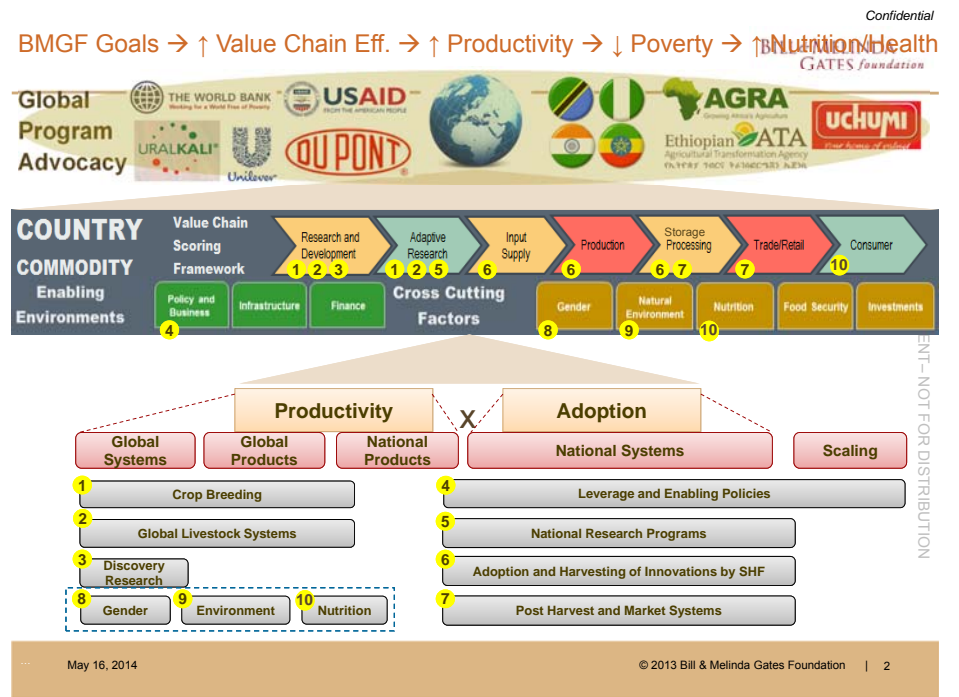


“Challenges to strengthening of grain legume value chains and Vision for Research on Grain Legumes by the Bill and Melinda Gates Foundation”

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

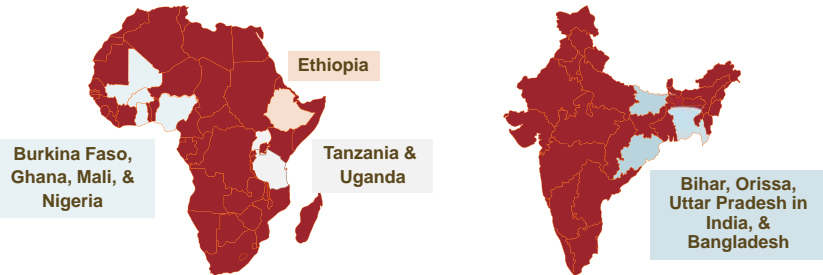


2011 Strategy Re-fresh

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

May 16, 2014

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

Species x Geography	Population (millions)	**Area ('000 Ha)	Consumption x1000MT ('000s tons/year)	Production x1000MT ('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 in 2012 of Monitor & Nigeria report the consumption gap 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 hectareage

