; ⁴ Sales based on an average of the harvest period price and the dry season price. There was a difference of between 20%–30% between the two; TZS/USD Exchange rate: 1,580 as per the average rate during the time of primary interviews — 31 Jan–09 Feb 2012

**Farmers**

- It is critical to increase the commercialization of common beans for SHFs to ensure they can obtain higher margins. Currently farmers interviewed only market ~48% of their output, and therefore make a loss of ~25% on their bean production. If farmers were able to sell at least 80% of their produce, they could make a margin up to 25%

- Developing markets for common beans is critical to improve farmer income

**Traders**

- Traders add limited value and play the role of just buying and selling — Margins are therefore low with traders making between 9%–11% margins depending on the variety

- Prices vary by up to TZS 300/KG (USD 0.19/KG) between harvest season and the dry season

Sources: Field Visits and Primary Interviews; Monitor Analysis
AGENDA

Country Background

Legume Market Introduction

Common Bean Market Overview

Groundnut Market Overview

Pigeon Pea Market Overview

Key Barriers and Potential Interventions
Production has been declining drastically despite significant increases in area harvested indicating a need for increased R&D efforts in increasing yields — thus far groundnut R&D has been limited.

**Groundnut Production Trends and Drivers**

- Groundnut is produced mainly in the southern highlands.
- Production has declined due to low (and declining) yields
  - Demand has also declined leading to reduced production.
- There is limited R&D into groundnut — the research institutes visited did not have any research programs into groundnut and no institutes were mentioned as doing any work on groundnut.
  - Very few groundnut varieties have been released in Tanzania
    - Up to 2002, there were only four groundnut varieties that had been released by the Selian Agricultural Research Institute.
    - In 2007/8, five new varieties were released — these nine varieties have been released with the support of ICRISAT.

GROUNDNUT MARKET OVERVIEW

YIELD

*Groundnut yields have moved erratically over the past ten years and are significantly below those in other East African countries*

- Yields have been low over the past ten years
- Achieving yields equivalent to those in Bangladesh would enable Tanzanians to **double their per capita consumption of groundnuts**
- Low yields have been characteristic of all regions as the local max is only slightly higher than the country average

**Groundnut Yield Gap: Tanzania vs. Comparables**

- **Yield (MT/ha)**
  - Bangladesh
  - Ethiopia
  - Tanzania
  - Rwanda

**Tanzania Potential Groundnut Yield, Production Volume and Nutritional Impact**

- **Yield (MT/ha)**
  - South Asia Max: 1.6
  - East Africa Max: 1.3
  - Tanzania: 1.0
  - Local Max: 0.7 (+86%)

- **Production (Thousand MT)**
  - South Asia: 768
  - East Africa: 650
  - Tanzania: 465
  - Local: 350

- **Consumption per Capita (KG)**
  - South Asia: 10.6
  - East Africa: 8.9
  - Tanzania: 6.4
  - Local: 4.8

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 Tanzania

Source: AgDev; FAOSTAT; CIA World Factbook; Monitor Analysis
GROUNDNUT MARKET OVERVIEW

CONSUMPTION AND TRADE

Groundnuts are consumed locally, although consumption is declining; Tanzania is a net exporter of groundnuts with the bulk of this trade being within the region and informal.

**Consumption of Groundnut in Tanzania**

- 2006: 783 (Thousand Metric Tons)
- 2007: 403
- 2008: 330
- 2009: 350
- 2010: 423

**Groundnut Trade in Tanzania (Thousand Metric Tons)**

- 2006: 16
- 2007: 5
- 2008: 11
- 2009: -2
- 2010: 43

- Mainly local consumption
  - Shelled and roasted to make a local snack
  - Ground with a mortar and pestle to make peanut paste used in fish, vegetables and other local dishes

GROUNDNUT MARKET OVERVIEW

PROCESSING AND MARKETING

There are few large buyers and processors of groundnuts despite farmers marketing up to ~80%\(^1\) of output; the bulk of this marketing happens at the local/village market level.

