



BILL & MELINDA
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MULTI CROP VALUE CHAIN PHASE II **BURKINA FASO/MALI COWPEA**

September, 2014

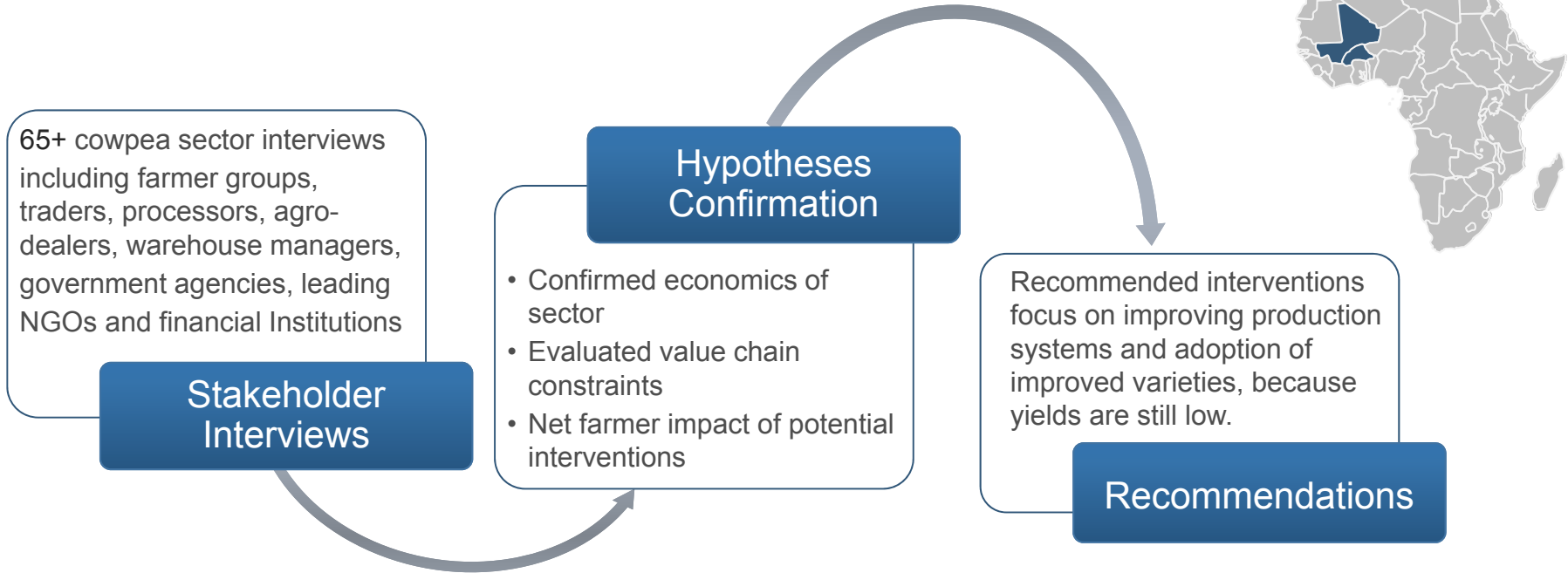


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SCOPE OF THIS STUDY

Study Methodology



PHASE 2 COWPEA BURKINA FASO/MALI EXECUTIVE SUMMARY

1 SECTOR FUNDAMENTALS

- Cowpea in Burkina has transitioned recently from food security to cash crop status, providing income for many of the 2.6M SHFs who grow cowpea
- 65% of the Burkina crop is marketed, and ~1/2 of that is exported, mainly to Nigeria
- Mali cowpea production is barely sufficient for domestic consumption
- Post-harvest losses from weevils now reduced by use of air-tight containers, inc. PICS

2 VALUE CHAIN OPPORTUNITIES

- Mono-crop cultivation systems are now common in market-focused areas of NE Burkina – so that the crop is now poised for yield improvement techniques
- Major insecticide cost saving is possible when Bt cowpea lines are introduced
- Current post-harvest value chain is relatively efficient, but large traders reap most profits from crop accumulation and storage – scope for improved SHF value capture

3 INTERVENTIONS & IMPACT

Most promising intervention cluster focuses on improving production systems and adoption of improved varieties, because yields are still low

- Int.#1 Cowpea Productivity Package – 50% yield gain potential
- Int. #2 Reduction of Post-harvest/Storage Losses
- Int. #3 Improved Cowpea Product Preparation
- \$97 per annum average benefit projected for 700,000 SHFs (20% of total) at Yr.10

4 STAKEHOLDER PROFILES

- NAFASO, seed co. leader in Burkina, produces basic seed; Faso Kaba in Mali
- Govt. plant research agencies INERA and IER
- Farmers organizations: Ops Namentenga, Boucle de Mouhoun, Sahel, CAP- Yako, Diemas (East) Burkina; OPs Bouroueli, Koulikoro and Mopti, Mali
- Processor capacity-building – GRET, Afrique Vert, ATCB, RTCF

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COWPEA IS A NATIVE AFRICAN SPECIES THAT RIVALS GROUNDNUT AS THE LEADING GRAIN LEGUME CROP IN WEST AFRICA

Cowpea in Burkina Faso & Mali

- Predominantly a woman's crop from production to processing
- Major protein source and is consumed in various forms:
 - Grain, leaves, green pea, pods
 - Boiled as whole beans and eaten with rice
 - Laboriously processed into flour for local pancakes, fried snacks, cakes
- Leaves are an important source of fodder for small and large ruminants
- Drought resistance makes it important for food security
- Also plays a major role in soil conservation and fertility management, and is part of multiple cropping systems



Typical cowpea bean appearance

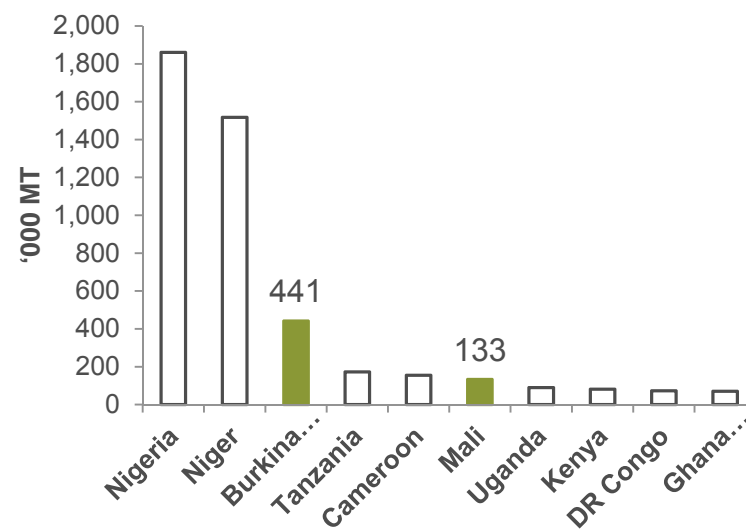


Mature cowpea pods

Cowpea (*Vigna unguiculata*) is native to Africa and is widely adapted to cultivation in the savannah zones

It is the leading food grain legume for most populations in West Africa and is also significant elsewhere

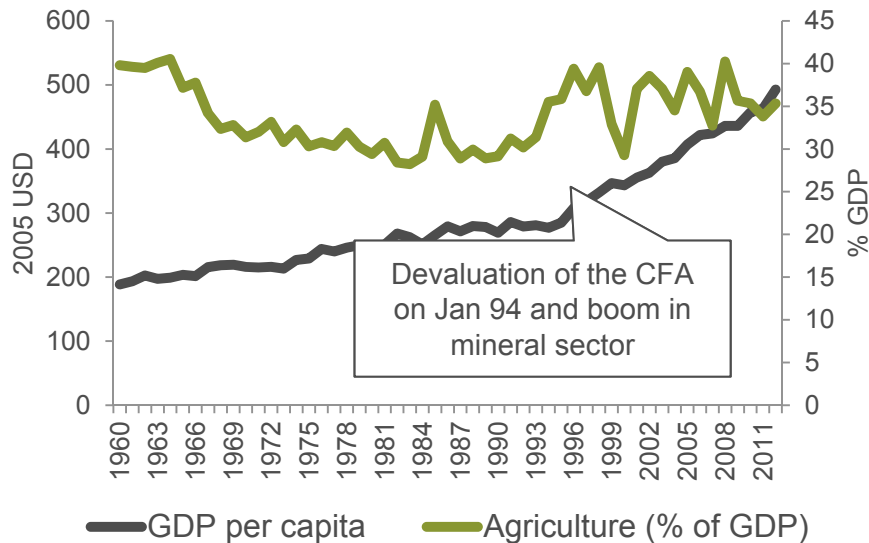
Cowpea Production, 2011²



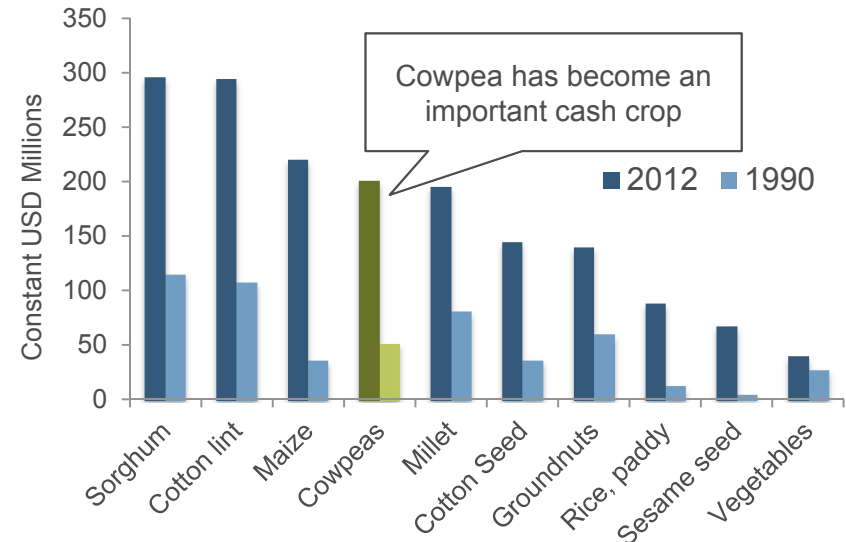
IN BURKINA FASO THE ECONOMY IS GROWING FAST WITH COWPEA NOW PLAYING A LARGE ROLE AS THE 4TH RANKING CROP BY VALUE



BF GDP/Capita & Agriculture Contribution¹
1960-2012



BF Gross Production Value of Top 10 Agriculture Products²



Economy

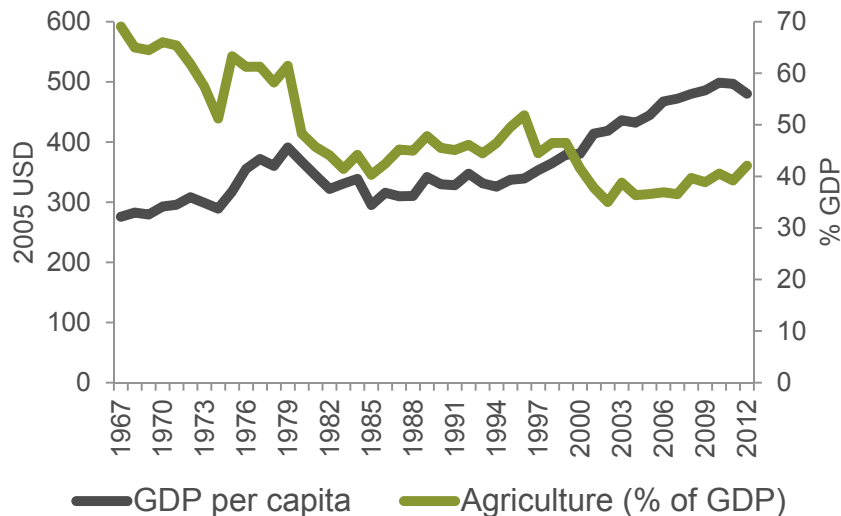
- 2012 GDP = \$8.1B
- Agriculture plays an important role in the economy of Burkina Faso with a relatively constant share of GDP of ~35%
- Arable land comprised 20.8% (5.7MM hectares) of total land in 2011

Agriculture & Cowpea

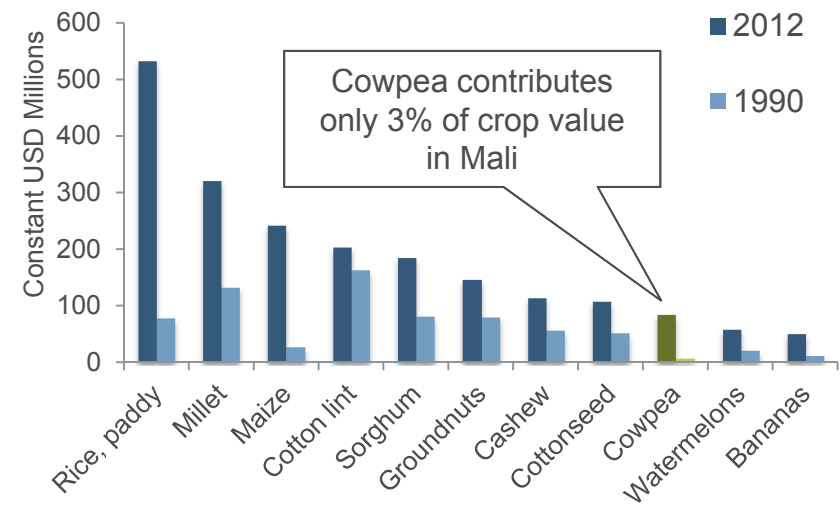
- Total 2012 crop production value = \$2.6B
- Cowpea \$201M value made up 8% of total
- The rate of value gain over the 1990-2012 period for cowpea (x4) was exceeded only by maize, rice and sesame

WHILE THE MALI ECONOMY WAS ALSO EXPANDING BEFORE 2012-13 CRISIS, COWPEA REMAINS A MINOR CROP THERE

Mali GDP/capita & Agriculture Contribution¹
1967-2012



Mali Gross Production Value of Top 10
Agriculture Products²



Economy

- 2012 GDP = \$10.3B, agriculture is ~40%
- Gold and phosphate fertilizer production account for a further 17% of the economy
- <6% of Mali is classified as arable land
- Niger river's irrigation resource is largely underdeveloped

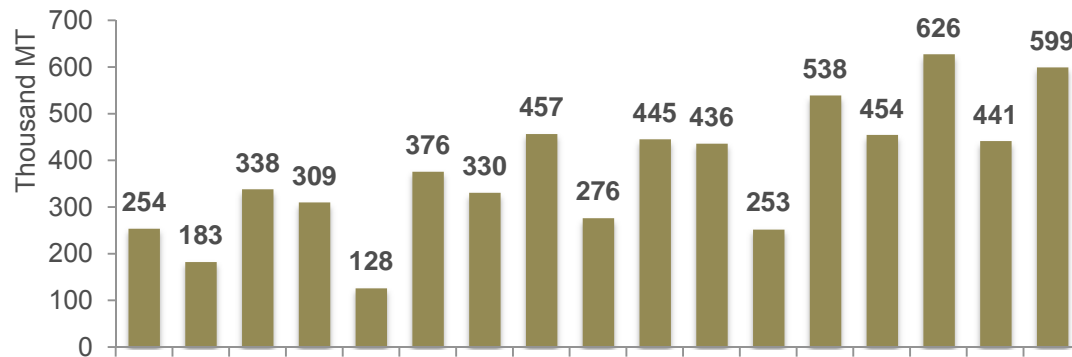
Agriculture & Cowpea

- FAOSTAT does not list cowpea in its *producer value* database for Mali. Estimating a farm-gate price of \$650/MT and 132,000MT production (2011) gives an \$86M value
- Production was only 13,600MT in 1990, and we have assumed the same constant price for that year in estimating a \$9M value in that year

IN BURKINA FASO, COWPEA PRODUCTION HAS BEEN GROWING AT ~6% SINCE 2002, MAINLY DUE TO AN INCREASE IN HECTARES PLANTED

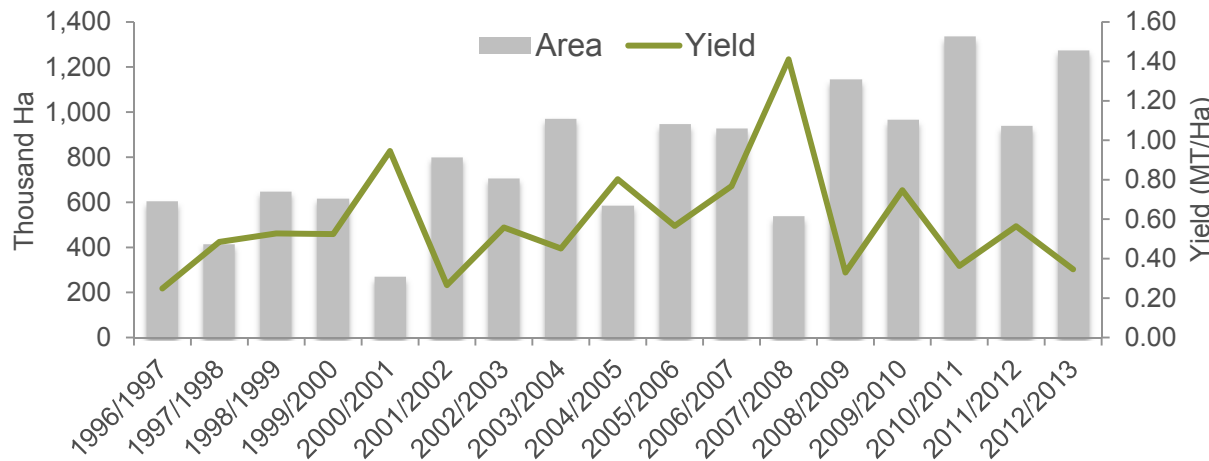


Cowpea Production Burkina Faso
1996-2013

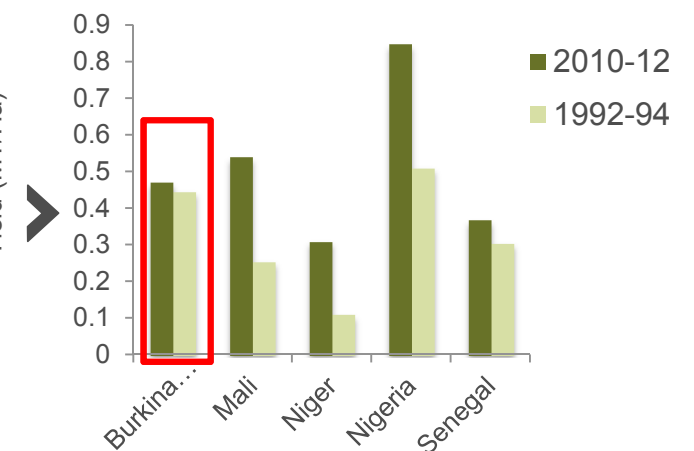


- Cowpea production has been growing at a CAGR of 6.1% since 2002 (10 years)
- The fluctuation in hectares planted is associated with low yields that same year, and is also correlated with late arrival of the rains