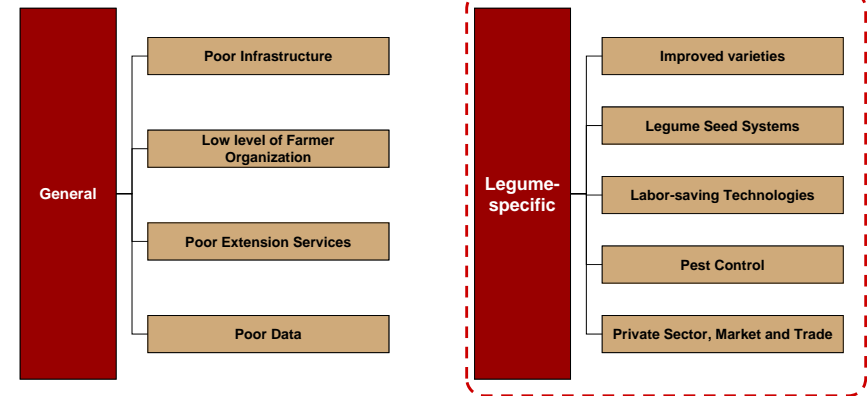
Chickpea-Ethiopia: Largest producer in Africa, growing # of SHFs, good local export markets, government priority

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

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VALUE CHAIN CONSTRAINTS



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

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VALUE CHAIN CONSTRAINTS



LEGUMES-SPECIFIC CONSTRAINTS (1/2)

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

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

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Source: Monitor Analysis; Field Interviews

LEGUMES-SPECIFIC CONSTRAINTS (2/2)

Constraint	Description	Degree of Constraint
4a Inadequate Aflatoxin Testing and Control	<ul style="list-style-type: none"> Aflatoxin contamination is the largest constraint to groundnut trade from Africa to Europe and North America, and poses a risk to local food safety Farmers are not adequately equipped to manage aflatoxin 	High
4b Ineffective Pest Control	<ul style="list-style-type: none"> Cowpea production is highly affected by pest-resulting in as much as 100% losses 	Medium
5 Lack of Private Sector, Market and Trade Linkages	<ul style="list-style-type: none"> Limited knowledge about market opportunities and few large buyers exist 	High

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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	✗	✓	✓	✗	✓	✓	✓
Seed	●	●	✓	✗	●	●	●
Exports	✗	✓	✗	✗	✗	✗	✗
Private Sector	✗	●	●	✗	✗	✗	✗
Priority	●	●	●	●	●	✗	●

✓ High government promotion of this policy dimension
 ● Medium government promotion of this policy dimension
 ✗ Low government promotion of this policy dimension

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

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

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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	Poor Agronomic Practices	Effects of Practices
<ul style="list-style-type: none"> 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 	1 Planting Farmers use low seeding rates or broadcast	Lost yield potential weeding and harvesting problems
	2 Harvest Practices Farmers use animals or tractors to trample their harvest for threshing	
	3 Cleaning, grading Farmers use slow winnowing practices, can't sort or grade efficiently	High labor /opportunity cost, low throughput

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Source: Monitor Analysis; Field Interviews

4 PEST CONTROL

Pests can cause up to 100% losses in cowpea

Field Pest Control	
<p>Cowpea Pest Susceptibility</p> <ul style="list-style-type: none"> 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 	
<p>Limited Availability of Pest-Resistant Varieties</p> <ul style="list-style-type: none"> Despite the development of pest-resistant cowpea varieties, there is low adoption of these varieties due to limited seed production and distribution 	

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

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

<p>Constraints to Legume Processing</p>	<ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> Processor are unable to source the required volumes
<p>Constraints to Market Linkages</p>	<ul style="list-style-type: none"> Limited direct purchasing from smallholder farmers Private companies cite erratic supply and weak contract enforcement <ul style="list-style-type: none"> 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

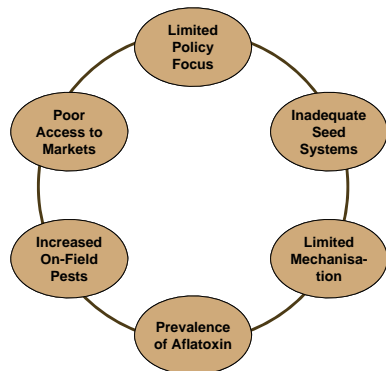
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Source: Monitor Analysis; Field Interviews

