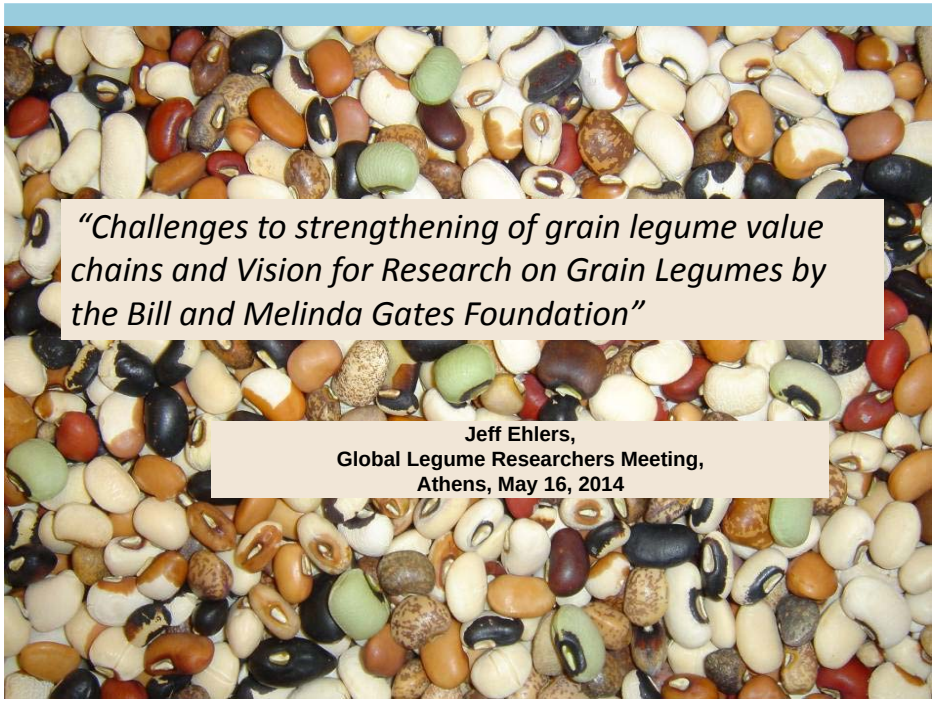


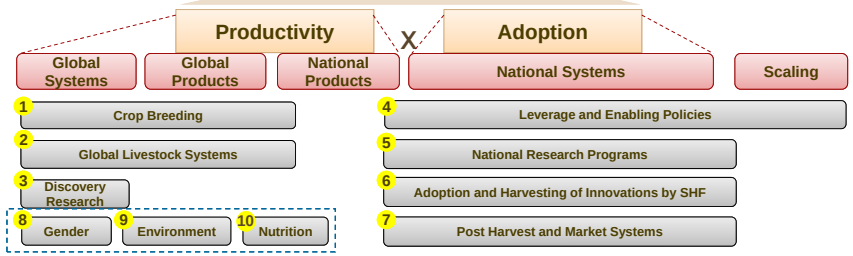
# *"Challenges to strengthening of grain legume value chains and Vision for Research on Grain Legumes by the Bill and Melinda Gates Foundation"*

**Jeff Ehlers,**
**Global Legume Researchers Meeting,**
**Athens, May 16, 2014**



BMGF Goals → ↑ Value Chain Eff. → ↑ Productivity → ↓ Poverty → ↑Nutrition/Health












## 2011 Strategy Re-fresh

### What Value Chains?

**We chose to focus our work on geographies with a high density of rural poor (vs production gap) (for Africa) and the crops they grow**

**Focus Geographies**



**Focus Products**

- Cereals: Maize, Millet, Sorghum, Rice
- Legumes: Groundnuts, Cowpeas, Chickpeas, Beans
- Vegetatively propagated: Cassava, Yams, Sweet Potatoes, Bananas
- Livestock: Cows, Goats, Chickens

- Cereals: Maize, Wheat, Rice
- Legumes: Chickpeas, Groundnuts
- Livestock: Cows, Goats, Chickens, Water buffalo





## Given 4 crops, 7 African countries - had to prioritize VC investments

| Species x Geography Species x Geography | Population (millions) | **Area ('000 Ha) | Consumption x000MT ('000s tons/year) | Production x000MT ('000s tons/year) | **Gov. Priority Source: Ag Regional Teams | Export Opportunity | Import substitution opportunity ('000 tons) | Favorable agro-ecology | **# of SHFs engaged in crop (millions) | Nutritional Value | **National Market Size (millions) | Production Per SHF Capita MT/year | Consumption Per Capita (kg/yr) | Yield Gap Estimates |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **GROUNDNUT** | | | | | | | | | | | | | | |
| Mali | 16.5 | 356 | 43-314 | 316-334 | | | | | .1 | | $158 | 3.2 | 2.6-19.2 | 125.9% or 188% |
| Burkina Faso | 18.5 | 399 | 193-331 | 265-342 | | | | | .3 | | $399 | 0.9-1.1 | 10.5-18 | 206.1% or 224% |
| Ghana | 25.8 | 352 | 142-394 | 465-531 | | | | | .5 | | $285 | 0.9-1.1 | 5.5-15.3 | 229.2% or 350% |
| Nigeria | 177.2 | 3888 | 364-526[1] | 2963-3247 | | | | | 1.9 | | $1,250 | 1.6-1.7 | 2.1-3.0 | 154.1% or 181% |
| Uganda | 35.9 | 408 | 90-165 | 175-299 | | | | | 1.4 | | $137 | 0.1-0.2 | 2.5-4.6 | 298.5% or 216% |
| Tanzania | 49.6 | 660 | 139-238 | 642-651 | | | | | .3 | | $247 | 2.2 | 2.8-4.8 | 228% or 182% |
| **CHICKPEA** | | | | | | | | | | | | | | |
| Ethiopia | 96.6 | 226 | 270-387 | 376 | | | | | .8 | | $154 | 0.5 | 2.8-4.0 | 218% |
| **COMMON BEAN** | | | | | | | | | | | | | | |
| Ethiopia[2] | 96.6 | 249[3] | 256-300 | 263-360 | | | | | 1.2 | | $94.3 | 0.2-0.3 | 2.6-3.1 | 240% or |