Cowpea Yield and Area Harvested Burkina Faso
1996-2013



Global Yield Comparisons

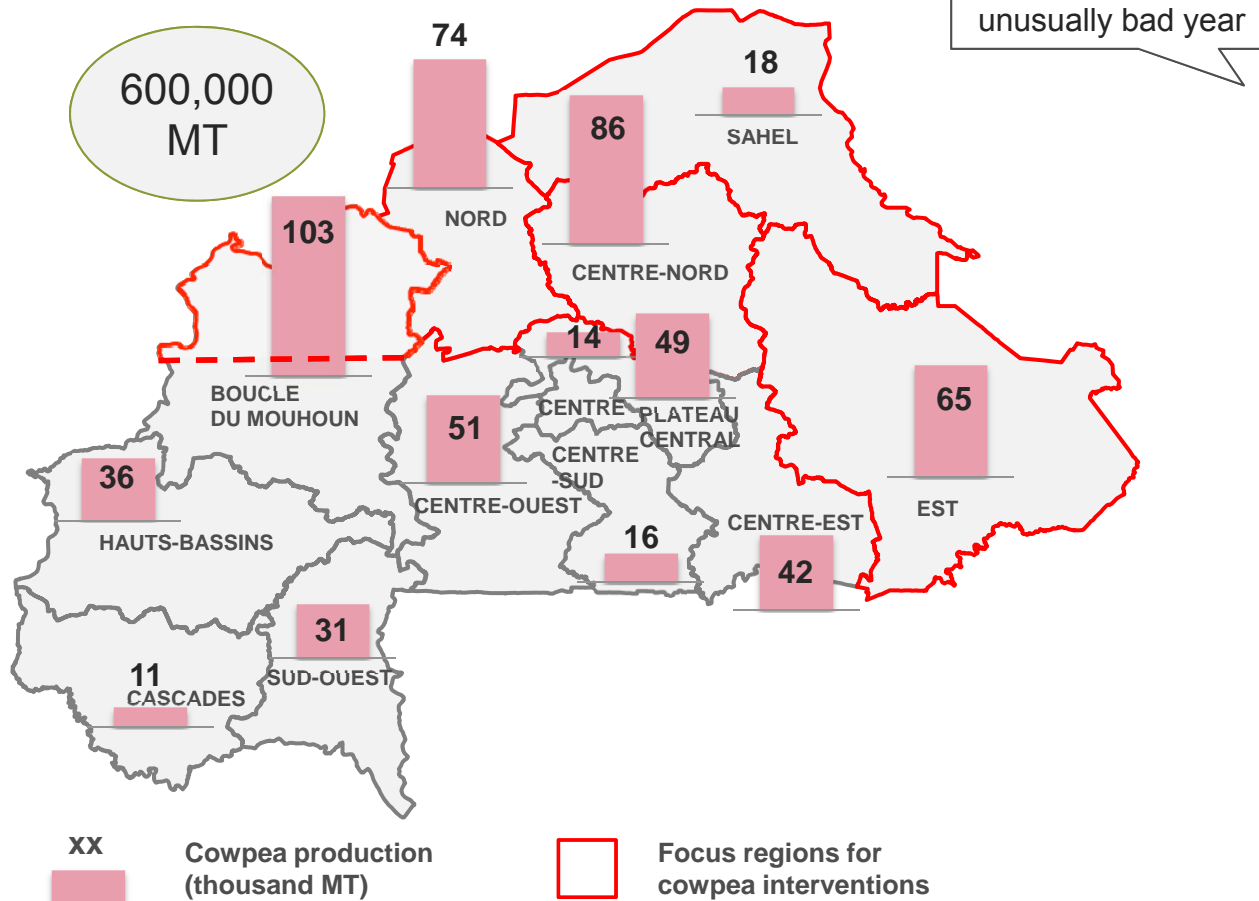


Source: Ministry of Agriculture, FAO STAT 2013

THIS PRODUCTION IS SPREAD ACROSS THE COUNTRY, BUT EXPANSION IS CONCENTRATED IN THE NORTH WHERE INTERVENTIONS WILL FOCUS



Burkina Faso Cowpea Production by Region
2012/13 season, '000 tons



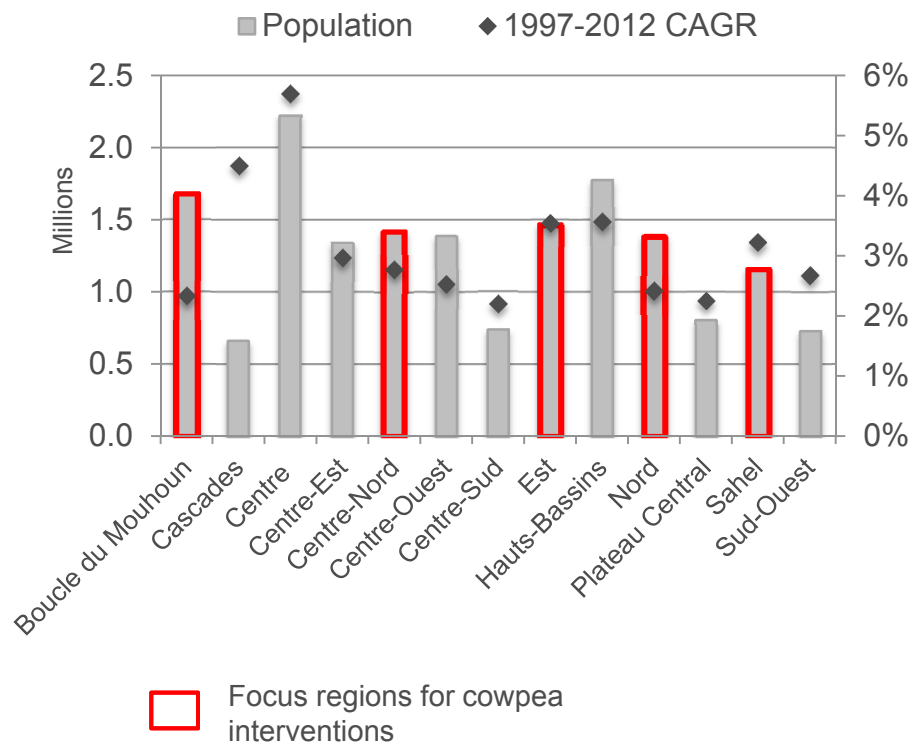
	4-year CAGR*
Boucle du Mouhoun	16%
Cascades	4%
Centre	-5%
Centre-Est	-9%
Centre-Nord	5%
Centre-Ouest	0%
Centre-Sud	-11%
Est	7%
Hauts-Bassins	3%
Nord	1%
Plateau Central	1%
Sahel	12%
Sud-Ouest	-2%
Burkina Faso	3%

*Including 2007/8 would increase CAGR to 19%

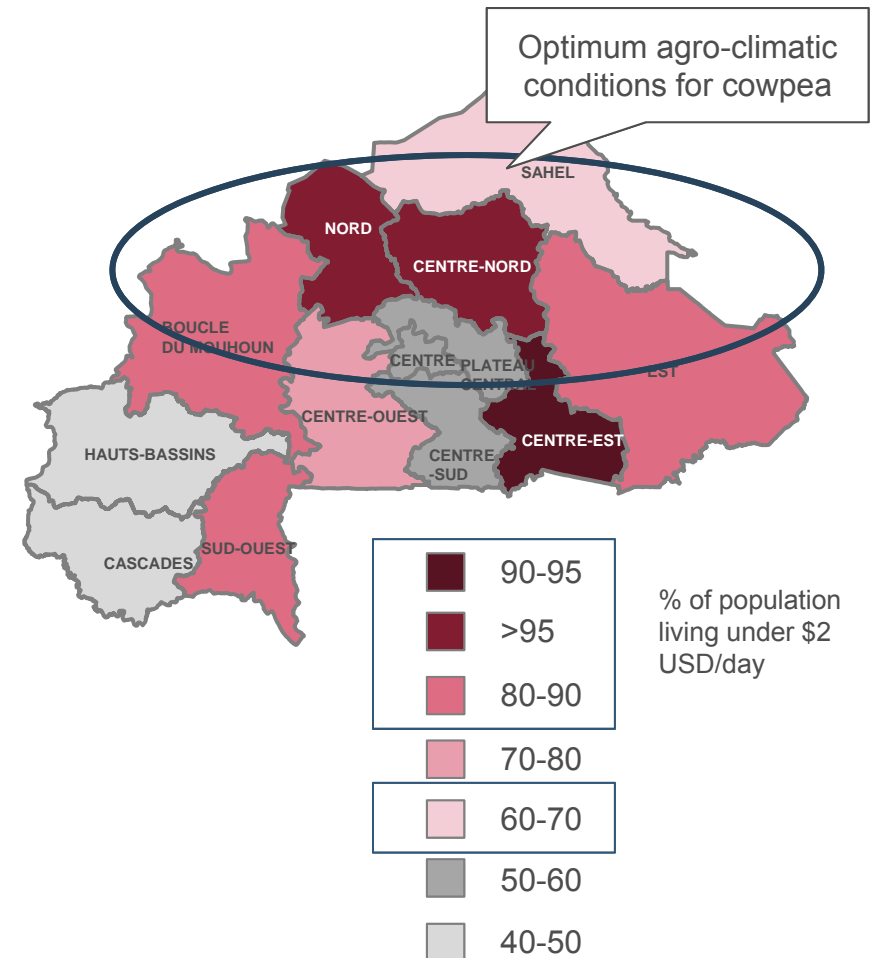
THESE HIGH GROWTH REGIONS ARE ALSO THE POOREST IN THE COUNTRY



Burkina Faso Population & Average Growth by Region
2012 population, 1997-2012 growth

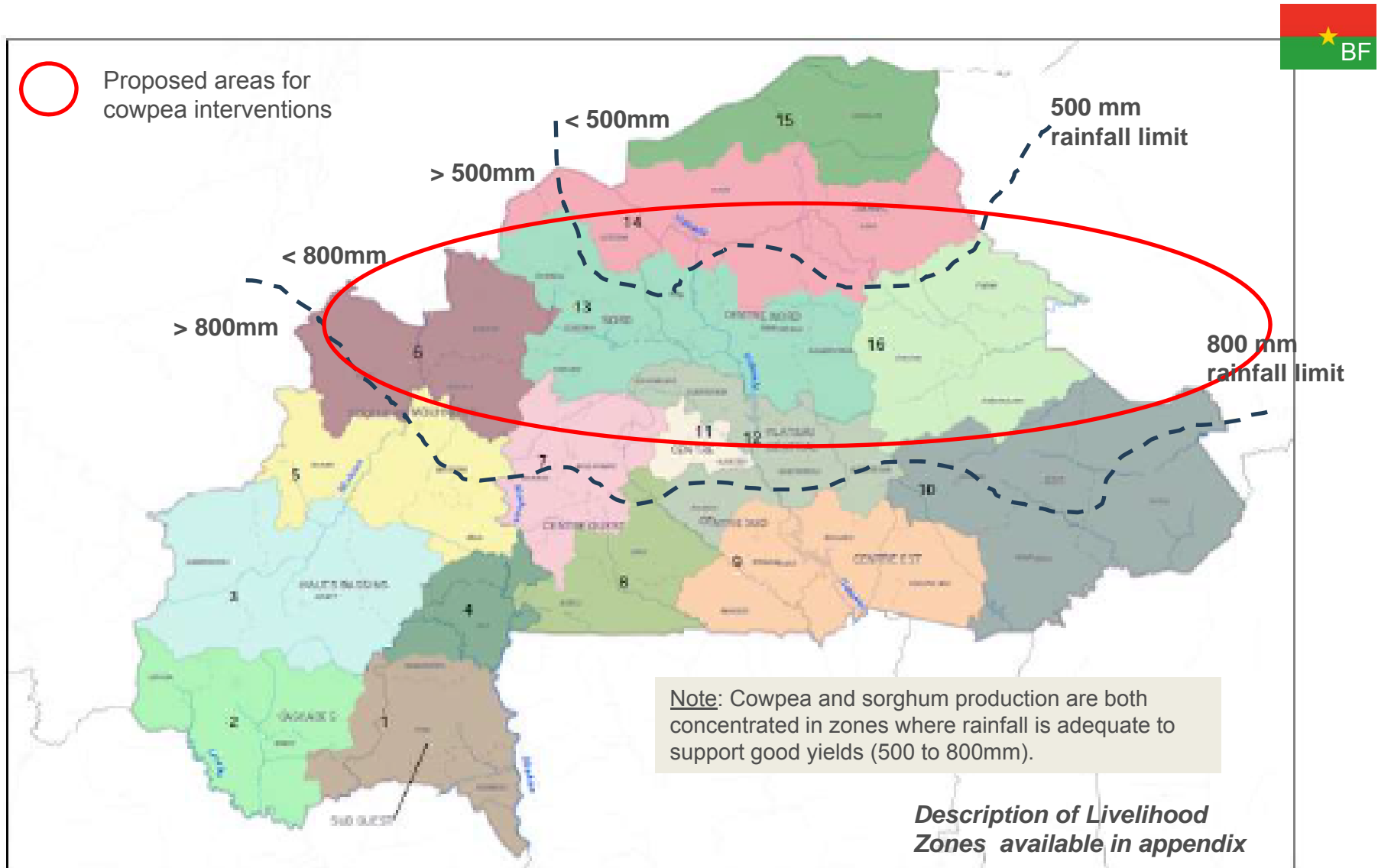


Poverty Distribution by Region²



12 Source: 1- Institut National de Development de Statistiques 2- International Food Policy Research Institute

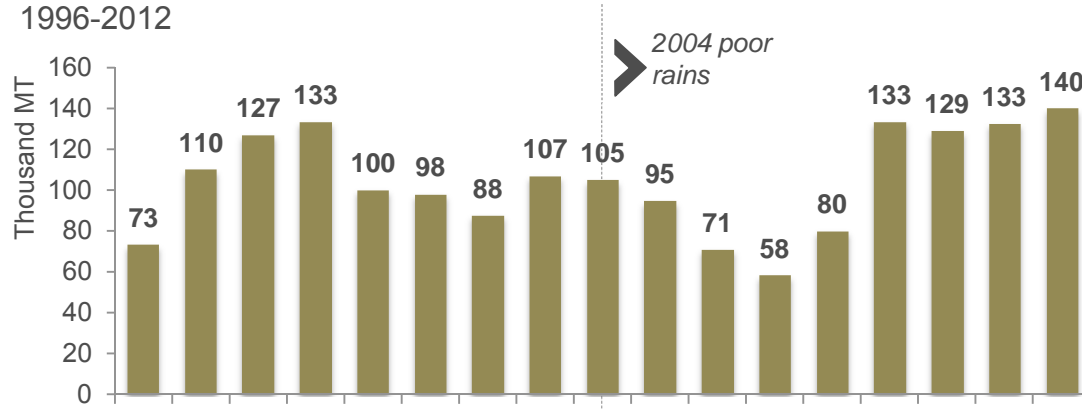
MOST OF THE COWPEA IN BURKINA IS GROWN ALONGSIDE SORGHUM AND MILLET IN REGIONS TOO DRY FOR MAIZE TO THRIVE



WHILE MALI'S PRODUCTION IS 25% OF BURKINA'S, GROWTH IS ~5% OVER THE PAST DECADE, MAINLY DUE TO A SLIGHT INCREASE IN YIELD

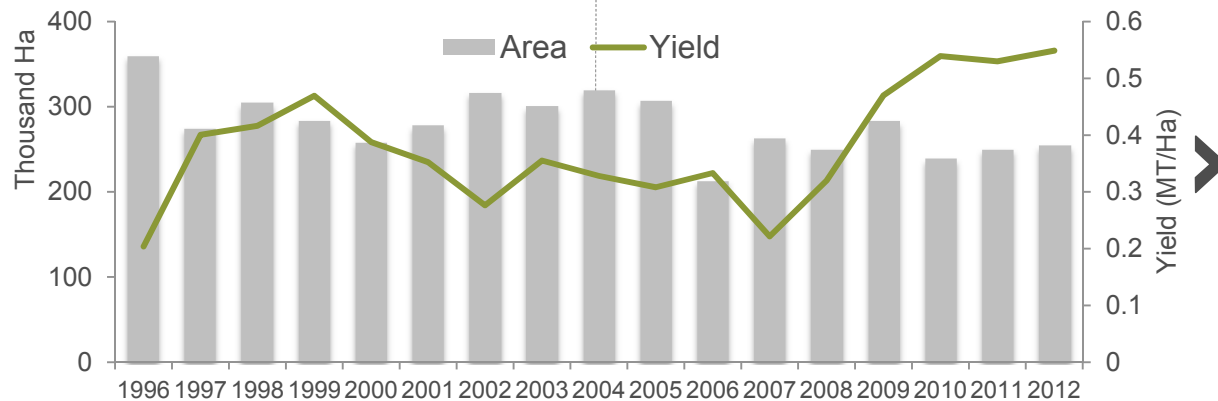


Cowpea Production Mali
1996-2012

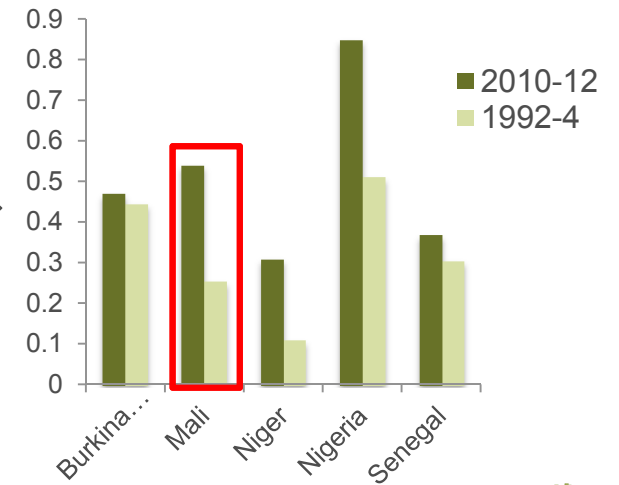


- Cowpea production has been growing at a CAGR of 4.8% since 2002 (10 years)
- Acreage has been relatively stable in the same period
- Annual yields have seen a slight increase