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

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Note:
Source:

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		Description of Intervention
Objective	<ul style="list-style-type: none"> Assist in creating conducive environments for the production and free trade of legume crops 	<ul style="list-style-type: none"> Advocate to: <ul style="list-style-type: none"> 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
Impact	<p>Medium</p> <ul style="list-style-type: none"> Policy is only highly effective if implemented aggressively 	
Feasibility	<p>Low</p> <ul style="list-style-type: none"> Changing government policy can be a long and arduous process without government willingness 	
Investment Level	<p>Low</p> <ul style="list-style-type: none"> Little investment required for advocacy 	

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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	<ul style="list-style-type: none"> To ensure legume varieties adequately meet the needs of the markets both from a production resilience perspective and a consumption and trade perspective
Impact	<p>High</p> <ul style="list-style-type: none"> Improved varieties have been shown to significantly increase yields
Feasibility	<p>High</p> <ul style="list-style-type: none"> Highly feasible with sufficient capital invested
Investment Level	<p>Medium</p> <ul style="list-style-type: none"> Moderate funding required for new variety breeding

Summary Description of Intervention
<ul style="list-style-type: none"> 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)

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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
<ul style="list-style-type: none"> 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
<ul style="list-style-type: none"> 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
<ul style="list-style-type: none"> For common beans in Tanzania, fund research on improved varieties in the following areas: <ul style="list-style-type: none"> –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: <ul style="list-style-type: none"> –Breeding for higher yields In Burkina Faso, fund research on improved varieties in the following areas: <ul style="list-style-type: none"> –<i>Cowpeas</i>: 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: <ul style="list-style-type: none"> –Breeding for local farmer/consumer preferences; suitability to agro-ecology; yield –Breeding for disease-, drought- and pest-resistance, where applicable

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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	<ul style="list-style-type: none"> Ensure adequate volumes of quality seed are produced and distributed to farmers as close to the farm gate as possible
Impact	<p>High</p> <ul style="list-style-type: none"> Adoption of improved varieties can significantly increase yields
Feasibility	<p>Low</p> <ul style="list-style-type: none"> Low economic incentive for multiplication of legume seed
Investment Level	<p>High</p> <ul style="list-style-type: none"> Dispersed regions leads to high distribution costs

Summary Description of Intervention
<ul style="list-style-type: none"> Expand distribution network of improved seeds into more agrodealers, private seed suppliers and village-level retail locations Increase multiplication of breeder/foundation/certified seeds <ul style="list-style-type: none"> – 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

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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
<ul style="list-style-type: none"> 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
<ol style="list-style-type: none"> 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 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 <ul style="list-style-type: none"> – 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

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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	
<ul style="list-style-type: none"> Establish "variety sample" programs, which would allow farmers to test small quantities of improved varieties, priced at-cost <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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 	DRAFT DOCUMENT - NOT FOR DISTRIBUTION

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		Description of Intervention
Objective <ul style="list-style-type: none"> Simple cost effective technologies to decrease labor costs which currently account for significant portions of production costs for SHFs 	Impact <i>High</i> <ul style="list-style-type: none"> Labor saving technologies could greatly reduce labor costs and improve productivity 	Design/provide low-cost machinery/simple technology that can be produced locally and can have a high impact: <ul style="list-style-type: none"> Planting and harvesting <ul style="list-style-type: none"> 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) <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> Provide hand-operated legume processors to women Provide these interventions at the farmer organization or agrodealer level
Feasibility <i>Medium</i> <ul style="list-style-type: none"> Essential for a local industry to be created for the equipment 	Investment Level <i>Medium</i> <ul style="list-style-type: none"> Machinery is simple and easy to produce economically using local materials 	