- **Processing and Value Addition**
  - There is **limited processing of groundnut at the farmer level with farmers purely drying groundnuts with the most processing being threshing** to remove beans from pods.
    - Farmers **do not shell groundnut despite receiving ~TZS 1,300 more per KG than they do for unshelled groundnut**
      - Shelling takes too much time and they lack the machinery to do it efficiently.
  - Groundnut is milled to produce nutritious flour, a mix of maize, soy, rice, groundnut and finger millet. Nutritious flour is used as food for children and heavy workers/sick people as it is high in protein.

- **Marketing**
  - **Farmers interviewed market ~80%** of their groundnut output through similar routes to common bean.
    - Farmers **take their produce to the closest market and sell to traders there**
    - Farmers **sell to middlemen who come to the farm gate**
    - Farmers **sell to each other**
      - A number of factors will determine which route a farmer chooses, including membership of a farmer group, proximity to markets and prevailing prices.

**Buyers of Groundnuts**

- **Afri-Youth Pride (Halisi Products)**
  - An SME that procures groundnuts (amongst other products) **for the production of nutritious flour (corn soy blend)**
    - Also roast groundnuts and sell them as a snack.
  - **Procurement is through middlemen** as they feel middlemen are better able to aggregate produce and control quality on their behalf.
- **Export Trading Group (ETG)**
  - Focused on the production, processing, trading and distribution of agricultural commodities, farm inputs and farm implements.
  - **Purchase a small amount of groundnut used in snacks**
    - In 2010, they purchased 2,000 metric tons of groundnut.

Note: \(^1\) Based on farmer focus group interviews in Mbeya district.
Source: Field Visits and Primary Interviews; Monitor Analysis

There are generally few large buyers and processors of groundnut. Middlemen and small scale market traders are the primary buyers. They subsequently sell on to end consumers, and a few local level supermarkets.
Farmers are currently making 8% margins compared to a potential 218% margin if they shelled their groundnuts; farmers perceive shelling to be too time consuming as they lack machinery.

**Farmer Value Chain Economics for UNSHELLED Groundnut in Tanzania, 2012 (USD/Ha) (Assuming 83%³ of Output Is Marketed)**

- **Labor Costs: 56% of Total Production Costs**
  - Seed: 117
  - Land Clearing: 23
  - Ploughing: 41
  - Seeding: 9
  - Weeding: 36
  - Harvesting: 47
  - Total Cost of Prod: 275
  - Transport: 116
  - Margin: 30
  - Sales: 421

**Farmer Value Chain Economics for SHELLED Groundnut in Tanzania, 2012 (USD/Ha) (Assuming 83%³ of Output Is Marketed)**

- **Labor Costs: 56% of Total Production Costs**
  - Seed: 117
  - Land Clearing: 23
  - Ploughing: 41
  - Seeding: 9
  - Weeding: 36
  - Harvesting: 47
  - Total Cost of Prod: 275
  - Transport: 116
  - Shelling: 47
  - Margin: 854
  - Sales: 1,291

**Note:**
1. Transport costs refer to the cost of transporting harvested crop from the field to the homestead / village level storage facility.
2. Shelling is potentially underestimated — no data for the cost of shelling was available and so shelling was assumed to cost as much as the most expensive labor cost in the production process.
3. Based on farmer focus group interviews.
4. Sales based on an average of the harvest period price and the dry season price. There was a difference of between 20%–30% between the two.
5. TZS/USD Exchange rate: 1580 as per the average rate during the time of primary interviews — 31st Jan–09th Feb 2012.

**Sources:** Field Visits and Primary Interviews; Monitor Analysis
AGENDA

Country Background

Legume Market Introduction

Common Bean Market Overview

Groundnut Market Overview

Pigeon Pea Market Overview

Key Barriers and Potential Interventions
PIGEON PEA MARKET OVERVIEW

R&D AND SEED PRODUCTION

The focus of pigeon pea R&D in Tanzania is around maturing time and resistance to fusarium wilt; SARI has a significant pigeon pea program that expects to release a further four varieties in 2012

