

# **Counterfeiting in African Agriculture Inputs – Challenges & Solutions**

## ***Research Readout***

This report was prepared for the Bill and Melinda Gates Foundation in collaboration with Monitor Deloitte, and was used to facilitate a workshop in Nairobi, Kenya on February 14, 2014.

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## Introduction to Bill & Melinda Gates Foundation Study

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### Objectives of Study

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*Understand the drivers of counterfeiting in the agricultural inputs sector in Africa, with a particular focus on Ghana and Uganda; lessons learned in these countries will be applicable to other countries as well*



*Identify commercially feasible solutions to address the problem of counterfeiting; understand the success factors and challenges when implementing solutions*

### Current Status

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1

#### Select Value Chains for Study

Value chains were selected based on selection criteria:

- 1) Relevance to smallholders
- 2) Size of category
- 3) Profitability of category
- 4) Role of the government
- 5) Prevalence of counterfeiting

2

#### Conduct Market Research on Drivers of Counterfeiting Across Value Chains

Value chains studied in Ghana and Uganda include:

- 1) Herbicides (Ghana)
- 2) Maize Seed (Ghana)
- 3) Herbicide (Uganda)
- 4) Maize Seed (Uganda)
- 5) Inorganic Fertilizer (Uganda)

3

#### Assess Applicable Solutions to Address Counterfeiting

Potential solutions to assess include: end-user authentication; track-and-trace technologies; quality assurance/certified channels; and manufacturer led interventions

**We have just concluded the market research phase of work**

## Agenda for Today

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### Workshop Objective

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- ✓ **Share insights** from market research on the extent and root causes of counterfeiting across the herbicide, maize seed, and fertilizer value chains in Uganda and Ghana
- ✓ **Discuss applicable solutions** (technological and non-technological) to address counterfeiting in agricultural input sectors studied
- ✓ **Evaluate the relevancy and feasibility of applicable solutions**, and distill key insights for moving forward

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### Agenda

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Agenda Item	Description	Time
Introductions	Welcome remarks and introductions	30 min
Prevalence of Counterfeiting	Presentation on key findings on extent and root causes of counterfeiting across five value chains studied in Ghana and Uganda	45 min
Potential Solutions	Presentation of potential solution types for tackling counterfeiting, and framework for evaluating different solutions	15 min
Evaluation of Solutions	Participants will be in breakouts and will evaluate the solutions	60 min
Read-out of Group Findings	Each breakout group will present findings in plenary, and discuss key themes and path forward	45 min

## Before we begin, an introduction to counterfeiting. . .

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### COUNTERFEITING IN AFRICA'S AGRICULTURAL INPUT SECTORS CAN TAKE MANY DIFFERENT FORMS

#### Adulterated Product

Product that is adulterated in some way, which may include authentic product that has been diluted or entirely fake products

Product may be packaged in reused branded bottles, or leverage imitation brand names, bottles or labels

#### Example



#### Sub-Standard Product

Product that does not effectively perform as it should, such as expired products or products with sub-standard concentrations

Product may be mislabeled (label doesn't reflect what's in the bottle), packaged in reused branded bottles, or leverage imitation brand names.

#### Example



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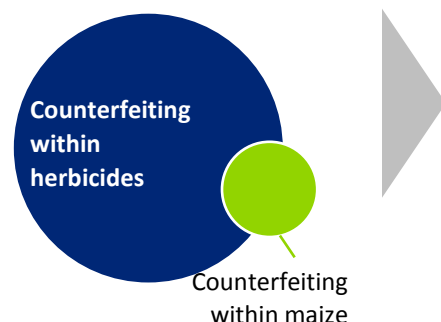
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## In summary, counterfeiting prevalence in Ghana is much higher within the herbicide market than in the maize seed market

### Summary of Prevalence of Counterfeiting Across Value Chains Studied

Relative Prevalence of Counterfeiting  
(Illustrative Sizes)



*While counterfeiting occurs within both herbicides and maize, prevalence is much higher in herbicides. Ghana's maize seed sector is still quite nascent; the sector is largely commoditized – a single low-priced OPV (Obatanpa) captures the majority of seed market. As a result, counterfeiting is not nearly as pervasive in seeds as it is in herbicides.*

### Summary of Types of Counterfeiting

#### Herbicides

- **Mislabeled / Sub-standard product** in which the label does not reflect contents in the bottle (often Chinese imports)
- **Label Reuse / Sub-standard product** in which a premium product's label is placed on a bottle of sub-standard product
- **Bottle Reuse / Adulterated product** in which premium bottles are refilled with diluted or fake product
- **Label Imitation / Sub-standard or Adulterated Product** in which a premium brand is imitated, but the product is sub-standard or adulterated

#### Maize Seeds

- **Mislabeled / Incorrect Seed** in which seed growers, companies, and agro-dealers place grains in the government-issued seed packages, and label them OPV or hybrid varieties.
- **Label Imitation / Adulterated or Sub-standard Seed** in which private seed companies packages are imitated/replicated and grains are sold as OPV or hybrid varieties (very rare given limited number of companies producing their own packages)
- **Mislabeled / Diluted Seed** in which seed growers “top-up” orders with grains in order to meet contracted amount

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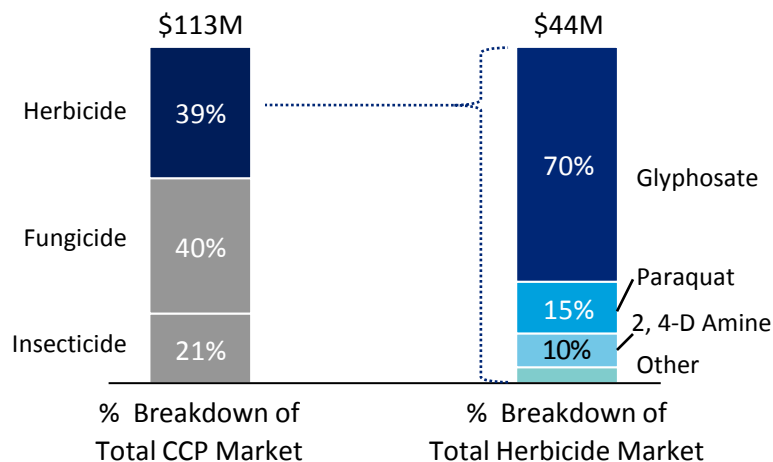
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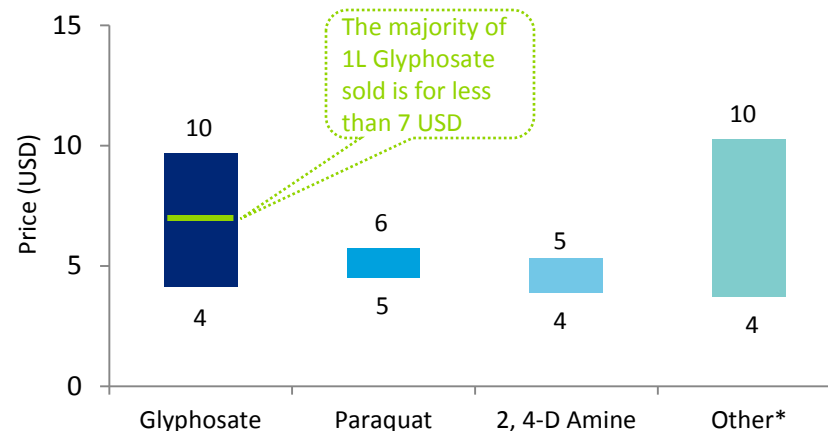


## Herbicides in Ghana represent a \$44 M market – low-priced Glyphosates sold in 1 liter containers constitutes a majority of the market

### Crop Protection Market in Ghana



### Price Range for 1 Liter of Herbicide



\* "Other" include Pendimethalin, Ametryn, etc.