**Summary of relevance of legume species and key value chain components by African geography and species (Green = High, Blue = Medium, Yellow = Low, Red = Very low) (** = Suggested Priority Columns)**

[1] Large discrepancy. Slide 12 of Monitor's Nigeria report has consumption at 2.6M metric tons, but I have not found another source to support this.
[2] Common bean in Ethiopia is haricot bean in Monitor data
[3] 312 from FAOSTAT '10-12 although definition of "bean" is unclear in FAO data

## Prioritizing our legume investments

Priority 1 country
Priority 2 country

**Metrics used across IVCTs for country prioritization**

- Area harvested (FAOSTAT)
- Consumption/National market size (FAOSTAT)
- Production (FAOSTAT)
- # SHFs engaged in crop (estimated)
- Gov. Priority (opinion from Country Team)
- Export opportunity (opinion)

| Common bean | Cowpea | Groundnut | Chickpea |
|---|---|---|---|
| Tanzania | Burkina Faso | Tanzania | Ethiopia |
| Ethiopia | Mali | Burkina Faso | TBD following SA Strategy Development |
| Uganda | Nigeria[1] | Nigeria[1] | TBD following SA Strategy Development |

**Explanation for prioritization**

**Common bean-Tanzania:** Largest producer and consumer,, strong regional and domestic market opportunities, strong NARS research team and government priority

**Common bean-Ethiopia:** viable and growing international and regional export markets, government priority

**Cowpea-Burkina Faso:** 3rd most important producer, government priority, large export opportunity to populated coastal cities

**Groundnut-Tanzania:** huge internal market, exporter interest and demand from food industry, sizeable hectarage

**Chickpea-Ethiopia:** Largest producer in Africa, growing # of SHFs, good local export markets, government priority

**1 Nigeria would be a Phase I choice for both cowpea and groundnut,** but security concerns throughout cowpea and groundnut production areas of Nigeria may prevent, delay, or hinder progress of investments. We will need direction from the Foundation on whether we can make and manage investments in Northern Nigeria

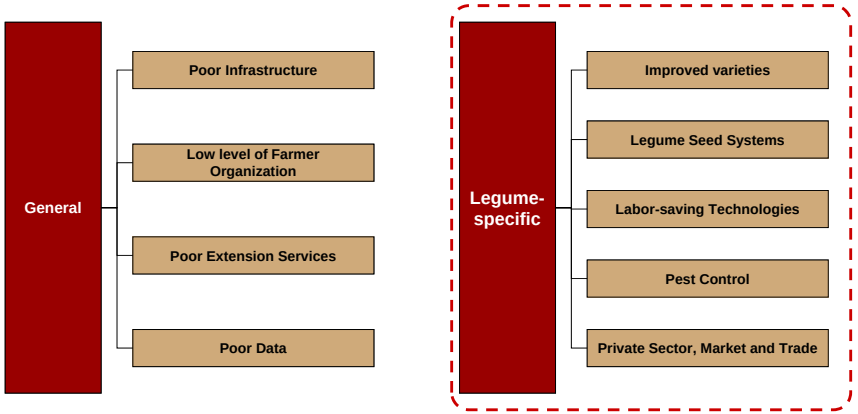


VALUE CHAIN Challenges OVERVIEW from *Monitor Group* Report, March 2012

Expert interviews, existing data and farmers to get their perceptions

*Legumes have major specific constraints along their value chains*

**Key Constraints Affecting Legume Value Chains in Africa**




Source: Monitor Analysis; Field Interviews



*Four main themes emerged from conversations with legume farmers: farmer education, seed cost, labor-saving technologies and storage*

**Themes from Discussions with SHFs**

| | |
|---|---|
| **Fully Comprehensive Farmer Education** | • Need for **fully comprehensive training covering all aspects of production** from good agronomic practices to marketing of produce |
| **Improved Seed Costs too High** | • Understood the benefits of using improved seed, but **seed costs were too high, not easily accessible** |
| **Need for Labor-Saving Technologies** | • **Save on both time and labor costs** as well as **receive higher income for value-added products** through the use of simple equipment |
| **Need for Storage** | • Farmers expressed the need for **storage for better price negotiation** |

*"It takes two days to harvest one hectare with equipment, but one week to harvest one hectare without equipment"*
–SHF in Burkina Faso

*"We get four times the price for shelled groundnut than we do for unshelled groundnut, but it just takes too long to do the shelling manually, so we would rather sell unshelled groundnut"*
–SHF in Tanzania








## LEGUMES-SPECIFIC CONSTRAINTS (1/2)

*legume-specific constraints that apply to legume value chains in particular*

| Constraint | Description | Degree of Constraint |
|---|---|---|
| **Lack of a Policy Focus on Legumes** 1 | • Limited policies focused on promoting legumes due to policymakers limited knowledge of legume benefits | High |
| **Unfocused Breeding Research and Development** 2a | • Insufficient research funding, aging research staff, varieties inappropriate for the market | Medium |
| **Ineffective Seed Production, Distribution and Adoption** 2b | • Lack of private sector involvement in legume seed due to the low profit margins associated with the seed | High |
| **Low Use of Labor-saving Technologies** 3 | • Mechanization has the potential to drive significant labor savings and increase production/ productivity, | Medium |

Source: Monitor Analysis; Field Interviews

# LEGUMES-SPECIFIC CONSTRAINTS (2/2)

| Constraint | Description | Degree of Constraint |
|---|---|---|
| 4a Inadequate Aflatoxin Testing and Control | • Aflatoxin contamination is the largest constraint to groundnut trade from Africa to Europe and North America, and poses a risk to local food safety<br>• Farmers are not adequately equipped to manage aflatoxin | High |
| 4b Ineffective Pest Control | • Cowpea production is highly affected by pest-resulting in as much as 100% losses | Medium |
| 5 Lack of Private Sector, Market and Trade Linkages | • Limited knowledge about market opportunities and few large buyers exist | High |