<table>
<thead>
<tr>
<th>Evolution of Pigeon Pea Varieties in Tanzania</th>
<th>Pigeon Pea R&amp;D Trends and Drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1940s Local variety introduced from Kenya — up to 300 days to mature, indeterminate maturing period and limited resistance to pests and diseases</td>
<td>• The <strong>local variety</strong> of pigeon pea was introduced to Tanzania in the 1940s from Kenya and took up to 300 days to mature with an indeterminate maturing period, making it difficult to harvest</td>
</tr>
<tr>
<td>1996/7 Three new varieties released — uniform maturing period and improved resistance to fusarium wilt</td>
<td>• <strong>Since 1996/7, three new varieties have been released</strong> with the support of ICRISAT — these have uniform maturing periods and improved resistance to fusarium wilt</td>
</tr>
<tr>
<td>2012 Four new varieties to be released</td>
<td>– Mature between 180 days and 270 days, depending on altitude (pigeon pea is a day sensitive crop). The varieties are:</td>
</tr>
<tr>
<td></td>
<td>o Dimali (long maturing)</td>
</tr>
<tr>
<td></td>
<td>o Tumiya (medium maturing)</td>
</tr>
<tr>
<td></td>
<td>o Kombowa (early maturing)</td>
</tr>
<tr>
<td></td>
<td>– The long and medium maturing varieties are planted in the north due to the altitude</td>
</tr>
</tbody>
</table>

- The **SARI expect to release an additional four varieties in 2012**
- **Babati white is the most preferred variety**, especially in the Indian market
- As with other legumes, there is **limited private sector participation in seed multiplication** of this self-pollinating crop
  - However, the **availability of such large markets for pigeon pea has the potential to drive increased purchases of improved seed by farmers**

Source: Ministry of Agriculture, Food Security and Cooperatives; Field Visits and Primary Interviews; Monitor Analysis
Pigeon pea production is increasing due to adoption of new varieties and expansion of area harvested; there is limited local consumption with the bulk of production being for export

- Pigeon pea is a significant cash crop with production mainly for export purposes
- Produced mainly in the North with Babati District being the primary growing zone
- Data on production varies significantly:
  - Research Institutes and the Ministry of Agriculture estimated 2010 production at between 130,000–140,000
  - FAO estimates 2010 production at ~55,000 Metric Tons
    - The team feels that FAO grossly underestimates production as Export Trading Group stated that they purchase ~80,000 Metric Tons of pigeon peas and account for ~80% of the market
- In general, production is increasing due to
  - Adoption of new varieties
  - Expansion of area harvested
    - Both driven by financial benefits that farmers are experiencing
- Most cultivation is as a companion crop to maize, which is a stable crop combination, environmentally and is less risk prone, the pigeon pea being drought-tolerant should the maize fail. Farmers stated the benefits of companion cropping as:
  - Less competition for nutrients as pigeon pea has a deeper root system than maize
  - Nitrogen fixation due to nodulation on pigeon pea roots
  - Moisture preservation due to penetration of the pigeon pea root system which breaks hard soils

- Local consumption of pigeon pea in Tanzania is limited with only 10%–15% being consumed locally, mostly by the Asian community
  - Farmers stated that they do not keep any pigeon pea for home consumption as they are not aware of how pigeons are prepared and consumed — providing opportunities to increase utilization by teaching farmers how to use pigeon pea

Note: ¹ Based on farmer focus group in Karatu district in Northern Tanzania
Source: Ministry of Agriculture; ITC TradeMaps; Monitor Analysis; Annual Progress Report”, ICRISAT, 2009; “Global and Regional Trends in Production, Trade and Consumption of Food Legume Crops”, Akibode, 2011
Pigeon pea yields are, however, well below their potential and have remained flat for the past 20 years.

- Yields have stagnated at less than one MT/ha
- Yields equivalent to those of Uganda could lead to an increase in production of 14%, without any change in area harvested
- Very little pigeon pea is consumed by farmers, they are mainly grown for export and thus yield improvements would have little nutritional impact

Note: ¹ Yield comparison is versus maximum- and minimum-yielding among countries in East Africa and maximum-yielding country in South Asia
Source: AgDev; FAOSTAT; CIA World Factbook; Monitor Analysis
PIGEON PEA MARKET OVERVIEW

PROCESSING AND MARKETING

Despite high levels of commercialization, pigeon pea processing is limited to cleaning, grading and packaging for export; a few large buyers exist and are engaged in exports to Asia.