Cowpea Yield and Area Harvested Mali
1995-2013



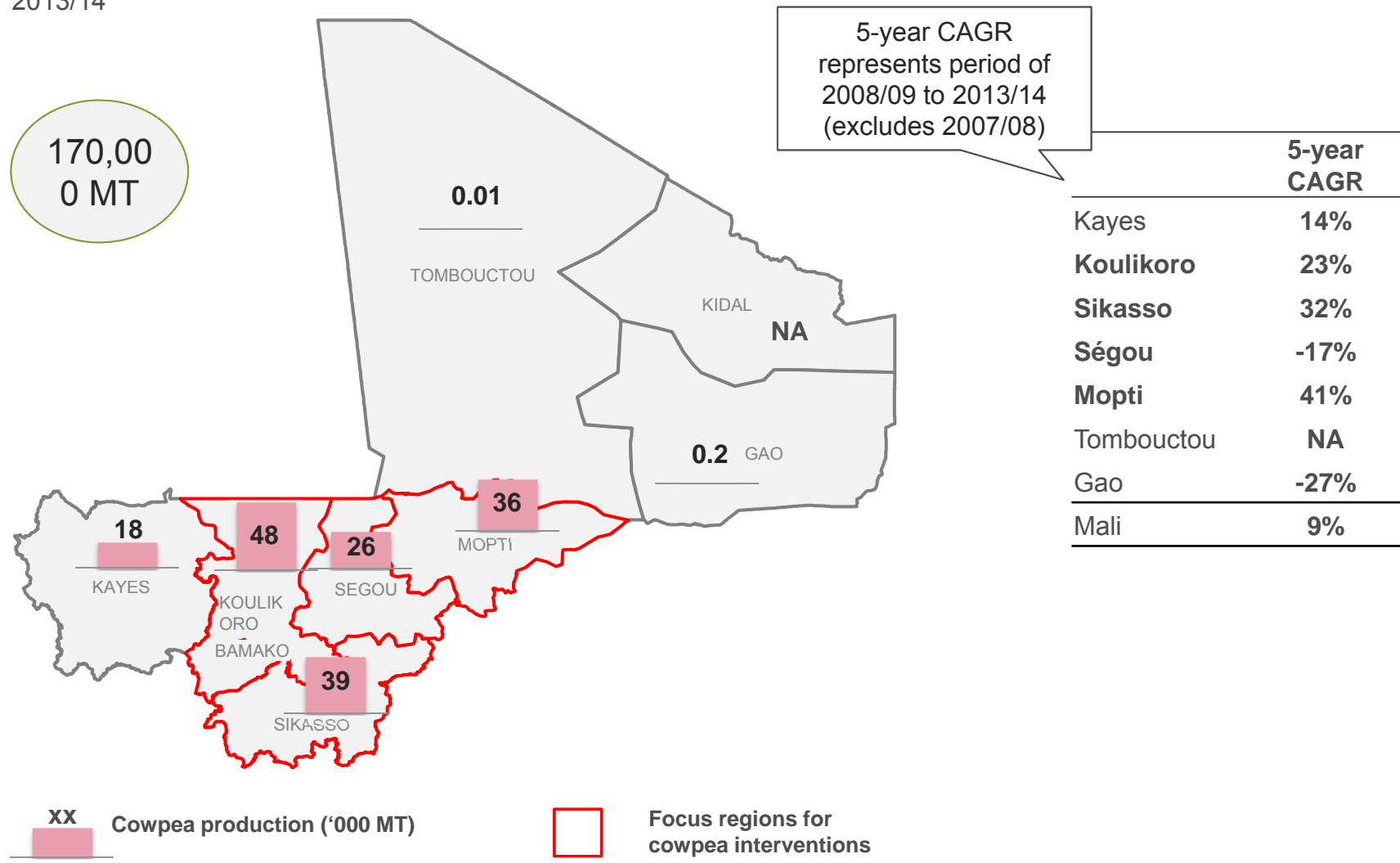
Global Yield Comparisons



Source: FAO STAT 2013

THIS PRODUCTION IS IN SOUTHERN MALI AND INTERVENTIONS WILL FOCUS ON FOUR REGIONS THERE

Mali Cowpea Production
2013/14



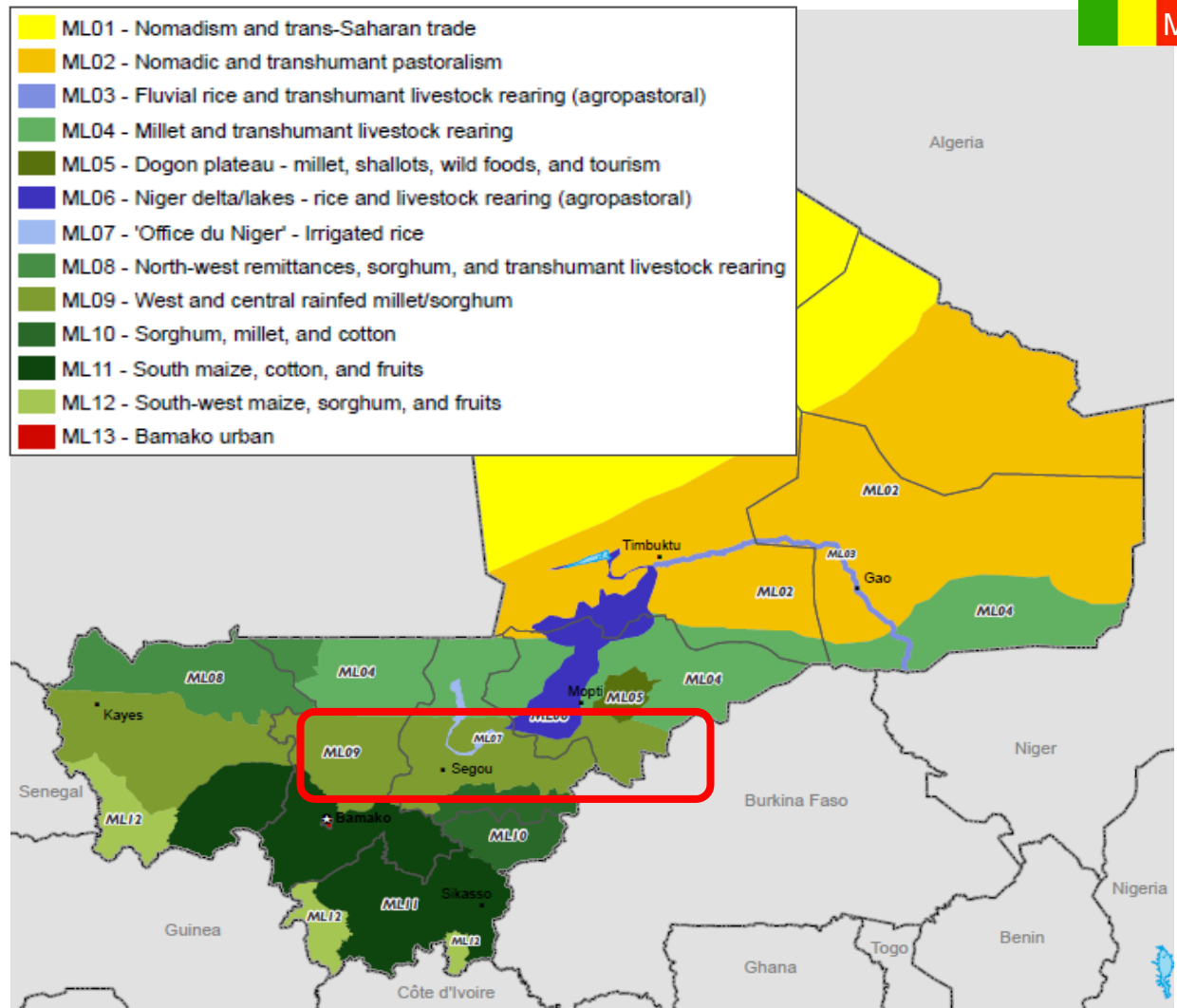
XX Cowpea production ('000 MT)

Focus regions for cowpea interventions

AS IN BURKINA, COWPEA IS GROWN ALONGSIDE SORGHUM AND MILLET, WHILE MAIZE IS ALSO OFTEN PRODUCED BY THE SAME SHF

Cowpea in Mali

- Cowpeas are pervasive across Mali's arable crop regions
- It is most often grown in association with Millet, Sorghum, and Maize
- The relative importance of mono-culture is much less in Mali than in Burkina Faso
- As in Burkina, cowpeas are a women's crop from production through processing
- The proposed interventions will cut across livelihood zones ML9 and ML10

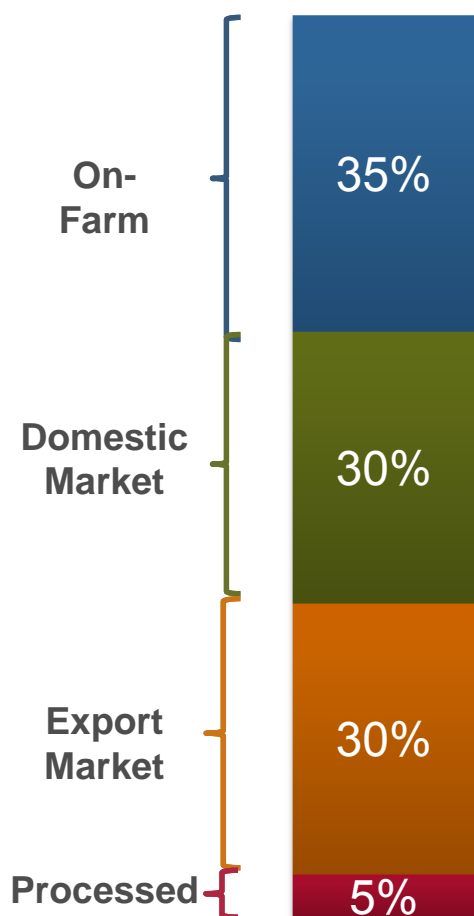


 Proposed Intervention Areas

¹ Groundwater Availability and Use in Sub-Saharan Africa: A Review of 15 Countries, Pavelic, P., IWMI, 2011, <http://westafrica.iwmi.cgiar.org/publications/>

IN BURKINA FASO UP TO 50% OF WHAT'S SOLD IS EXPORTED, WHILE IN MALI, PRODUCTION IS NOT HIGH ENOUGH TO MEET LOCAL DEMAND

**Burkina Faso Market Share
(by Usage)¹**
~600,000 MT Production



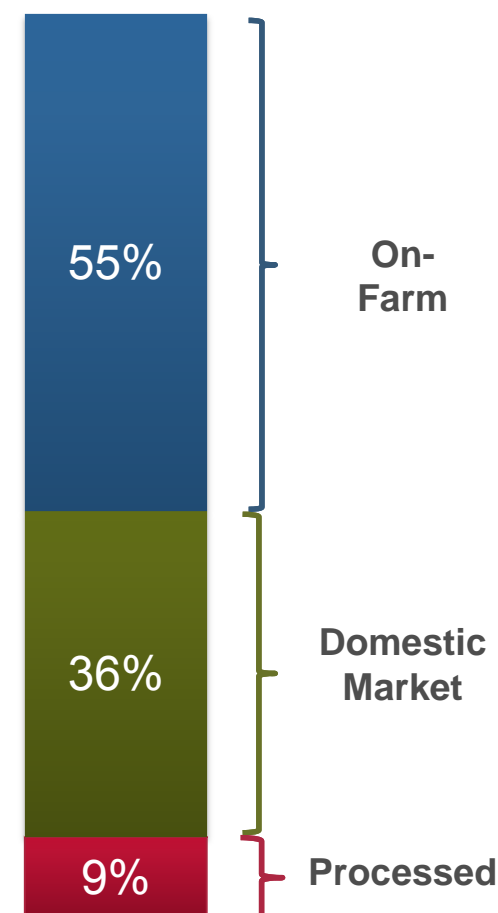
In Burkina Faso ...

- The marketed surplus dominates
- It is divided between domestic purchases by institutional buyers, rural and urban households, and small scale processors and the export markets (Nigeria, Ghana and Mali)
- Processed refers to the finished products of cowpeas such as snacks, baby food, couscous

In Mali...

- More cowpea is eaten on farm and less than half (~80,000 MT) is marketed
- Processed products are the same as in Burkina Faso

**Mali Market Share
(by Usage)²**
~170,000 MT Production



IN BOTH BURKINA FASO AND MALI THE ENABLING ENVIRONMENT AND INFRASTRUCTURE ARE CONSTRAINED

Constraints in the enabling environment and infrastructure

- Limited storage capacity at all levels: village, district/commune, province/region
- Poor farm to market roads in some areas



Moderately constrained

- High export taxes and import duties, along with difficult and lengthy licensing and registration processes
- Lack of sector based inter-professional organizations and hierarchical farmer organizations
- Seed sector policies (Mali) reduce the efficiency and effectiveness of multiplication and diffusion of improved cowpea



Underdeveloped

Infrastructure

Business and Finance Environment

Industry Bodies and Sector Policies

Research and Extension Services

- Lack of operational capital and investment capital for farmers' organizations, traders and input suppliers
- Lack of transparency and market information
- Numerous informal checkpoints which increase the cost of importing and exporting
- High transportation costs
- Lack of knowledge of legislation, rules and regulations related to economic activities at all levels



More constrained

- Fertilizer recommendations not adapted to different agro-ecologic zones, soil types, or crops
- Inadequate participation of farmers in variety selection
- Testing and evaluation of new varieties done only under mono-culture conditions
- Lack of resources for effective action by government extension personnel in technology transfer and diffusion
- Lack of resources for research system to produce sufficient foundation seed to ensure increased multiplication and diffusion of new varieties



Opportunity for improvement

Relative degree of constraint



More constrained



Less constrained



2 Value Chain Opportunities

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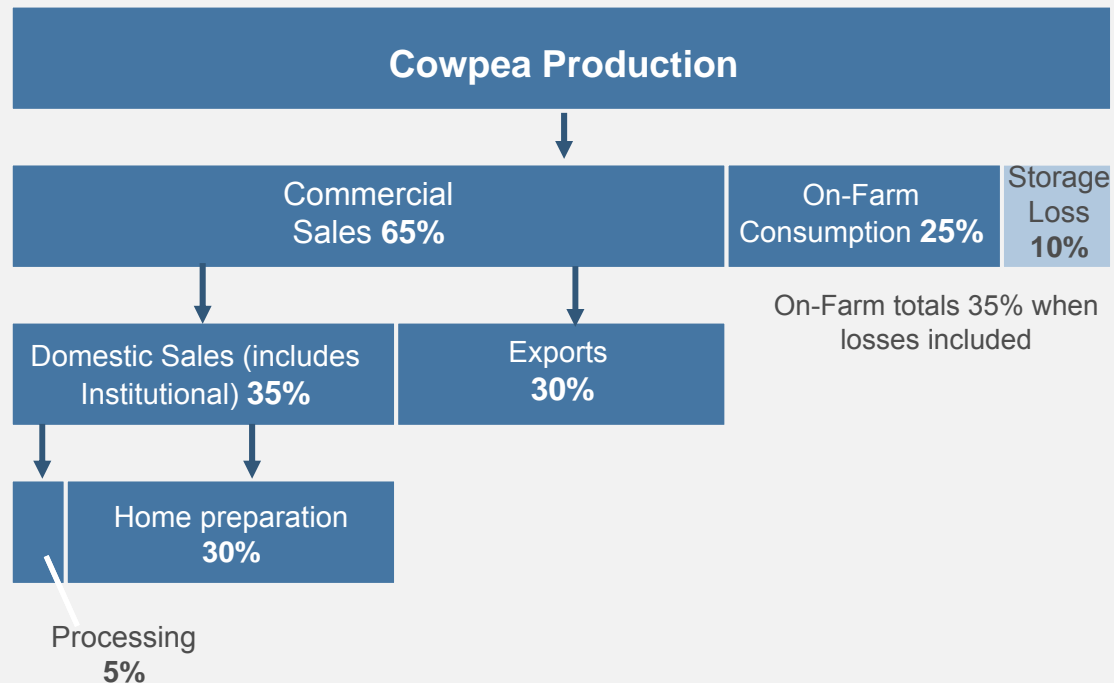
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COWPEA IN BURKINA IS MOSTLY GROWN AS A CASH CROP. THE HIGH COST OF PRODUCTION MAKES IT AN EXPENSIVE SUBSISTENCE CROP