Source: Monitor Analysis; Field Interviews





# 1 POLICY

*Legumes need a more active role from governments – Adequate policy and attention is non-existent for legumes in most focus countries*

**Legumes Policy Support in Focus Countries**

| | Burkina | Ethiopia | Ghana | Mali | Nigeria | Tanzania | Uganda |
|---|---|---|---|---|---|---|---|
| Variety registration | x | ✓ | ✓ | x | ✓ | ✓ | ✓ |
| Seed | ● | ● | ✓ | x | ● | ● | ● |
| Exports | x | ✓ | x | x | x | x | x |
| Private Sector | x | ● | ● | x | x | x | x |
| Priority | ● | ● | ● | ● | ● | x | ● |

*"Legumes are orphan crops. They are considered as minor crops by government institutions."*

✓ *High government promotion of this policy dimension*

● *Medium government promotion of this policy dimension*

x *Low government promotion of this policy dimension*

Source: Monitor Analysis; Field Interviews





# 2 VARIETY DEVELOPMENT AND SEED SYSTEMS

*The development of seed systems is a major constraint for legumes, from seed research and development through to production, distribution and adoption*

**Constraints Along the Seed Supply System**

| Research | Multiplication | Certification | Distribution | Adoption |
|---|---|---|---|---|
| **Insufficient funding**<br>**Aging staff**<br>Research continuity and institutional memory<br>**Inappropriate focus**<br>Important market characteristics and pests/ disease<br>**Breeding conditions**<br>Breeding under high-inputs, unlike on-farm conditions | **Inherent low multiplication rate**<br>**Focus of NARS**<br>As much as 80% of seed production is focused on cereals<br>**Low private sector multiplication of legume seed**<br>Legumes seed can be recycled, presenting little incentive for the sale of legume seed | **Under-capacity in registering certified seed producers**<br>Governments do not have clear structures or sufficient capacity to register producers of certified seed | **Complex distribution systems**<br>Improved seeds often have to follow a complex path<br>**Little local-level production of seed**<br>Lmited availability and accessibility of seed at a farmer level<br>**Limited agro-dealers carrying legume seed** | **Insufficient distribution channels**<br>Varieties are not getting to farmers<br>**Lack of awareness and realization of the benefits of improved varieties**<br>Seeds are poorly marketed; benefits must be obvious and attractive<br>**Improved seed is too expensive**<br>Farmers state high price as a reason for low adoption |





# 3 LABOR-SAVING TECHNOLOGIES

*Legume production is highly labor-intensive- the use of labor-saving technologies could lead to significant labor cost savings and improved productivity*

**Low Use of Labor-Saving Technologies**

- Mechanization has the **potential to drive significant labor savings and increase production/ productivity**
- Legume farming is very-labor-intensive. The **effort required leads farmers to adopt quality-reducing and yield-compromising agronomic habits**

| Poor Agronomic Practices | Effects of Practices |
|---|---|
| 1 **Planting**<br>*Farmers use low seeding rates or broadcast* | *Lost yield potential* ***weeding and harvesting problems*** |
| 2 **Harvest Practices**<br>*Farmers use animals or tractors to trample their harvest for threshing* | *Trampling is an* ***unhygienic*** *method which also results in* ***significant loss of*** |
| 3 **Cleaning, grading**<br>*Farmers use slow winnowing practices, can't sort or grade efficiently* | ***High labor /opportunity cost, low throughput*** |

Source: Monitor Analysis; Field Interviews



VALUE CHAIN CONSTRAINTS

## 4 PEST CONTROL

*Pests can cause up to 100% losses in cowpea*

**Field Pest Control**

**Cowpea Pest Susceptibility**

- On-field pests can result in **as much as a 100% drop in cowpea yields**
- There have been several interventions targeted at off-field losses to pest damage such as the PICs storage bags, but field pests remain a challenge

**Limited Availability of Pest-Resistant Varieties**

- **Despite the development of pest-resistant cowpea varieties, there is low adoption** of these varieties due to limited seed production and distribution

Note: [1] "ppb" stands for parts per billion
Source: Monitor Analysis; Field Interviews







VALUE CHAIN CONSTRAINTS

## 5 PRIVATE SECTOR, MARKET AND TRADE

*Private sector buyers and processors are reluctant to engage smallholder farmers due to unreliable supply. In addition to this, existing processors operate under capacity*

**Constraints for the Private Sector, Market and Trade**

**Constraints to Legume Processing**

- **Little large scale formalized processing of legumes in focus countries-**Small scale through home/cottage industries
- Where processors do exist, they **often operate under capacity**
  - Processor are unable to source the required volumes

**Constraints to Market Linkages**

- **Limited direct purchasing from smallholder farmers**
- Private companies cite **erratic supply and weak contract enforcement**
  - Farmers do not supply buyers with the correct quality and volume of legumes as agreed upon in contracted agreements
  - no mechanism for companies to enforce contracts or recoup costs

Source: Monitor Analysis; Field Interviews





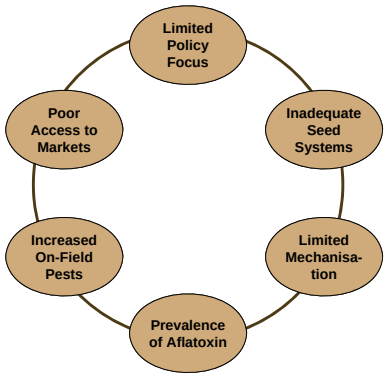


RECOMMENDATIONS

## OVERVIEW

*There are six categories of legume specific interventions that would boost the legumes markets specifically and ultimately improve farmer livelihoods*