Processing and Value Addition

- Pigeon pea is a more commercialized crop with a significant export market. Despite this, the level of processing is limited and confined to mainly cleaning, grading, packaging for export markets.
- Only Export Trading Group (ETG) has processing facilities — there are 2 processing plants for pigeon pea, chick pea and green gram with a capacity of 50 to 60 metric tons a day, where they process pigeon pea into dal.
  - ETG also has numerous cleaning plants (usually situated in their warehouses). Produce is cleaned, graded and shipped to export markets, primarily India.
- Quality of grains is the biggest challenge ETG faces.
  - ETG states that they send extension agents to farmers to educate them on how to supply better quality product but that they do not dictate varieties to farmers and purchase any pigeon peas produced.

Marketing

- Pigeon peas are sold to large traders such as Mohammed Enterprises, Dodoma Transport and Export Trading Group (ETG).
  - ~60% of this trade goes through middlemen — middlemen make a margin of up to 83% when selling pigeon pea on to these buyers.
  - ETG trades ~80,000 metric tons of pigeon peas which it believes is about 80% of the Tanzanian market.
- In the North of Tanzania (Karatu), farmers were seeing impact from their interaction with Kilimo Markets, a private company that is helping farmers to organize themselves into groups and acts as a broker for pigeon pea on behalf of these farmer groups.

Preferred Traits

- The key traits and preferences thereof for pigeon peas in Tanzania are:
  - Color — white color is preferred for the market in India.
  - Taste — the sour pigeon peas are NOT preferred.
  - Yield — high yielding.
  - Maturity — early maturing.

Source: Field Visits and Primary Interviews; Monitor Analysis.
Tanzanian pigeon pea has the competitive advantage of being harvested 2–3 months before Asian pigeon pea — Tanzania is, therefore one of the top six global exporters of pigeon, primarily to the Asian markets.

Overview of Pigeon Pea Trade

- Tanzania is one of the top six global exporters of pigeon pea.
- India and other Asian markets import the most Pigeon Peas from Tanzania.
  - The Tanzanian Pigeon Pea is regarded highly in India because of its white grain color (Babati white variety).
  - Tanzania has a competitive advantage over Asian countries producing pigeon pea because of when pigeon pea is harvested.
    - May to Nov/Dec is dry season for pigeon pea in Asia while Tanzanian pigeon pea is harvested in Aug/Sep and can be exported by October, thus taking advantage of shortages and higher prices in India.
- The European Market demands a high quality and presently Tanzania does not meet those standards, although some small volumes are being Exported to the UK by Export Trading Group.
  - There is potential to increase export to European markets as there are large Asian communities in these markets and these markets would not necessarily want to undertake the processing of pigeon peas.

Source: ITC TradeMap — Accessed 16 February 2012; Field Visits and Primary Interviews; Monitor Analysis
### Pigeon Pea Market Overview

**Value Chain Economics**

Pigeon peas are a highly profitable crop for farmers with possible margins of over 400% for farmers; farmers market 100% of their produce.

#### Farmer Value Chain Economics for Pigeon Pea in Tanzania, 2012 (USD/Ha)

(Assuming 100%² of Output Is Marketed)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Cost (USD/Ha)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seed</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Land Clearing</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Ploughing</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Seeding</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Weeding</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Harvesting</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Total cost of prod</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>Transport</td>
<td>86</td>
<td>+427%</td>
</tr>
<tr>
<td>Margin</td>
<td>646</td>
<td></td>
</tr>
<tr>
<td>Sales</td>
<td>798</td>
<td></td>
</tr>
</tbody>
</table>

Some farmers keep ~20KG of grain for seed purposes, while others buy from neighbors.

#### Labor Costs:

80% of Total Production Costs

Note:

1. Transport costs refer to the cost of transporting harvested crop from the field to the homestead/village level storage facility.
2. Based on farmer focus group interviews.
3. Sales based on an average of the harvest period price and the dry season price. There was a difference of between 20%–30% between the two.
4. Labor costs stated by the farmers were divided by three as farmers plant maize, pigeon pea and common bean in close proximity — assumes equal labor burden across all three crops; TZS/USD Exchange rate: 1,580 as per the average rate during the time of primary interviews — 31 Jan–09 Feb 2012

Sources: Field Visits and Primary Interviews; Monitor Analysis