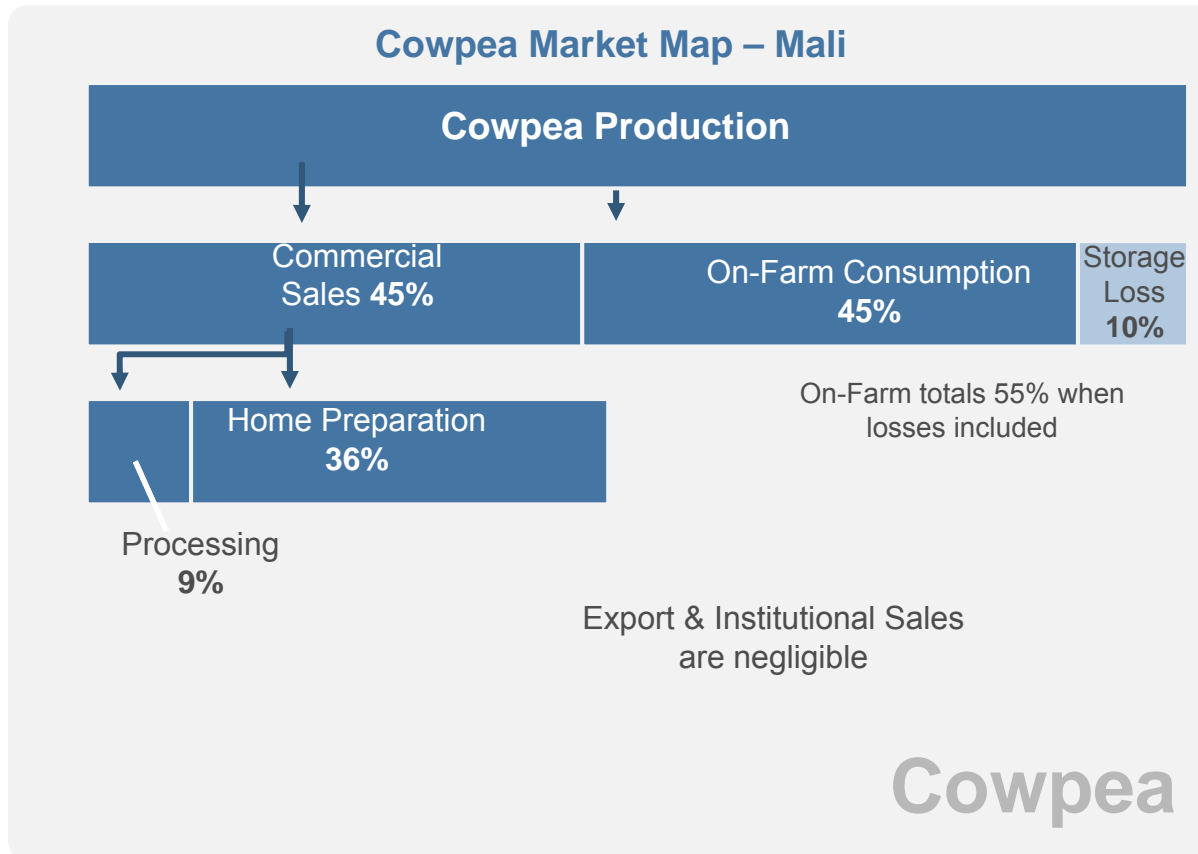
Cowpea Market Map – Burkina Faso



Cowpea

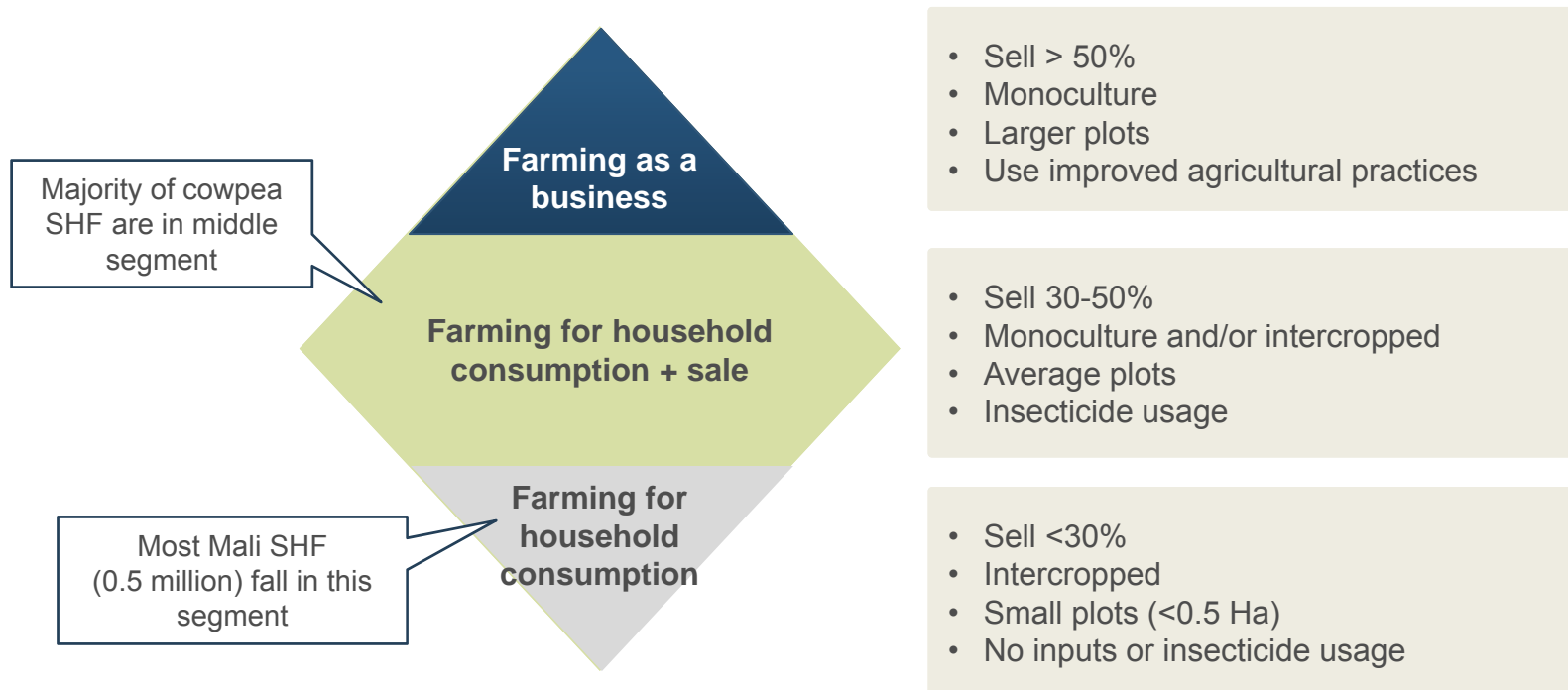
- The high price of cowpea has pulled cowpea off-farm in recent years
 - Groundnuts are the most common substitute for home consumption
- Contacts in Burkina were uniformly adamant that most cowpea produced on SHFs was sold rather than consumed on-farm
- Circumstantial evidence for this assessment is to be found in the cost of insecticides, which would likely be prohibitive for a subsistence crop
- A network of collectors buys cowpea at local markets, mostly acting as agents for large traders

MALI PRODUCES FAR LESS COWPEA THAN DOES BURKINA, AND A MUCH GREATER PROPORTION IS CONSUMED ON-FARM: SO FAR, THIS IS A MISSED OPPORTUNITY TO EXPLOIT CASH CROP EXPORT POTENTIAL: THERE ARE SIGNS THIS IS CHANGING



- Mali does not yet fully meet its own domestic demand for cowpea
 - Contacts in Burkina report regular export business to Mali
- The agro-climatic zone where cowpea can be cost effectively produced extends across Mali
 - The expansion of the regional import market for cowpea is a recent phenomenon, and Mali is currently expanding its cowpea production area, presumably to address export markets

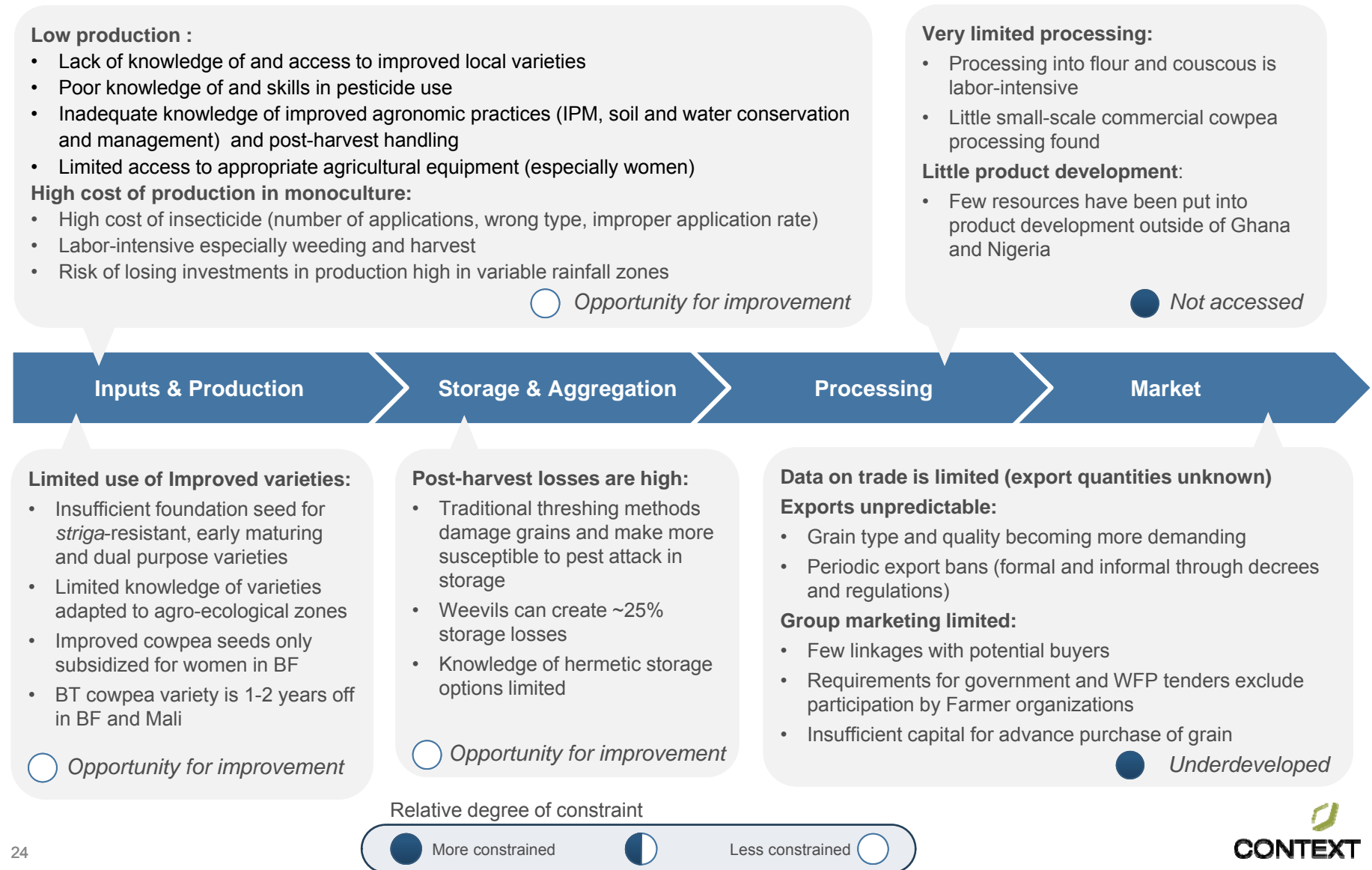
THERE ARE 3 TYPES OF FARMERS GROWING COWPEA IN BURKINA FASO AND MALI, WITH MOST GROWING FOR CONSUMPTION & SALE



NOTE: The situation is more complicated than this simple depiction because within a household you may have different types of farmers (i.e., Woman growing for consumption and men growing for business).

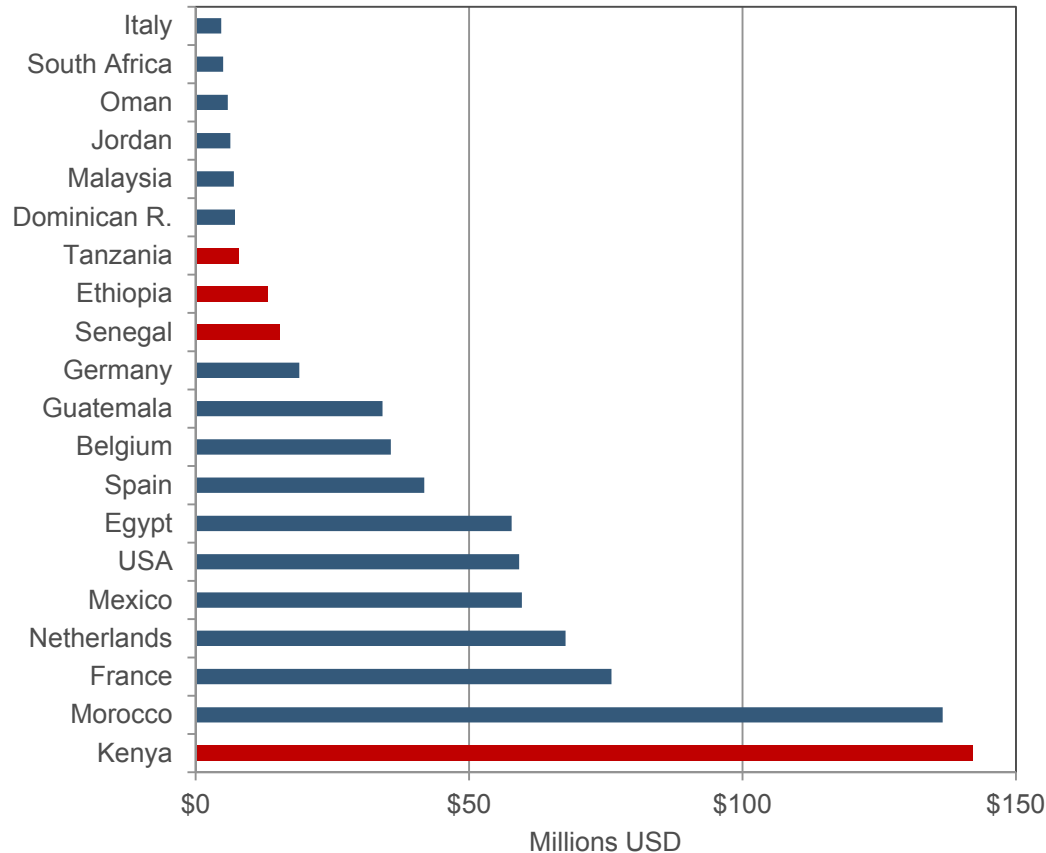
FOR THOSE SHF, THE COWPEA VALUE CHAIN IS PRIMARILY CONSTRAINED ON THEIR PRODUCTION END

Cowpea constraints along the value chain in Burkina Faso and Mali



WHILE COWPEA IS NOT SPECIFIED IN OFFICIAL GLOBAL TRADE DATABASES; NON-REPORTED (“*informal*”) TRADE IS ANOTHER MATTER

Bean Exports by Country
2013 (HS 070820 trade code)¹



“Bean” Definition & Trade

The many sub-types of “Beans” are not differentiated by the HS-6 international trade data codes

- Surprisingly, this code does not discriminate between green and dry beans
- “Beans” is applied to several species and genera of seed legumes²

- Cowpea is one of many types of beans

Only five African countries feature in global trade statistics as exporters of significant values of bean

- In all five cases – Kenya, Senegal, Ethiopia, Tanzania and South Africa - these are predominantly green bean exports³
- However, Burkina’s informal exports may be more valuable even than Kenya’s

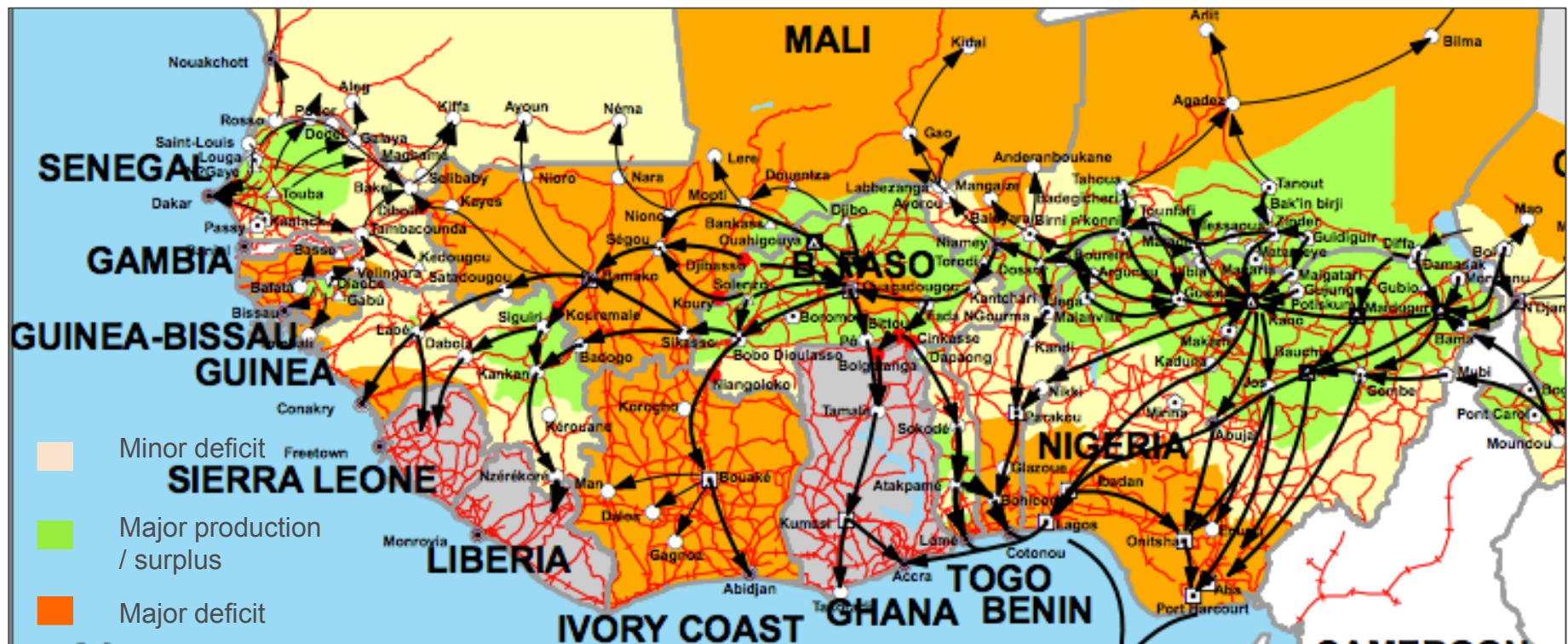
¹ Trade Map, ITC – Trade Code HS 070820: Beans, shelled or unshelled, fresh or chilled