**Key Legumes-Specific Barriers**




**Recommended Legumes Initiatives**

1. Policy / Advocacy Support
2. Research and Development
3. Labor-Saving Technologies
4. Pest Control
5. Aflatoxin Testing and Control
6. Legume Markets and Trade

Note:
Source:







RECOMMENDATIONS

## 1 PROVIDE POLICY/ADVOCACY SUPPORT

*Governments need to place more emphasis on legumes and create environments that support legume production and trade, which could in turn provide economic and food security benefits*

**Intervention Summary**

| | | |
|---|---|---|
| Objective | | • **Assist in creating conducive environments for the production and free trade of legume crops** |
| Impact | *Medium* | • Policy is only highly effective if implemented aggressively |
| Feasibility | *Low* | • **Changing government policy can be a long and arduous process without government willingness** |
| Investment Level | *Low* | • Little investment required for advocacy |

**Description of Intervention**

- Advocate to:
  - **Refine existing policies to promote and prioritize legumes** and reduce/remove any inconsistencies and contradictions in policies that impact legumes
  - **Identify opportunities to bridge the gap between the law and reality** on the ground In some cases
  - **Align the policy environment** so that all agricultural agencies work toward the same goals
  - **Relax restrictive policies** which limit the potential of the legume industry

RECOMMENDATIONS

## 2 CROP IMPROVEMENT (1/2)

*Interventions are required to ensure that legume varieties adequately meet the needs of the market on a number of dimensions including consumer preferences, drought, pest and disease-resistance and higher yields*

| Intervention Summary | | |
|---|---|---|
| Objective | | • **To ensure legume varieties adequately meet the needs of the markets both from a production resilience perspective and a consumption and trade perspective** |
| Impact | *High* | • Improved varieties have been shown to significantly increase yields |
| Feasibility | *High* | • Highly feasible with sufficient capital invested |
| Investment Level | *Medium* | • Moderate funding required for new variety breeding |

**Summary Description of Intervention**

- **Capacity-building** to incentivize qualified students to join research institutes and ensure **succession of researchers at research institutions**
- **Provide essential research station machinery** to assist in shortening variety release time
- **Fund improved variety research & development for both** legumes that have traditionally been prioritized (e.g. common bean in East Africa and cowpea in West Africa) as well as those that have traditionally been ignored by researchers/breeders (e.g. cowpea in East Africa)





RECOMMENDATIONS

## 2 CROP IMPROVEMENT (2/2)

*This requires capacity building and succession planning within the research community as well as funding to enable access to modern bio-techniques*

**Capacity-building**

- Work with the government to **plan for the succession of researchers at research institutions**
- Encourage **private sector participants to fund research that is aligned to their objectives**, and thus to market objectives

**Provide essential research station machinery and new technology**

- Assist research institutions in accessing **funding for improved equipment to shorten variety release time**
- Also promote the **combination of traditional research techniques (marker assisted selection (MAS) technology)**

**Fund crop breeding**

- For common beans in Tanzania, fund research on improved varieties in the following areas:
  - Breeding for drought-resistance given the effects of climate change
  - Breeding for pest- and disease-resistance for pests that were previously minor pests but are now major
- For common beans in Ethiopia, fund research on improved varieties in the following areas:
  - Breeding for higher yields
- In Burkina Faso, fund research on improved varieties in the following areas:
  - *Cowpeas:* Breeding for resistance to on-field pests
- Other than the specifics outlined above, broadly speaking, for legumes that have traditionally been prioritized by researchers/breeders, **fund incremental research on improved varieties in the following areas:**
  - Breeding for local **farmer/consumer preferences; suitability to agro-ecology; yield**
  - Breeding for **disease-, drought- and pest-resistance,** where applicable





RECOMMENDATIONS

## 2 SEED PRODUCTION, DISTRIBUTION & ADOPTION (1/3)

*There is a need to increase seed production, distribution and adoption to ensure that adequate volumes of quality seeds reach farmers*

| Intervention Summary | | |
|---|---|---|
| Objective | | • **Ensure adequate volumes of quality seed are produced and distributed to farmers as close to the farm gate as possible** |
| Impact | *High* | • Adoption of improved varieties can significantly increase yields |
| Feasibility | *Low* | • Low economic incentive for multiplication of legume seed |
| Investment Level | *High* | • Dispersed regions leads to high distribution costs |

**Summary Description of Intervention**

- **Expand distribution network of improved seeds** into more agrodealers, private seed suppliers and village-level retail locations
- **Increase multiplication of breeder/foundation/certified seeds**
  - **Enhance the capacity to multiply** breeder/foundation seeds in more research stations and increase the volumes of seed multiplied
  - **Pilot a comprehensive improved seed production system in areas where the bulk of legume production**
  - **Increase marketing of improved seeds** by allowing farmers to test small quantities of improved varieties, priced at-cost, providing extension services and creating demonstration farms





RECOMMENDATIONS

## 2 SEED PRODUCTION, DISTRIBUTION & ADOPTION (2/3)

*In addition to decentralizing and increasing the multiplication of breeder, foundation and certified seed, the distribution system must be expanded and brought right down to the village level*

**Expand distribution network of improved seeds**

- **Facilitate the distribution of improved seeds into more agrodealers, private seed suppliers and village-level retail locations**
- **Build awareness** around the existence of private sector demand

**Increase multiplication of breeder/foundation/certified seeds**

1. **Decentralize and increase multiplication of breeder/foundation seed**: Enhance the capacity to multiply breeder/foundation seeds in more research stations and increase the volumes of seed multiplied
2. **Decentralize and increase multiplication of certified seed – pilot a comprehensive improved seed production system in areas where the bulk of legume production occurs**; remove the barriers related to becoming a seed producer
   - Identify districts with potential for production and organized farmer group structures as pilot districts
   - Supply farmers with improved foundation seed from research institutions on credit
   - Support farmers in obtaining additional inputs (e.g. fertilizer and water/irrigation) to ensure optimal growing conditions by providing a credit guarantee to allow them to access credit form banks
   - Train farmers on seed production and processing
   - Ensure that the certified seed production schemes are embedded in the district in order to ensure that they are sustainable