### SKUs



**250 mL**  
Very  
infrequently  
sold



**500 mL**  
Sold  
infrequently  
(~ 5% of  
volume sold)



**1 L**  
Most popular size  
(~73% of volume  
sold)



**5 L**  
Less popular size  
(~22% of volume  
sold)

### Leading Brands in the Herbicide Sector

- While brand choice is a strong driver of purchasing behavior, the herbicide market is highly fragmented, with ~ 40 different varieties of glyphosates registered (over 60% of which are generic varieties)
- Most popular brands with smallholders include RoundUp, Rival, Dursban, and Kalach, but these brands are not always available in the channel



## Ghana's Crop Protection Product market is well regulated; manufacturers and importers must undergo rigorous testing before products can be distributed

### Key Players

**ENVIRONMENT PROTECTION AGENCY (EPA)** – Responsible for protecting and improving the environment of Ghana, which includes writing legislation on the production and use of agro-chemicals

**PLANT PROTECTION & REGULATORY SERVICES DEPARTMENT (PPRSD)** – Organizes, regulates, and implements plant protection services, including: plant imports/exports, seed inspection, and agro-chemical regulations

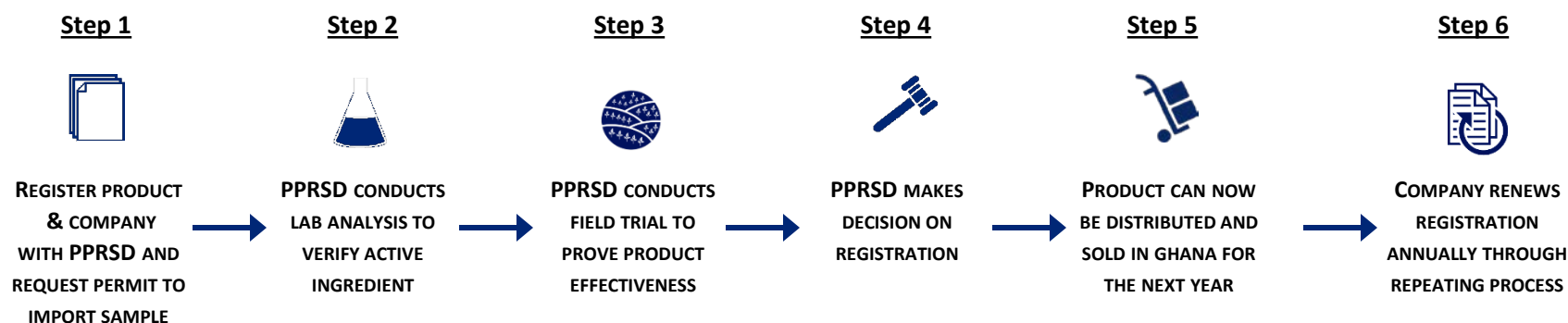
**PLANT & FERTILIZER REGULATORY DIVISION (PFRD)** – Division of the PPRSD that regulates the agro-chemical sector; registers and trains agro-chemical dealers and applicators; manages agro-chemical stock; supervises agro-chemical research

### Relevant CPP Regulations<sup>1</sup>

**PLANTS AND FERTILIZER ACT, 2010 (ACT 803):** Stipulates that “a person shall not import, manufacture or distribute fertilizers in commercial quantities unless the person is registered [with the PPRSD].”

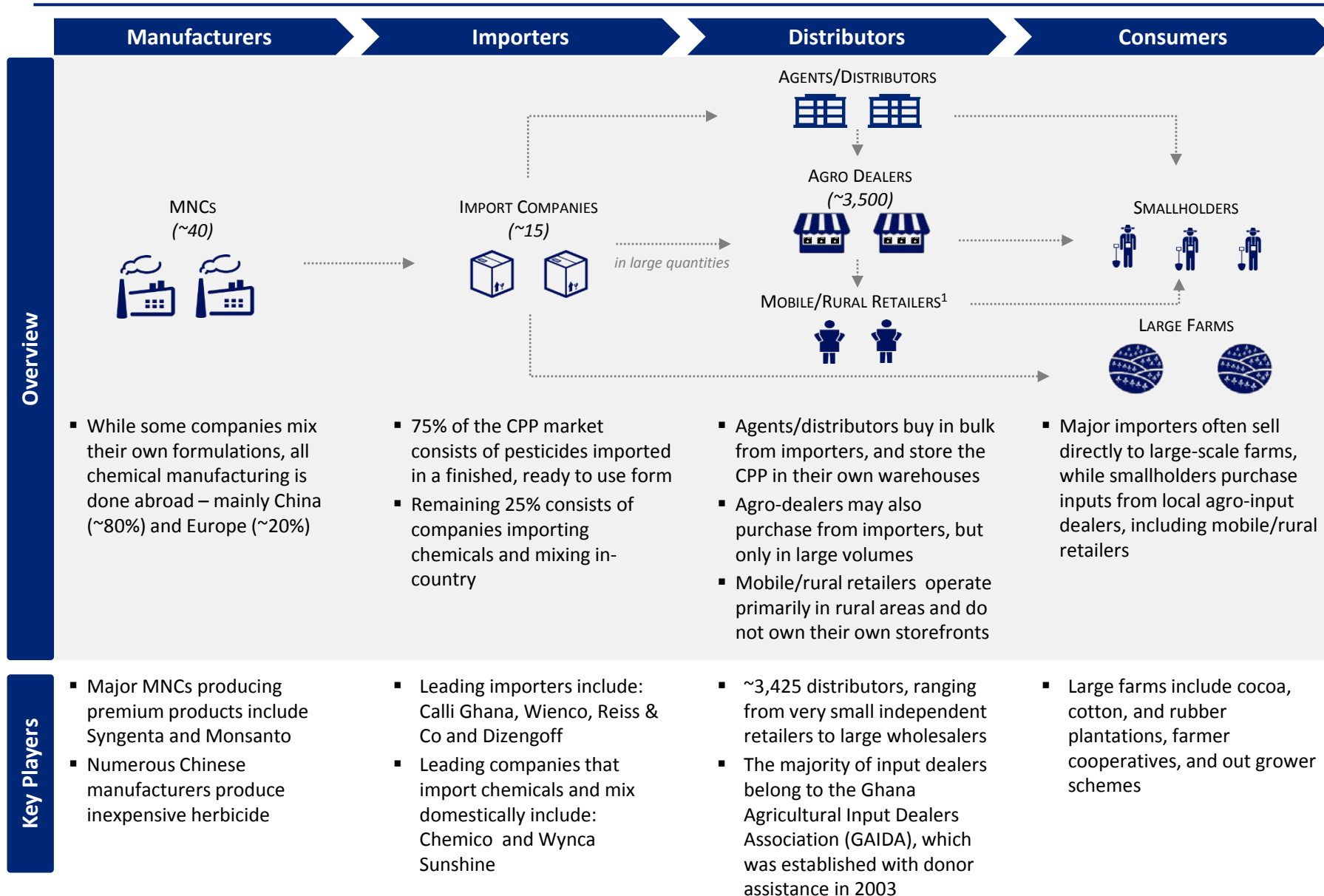
**ENVIRONMENTAL PROTECTION AGENCY ACT 490 (1994):** Mandates that the EPA and the PFRD carry out all regulatory activities within the pesticide market; gives the EPA authority to prosecute for environmental crimes such as misuse of chemicals and pesticides, including selling of counterfeit products