² The term bean originally referred to the seed of the **broad or fava bean**, but was later expanded to include members of the New World genus **Phaseolus**, such as the **common bean** and the **runner bean**, and the related genus **Vigna**. The term is now applied generally to many other related plants such as Old World **soybeans**, **peas**, **chickpeas** (garbanzos), **vetches**, and **lupins** (<http://en.wikipedia.org/wiki/Bean>)

³ Food Safety Requirements in African Green Bean Exports..., IFPRI, 2007 - <http://www.ifpri.org/sites/default/files/pubs/pubs/dp/ifpridp00737.pdf>

THIS INFORMAL TRADE HAS MADE COWPEA A CASH CROP FOR MANY BURKINA FARMERS – WITH NIGERIA A LEADING EXPORT DESTINATION

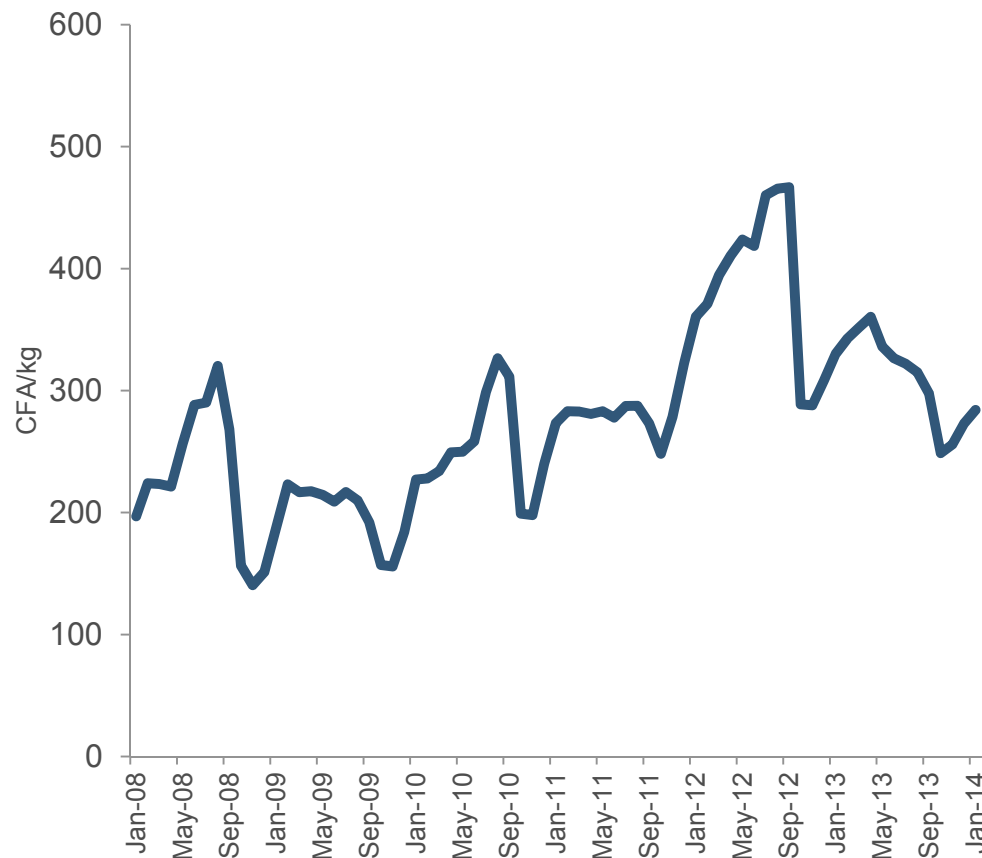
- The FEWS trade flow map portrays Burkina as a cowpea surplus area, but with exports flowing to the South and West.
- Traders & other contacts in Burkina emphasize that Nigeria is also a major destination.
- Because Nigeria produces so much cowpea itself, regional export market demand has become unpredictable, depending on changes in Nigeria's degree of self-sufficiency from season to season.
- Context estimates that **200,00MT (~30% of the Burkina crop) is exported, earning \$150M** for Burkina's SHFs.
- Mali is a cowpea deficit area, despite having agro-climatic zones where cowpea can grow well.



DRIVEN BY EXPORT DEMAND, COWPEA PRICES IN BURKINA ROSE SHARPLY FROM 2008 ONWARD, THEN FELL BACK IN 2013. THIS WAS A POWERFUL INCENTIVE TO TRANSFORM PRODUCTION SYSTEMS



Burkina Faso Cowpea Monthly Farm gate Prices
2008-2014



Cowpea Market

Exports

- The export market has destabilized domestic prices in recent years.
- Government export bans have been ineffectual

Excess Supply

- The rise in cowpea prices brought on excess supply by 2012, and merchants report excess stocks being held in mid-2014

Trends

- The recent fall in prices is seen as due to market imbalances rather than due to government actions
- The long term trend is still seen as positive by value chain participants
- Seasonal fluctuations are apparent in the price graph, but industry contacts report that prices stagnated in the first half of 2014

SPURRED ON BY HIGH MARKET PRICES, PRODUCTION OF COWPEA AS A SOLE CROP HAS SPREAD IN BURKINA FASO – CREATING PRE-CONDITIONS FOR CROP INTENSIFICATION AND YIELD IMPROVEMENT



Cowpea grown as a mono-crop (IITA photo)

Cowpea Production Trends

- When cowpea prices rose to a multiple of cereal prices, cowpea transitioned from being a devalued “women’s crop” to cash crop status
- Women still play a prominent role in cowpea production and marketing, but men now join in soil preparation at the same time cereals are sown, instead of treating it as a cash-crop²
- Within the past 5 years (2012), 1/3 of the farmers in the Central-North have adopted open-field systems

¹ *Improved Cowpea-Cereal Cropping Systems: Ajeigbe, H. et al* [Link](#)

² *Baseline Study of Smallholder Farmers in Striga-infested Maize and Cowpea-Growing Areas of Northern Nigeria*, Mignouna, B. et al, IITA, 2013, p.26 - [Link](#): Sole crop” means cowpeas were not intercropped with another crop in same field“

³ Plan de Développement à moyen terme de la filière niébé dans la région du Centre- Nord . CRA. 2012

Cowpea Production Systems



Production systems are changing rapidly, which offers scope for major yield improvements and cost savings for the first time

- Cowpea viewed as the most important legume for food, fodder cash and soil fertility in West Africa¹
- Intercropping with cereals is still common, but the traditional alternate-single-row system limits yield



Traditional inter-cropping system: cowpea planted after maize in single rows -- shaded, low yields

PEST PRESSURES ARE SEVERE AND INSECTICIDE EXPENSE CAN SWALLOW UP MOST OF THE PROFIT. THE OPTIMUM PRODUCTION ENVIRONMENT IS WHERE RAINFALL IS MODERATE

Insects are Well-Adapted to Cowpea

- Highly vulnerable to insect attack, particularly pod borers and thrips
 - If left unsprayed, few cowpea fields will produce a harvest
 - Cowpea insecticide use rate is close to that for tomato or cotton, at the top end of vulnerability among crop species
- In Burkina and Mali the average number of insecticide sprays is 3-4, for a cost of **\$42-\$60/ha²** (Nigeria is 4-6 sprays at 6.1 L/ha)¹
- Insecticides used are mainly pyrethroids, such as deltamethrin, and lambda cyhalothrin



Knapsack sprayer - usual application method



ULV (Ultra Low Volume) sprayer for misting

Insecticides Depend on Weather & Are Over-Used

The intensity of insect pressure on cowpea is directly related to rainfall and humidity levels

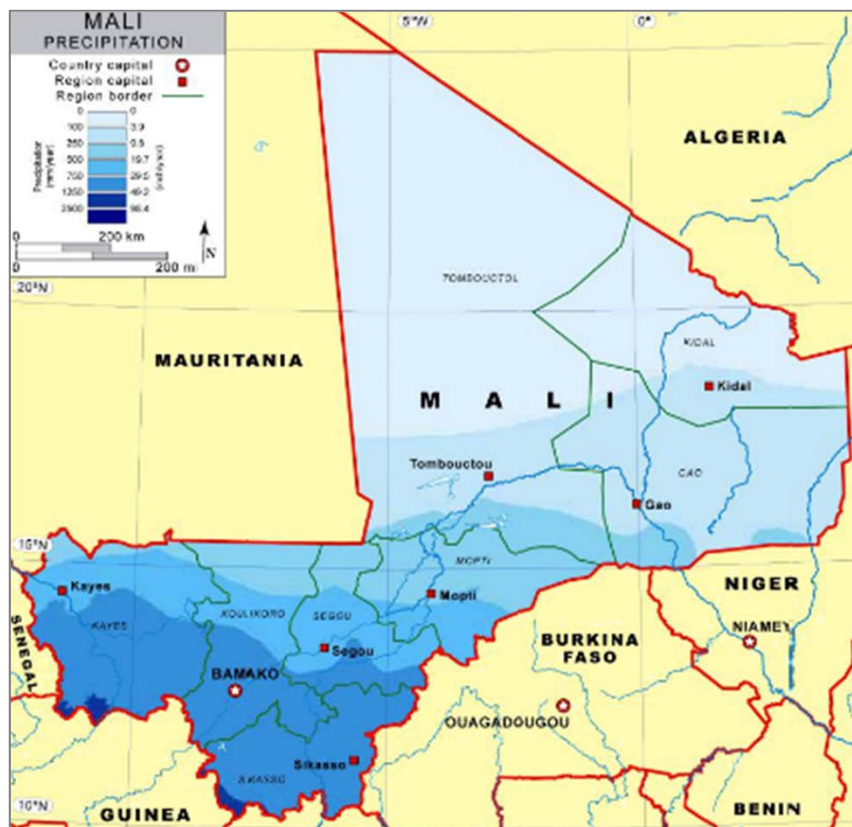
- This reduces production costs in areas where rainfall is sufficient for good yields, yet dry enough to limit insect infestations and the need to spray frequently
- Ratio depends on chemical, formulation and the extent to which ULV sprayers are used (probably relatively few)
- Not only are pesticides over-applied, but integrated pest management is not commonly practiced

¹ Based on interviews with farmers, input suppliers and government research and extension staff

² Baseline Study of Smallholder Farmers in Striga-infested Maize and Cowpea-Growing Areas of Northern Nigeria, Mignouna, B. et al, IITA, 2013, http://www.iita.org/c/document_library/get_file?p_l_id=1252640&folderId=2108247&name=DLFE-6192.pdf;

INSECT PRESSURE ON COWPEA FIELDS IS CORRELATED WITH RAINFALL - FARMERS MUST TRADE OFF INSECTICIDE COST VS. YIELD POTENTIAL

Cowpea thrives in a wide range of rainfall regimes. However, the cost of protecting the crop increases greatly as rainfall increases and insecticide sprays have to be applied more and more frequently to control pests. The 500-750mm rainfall zone in North-Central Burkina and extending into Mali provides sufficient moisture to produce a good crop, while reducing the spray need to only one treatment



The cost advantage provided by this agro-climatic environment makes Burkina competitive in the cowpea export market

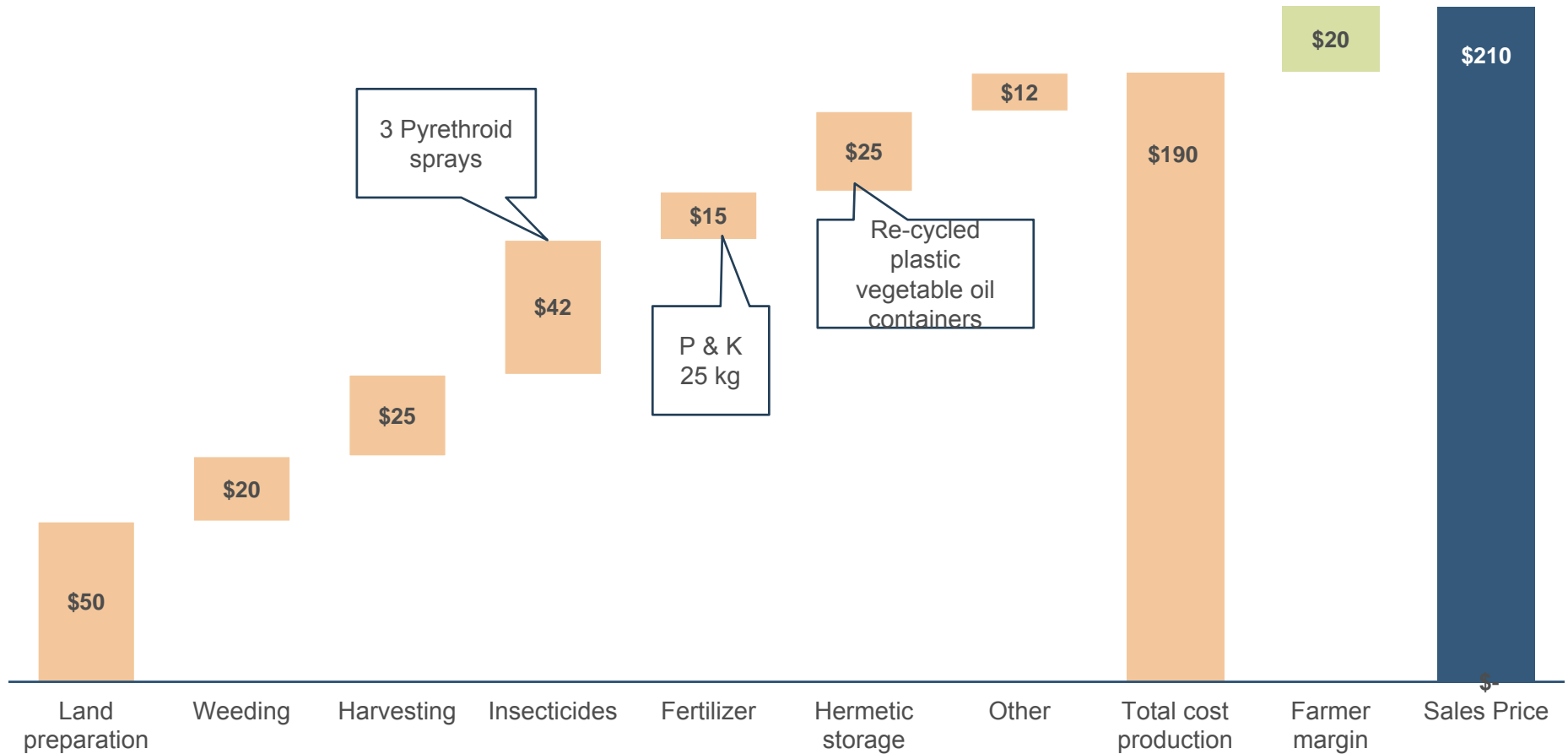


Source: <http://www.bestcountryreports.com>

43% OF TOTAL FARMER COST OF \$190/HA IS COMPRISED OF INSECT PROTECTION, INCLUDING BOTH FIELD SPRAYS AND HERMETIC STORAGE



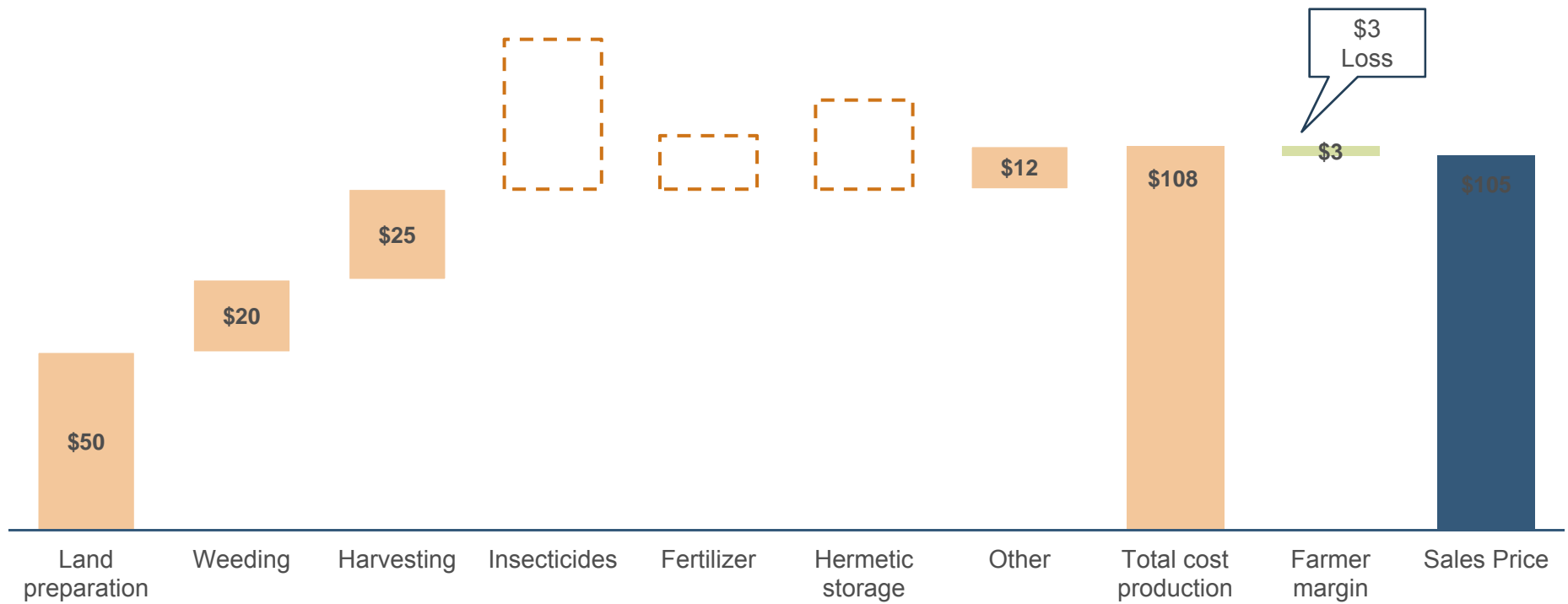
Farmer Cost Economics for Cowpea at Harvest
 \$USD per Ha, per annum



HOWEVER, WHEN INSECT PROTECTION IS NOT USED, YIELDS DROP 50% AND FARMERS EXPERIENCE A LOSS



Farmer Cost Economics for Cowpea at Harvest
 \$USD per Ha, per annum



NEW BIOLOGICAL WEAPONS ARE EMERGING THAT COULD REPLACE PEST CONTROL SYSTEMS, ALTHOUGH THEY HAVE YET TO REACH FARMERS

The major production bottleneck for cowpea is the high cost of pest control. Insecticides can cost up to \$100/ha. In a bad year. *Striga*, a parasitic weed, often adds a yield drag >10-20%.