RECOMMENDATIONS

## 2 SEED PRODUCTION, DISTRIBUTION & ADOPTION (3/3)

*Farmers themselves can play a role in multiplication and distribution of seed, provided they receive the right support in the form of extension services and demonstration farms*

### Increase marketing of improved seeds

- **Establish "variety sample" programs**, which would allow farmers to test small quantities of improved varieties, priced at-cost
  - Include farming manual with sample seed to mitigate concerns around complication of cultivation
- **Provide extension services and create demonstration farms**: Three measures can be taken to encourage farmers to adopt the use of improved seeds:
  - Provide extension services to demonstrate the benefits of improved seed use
  - Create demonstration farms where farmers can physically see the benefits of improved seeds and learn best agronomic practices throughout the season
  - Sensitize farmers to the benefits of improved varieties through farmer education and counseling
- **Distribution/marketing reassignment:** Facilitate the creation of an organization that will be responsible for the marketing/distribution of improved seeds to diversify the distribution and marketing improved seed away from the government
  - For legumes that are intercropped, distribution could be added on to the distribution of main intercrop seeds, such as maize. For legumes that are monocropped, seeds could be distributed via the end-buyer as this would create a guaranteed market for the grain and thus motivate farmers to adopt improved seed





RECOMMENDATIONS

## 3 LABOR-SAVING TECHNOLOGIES

*We recommend the provision of simple, cost effective machinery to decrease labor costs for farmers; if machinery is produced domestically*

### Intervention Summary

| | | |
|---|---|---|
| Objective | | • **Simple cost effective technologies to decrease labor costs which currently account for significant portions of production costs for SHFs** |
| Impact | *High* | • Labor saving technologies could greatly reduce labor costs and improve productivity |
| Feasibility | *Medium* | • Essential for a local industry to be created for the equipment |
| Investment Level | *Medium* | • Machinery is simple and easy to produce economically using local materials |

### Description of Intervention

**Design/provide low-cost machinery/simple technology that can be produced locally and can have a high impact:**

- **Planting and harvesting**
  - Adapt ox-ploughs for planting by adding a small box that drops seeds into the ground as ploughing occurs
  - Potentially combine this with a small box that drops fertilizer concurrently, allowing the germinating seed to have adequate nutrients
- **Post-harvest handling (e.g. small hand-held threshers**)
  - Scale up WFPs current attempts to provide cooperative unions with shellers, cleaners and fumigation sheets, where applicable
  - Encourage local production of these small machines to boost local industry
- **Processing**
  - Provide hand-operated legume processors to women
- **Provide these interventions at the farmer organization or agrodealer level**





RECOMMENDATIONS

## 4 PEST CONTROL

*There is a need to increase the availability of, and access to, varieties that are more resistant to on-field pests; this could increase yields significantly*

### Intervention Summary

| | | |
|---|---|---|
| Objective | | • **Improve yields by limiting field pests** |
| Impact | *High* | • On-field pest losses can have an effect as high as 100% loss in production |
| Feasibility | *Medium* | • Farmer education required, however, there is insufficient extension service |
| Investment Level | *Medium* | • Significant investment lies in capacitating extentionists |

### Description of Intervention

- **Fund breeding for resistance to major on-field pests**: Evaluate options to reduce the time span for the development of these varieties
- **Educate farmers on Integrated Pest Management (IPM). Educate villages on key aspects of IPM**. Core aspects of training would include:
  - *Monitoring and management of pests:* An ability to regularly inspect and identify pests
  - *Control of pests:* Understanding what acceptable levels of pest attack are
- **Promote the production and distribution of insecticides in cases where pest-resistant varieties have not been bred**
  - Resistance to key pests such as flower thrips and pod bugs has not been bred for as of yet and thus in the absence of resistant varieties insecticides are necessary to avoid large reductions in yield due to pest loss



RECOMMENDATIONS

## 6 PRIVATE SECTOR, LEGUME MARKETS & TRADE (1/5)

*Increasing the availability of output markets for legumes is likely to lead increased prices which will incentivize farmers to increase their output*

### Intervention Summary

| | | |
|---|---|---|
| Objective | | • **To increase the availability of output markets for legumes** |
| Impact | *High* | • Market linkages provide better pricing for farmers, thus incentivizing them to increase production |
| Feasibility | *Medium* | • Success is reliant on farmers being able to meet volume and quality requirements of buyers |
| Investment Level | *High* | • High infrastructural investments required |

### Summary Description of Interventions

- **Facilitate the creation of country-level and regional associations of large legume buyers**
  - Primary membership would be processors and private buyers, with representation from across the value chain
- **Establish local processing** of legumes
- **Create marketing intermediaries/aggregators** to ease the process of sourcing large quantities of legumes where demand exists
- **Link farmers to patient buyers and private buyers**
- **For each legume, promote improved production to serve appropriate geographies**



RECOMMENDATIONS

## 6 PRIVATE SECTOR, LEGUME MARKETS & TRADE (2/5)

*A key element of market creation is to build the local processing industry, where necessary, to encompass both processing of the largest staple in a given country for domestic consumption as well as the largest export crops to boost exports further*

### Establish Local Processing of Legumes and Create Marketing Intermediaries

- **Market analysis:** Assist Ministries of Trade, Industry and Marketing to perform a market analysis to identify potential target markets and major sources of demand for processed legumes, both and a local and regional level
- **Government engagement**: Advocate that government promote both local processing enterprises as well as foreign multinationals who wish to process legumes by easing the bureaucratic hurdle associated with establishing a business and testing new products before they are released in the market
- **Provide financial incentives**: Provide financial incentives to processors interested in engaging in the legume value chain to minimize the financial burden faced by such companies and reduce some of the financial risk. Such incentives include, but are not limited to:
- **Technical Assistance:** Provide pool of technical assistants available to processors who are buying to educate farmers on grades, quality, inputs needed, etc.
- **Seed Research & Development:** Support breeding for market preferences
- Processing of the **largest staple must be encouraged for domestic consumption purposes** (e.g. cowpea / groundnut in Ghana and Nigeria) whilst **processing of the largest export crop must be encouraged to boost exports further** (e.g. pigeon pea in Tanzania)