### Steps to Become A Licensed CPP Importer or Manufacturer<sup>1</sup>



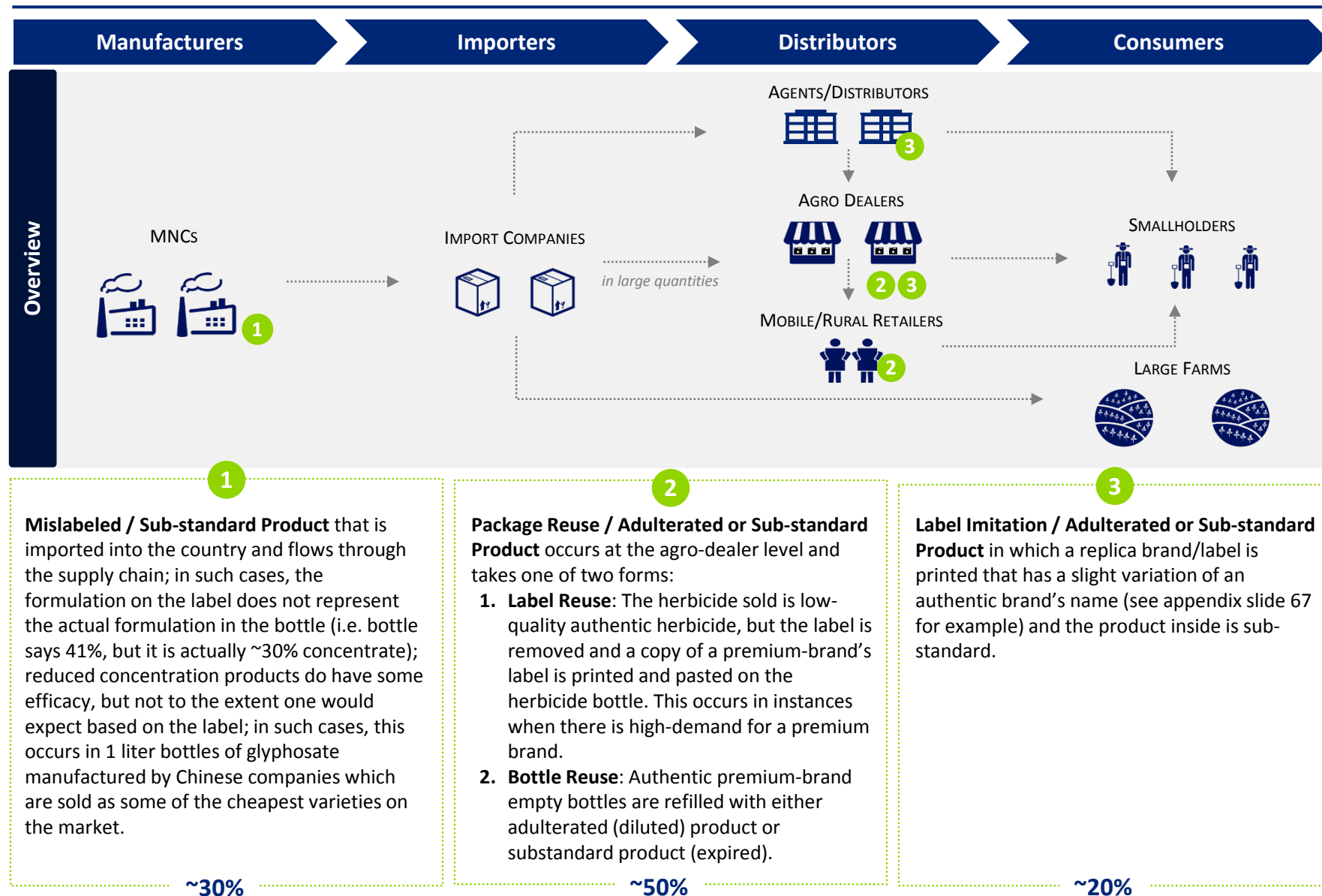
*Entire process takes 6-12 months to complete for a cost of ~US\$ 2000*

# The majority of herbicides sold in Ghana are imported in a finished form; while some companies import chemicals and mix domestically, there is no domestic manufacturing



<sup>1</sup> Note: An additional transaction may exist in which a retailer sells to another mobile/rural retailer

## Counterfeiting within the herbicide sector in Ghana primarily occurs in one of three forms . . .



## ... and is driven by four key issues

### Drivers of Counterfeiting in Ghana's Herbicide Market

1

#### Package Integrity across Distribution Chain

**High Degree of Intermediation** – The supply chain for herbicides is highly fragmented. Rather than having established contracts with 1 or 2 distributors, agro-dealers will often source their product from multiple different intermediaries, as well as sell to several agro-dealers further down the supply chain. In addition to a lack of vertical integration, the product will change hands 4-6 times before it reaches the consumer.

*“Manufacturers and distributors don’t have any visibility at the retailer level”*

2

#### Manufacturers Willingness to Intervene

**Out-of-Stocks of Reputable Brands** – Brands play a key role in the purchasing decisions of smallholder farmers; if they cannot buy the brand they want, they may not purchase a herbicide at all. During periods of limited supply in semi-urban and rural areas, agro-dealers are thus incentivized to provide the brand the farmer wants through counterfeiting activities.

**Limited Channel Oversight** – After the manufacturer sells the herbicide to the importer, very little is done to ensure that the product/package is not adulterated

*“If a product works, farmers insist on that brand; if its out of stock, it is in the interest of the dealer to counterfeit”*

3

#### Smallholder Context/ Behaviour

**Difficulty Identifying Adulterated or Sub-Standard Herbicides** – It is difficult for farmers to determine if a label has been tampered with or if the label represents the formulation actually in the bottle. Farmers typically won't know if the product is authentic for weeks after usage. Because of this uncertainty, farmers will often simply choose the cheapest alternative (in which case the opportunity cost is the lowest), which is likely a counterfeit.

*“The farmer often does not know the difference between a high-quality and a counterfeit product”*

4

#### Distribution Chain Actors' Behaviour

**Profit Potential of Selling Counterfeits** – Counterfeit herbicides command a higher profit margin than authentic herbicides; as such, producers of counterfeit will source identical packaging from China and fill it with sub-standard or adulterated materials in order to make greater profitability.