Striga-Resistance is Available

- Complete genetic resistance to *Striga* have been incorporated into recently released IITA varieties – **but few SHF are aware of them**
- Until now, this parasite has routinely depressed cowpea yields by 10-20% on the majority of farms in the savanna zones



Bt-Cowpea Controls Maruca Pod Borer

- Maruca is a Lepidopteran insect, and is susceptible to the toxins produced by Bt - Monsanto licensed its Cry1Ab Bt gene to AATF for use with cowpea royalty-free in 2003
- Transgenic Bt plants (IITA) are reported to be highly resistant
- Government research organizations are field testing in Burkina Faso, Ghana & Nigeria - as of June, 2014, Nigeria had completed 4 years of trials, Burkina 2 and Ghana 1²
- Approvals to launch these Bt varieties in both Nigeria and Burkina are seen as being a year or two away

1 Varietal Response of Cowpea (*Vigna unguiculata* (L.) Walp.) to *Striga gesnerioides* (Willd.) Vatke Race SG5 Infestation, Noubissie Tchiagami, J-B. et al, Not. Bot. Hort. Agrobot. Cluj 38 (2) 2010, Special Issue, 33-41 - www.notulaeobotanicae.ro

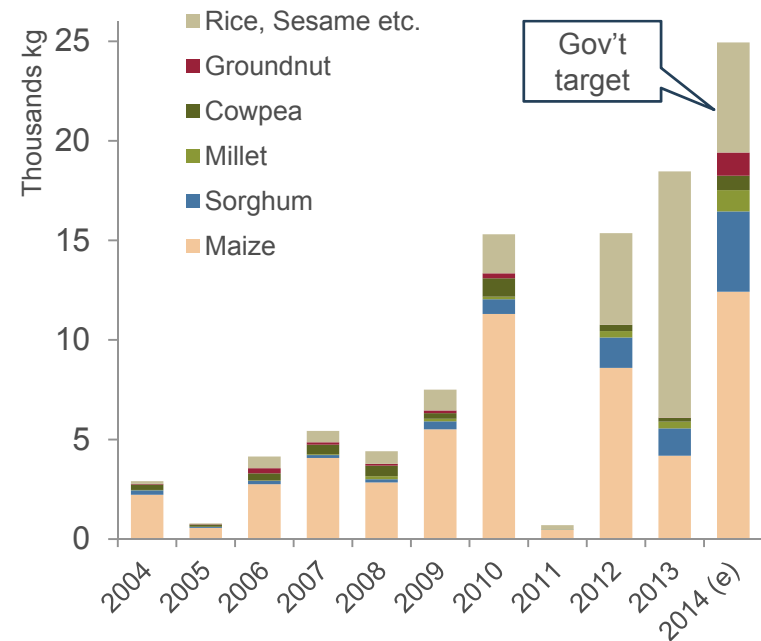
2 Interview with M. Abdulai, Entomologist, CSIR-Savannah Agricultural Research Institute, Nyankpala, Tamale, Ghana, June, 2014

AND ALTHOUGH BURKINA FASO CROP SEEDS ARE HEAVILY SUBSIDIZED, COWPEA IS NOT WELL SUPPORTED

Burkina Faso Seed Supply Status¹

Crop	Millet	Sorghum	Maize	Cowpea	Rice
2012/2013 (M ha.)	1.27	1.79	0.85	1.30	0.14
Seed Rate (kg./ha.)	8	10	15	15	80
Seed Need (000MT)	10.18	17.89	12.70	19.50	10.95
Govt. Subsidy Sales (000MT)	0.39	1.50	3.00	0.17	3.20
Seed Company Sales (000MT)	0.00	0.51	3.00	0.10	4.50
Farm-saved Seed (000MT)	9.79	15.88	6.70	19.23	3.25
Purchased Seed %	4%	11%	47%	1%	70%

Burkina Faso Certified Seed Production 2001-2013



Since 2008, Burkina Faso has up to 90% subsidized selected field crop seeds – mostly rice, maize, sorghum

- Government seed support program has included ambitious certified seed production targets, but industry opinions differ on the extent to which targets have been achieved, and on what proportion of the certified seed effectively reaches farmers

Seed industry contacts see an expansion of the seed market rather than a cannibalization of commercial sales

- Their sales of unsubsidized seed are significant only for maize, rice and cowpea as a proportion of seed need
- The 8,000 tons of subsidized seed sold in 2012-3 represented ~50% of all seed sales

MALI IS WORSE OFF WITH A RESTRICTIVE AND COSTLY SEED CERTIFICATION SYSTEM THAT INHIBITS ADOPTION OF IMPROVED SEED OF ALL SPECIES

There is little difference in the proportion of cowpea seed sales between Burkina and Mali – it is very low in both countries



Mali Seed Supply Status¹

Crop	Millet	Sorghum	Maize	Cowpea	Rice
2012/2013 (M ha.)	1.44	0.94	0.63	0.25	0.61
Seed Rate (kg./ha.)	8	10	15	15	80
Seed Need (000MT)	11.49	9.37	9.50	3.81	48.40
Certified Seed Prod. ('000 MT)	0.13	0.33	0.61	0.05	0.87
Farm-saved Seed ('000 MT)	11.36	9.03	8.89	3.76	47.51
Purchased Seed % ¹	1%	4%	6%	<1%	2%

- Certified seed producers are charged a high and often capriciously calculated fee for crop inspection in Mali¹
- These expenses are covered by the Ministry of Agric. in Burkina
- The only seed subsidies are for hybrid maize - 600 MT imported from Burkina and S. Africa for 2014-15 season

Seed Certification is Restrictive

- The current system of seed certification discourages seed producers because its administration is perceived as arbitrary and prone to abuse
- Seed producers pay to have their fields inspected and for laboratory analyses
- Certified seed production is undertaken mostly by farmer associations, and too few farmers want to participate in this activity to meet the seed needs.
- Mali is singular in having a law in place that makes it a crime to produce and sell uncertified seed
- IER managers claim that there is no shortage of basic seed for most varieties. The bottleneck is at the certified seed level

¹ An ICRISAT manager cited one seed association that had been charged \$1,000 for certification of a single hybrid sorghum field – the inspector had claimed per diem, mileage and hotel expenses for an unnecessary journey of several hundred mile from Bamako, even though a local inspector was available,

DIFFUSION OF IMPROVED VARIETIES OF COWPEA SEED DOES NOT MAKE UP FOR SHORTFALLS IN CERTIFIED SEED PRODUCTION - SHARING SEED WITH NEIGHBORS DOES NOT SPREAD NEW VARIETY USE VERY FAR

It is likely that farm multiplication of improved varieties reaches only ~10% of the planted areas

- Stimulation of demand for improved seed (as well as supply) was stressed as a need throughout West Africa in a 2010 IFPRI study²




Integrated Striga Management in Africa

Baseline Study of Smallholder Farmers in
Striga-infested Maize and Cowpea-Growing
Areas of Northern Nigeria

B.D. Mignouna, T. Abdoulaye, A. Kamara, and M. Oluoch



www.iita.org

Informal Seed Diffusion has Limited Reach

- Theoretically, low rates of sales of improved varieties may still be sufficient to disperse new genetics over the following years, if farmers share 2nd generation seed widely among their neighbors
- Survey evidence suggests that this currently happens to only a limited extent in Mali and Burkina
- The view that improved variety penetration was limited was a common theme in discussions with seed company managers, IER, INERA and ICRISAT staff and others
- A group of “lead adopter” SHFs are said to habitually replenish their seed periodically, but many of their neighbors continue to rely on land races
- IITA surveys on the extent to which improved varieties have been adopted are said to be misleading, because many of the “varieties” counted are actually land race selections made decades ago

¹ Baseline Study of Smallholder Farmers in Striga-infested Maize and Cowpea-Growing Areas of Northern Nigeria, Mignouna, B. et al, IITA, 2013, http://www.iita.org/c/document_library/get_file?p_l_id=1252640&folderId=2108247&name=DLFE-6192.pdf,

² <http://www.ifpri.org/publication/demand-characteristics-improved-rice-cowpea-and-maize-seeds-nigeria>

VILLAGE-LEVEL WOMEN'S COWPEA PRODUCTION GROUPS ARE DEVELOPING IN BURKINA, BUT THEY STILL FIND BUYERS LOCALLY



Groups that pool their input procurement, production and storage resources are developing in Burkina, but sales are often still made to local collectors, who act on behalf of large traders

Product differentiation also occurs: SECOPA trading company, Bobo Dioulasso, offers a premium price for Comsal variety (large white grain for export to Ghana and Nigeria)

Levels of Marketing

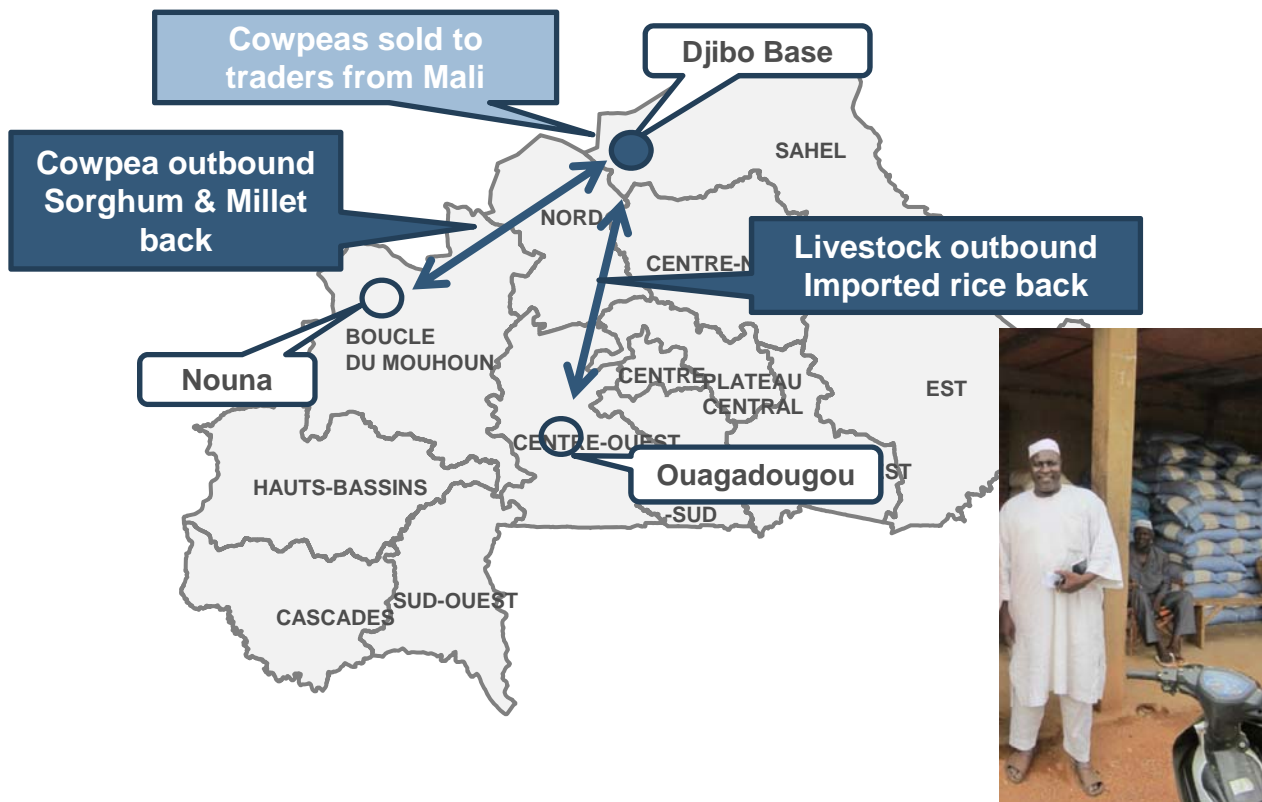


Women's group officers interviewed at Titau, North Region

AN INTERVENTION STRATEGY TO CAPTURE VALUE FOR SHF ASSOCIATIONS FROM DOWNSTREAM MARKETING (COMPETING WITH LARGE TRADERS) MUST CONSIDER MULTI-PRODUCT STRATEGIES

Long-distance traders with transport fleets ensure they arrange return loads to hold costs down. This demands a multi-product strategy. (Kiemde Adama trades large volumes of cowpea alongside rice, sorghum, millet and livestock.)

A SHF-based marketing association would need to consider its own **multi-product strategy**.



Case: Integration of cowpea into a regional trading system Kiemde Adama – Wholesale Trader – Djibo¹

- Business is 34 years old, started by his father
- Warehouse in town has 150 MT capacity
- He owns three 20 ton trucks
- ~3,000 MT/yr. of grains are traded with other large merchants
- 750 MT cowpea are procured in the Sahel & Nord regions
- Employs 6 collectors to buy in village markets
- Also sells 500 MT millet; 250 MT sorghum
- 1,500 MT/yr. of imported rice traded

LARGE VOLUMES ARE TRADED IN A COMPETITIVE BURKINA MARKET – WHILE % MARGINS CAN BE THIN, EVEN AFTER STORAGE-RELATED GAINS, THE OVERALL PROFIT IS STILL ATTRACTIVE



Market margins for cowpea in Burkina Faso¹
\$USD per farmer per Ha



Comments

- Collectors purchase cowpeas off-farm or in village markets and act as aggregators.
- Trader gross margins include transport costs from the North to Ouagadougou
- Ouagadougou is the main collection point for cowpea intended for the export market, where traders such as SECOPA take possession
- NOTE: Collectors/traders were asked for their average purchase prices (mostly completed several months earlier), thus margins do include value capture from storage³

1. Assuming yield of 0.6MT of cowpea produced per hectare
2. Trader gross margin includes transport from Djibo to Ouagadougou
3. Interviews with merchants in Ouagadougou, April 2014

3 Interventions & Impact

PHASE 2 COWPEA BURKINA FASO/MALI EXECUTIVE SUMMARY

1 SECTOR FUNDAMENTALS

- Cowpea in Burkina has transitioned recently from food security to cash crop status, providing income for many of the 2.6M SHFs who grow cowpea
- 65% of the Burkina crop is marketed, and ~1/2 of that is exported, mainly to Nigeria
- Mali cowpea production is barely sufficient for domestic consumption
- Post-harvest losses from weevils now reduced by use of air-tight containers, inc. PICS

2 VALUE CHAIN OPPORTUNITIES

- Mono-crop cultivation systems are now common in market-focused areas of NE Burkina – so that the crop is now poised for yield improvement techniques
- Major insecticide cost saving is possible when Bt cowpea lines are introduced
- Current post-harvest value chain is relatively efficient, but large traders reap most profits from crop accumulation and storage – scope for improved SHF value capture

3 INTERVENTIONS & IMPACT

Most promising intervention cluster focuses on improving production systems and adoption of improved varieties, because yields are still low

- Int.#1 Cowpea Productivity Package – 50% yield gain potential
- Int. #2 Reduction of Post-harvest/Storage Losses
- Int. #3 Improved Cowpea Product Preparation
- \$97 per annum average benefit projected for 700,000 SHFs (20% of total) at Yr.10

4 STAKEHOLDER PROFILES

- NAFASO, seed co. leader in Burkina, produces basic seed; Faso Kaba in Mali
- Govt. plant research agencies INERA and IER
- Farmers organizations: Ops Namentenga, Boucle de Mouhoun, Sahel, CAP- Yako, Diemas (East) Burkina; OPs Bouroueli, Koulikoro and Mopti, Mali
- Processor capacity-building – GRET, Afrique Vert, ATCB, RTCF

SUGGESTED INTERVENTIONS FOCUS ON PRODUCTION AND STORAGE, WITH SOME EFFORTS ON PROCESSING TO INCREASE DEMAND PULL

1

Field Productivity Input Package

- New, yield-improving genetics are available but not widely adopted
 - *Striga* resistance, early maturing varieties available now
 - Bt cowpea 1-2 years off for pod borer control
- Technologies need to be promoted via an intervention centered on extension education
 - Media publicity
 - Farmer Field Schools
 - Input packages (HOPE model) for sale to farmers for small-scale evaluation

2

Post-Harvest & Storage Loss Reduction

- Equipment and methods for improving post-harvest handling of grain are not widely adopted
- The use of hermetic storage to reduce insect damage in stored seed and grain needs to be reinforced
- Safe bulk storage methods are not widely applied at aggregation points (farmer organizations and traders)