RECOMMENDATIONS

## 6 PRIVATE SECTOR, LEGUME MARKETS & TRADE (3/5)

*Targeting unused processing capacity as well as linking existing processors to farmer groups or intermediaries would also benefit processors by ensuring adequate volumes and quality*

### Expand Local/Regional Processing of Legumes

- **Diversify existing legume processing operations**: Where a strong processing sector already exists for one or more legumes, assess the willingness of processing firms to diversify their operations into (other) legume products, where applicable
- **Target unused capacity**: Engage with those processors locally, and regionally, that currently have excess processing capacity and evaluate ways to substitute imports where they may exist. This is primarily the case in the processing of groundnuts and soybeans
  - Substitute imports through increasing farmer productivity and imports and not through policy interference in soybean and groundnut prices, as this is not sustainable
- **Link processors to marketing intermediaries or farmer groups** and:
  - Obtain a clear understanding of quality requirements
  - Obtain a clear understanding of volume requirements
  - Encourage processors to offer premium/attractive pricing to farmers to avoid lack of adherence to contracts
- For cowpeas specifically, evaluate options to strengthen the small-scale/home processing industry to benefit women
  - For example, cheap and portable hand-processing machinery for women





RECOMMENDATIONS

## 6 PRIVATE SECTOR, LEGUME MARKETS & TRADE (4/5)

*Intermediaries are essential in initially linking farmers to patient and private buyers as they support farmers in meeting quality and quantity requirements*

### Link Farmers to Patient Buyers and Private Buyers

- **Link farmers to patient buyers**
  - **Link legume farmers with patient buyers who place a premium on nutritional value including hospitals, school-feeding programs, food aid NGOs**
- **Link farmers to private buyers**
  - **Engage large buyers to provide an outline of quality and quantity requirements for selected legumes**
    - Target buyers of raw agricultural products as well as processors (animal feed, oil and other derivative products)
    - Expand outwards; target large buyers who can absorb demand locally, within the region (West Africa and East Africa), and globally
  - **Engage an intermediary to assist farmers to meet buyers' sourcing requirements** by assisting them to access credit and provide training on good agronomic practices
  - **Introduce buyers to modern best practices with respect to keeping in-line with contracts**





RECOMMENDATIONS

## FARMER SEGMENTATION

*Because legumes are primarily grown for subsistence purposes with surpluses being marketed, or alternatively for soil health benefits, this creates some unique dynamics specific to legumes*

*Increasing likelihood of responding to economic incentives*

| Farmer Segment | Farmer Characteristics |
|---|---|
| Subsistence Only | • Farmers produce legumes (among other crops) purely for subsistence<br>• Legumes grown on minor or garden plots, Likely to be intercropped<br>• Crop primarily managed by women<br>• Farmers least likely to react to economic incentives |
| Subsistence and Market | • Farmers producing for subsistence with some marketable surplus<br>• Excess volumes produced will likely be low<br>• More likely to grow cowpeas, chickpeas, common beans<br>• Farmers moderately likely to react to economic incentives |
| Market Mainly | • Farmers producing for sale, minimal volumes consumed for subsistence<br>• Legumes are the principal crop , with large areas under cultivation<br>• Likely to be monocropped, Male-dominated<br>• Farmers most likely to be responsive to economic incentives |
| Mainly for Soil Health Benefits | • Farms legumes to maximize principal crop – lower incentive to maximize legume yields<br>• High potential to switch to legume crops if incentive is aligned |



RECOMMENDATIONS

## FEASIBILITY & IMPACT OF INTERVENTIONS

| | | Subsistence Only | Subsistence/ Market | Market Mainly | Soil Health |
|---|---|---|---|---|---|
| Feasibility | Government policy | ○ | ○ | ○ | ○ |
| | Seed research & development | ◑ | ◑ | ◑ | ◑ |
| | Seed production, distribution & adoption | ○ | ◑ | ● | ◑ |
| | Labor-saving technologies | ○ | ◑ | ◑ | ○ |
| | On-field pests | ◑ | ● | ● | ● |
| | Aflatoxin | ○ | ◑ | ● | ◑ |
| | Private sector, legume markets & trade | ○ | ◑ | ● | ○ |
| Impact | Government policy | ○ | ● | ● | ○ |
| | Seed research & development | ● | ● | ● | ● |
| | Seed production, distribution & adoption | ● | ● | ◑ | ● |
| | Labor-saving technologies | ○ | ● | ● | ○ |
| | field pests | ● | ◑ | ◑ | ● |
| | Aflatoxin | ○ | ◑ | ● | ◑ |
| | Private sector, legume markets & trade | ○ | ● | ◑ | ○ |

Applicable to farmer segment

Not applicable to farmer segment

**Impact/ Feasibility Legend:** ○ None ◑ Moderate ● Major








## Preliminary perspective on emerging BMGF Legume Strategy

**Areas for intervention to drive productivity:**

| | | |
|---|---|---|
| R&D | Discovery | Critical constraint with potential for direct BMGF intervention |
| | Crop improvement | Critical constraint with potential for direct BMGF intervention |
| | Agronomic research | Critical constraint with potential for direct BMGF intervention |
| Inputs and farmer services | Seed systems | Critical constraint with potential for direct BMGF intervention |
| | Other input systems | Critical constraint with potential for direct BMGF intervention |
| | Farm management | Area we need to understand further |
| | Knowledge exchange | Critical constraint with potential for direct BMGF intervention |
| Post-harvest handling and access to markets | Aggregation, quality and storage | Critical constraint with potential for direct BMGF intervention |
| | Processing | Area we need to understand further |
| | End-user demand | Critical constraint with potential for direct BMGF intervention |
| Enabling environment | Finance and insurance | Area we need to understand further |
| | Infrastructure, transportation/ logistics | Critical constraint that other actors must address (BMGF to use voice to influence where possible) |
| Policies and data | Value-chain specific regulations | Critical constraint that other actors must address (BMGF to use voice to influence where possible) |
| | Multi-value chain national policies | Critical constraint that other actors must address (BMGF to use voice to influence where possible) |
| | Data and data systems | Area we need to understand further |
| Foundations of sustainable productivity | Gender | Critical constraint with potential for direct BMGF intervention |
| | Environment | Area we need to understand further |
| | Nutrition | Not a critical constraint for the value chain to develop |