*“The agro dealer gets 2 cedis for RoundUp and 5 cedis for ‘Round Down’ so he pushes the Round Down”*

*Drivers of counterfeiting are interrelated and do not function in isolation*

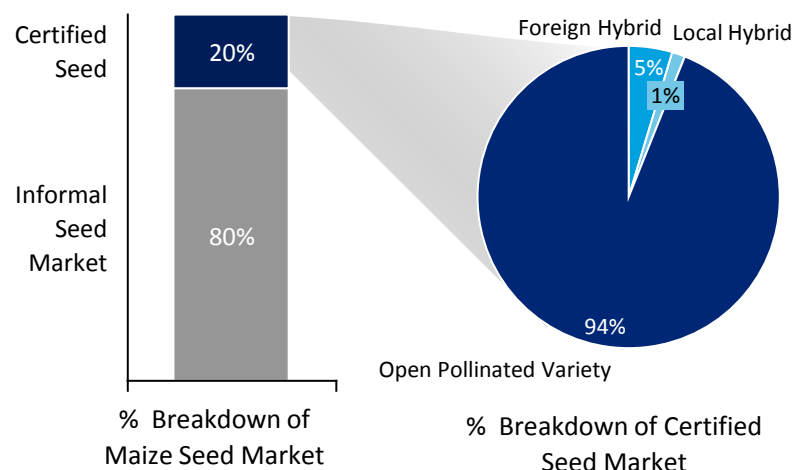
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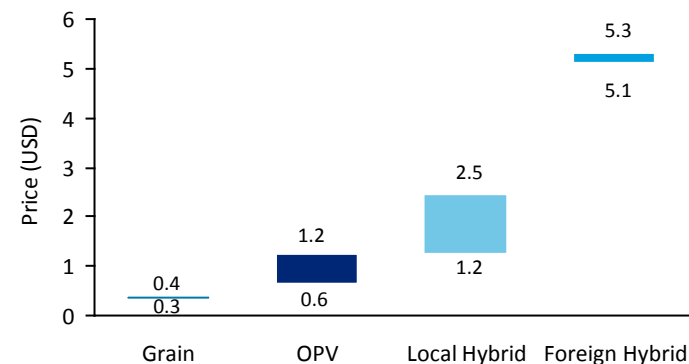
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# The market for certified maize seed in Ghana is still relatively nascent, and dominated by a single open-pollinated variety brand

## Maize Seed Market in Ghana



## Price Range for 1 kg of Maize



- The government recently announced a subsidy on maize seed, effectively reducing the current price by ~50%
- Initially, the majority of the subsidy will be spent on lowering the price of OPVs to match the price of reused grains

## Maize Seed Packaging

- Maize seed is typically sold in 1 kg government issued bags, which indicate the seed variety and seed company/grower
- Up until 2010, the PPRSD prescribed these uniform seed packages for all sale of maize seed
- This law has since been revised, and seed companies may apply to use their brand on product packaging; however, only 3 domestic seed companies have proprietary packaging thus far



## Maize Brands Sold

- The maize seed market in Ghana is highly commoditized
  - A single OPV, Obatanpa, constitutes the vast majority of domestic maize seed production
  - Private labeling of brands only began in the past year
- Wienco and AgriServ have recently begun promoting imported hybrid varieties, from Pannar and Pioneer, respectively, though these are rarely used by smallholder farmers



# Ghana's certified seed market is regulated by the GSID; seed growers and importers must go through an in-depth registration and testing process before seeds can be sold and distributed

## Key Players

### PLANT PROTECTION & REGULATORY SERVICES DEPARTMENT (PPRSD) –

Organizes, regulates, and implements plant protection services, including: plant imports/exports, seed inspection, and agro-chemical regulations

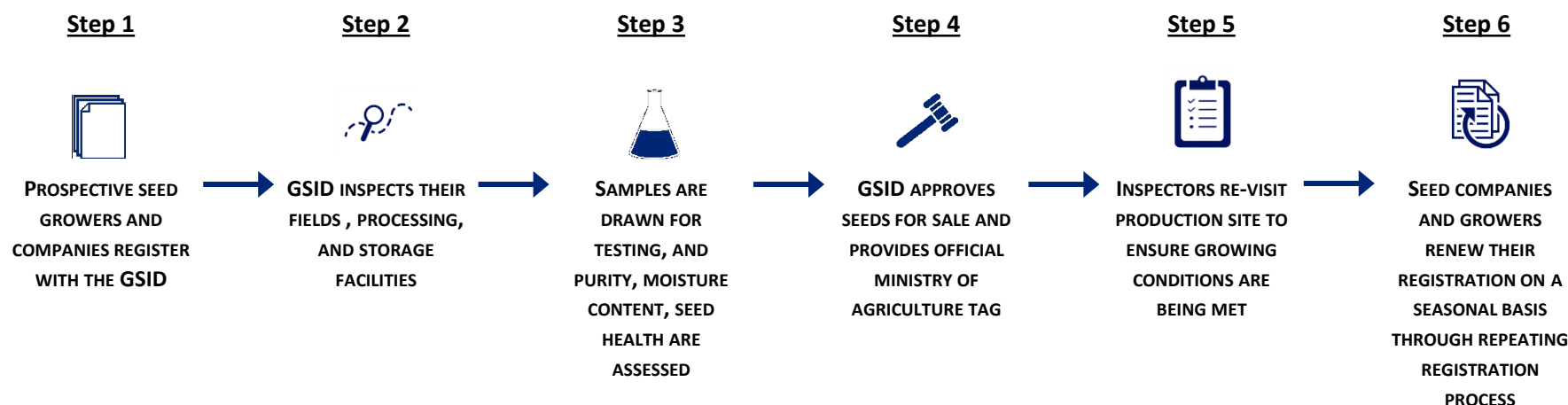
**GHANA SEED INSPECTION DIVISION (GSID)** – Division of the PPRSD that regulates the seed sector; registers and certifies seed growers / companies; supervises seed breeding research; monitors quality of seed, and facilitates promotional activities in the seed industry

**NATIONAL SEED COUNCIL (NSC)** – Responsible for policy formulation related to the development, production, inspection, sampling, analysis, conditioning and marketing of seeds in Ghana

## Relevant Seed Regulations<sup>1</sup>

**PART II OF PLANTS AND FERTILIZER ACT, 2010 (ACT 803):** The law includes designation of responsibilities for seed import and export, establishes a register of varieties that can be marketed, outlines procedures for seed quality control and testing, and establishes a National Seed Council and associated committees