3

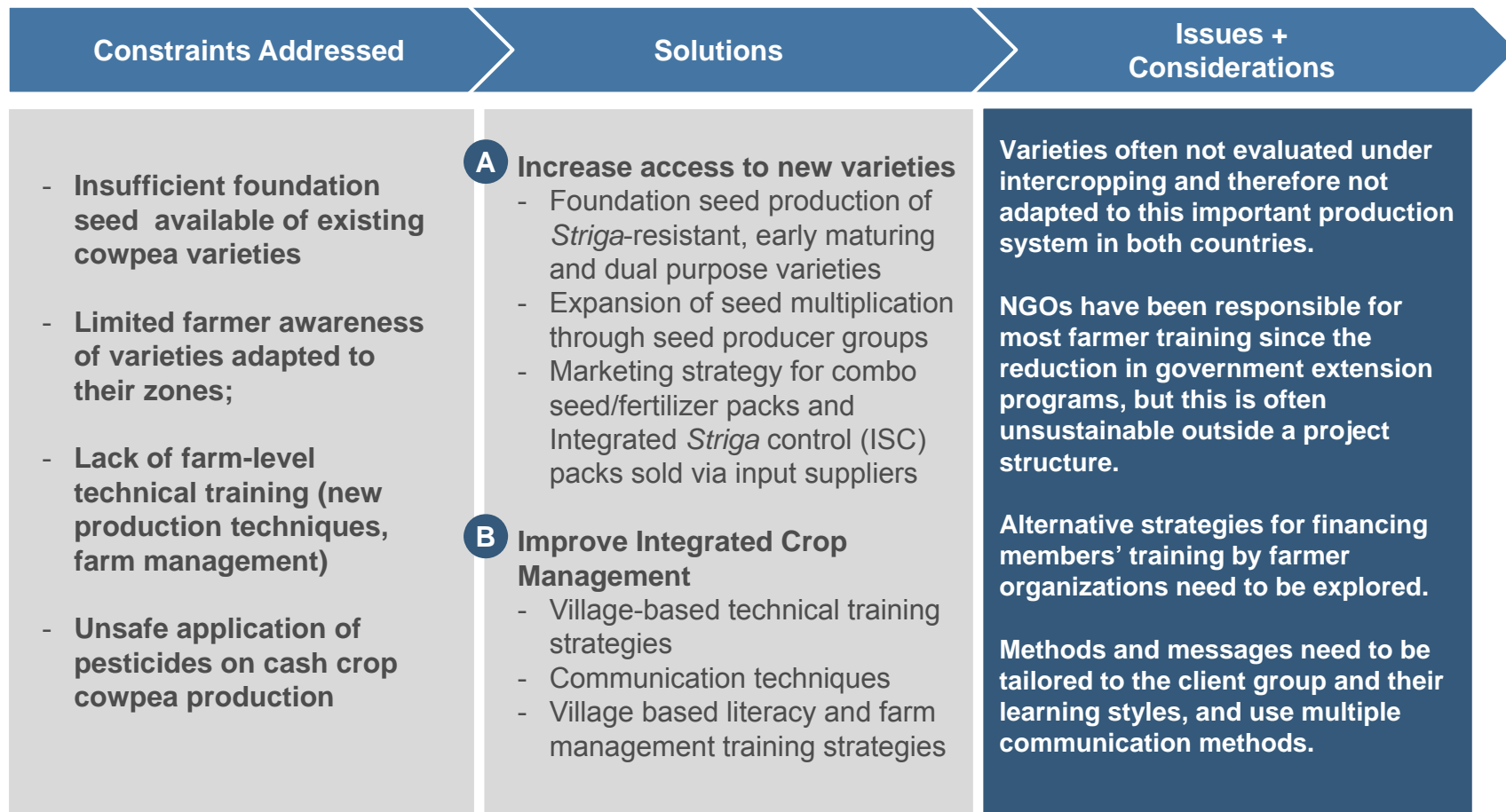
Improve Processing & Grow Demand

- Processing into flour and couscous is labor-intensive but currently the two most important forms of processed cowpea
- Few resources have been put into product development outside of Ghana and Nigeria
- Support existing processors to incorporate cowpeas into their product line
- Facilitate the development / introduction of mechanized low-cost processing

1

IMPROVING COWPEA PRODUCTIVITY IS A KEY INTERVENTION IN BOTH COUNTRIES

Intervention #1: Improve productivity through improved varieties and integrated crop management



1 DETAILED INTERVENTION DESCRIPTION - INCREASE ACCESS TO NEW VARIETIES & IMPROVE INTEGRATED CROP MANAGEMENT

Key Intervention Elements

- Support increased foundation seed production for main production zones
- Support increased participatory varietal selection (PVS) for both monoculture and intercrop systems
- Expand and decentralize seed multiplication (support to Union/OP producer groups)
- Sales & marketing of combo seed/fertilizer & (ISC) packs
- Farmer Field Schools for evaluation of IPM, soil conservation and fertility practices

Potential Programs Formats

- **Training** – Increase seed producer groups trained to multiply certified seed. Use practical technical training methods such as FFS. Promote family farm management training and literacy.
- **Seed** – Seed produced under contract to seed companies or purchased after certification by Ops, input suppliers, government or NGOs for distribution and resale
- **Marketing** - Large-scale media campaign (knowledge of varieties, improved practices) to reinforce field activities

Size, Scalability & Timing

- Expect to scale up over the course of five years
- Potential to reach ~140,000 farmers per year

Key Dependencies & Risks

- New variety performance is limited with intercropping, predominant in Mali.
- Combo packs take time to prep and have increased costs of packaging and instruction sheets.
- Input suppliers need to be located near production.
- **Use of various communication methods** results in better results than single message/method systems.

Gain to SHF (est.)

- Average yield gain – **50%**
- **Potential benefit to SHF: \$72 / ha**

Potential Partners

Seed companies

- Faso Kaba (Mali), Nefaso (BF)

Farmer Organizations

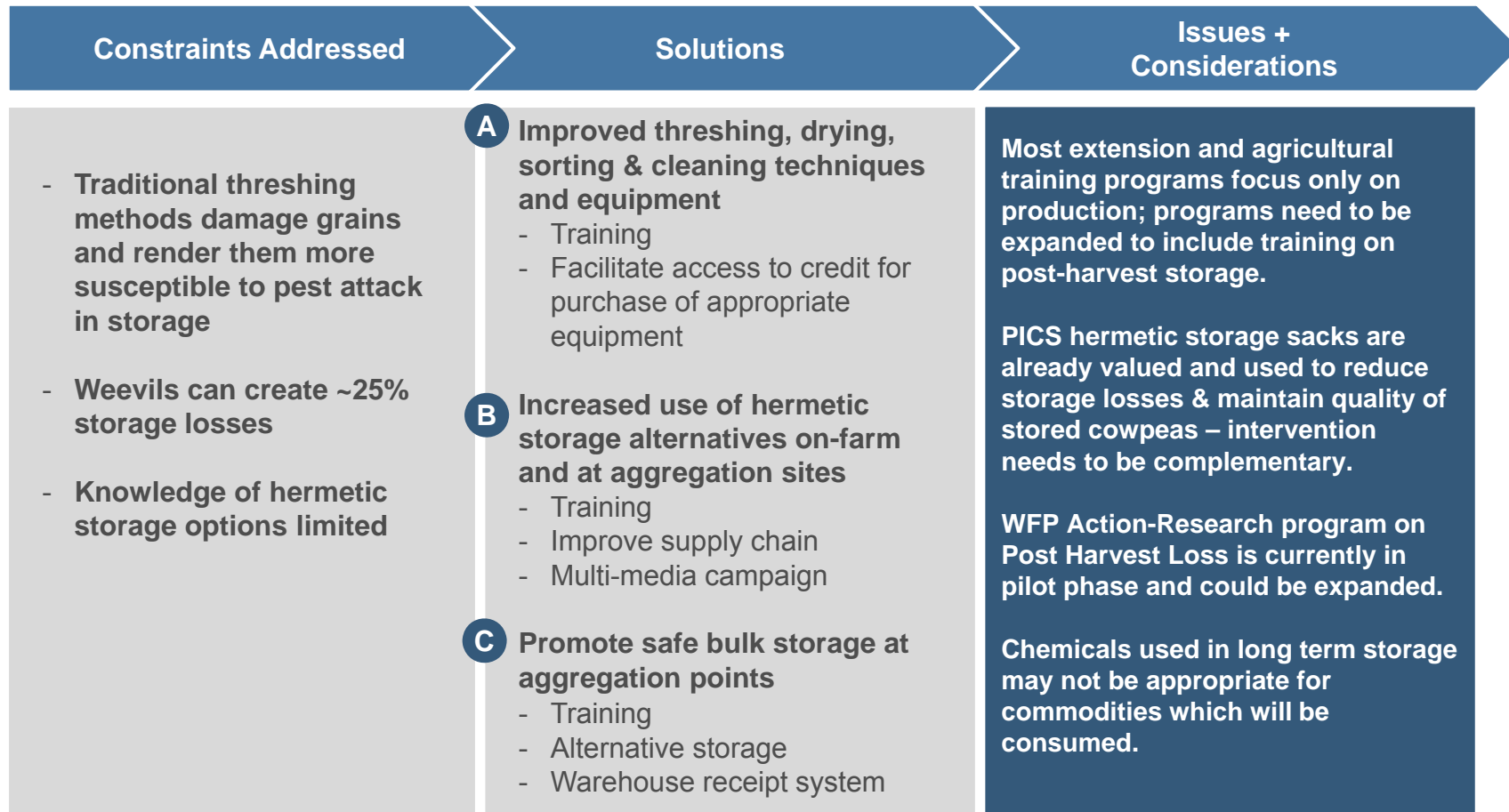
- Burkina Faso: Ops Namentenga, Boucle de Mouhoun, Sahel, CAP- Yako, Diemas (East)
- Mali: OPs Bouroueli, Koulikoro and Mopti

Farmer Organization Capacity Building

- Burkina Faso: INERA, SNV
- Mali: IER, SNV, Sasakawa

2 REDUCING POST-HARVEST & STORAGE LOSSES INCREASES COWPEA AVAILABLE FOR SALE IN BOTH COUNTRIES

Intervention #2: Reduction of post-harvest and storage losses



2 DETAILED INTERVENTION DESCRIPTION – POST-HARVEST AND STORAGE LOSS REDUCTION

Key Intervention Elements

- **Training module** development and training in improved threshing, drying, sorting & cleaning techniques
- Facilitate **access to credit** for purchase of appropriate equipment
- Promote the increased use of **hermetic storage alternatives** on-farm and at aggregation sites
- Promote **safe use of chemicals** on-farm and in aggregated storage systems

Potential Programs Formats

- **Training** – Train farmers participating in FFS; TOT for agents of Farmer Organizations; extension agents; input supply dealers
- **Access to Credit** - Assist OP to develop business plan and request for credit for post harvest handling equipment
- Work with FOs, agro input dealers and managers of FO input stores to develop strategies for increasing availability of hermetic storage farmers in rural areas
- **Media campaign** - increase awareness of safe use of storage chemicals

Size, Scalability & Timing

Key Dependencies & Risks

- Farmers are still using Phostoxine and other chemical fumigants in three-ply sacks – unsure of quality and functionality
- Cost of storage (perceived and actual) is significant factor in successful adoption
- Availability of hermetic storage options in close proximity to farmers will facilitate their adoption

Gain to SHF (est.)

- Average storage loss gain – **10%**
- **Potential benefit to SHF: \$40 / ha**

Potential Partners

Technical capacity building

- INERA (BF), IER (Mali), IFDC (both)

Farmer Organizations

- Mali: OP Cinzana, UR SCPV, OP Baroueli, OP Koutiala, Faso Jigi
- BF: UPPAs-North, UPPAs Boucle de Mouhoun, Federation of Diemas, Unions of Center North

NGOs

- CRS, Tin Tua, FERT, AFDR (BF); Sasakawa (Mali); SNV and GIZ (both)

Microfinance:

- Caisse Populaire or other regional MFI (BF); Soro Yiriwasso or other regional MFI (Mali)

2 ADDRESSING POST-HARVEST TECHNIQUES IMPACTS WOMEN IN PARTICULAR AS THEY CARRY OUT THESE ACTIVITIES

Harvesting and threshing are women's activities

- Cowpeas are threshed traditionally by hitting the dried pods with a stick
- A manual machine has been introduced by FERT and widely diffused by PROFIL (IFAD funded value chain project) in Burkina Faso
- Grain quality has been improved by introducing women to the new mechanized thresher which can also be used for groundnuts



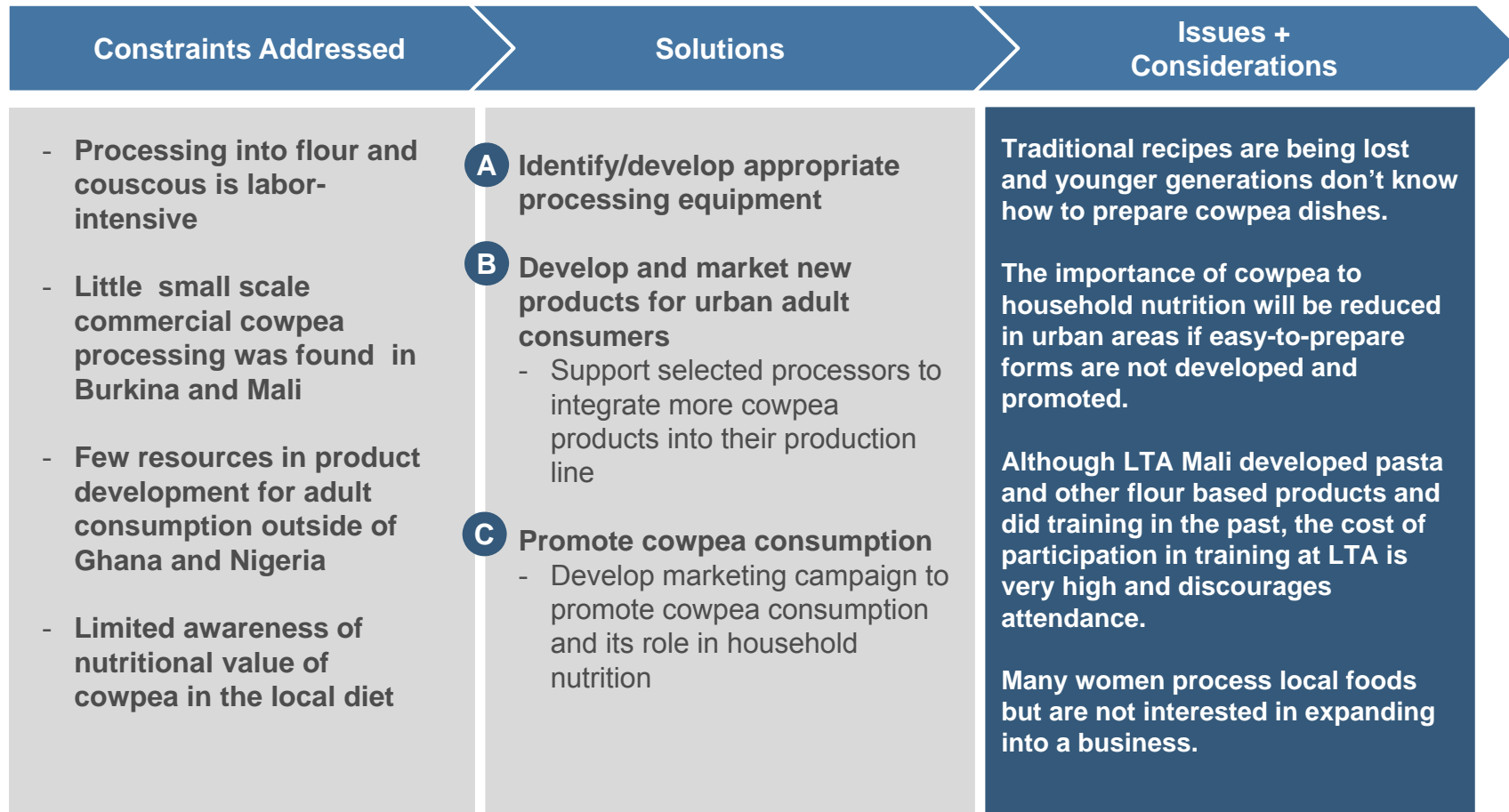
Cowpea threshing with sticks¹



Mechanized manual threshing¹

3 IMPROVING EFFICIENCY OF COWPEA PROCESSING IMPACTS WOMEN'S INCOME GENERATION, IN PARTICULAR RURAL WOMEN

Intervention #3: Improve efficiency of cowpea processing



3 DETAILED INTERVENTION DESCRIPTION – IMPROVE EFFICIENCY OF TRADITIONAL COWPEA PROCESSING

Key Intervention Elements

- **Identify/develop labor-saving devices** for cowpea processing
- **Develop new products** for urban adult consumers
- **Identify and catalog** traditional cowpea recipes
- **Market** Develop strategy to make more accessible for an urban market
- **Campaign** Develop generic “eat cowpea” advertising messages to promote its nutritional benefits and increase demand

Potential Programs Formats

- **Work with processors** Identify, evaluate and adapt cowpea processing equipment. Facilitate linkages and contractual arrangements with more advanced ones.
- Train selected processors in production of cowpea based foods, hygiene, standards, packaging and business management
- **Research & Development** on traditional recipes and new products
- Assist in preparing business plans and facilitating linkages with financial institutions
- **Marketing Campaign** – “Eat Cowpea”

Size, Scalability & Timing

- **25 Processors:** 10 rural groups (5 focus regions) + 3 individual urban processors in Burkina Faso; 8 rural groups (4 focus regions) + 4 individual urban processors in Mali
- **SHF:** all 700,000 targeted

Key Dependencies & Risks

- Efficient & affordable processing equipment isn't identified or developed for small-scale processors
- Women do not have access to credit and the physical infrastructure to buy and store sufficient raw materials after harvest when prices are lower
- Market demand does not increase as expected

Gain to SHF (est.)