Maintain current investments in breeding and agronomy to CG centers, ARIs, in collaboration with NARS, but more aligned to focus crops, geographies

**Invest in:**

**Increasing the effectiveness** of CG and ***especially NARS* legume breeding programs** to speed delivery of improved varieties;

**Integrated Pest Management packages** for safely reducing the huge losses legumes suffer from insect predation

**Align with new country level investments that support demand creation and improved delivery outcomes by:**

Piloting sustainable **integrated value chain models** that are informed by a comprehensive market analysis and include mitigation of post-harvest losses

Developing **innovative** approaches to improve the performance of legume **seed value chains**

**Training and outreach pilots** to improving the lives of **women** SFH, and general **nutritional outcomes**



## Our strategy relies on successful partnerships

**We won't succeed on our own.**
**We rely on partners to carry out and leverage the work.**

- From developed and non-developed,public, private and nonprofits
- Strengthen working partnerships with complementary programs (e.g. USAID *Feed-the-Future,* AGRA, Government initiatives such as Ethiopia ATA) are considered essential for leveraging our work







## We can not do it alone

I LOOK FORWARD TO PARTNERING WITH YOU OVER THE COMING YEARS

THANK YOU

## Current and Future Legume Investments

| Grants made or to be made | Summary | Grantee | # yrs to date all phases | Start current phase | Total Budget Grant ($) |
|---|---|---|---|---|---|
| Tropical Legumes I | Development of molecular marker platforms and molecular breeding approaches in support of legume breeding activities of TLII and NARS. | CIMMYT/GCP | 7 | 2011 Q2 | $18M ends June 2014 |
| Tropical Legumes II | Breeding improved varieties of all 4 target legumes plus soybean and pigeonpea. | ICRISAT | 7 | 2011 Q3 | $43M, ends Dec. 2014 |
| Tropical Legumes III | Breeding for tropical legumes, basic crop improvement to create improved varieties that meet smallholder farmers' needs. | ICRISAT | 4 | 2015 Q1 | TBD |
| N2Africa | Research on how to enhance the productivity of legumes. | Wageningen | 8 | 2014 Q1 | $45 M, renewed end of 2013 |
| Cowpea IPM | Complete development and pilot deploy cowpea IPM model; | Mich.State U | 3 | 2014 Q1 | 1,500,000 |
| PICS III | Scaling-up and out of effective interventions in the PICS project | Purdue | 1 | | |
| Integrated Seed Sector Development | Strengthening the development of seed sector, with strong focus on legumes, sorghum and millets | Wageningen UR | 4 | 2014 Q4 | |
| Integrated Seed Sector Development | Strengthening legume value chains in focus countries | Wageningen UR | 4 | 2014 Q4 | |



## Tropical Legume I:

*Improving Tropical Legume Productivity for Marginal Environments in Sub-Saharan Africa and South Asia*

Confidential

## TLI Phase I Objectives and Activities

- Characterize diversity and develop germplasm for genetic studies
- Generate genomic resources for genetic studies and breeding
- Identify molecular markers and genes for biotic stress resistance
- Identify molecular markers and genes for drought tolerance
- Enhance locally adapted germplasm with target traits
- Orthologous genetic markers for cross genome analysis
- Comparative analysis of the arachis-species complex.

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## Objectives of TLI phase II

- Validation of molecular markers and testing of molecular breeding approaches in drought-prone environments for traits important to sub-Saharan African farmers
- Precision phenotyping to guarantee accurate marker-trait associations and to refine selection indices used by breeders
- Data integration of all data-producing research activities in TLI, phase I and II, to ensure availability of high-quality, curated and publicly available data
- Building capacity of African breeding programme partners
- Combined endeavor with building capacity for drought tolerance breeding through the detailed study of **cross-legume phenotyping** and on **data management** by cataloguing all data generated in the project

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# TL-II Project :

Enhance productivity by at least 20% the six legume crops in drought-prone areas of SSA and SA, through the availability and adoption of improved crop varieties and associated crop management practices

- A partnership involving three CGIAR centres, 15 national programs, the private sector and other R&D organizations.
- Organized into 9 objectives; 6 crop-specific (Obj 2-7), 2 (Obj 1 & 8) common across the crops, and one (Obj 9) on management.

**10 Years in Three Phases**

- **Phase I: Sept 2007 – Aug 2011**
- **Phase II: Sept 2011 – Aug 2014**
- **Phase III: Sep 2014 – Aug 2017**





## TL-II Project Objectives

Objective 1: Targeting crop breeding and seed delivery efforts to enhance the impact on the livelihoods of the poor PI: Cynthia Bantilan, ICRISAT, Hyderabad.

- Objective 2: Groundnuts for SSA and SA. PI: P. Janila, ICRISAT
- Objective 3: Cowpea for SSA. PI: O. Boukar, IITA, Ibadan, Nigeria
- Objective 4: Bean for ESA. PI: S. Beebe, CIAT, Cali, Colombia
- Objective 5: Chickpea for ESA and SA. PI: Pouran Guar, ICRISAT
- Objective 6: Pigeonpea for ESA and SA. PI: K.B. Saxena, ICRISAT
- Objective 7: Soybean for SSA. PI: Hesham Agrama, IITA, Malawi

Objective 8: Developing sustainable seed production and delivery systems for reaching the poor in drought prone areas of SSA and SA. PI: Jean-Claude Rubyogo, CIAT (Arusha).