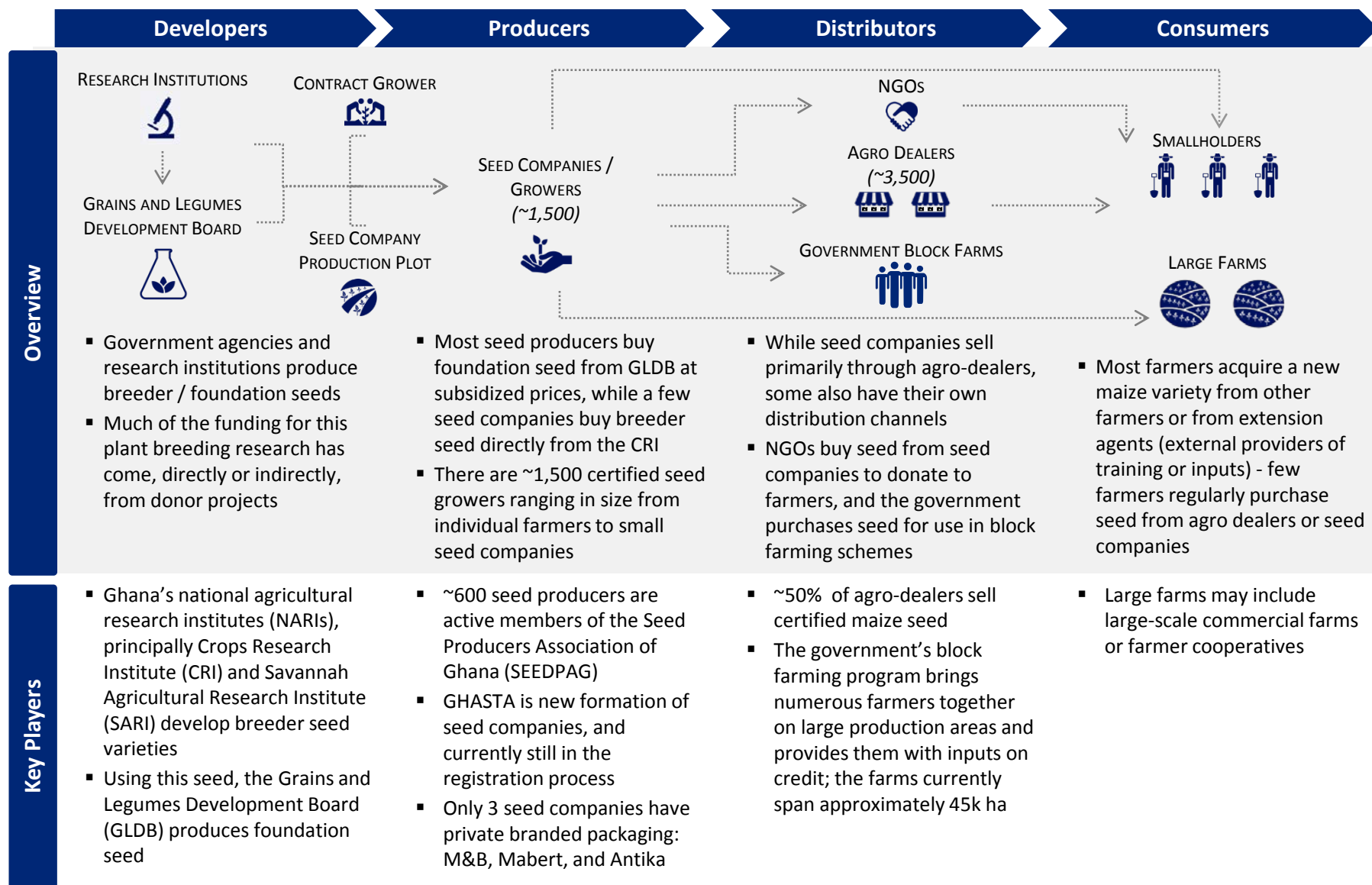
## Steps to Become A Certified Seed Grower / Company<sup>1</sup>



*Initial registration takes ~12 months to complete and is valid for 2 years, after which registration is renewed on a seasonal basis*



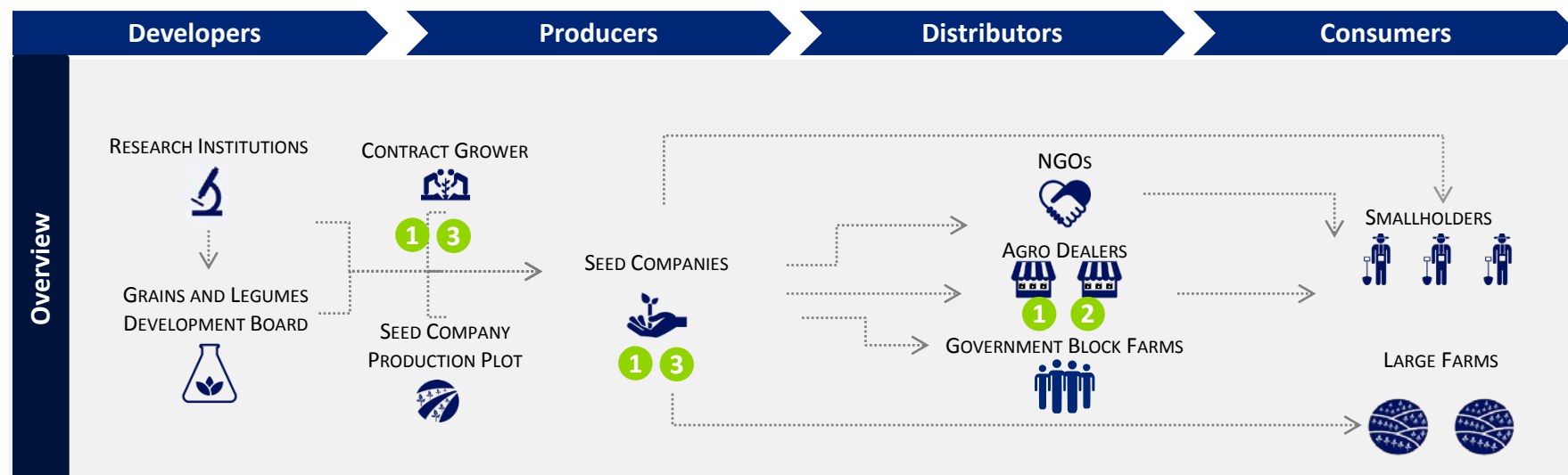
# Seed “companies” in Ghana have only recently emerged; the majority of seed producers are small-scale individual farmers that rely on government-produced breeder and foundation seed



Note: A small imported seed market is also present in Ghana, but counterfeiting is not a prevalent issue due to size of market and high degree of vertical integration; refer to the appendix for further information on distribution chain

Source: Primary interviews; IFPRI, “Ghana’s Commercial Seed Sector”, 2013; World Bank, “Agribusiness Indicators: Ghana”, 2012

# Counterfeiting within the maize seed sector in Ghana primarily occurs in one of three forms . . .



1

**Mislabeled / Incorrect Seed** occurs when the seed-type packed in the bag does not represent the variety or quality of seed indicated on the label. This is carried out by seed growers, agro-dealers, or other individuals, and can take two forms:

1. Seed growers selling grain as seed, or OPVs as hybrid seeds in government-issued bags
2. Agro-dealers or other individuals illicitly obtaining government issued bags and filling them with grains

~80%

2

**Label Imitation / Adulterated or Sub-standard Seed** occurs at the agro-dealer level, in which private seed companies packages are imitated/replicated; for example, imitation Mabert and M&B bags have appeared on agro-dealer shelves (Note: this instance of counterfeiting is relatively rare given the vast majority of seeds are still sold in government packages, but potential to increase as more companies move toward private branding)

~5%

3

**Mislabeled / Diluted Seed** is a response by seed growers to constrained supply. In the event of drought or other natural disasters, or when seed production is low, NGOs and government block farms will issue large orders for seed in order to ensure food security. When growers cannot meet the contracted amount with genuine seeds produced, they dilute quantities by adding grain to the order

~15%

Estimate of breakdown of counterfeit seed market

## ... and is driven by four key factors

### Drivers of Counterfeiting in Ghana's Maize Seed Market

1

#### Package Integrity across Distribution Chain

**Government-Issued Seed Packages** – The GSID provides standard plastic seed bags; these bags are easy to imitate, and relatively easy to acquire (until 2010, use of these packages by seed companies was mandated)

**Market Fragmentation**– With ~1,500 seed producers for a relatively small market, the majority of maize seed suppliers are small-scale growers participating in a highly commoditized market. This market fragmentation makes it difficult to identify the source of counterfeit seeds.

*“Because they have the government bags, they can take grains and sell them as seed, and write any name in the grower section”*

2

#### Manufacturers Willingness to Intervene

**Limited Product or Packaging Innovation** – Only three domestic seed companies have made investments in proprietary packaging (since the law changed in 2010); a lack of packaging variety in Ghana's nascent seed sector lowers barriers to counterfeiting activities.

*“While the PPRSD gave seed companies approval to brand, only 3 companies have started printing their own materials”*

3

#### Smallholder Context/ Behaviour

**Difficulty Identifying Poor Quality or Diluted Seeds** – It is very for smallholder farmers to determine the quality of a seed based on sight alone – seed and grain are almost indistinguishable. Furthermore, if yields are lower than expected, a number of other factors could have been the cause - from proper fertilizer usage to weather. Therefore, identifying and tracing the sale of counterfeit seed proves difficult for seed consumers.