- **Potential benefit to SHF: Unknown**

Potential Partners

Processors capacity building

- GRET, Afrique Verte (both BF and Mali)

Equipment producers

- Mali: CAFON
- BF: TBD

Financial institutions

- Mali: Soro Yriwasso, Oikos
- BF: Orabank, Caisse Populaire, Coris Bank

DOWNSTREAM MARKET INTERVENTION BENEFITS OFTEN CANNOT BE EVALUATED SOLELY IN TERMS OF DIRECT IMPACT ON SHFs: A BROADER MEASURE OF SOCIO-ECONOMIC IMPACT MUST BE SOUGHT

Improved market access for SHFs is the measure by which potential interventions have been evaluated throughout the multi-crop value chain study

- Calculated by estimating the effect of yield increases, production cost reductions and unit price premiums on SHF income
 - However, certain downstream interventions that create a positive long-term macro-economic impact that positively impact the SHF environment cannot be assessed using this analytical approach. Another approach to evaluation is needed if the benefits of such interventions are to be assessed
-
- Market access to processors for SHFs is seen as a desirable feature in value chain studies
 - However, at least implicitly, the expectation is that a **price premium** will be paid for bulk delivery of uniform, high quality products, so that there is an immediate cash benefit to the SHF
 - With cowpea, there is already **strong market demand for an undifferentiated commodity**
 - With few opportunities to differentiate the grain to obtain price premiums
 - There is little scope to calculate short-term benefits for the SHF from processing-focused interventions where no unit price premium can be expected
 - One way of incorporating a downstream benefit is to view it as **enlarging the SHF market**
 - The SHF hectares affected by the interventions is set at a given percentage (20% for cowpea) using the present analytical approach. The value of increasing processing efficiencies can be indicated by increasing the number of hectares impacted, which increases the overall value of the intervention set
 - In Africa, very often, the food crop value chains end up reaching artisan-level processors, mostly run by women in both rural and urban environments
 - Perhaps BMGF should consider whether the small-scale food processors should also be included as beneficiaries of food crop value chain interventions alongside the SHFs themselves

ASSUMING INTERVENTIONS IMPACT 700,000 SHFS in BURKINA & MALI AT FULL ADOPTION IN 10 YRS., ANNUAL BENEFIT IS PROJECTED TO REACH +\$68MM/ANNUM

Number of target SHFs for interventions:	700,000
	<u>Net financial benefit per farmer with 0.5 ha. in cowpea</u>
Benefit per farmer from Int. #1:	\$57
• Yield gain impact (input package)	\$37
• Anaerobic storage benefit	\$20
Benefit per farmer from Int. #2:	\$40
Benefits per farmer from Int. #3: (not directly estimated – see note)	\$?
Net benefit per farmer <i>Per annum</i>	\$97

Aggregate SHF benefit
Per annum – 700,000 SHFs

\$68 MM

Assumptions of Context Network Analysis:

- 0.5 ha of cowpea grown per farmer
- \$450 farm gate sales price basis
- 0.9MT yield per ha, less 10% storage loss
- 1.8 million hectares of cowpea in Burkina Faso & Mali combined in 85:15 ratio
- At full adoption in year 10

Based on crop hectare split between countries, this infers benefits of \$58MM for Burkina & \$10MM for Mali

COWPEA INTERVENTIONS COULD INCREASE FARMGATE CROP VALUE BY ~\$193/HA. ANNUALLY IN BURKINA AND MALI COMBINED

	Base Yield ²	Yield Gain	Yield Gain	Gross Yield	Storage Loss	Storage Loss	Net Sold	Price	Cost Impact	Outcome/ Gain
	MT/ha	%	MT/ha	MT/ha	%	MT/ha	MT	\$/ MT	\$/ ha.	
Adoption of optimal intercropping pattern, improved varieties with Striga resistance, and input package	0.6	50%	0.3	0.9	10%	0.09	0.81	\$450	\$50	\$315
- Traditional production system	0.6		0	0.6	10%	0.06	0.54	\$450		<u>\$243</u>
YIELD GAIN IMPACT										\$72
Anaerobic storage value added (assuming improved yield of previous impact assessment)				0.9	0%		0.90	\$450		\$405
- Traditional storage				0.9	10%	0.09	0.81	\$450		<u>\$365</u>
ANAEROBIC STORAGE INTERVENTION IMPACT										\$40
Storage price-premium, crop is sold 3 months after harvest at 20% higher price				0.9				\$540		\$486
- Traditional rapid post-harvest sale				0.9				\$450		<u>\$405</u>
POSTPONED SALE PRICE GAIN IMPACT										\$81
TOTAL POTENTIAL FARMGATE CROP VALUE IMPACT PER HECTARE										\$193

Number of cowpea hectares in Burkina and Mali ³ (million)										1.8
Area impacted, assuming intervention measures eventually reach projected share of cowpea hectares ¹								20%		0.36
Smallholder farm average area in cowpea (ha.)										0.5
Smallholder farmer number impacted										700,000
POTENTIAL FARMGATE CROP VALUE IMPACT OF COWPEA INTERVENTIONS AT FULL ADOPTION , million \$										\$68

INTERVENTION #1 ALSO HAS A POTENTIAL UPSIDE FROM INTRODUCTION OF Bt-COWPEA, INCLUDING REDUCTION OF INSECTICIDE SPRAY COST

Impact of Bt Cowpea Seed Use per ha.	Insecticide Cost/Liter	Spray #	Insecticide Cost Reduction
Reduction in insecticide use from 3 sprays to one	\$14	1	\$14
- Traditional production system	\$14	3	\$42
PRODUCTION COST REDUCTION (Bt Cowpea)			\$28

Benefits from prevention of sub-threshold insect damage:

After the introduction of Bt-cotton, data showed a yield increase versus sprayed fields. This was an unanticipated benefit. The reason was that growers monitor pest populations and only spray when they build up to a level that economically justifies chemical treatment. The resulting yield losses were significant, but should be expected to amount to less than the cost of a spray. However, if several sprays are required, then the total value of sub-threshold losses could be multiples of some high fraction of **\$14/ha**. Such yield gains have been ignored in the present benefit analysis.

4 Stakeholder Profiles

PHASE 2 COWPEA BURKINA FASO/MALI EXECUTIVE SUMMARY

1 SECTOR FUNDAMENTALS

- Cowpea in Burkina has transitioned recently from food security to cash crop status, providing income for many of the 2.6M SHFs who grow cowpea
- 65% of the Burkina crop is marketed, and ~1/2 of that is exported, mainly to Nigeria
- Mali cowpea production is barely sufficient for domestic consumption
- Post-harvest losses from weevils now reduced by use of air-tight containers, inc. PICS

2 VALUE CHAIN OPPORTUNITIES

- Mono-crop cultivation systems are now common in market-focused areas of NE Burkina – so that the crop is now poised for yield improvement techniques
- Major insecticide cost saving is possible when Bt cowpea lines are introduced
- Current post-harvest value chain is relatively efficient, but large traders reap most profits from crop accumulation and storage – scope for improved SHF value capture

3 INTERVENTIONS & IMPACT

Most promising intervention cluster focuses on improving production systems and adoption of improved varieties, because yields are still low

- Int.#1 Cowpea Productivity Package – 50% yield gain potential
- Int. #2 Reduction of Post-harvest/Storage Losses
- Int. #3 Improved Cowpea Product Preparation
- \$97 per annum average benefit projected for 700,000 SHFs (20% of total) at Yr.10










4 STAKEHOLDER PROFILES

- NAFASO, seed co. leader in Burkina, produces basic seed; Faso Kaba in Mali
- Govt. plant research agencies INERA and IER
- Farmers organizations: Ops Namentenga, Boucle de Mouhoun, Sahel, CAP- Yako, Diemas (East) Burkina; OPs Bouroueli, Koulikoro and Mopti, Mali
- Processor capacity-building – GRET, Afrique Vert, ATCB, RTCF

POTENTIAL STAKEHOLDERS SPAN DIFFERENT PORTIONS OF THE INTERVENTIONS - COWPEA BURKINA (1)

		INT# 1: Cowpea Productivity Package			INT# 2: Storage Loss Reduction			INT# 3: Improve processing		
Farmer's Organization	CAP-Yako	■	■		■					
	UPPAs-North	■			■					
	UPPAs – Center North	■			■					
	Union de Soum (Sahel)	■			■					
	Federation des Diemas	■			■					
	FERT	■	■		■					
Farmer's Organization Capacity Building	Tin Tua	■			■					
	AFDR? (Sahel)	■			■					
	SNV	■			■			■		
	IFDC	■	■		■	■	■			
	INERA	■	■	■	■	■	■			



POTENTIAL STAKEHOLDERS SPAN DIFFERENT PORTIONS OF THE INTERVENTIONS – COWPEA BURKINA (2)

		INT# 1: Cowpea Productivity Package	INT# 2: Storage Loss Reduction	INT# 3: Improve processing
Financial Institutions - Banks				
				
				
Financial Institutions - MFI				
				
				
				
Processors Capacity Building				
				
	ATCB			
	RTCF			

POTENTIAL STAKEHOLDERS SPAN DIFFERENT PORTIONS OF THE INTERVENTIONS - COWPEA MALI (1)

		INT# : Cowpea Productivity Package			INT# 2:Storage Loss Reduction			INT#3: Improve processing		
Farmer's Organization	OP Cinzana	■			■					
	UR SCPV	■			■	■				
	OP Baroueli	■	■		■					
	OP Koutiala	■			■			■		
	FASO JIGI	■			■	■				
	OP Plaine de SENO	■			■					
Farmer's Organization Capacity Building	IFDC	■	■		■	■				
	SNV Mali	■			■			■		
	IER	■	■	■	■	■	■	■		
	Nyeta Conseil	■			■			■		
	CRS	■			■			■		
	Sasakawa	■	■		■			■		

POTENTIAL STAKEHOLDERS SPAN DIFFERENT PORTIONS OF THE INTERVENTIONS – COWPEA MALI (2)

		INT# 1: Cowpea Productivity Package			INT# 2: Storage Loss Reduction			INT# 3: Improve Processing		
Financial Institutions - Banks	BNDA									
	Oikos									
	Soro Yiriwasso	■			■			■	■	
Financial Institutions - MFI	Other regional MFI (TBD)									
Processors Capacity Building	 CRET Professionnels du développement agricole							■	■	■
		■			■			■	■	
	SOCAFON	■						■		

Appendix

SORGHUM AND/OR MILLET FEATURE PROMINENTLY IN 12 OF 16 LIVELIHOOD ZONES IN BURKINA FASO

COWPEA IS MENTIONED AS AN “IMPORTANT” CROP IN ONLY ONE ZONE (14), BUT THIS REFLECTS THE DOMINANCE OF CEREAL CROPS IN AREA AND NOT THE SIGNIFICANCE OF COWPEA AS A CASH CROP

- The zones in the table are arranged by agro-climatic zone.
- The sequence starts with the highest rainfall zone and ends with the lowest.
- The associated map is reproduced on the next slide.

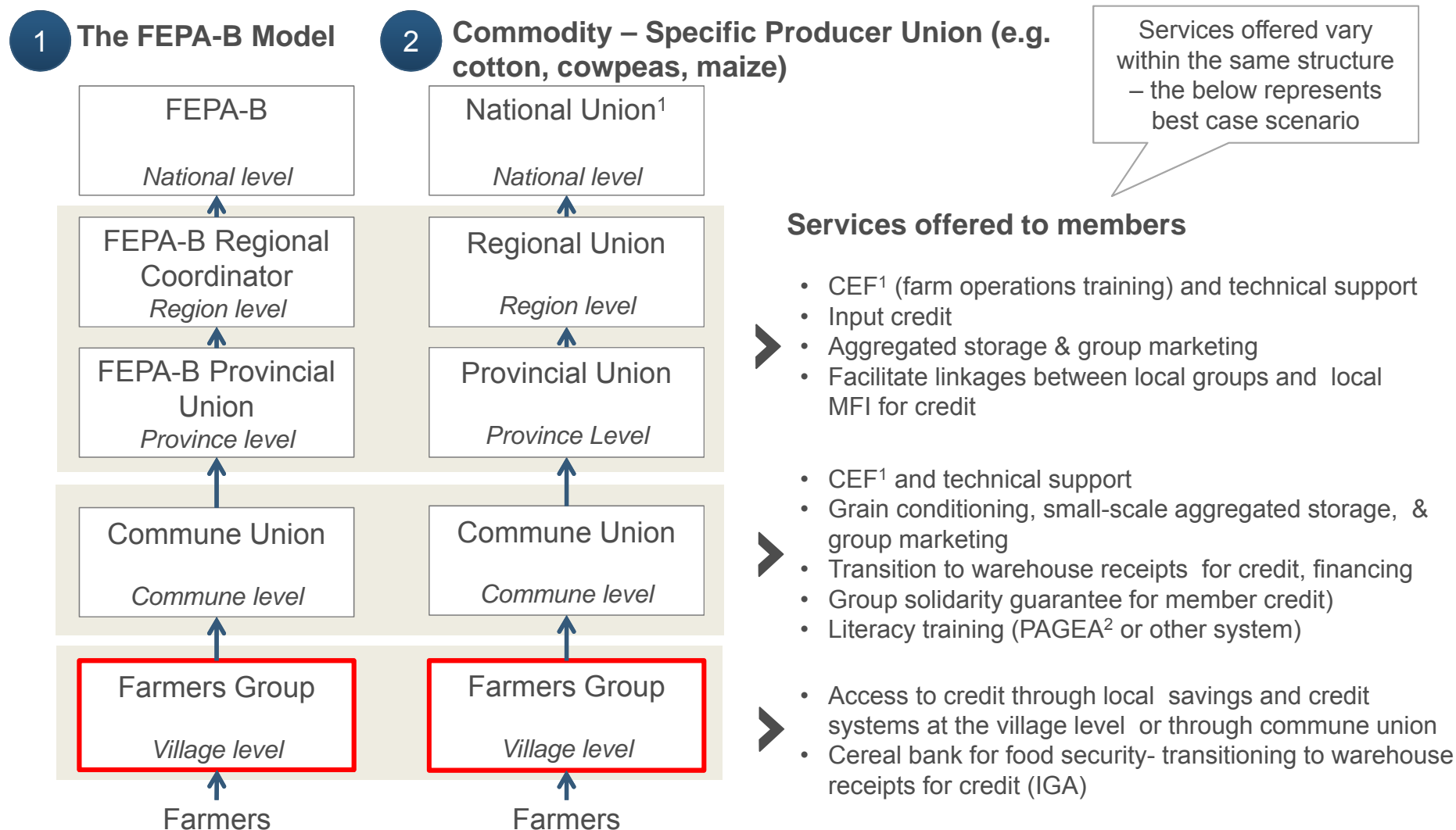
Burkina Faso: Livelihood Zone Description¹

Zone	Climate	Region	Arable Farming (ranked by importance)	Livestock	Other
1	Sudano-Guinean	SW	Cereals (sorghum, millet) & roots (yams, taro)	Assembly area; year-round grazing	-
4	South Sudanian	SW	Cereals (sorghum, maize), cotton	Assembly area; seasonal migration	Fishing
7	North Sudanian	Ctr-W	Cereals (sorghum, millet), small-plot gardening	Seasonal grazing, poultry	Shea nuts, trade, migration
8	South Sudanian	S	Cereals (maize, sorghum), yams, cassava, cotton	Assembly area; seasonal migration	Forestry, tourism, shea nuts
9	North Sudanian	Ctr-E	Cereals (sorghum, rice), groundnuts, potato, cotton	Assembly area; seasonal migration	Cross-border trade
10	North Sudanian	SE	Cereals (sorghum, millet), cotton	Assembly area; seasonal migration	Fishing, wildlife, forestry
12	North Sudanian	Ctr.	Cereals (sorghum, millet), Bambara nut, vegetables	Peri-urban animal rearing	Local market trading
6	Sudano-Sahelian	NW	Cereals (sorghum, fonio, rice), vegetables, sesame	Year-round and seasonal grazing	Fishing, shea nuts
13	Sudano-Sahelian	Ctr-N	Cereals (sorghum, millet), Bambara nut, veg.	Small-scale animal raising	trade, gum arabic
16	Sudano-Sahelian	E	Cereals (millet, sorghum), Bambara nut	Year-round and seasonal grazing	Cross-border trade
14	Sahelian	N	Cereals (millet, sorghum), cowpea, veg.	Migratory seasonal grazing	Gold, cattle dominant
15	Sahelian	NE	Cereals (millet, sorghum), Bambara nut	Year-round and seasonal grazing	Cross-border trade

- The zones where the focus crops were not listed featured cotton (Zone 5), maize and rice (Zones 2 and 3) and peri-urban cultivation (Zone 11).
- The full list in French is included in the Appendix.

61 ¹Cartographie des Zones Socio-Rurales du Burkina Faso, Dembele, Y., FAO, 2010, www.fao.org/nr/water/docs/BFA_LZ_analysis.pdf

INPUTS AND SERVICES FOR FARMERS ARE PRIMARILY CHanneLED THROUGH THE TIERED STRUCTURES OF FARMERS ORGANIZATIONS



Note: Only national cotton producers union and hierarchical structures are operational; little organization around commodities at any level. Most FEPA-B and other nonaligned provincial unions multi-crop to better serve needs of members;

¹ CEF – Conseil en Exploitation Familiale (Farm Operation Consulting) is counseling and support for SHF aimed at increasing income with better operations management

62 ² PAGEA – Programme d'Alphabétisation à la Gestion des Exploitations Agricoles Is a Literacy Program in Agricultural Operations Management for SHF operations

COWPEA PESTS & THE Bt COTTON ANALOGY – A GAME-CHANGER?

“Insect pests are major constraints to cowpea production in West Africa. The crop is severely attacked at every stage of its growth by a myriad insects that make the use of tolerant varieties and insecticide sprays imperative”¹

- In this situation, what is the point of introducing Bt cowpea, which controls only *Maruca*?
- The answer may lie 30 years back. Pyrethroid insecticides were introduced then to control *Maruca*, which was at that time the dominant pest²
- The repeated season-long sprays of insecticides certainly killed off *Maruca*, but also eliminated beneficial *Lepidopteran* insects that kept populations of other pests low
- The result was that aphids, thrips and bugs that were not controlled by pyrethroid chemicals flared uncontrollably
- The expectation now is that if *Maruca* can be controlled without spraying, then the beneficial insects will return and insecticide use will be dramatically reduced
- This scenario has transpired already with Bt crops in the US and elsewhere³
- The pest spectrum is different between West Africa and the USA, but experience with Bt cotton in Burkina Faso may already provide insights on the likely beneficial environmental impact of Bt cowpea

¹ Farmers Guide to Cowpea Production in West Africa, IITA, 2009

² Context consultant Mike Harwood worked with FMC, 1982-7 on the introduction of cypermethrin to control *Maruca* on cowpea in Nigeria

³ Impacts of Bt Crops on Non-target Invertebrates and Insecticide Use Patterns, Naranjo, S., CAB Reviews, 2009 4, No. 011

<http://fbae.org/2009/FBAE/website/images/pdf/important-publication/impacts-of-bt-crops-on-non-target-invertebrates-and-insecticide-use-patterns.pdf>