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		Description of Intervention
Objective <ul style="list-style-type: none"> Improve yields by limiting field pests 	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: <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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 	
Impact <i>High</i> <ul style="list-style-type: none"> On-field pest losses can have an effect as high as 100% loss in production 		
Feasibility <i>Medium</i> <ul style="list-style-type: none"> Farmer education required, however, there is insufficient extension service 		
Investment Level <i>Medium</i> <ul style="list-style-type: none"> Significant investment lies in capacitating extensionists 		

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		Summary Description of Interventions
Objective <ul style="list-style-type: none"> To increase the availability of output markets for legumes 	<ul style="list-style-type: none"> Facilitate the creation of country-level and regional associations of large legume buyers <ul style="list-style-type: none"> 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 	
Impact <i>High</i> <ul style="list-style-type: none"> Market linkages provide better pricing for farmers, thus incentivizing them to increase production 		
Feasibility <i>Medium</i> <ul style="list-style-type: none"> Success is reliant on farmers being able to meet volume and quality requirements of buyers 		
Investment Level <i>High</i> <ul style="list-style-type: none"> High infrastructural investments required 		

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 at 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)

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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

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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

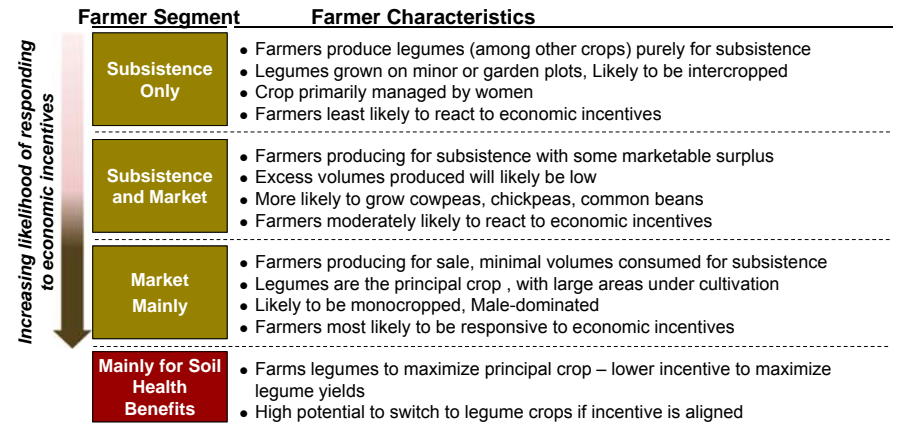
- **Link farmers to patient buyers**
 - Link legume farmers with patient buyers who place a premium on nutritional value including hospitals, school-feeding programs, food aid NGOs
- **Link farmers to private buyers**
 - Engage large buyers to provide an outline of quality and quantity requirements for selected legumes
 - o Target buyers of raw agricultural products as well as processors (animal feed, oil and other derivative products)
 - o 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

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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



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RECOMMENDATIONS

FEASIBILITY & IMPACT OF INTERVENTIONS



	Subsistence Only	Subsistence/Market	Market Mainly	Soil Health			
Feasibility	Government policy	○	○	○	○	Applicable to farmer segment	
	Seed research & development	◐	◐	◐	◐		
	Seed production, distribution & adoption	◑	◑	◑	◑		
	Labor-saving technologies	○	◐	◐	○		
	On-field pests	◐	●	●	●		Not applicable to farmer segment
	Aflatoxin	○	◐	●	◐		
	Private sector, legume markets & trade	○	◐	●	○		
Impact	Government policy	○	●	●	○	DRAFT DOCUMENT – NOT FOR DISTRIBUTION	
	Seed research & development	●	●	●	●		
	Seed production, distribution & adoption	●	●	◐	●		
	Labor-saving technologies	○	●	●	○		
	field pests	●	◐	◐	●		
	Aflatoxin	○	◐	●	◐		
	Private sector, legume markets & trade	○	●	◐	○		

Impact/ Feasibility Legend: ○ None ◐ Moderate ● Major

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Preliminary perspective on emerging BMGF Legume Strategy

Areas for intervention to drive productivity:

R&D	Discovery	■
	Crop improvement	■
	Agronomic research	■
Inputs and farmer services	Seed systems	■
	Other input systems	■
	Farm management	■
Post-harvest handling and access to markets	Knowledge exchange	■
	Aggregation, quality and storage	■
	Processing	■
Enabling environment	End-user demand	■
	Finance and insurance	■
	Infrastructure, transportation/ logistics	■
Policies and data	Value-chain specific regulations	■
	Multi-value chain national policies	■
	Data and data systems	■
Foundations of sustainable productivity	Gender	■
	Environment	■
	Nutrition	■

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**

■ 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

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 TLI 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	

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Tropical Legume I:

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



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**

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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

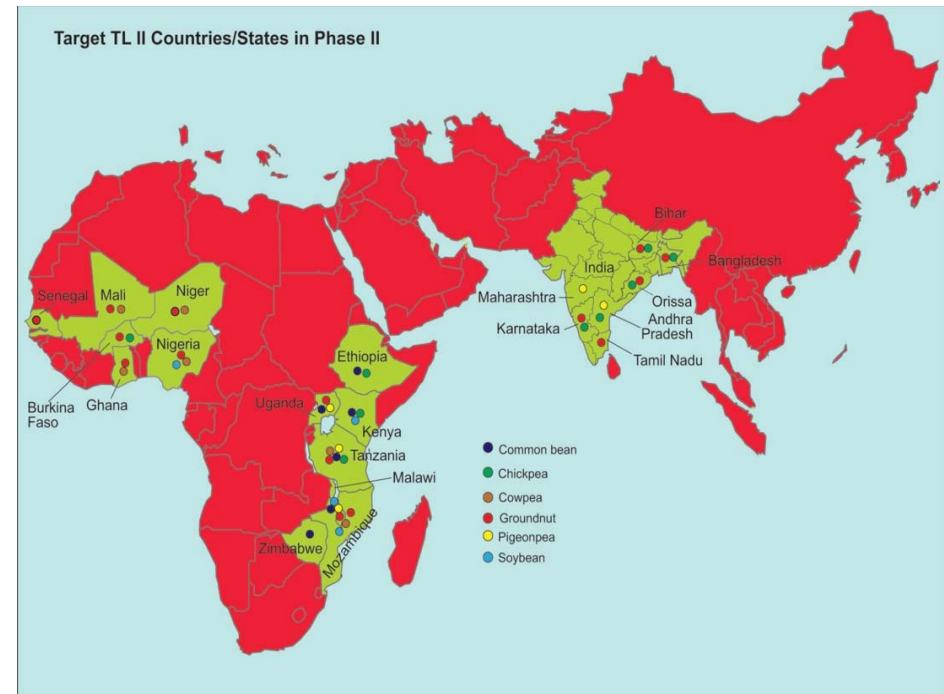
Objective 8: Developing sustainable seed production and delivery systems for reaching the poor in drought prone areas of SSA and SA. PI: Jean-Claude Rubyogo, CIAT (Arusha).

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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

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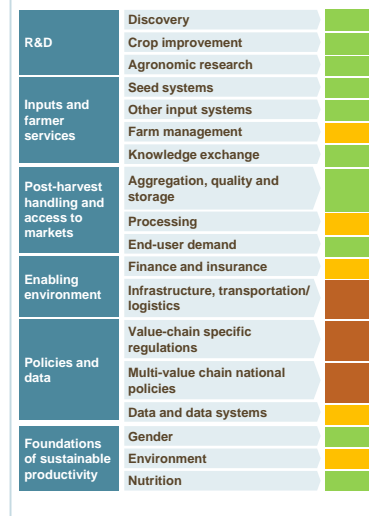
TL-II seed production -tons of assorted seed grade produced by crop and per country, May 1st, 2012-April 1st, 2013. NA= Not Applicable (crops are not targeted in the country)

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

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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