*“Farmers only know if the seed is authentic after planting – visually there is no way to tell the difference”*

4

#### Distribution Chain Actors' Behaviour

**Profit Potential of Selling Counterfeits** – The seed market in Ghana is subject to large swings in supply and demand. In times of low seed production or natural disaster, NGOs and government block farms issue large seed orders to ensure food security. In addition, when the price of grain rises due to constrained supply, farmers turn to buying more seed instead of grain. These volatile market dynamics drive registered growers to sell grains or impure seeds in order to meet escalating demand, and unlicensed individuals to capitalize upon the rise in seed price by selling counterfeit seed.

*“When there are seed shortages, and NGOs and the government wants to buy seeds, growers can easily “fulfill” these orders by filling their government issued bags with grains or OPVs”*

*Drivers of counterfeiting are interrelated and do not function in isolation*

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- Introduction to Potential Solutions

## Several efforts have been piloted to address counterfeiting in Ghana; however, each has potential shortcomings (1 of 2)

### Industry Association-Led Initiatives<sup>1</sup>

Solution Type	Initiative Name	Description	Key Learnings	Sector Applicability
<b>QUALITY ASSURANCE / CERTIFIED CHANNELS</b>	Spray Service Provider Project	<ul style="list-style-type: none"> <li>Piloted by CropLife and ADVANCE (a USAID project) in the Ashanti region</li> <li>Young unemployed graduates are trained to become sprayers and to use genuine agrochemicals, with which they spray farmers' fields for a fee</li> <li>486 sprayers have been trained to spray farms in 8 communities thus far</li> </ul>	<ul style="list-style-type: none"> <li>Reduces the level of intermediation that occurs along the value chain</li> <li>However, success of the program is contingent upon building high levels of credibility among farming community</li> <li>In addition, a risk of spray providers deciding to engage in fraud remains</li> </ul>	<input checked="" type="checkbox"/> CPPs <input type="checkbox"/> Seeds <input type="checkbox"/> Fertilizer
<b>SMALLHOLDER EDUCATION</b>	Container Collection Program	<ul style="list-style-type: none"> <li>CropLife, in collaboration with PPRSD and the EPA, initiated a collection program for farmers' empty pesticide containers</li> <li>13 collection bins have been placed around the Ashanti region, and 15k-30k bottles are collected annually (~0.3% of market)</li> </ul>	<ul style="list-style-type: none"> <li>Decreases the number of containers that could potentially be reused by counterfeiters</li> <li>However, dependent upon autonomous opt-in by farmers, and does not address sub-standard counterfeits</li> </ul>	<input checked="" type="checkbox"/> CPPs <input type="checkbox"/> Seeds <input type="checkbox"/> Fertilizer
<b>END-USER AUTHENTICATION</b>	Verified Brand Scheme	<ul style="list-style-type: none"> <li>CropLife (funded by Bayer) piloted the use of "Holospots" on Confidor, an insecticide for cocoa</li> <li>Each container was marked with a hologram, which was verified by viewing under direct light and tilting the label</li> <li>The user then texts in the numerical code shown to assess the authenticity of product</li> </ul>	<ul style="list-style-type: none"> <li>Effectively verifies that the product was produced by the stated manufacturer</li> <li>However, holograms proved difficult to use, given farmers' unfamiliarity with the technology and illegibility of the hologram</li> </ul>	<input checked="" type="checkbox"/> CPPs <input type="checkbox"/> Seeds <input type="checkbox"/> Fertilizer

(1) Note: See appendix for additional information on key industry associations and extension networks

## Several efforts have been piloted to address counterfeiting in Ghana; however, each has potential shortcomings (2 of 2)

### Private Sector-Led Initiatives<sup>1</sup>

Solution Type	Initiative Name	Description	Key Learnings	Sector Applicability
<b>PRODUCT, PACKAGE OR CHANNEL INVESTMENT</b>	Seed Dyes	<ul style="list-style-type: none"> <li>Pannar and Pioneer hybrid maize seeds are dyed red to visually distinguish them from grain and other types of certified seed</li> </ul>	<ul style="list-style-type: none"> <li>Unique dyes enable farmers to more easily identify counterfeit seed</li> <li>However, possibility that sophisticated counterfeiters learn to mimic these seed dyes remains</li> </ul>	<input type="checkbox"/> CPPs <input checked="" type="checkbox"/> Seeds <input type="checkbox"/> Fertilizer
<b>QUALITY ASSURANCE / CERTIFIED CHANNELS</b>	Masara Outgrower Scheme	<ul style="list-style-type: none"> <li>Farmers association sponsored by Yara and Wienco, in which inputs are supplied to farmers on credit and repaid after harvest (only quality inputs are used)</li> <li>Currently covers Brong -Ahafo, Northern, Upper West and Upper East regions</li> <li>Planting for the year 2013 amounted to 22,000 acres for more than 5,000 farmers</li> </ul>	<ul style="list-style-type: none"> <li>Minimizes the level of intermediation in the channel, thus effectively ensuring that product integrity is preserved</li> <li>However, requires high degree of investment in channel, and may not be easily scalable</li> </ul>	<input checked="" type="checkbox"/> CPPs <input checked="" type="checkbox"/> Seeds <input checked="" type="checkbox"/> Fertilizer

(1) Note: See appendix for additional information on key industry associations and extension networks

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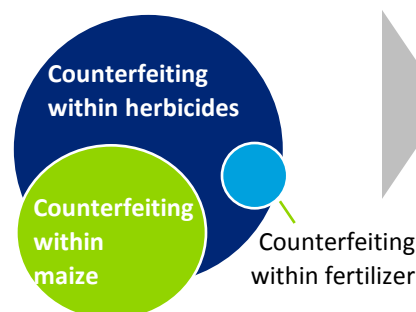
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# Among the value chains studied, counterfeiting prevalence in Uganda is highest within the herbicide market, followed by the maize seed market and the fertilizer market

## Summary of Prevalence of Counterfeiting Across Value Chains Studied

Relative Prevalence of Counterfeiting  
(Illustrative Sizes)



*The prevalence of counterfeiting is highest within herbicides. Counterfeiting in maize seeds – especially among hybrid varieties – is also prevalent, but less so than in herbicides. Smallholder farmers rarely use fertilizer and therefore counterfeiting is not as prevalent as in the other two value chains (but remains a recognized issue).*

## Summary of Types of Counterfeiting

Herbicides	Maize Seeds	Fertilizer
<ul style="list-style-type: none"> <li>■ <b>Mislabeled / Sub-standard Product</b> in which the label does not reflect contents in the bottle (often Chinese imports)</li> <li>■ <b>Label Reuse / Sub-standard Product</b> in which a premium product's label is placed on a bottle of sub-standard product</li> <li>■ <b>Bottle Reuse / Adulterated Product</b> in which premium bottles are refilled with diluted or fake product</li> <li>■ <b>Label Imitation / Sub-standard or Adulterated Product</b> in which a premium brand is imitated, but the product is sub-standard or adulterated</li> </ul>	<ul style="list-style-type: none"> <li>■ <b>Mislabeled / Diluted Seed</b> in which seed growers “top-up” orders with grains in order to meet contracted amount or mobile salesmen sell grains mixed with seeds out of the back of trucks</li> <li>■ <b>Label Imitation / Adulterated or Sub-standard Seed</b> in which imitation packages of leading seed companies are produced and filled with grain and/or fake seeds</li> <li>■ <b>Label Reuse / Adulterated Seed</b> in which agro dealers acquire and re-use bags of reputable seed companies</li> </ul>	<ul style="list-style-type: none"> <li>■ <b>Mislabeled / Underweight Product</b> in which fertilizer is removed from bag and then the bag is resealed</li> <li>■ <b>Mislabeled / Diluted Product</b> in which agro-dealers dilute fertilizer with ash or sand during re-packaging</li> <li>■ <b>Mislabeled / Adulterated Product</b> in which large packages are broken into smaller packages and fake materials are placed in the small packages</li> </ul>