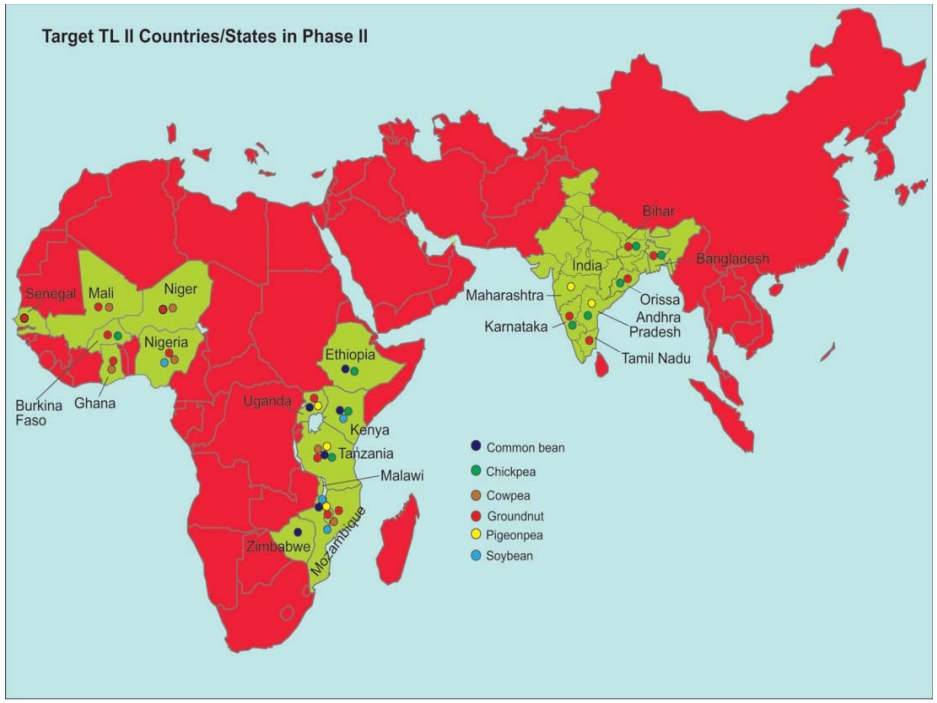


## TL-II project overview

- **Central tenants:**
  - **Initially, foster rapid release of 'on-the-shelf' varieties**
  - **Participatory Variety Selection**
  - **Broad partnerships (185 in SSA), Country strategies for phase 2**
  - **High quality phenotyping and increasing capacity of NARS to screen for constraints**
  - **Large emphasis (30%) on seed systems, pioneered small packs (now used by AGRA grantees)**
  - **Pioneering seed roadmaps and country plans**
    - **Developing a digital version**





**TL-II seed production -tons of assorted seed grade produced by crop and per country, May 1st, 2012-Aprli 1st, 2013.** NA= Not Applicable (crops are not targeted in the country)

| Country | Crops | | | | | | Total |
|---|---|---|---|---|---|---|---|
| | Chickpea | Groundnut | Common bean | Soybean | Pigeon pea | Cowpea | |
| India | 62,878.2 | 5,400.8 | NA | NA | 1,201.1 | NA | **69,480.1** |
| Bangladesh | 101.5 | 236.2 | NA | NA | NA | NA | **337.7** |
| Burkina | NA | 0.3 | NA | NA | NA | NA | **0.3** |
| Ethiopia | 3,129.5 | NA | 1,492.5 | NA | NA | NA | **4,622** |
| Ghana | NA | 0.5 | NA | NA | NA | NA | **0.5** |
| Uganda | NA | 7,661 | 1,609.89 | NA | 13.21 | NA | **9,284.1** |
| Tanzania | 54.2 | 117.49 | 372.28 | NA | 32.83 | NA | **576.8** |
| Kenya | 60.11 | NA | 454 | 211.09 | NA | NA | **725.2** |
| Mozambique | NA | NA | NA | 516.5 | NA | 140.3 | **656.8** |
| Nigeria | NA | 108.7 | NA | 371.4 | NA | 236.4 | **716.5** |
| Niger | NA | 94.55 | NA | NA | NA | 81.5 | **176.05** |
| Malawi | NA | 602.5 | NA | NA | 803.9 | NA | **1,406.4** |
| Mali | NA | 80.8 | NA | NA | NA | 21.72 | **102.52** |
| Senegal | NA | 14.3 | NA | NA | NA | NA | **14.3** |
| **Totals** | **66,223.51** | **14,317.14** | **3,928.67** | **1,098.99** | **2,051.04** | **479.92** | **88,099.27** |

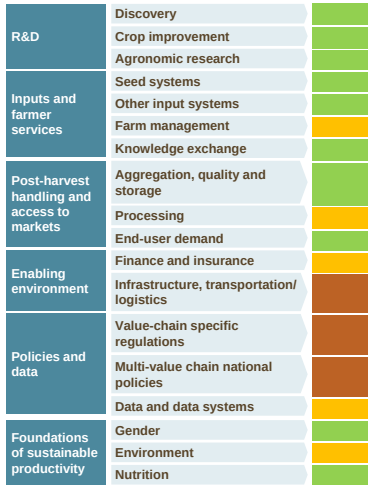






## Where do you invest to strengthen legume value chains?

### Potential areas for intervention




### Legume Value Chains have many constraints and thus potential intervention areas -

*What gap filling along the value chain gives the highest ROI?*

*How does the intervention scale?*

*Internal consensus on the best sets of interventions a challenge*

*Consider what others are doing, BMGF comparative advantage*

*What are the partnership opportunities?*

*What interventions would most benefit women farmers and VC actors?*

- Critical constraint with potential for direct BMGF intervention
- Critical constraint that other actors must address (BMGF to use voice to influence where possible)
- Area we need to understand further
- Not a critical constraint for the value chain to develop