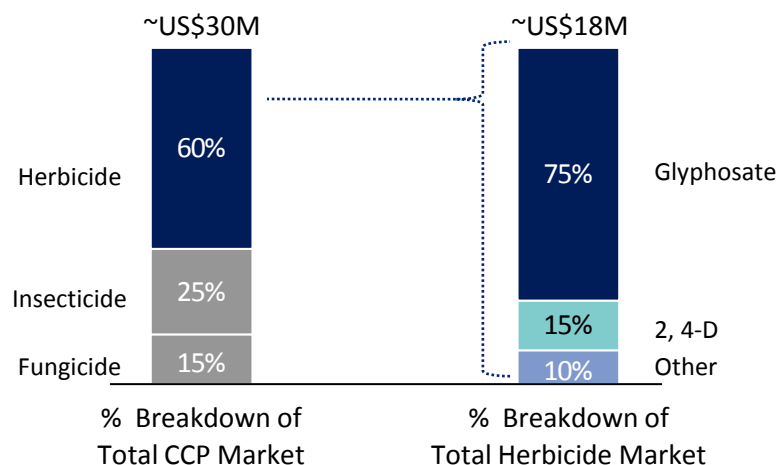
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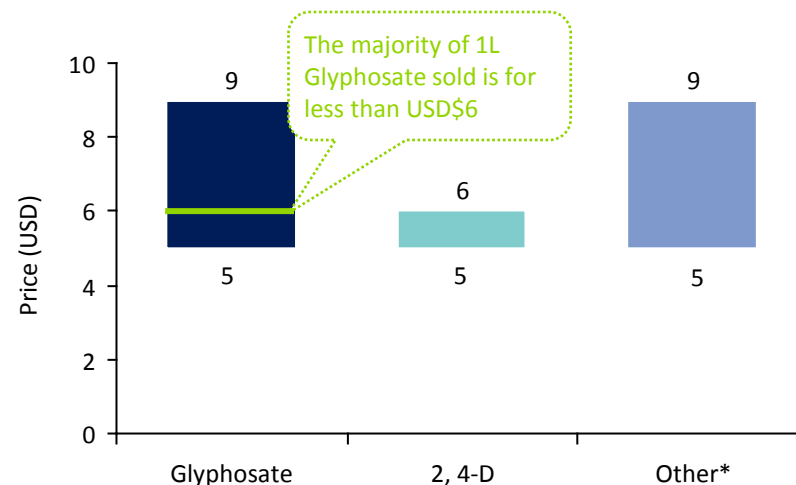
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  - Uganda: Overview
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# Herbicides in Uganda represent a ~US\$18M market – low-priced Glyphosates sold in 1 liter containers constitutes a majority of the market

## Crop Protection Market in Uganda



## Price Range for 1 Liter of Herbicide



\* "Other" includes Ametryne, Paraquat, Butanil, etc.

## SKUs



**500 mL**

Less popular size (~5% of volume sold)



**1 L**

Most popular size (~80% of volume sold)



**5-20 L**

Less popular sizes (~15% of volume sold)

## Leading Brands in the Herbicide Sector

- The most popular glyphosate is a Chinese generic under the WeedMaster trade-name (distributed by Bukoola)
- There are currently 48 generic brands on the Ugandan herbicide market (WeedUp, RoundAll, WeedAll, etc.)
- Brand choice is a strong driver of purchasing behavior, but most farmers can only afford generic varieties. Leading premium brands include RoundUp and Mamba



## The regulatory environment in Uganda is evolving – implementation and enforcement is relatively poor

### Key Players

**CROP INSPECTION AND REGISTRATION DEPARTMENT (CIRD)** – Newly mandated department (2013) to license agro dealers and importers; assess and certify quality of agro-chemicals; monitor and enforce compliance of agro-chemical regulations in imports and exports

**CROP PROTECTION BOARD (CPB)** – In coordination with CIRD, approves registration of crop protection products and agro-dealers; the Agricultural Chemicals Control Technical Committee reports to and makes recommendations to CPB

**UGANDA NATIONAL BUREAU OF STANDARDS (UNBS)** – Mandated (within the Ministry of Trade) to enforce the use of standards across industries primarily at points of entry

**UGANDA NATIONAL AGRO DEALER ASSOCIATION (UNADA)** – represent Ugandan agro dealers, providing professional support and enforcing good business practices among members. UNADA has ongoing lobbying efforts for stricter counterfeit regulation

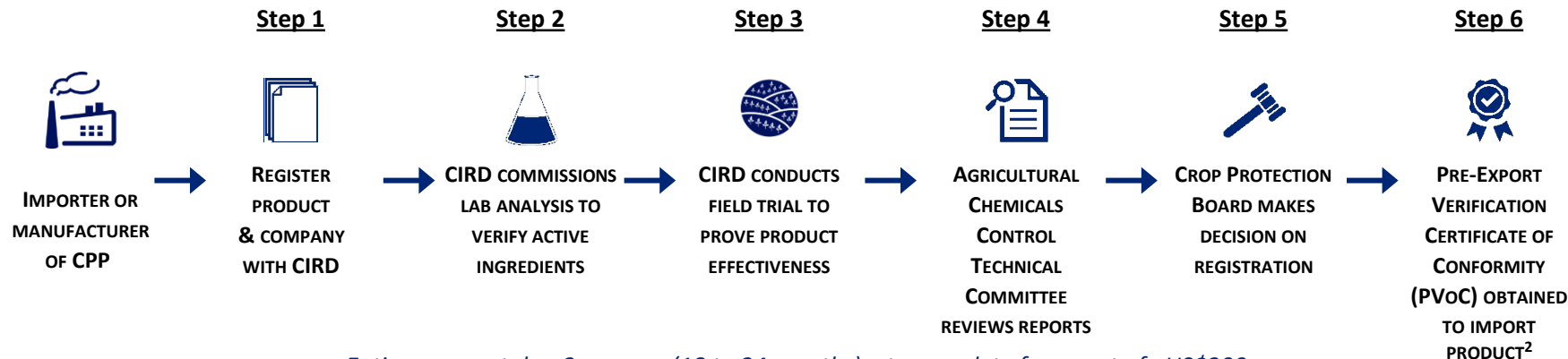
### Relevant CPP Regulations<sup>1</sup>

**NATIONAL AGRICULTURE ADVISORY SERVICES ACT (2001)**: Mandates the provision of agricultural advisory services to improve farmer's access to quality inputs and farming practices; responsible for extension services across Uganda

**CONTROL OF AGRICULTURAL CHEMICALS ACT (2006)**: Requires any agro-chemical manufactured, stored, imported or distributed in Uganda to be registered, packaged and labeled

**AGRO-CHEMICAL REGULATIONS (2011) - DRAFT**: Regulatory framework that outlines how to monitor and enforce the law (Control of Agricultural Chemicals Act); calls for additional resources for regulators and stricter punishments for counterfeiting – the framework has not yet been approved by the ministry

### Steps to Register a Crop Protection Product and Company in Uganda<sup>1</sup>



Source: (1) Interviews with Crop Inspection and Regulation Assistant Commissioner;

Notes: (2) PVoC is an international standard that issues a Certificate of Conformity to verify all regulated products are in fact what they claim to be.

## Herbicides sold in Uganda are imported in a finished form

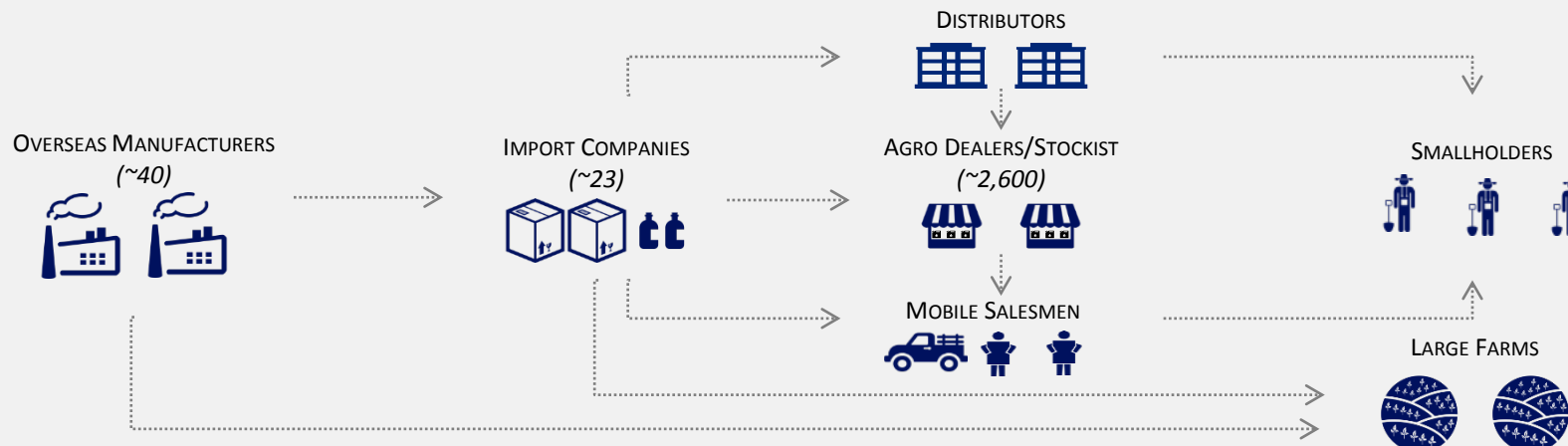
### Manufacturers

### Importers

### Distributors

### Consumers

#### Overview



- All manufacturing is done abroad, there is no domestic chemical manufacturing

- Import comes in cartons with products ready for sale
- Only two companies are licensed to break-bulk and repackage
- Importers act as wholesalers as well

- Agro dealers purchase from importers or distributors
- Some agro dealers visit “village days”\* to broaden their market reach into rural areas
- Mobile/rural retailers operate primarily in rural areas and do not own their own storefronts

- Major importers often sell directly to large-scale farms
- Smallholders purchase inputs from local agro-input dealers

#### Key Players

- Large majority of the available products are inexpensive herbicide manufactured in China (Kingtech Corp.) and India (Indofil Chemicals)
- None of the major manufacturers have dedicated presence in Uganda

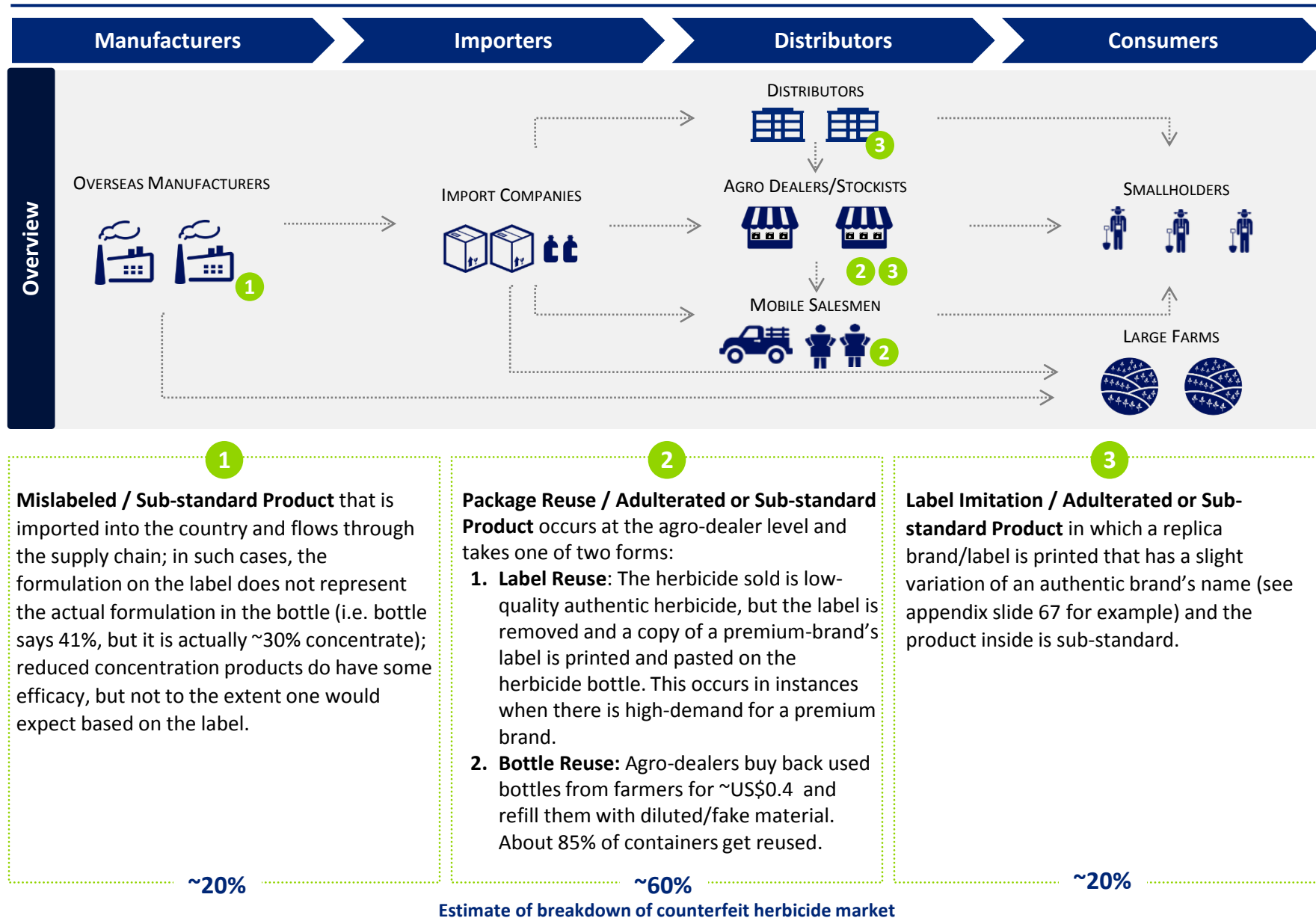
- Major manufacturers distribute through 23 importers (17 CropLife members)
- The top three importers are Buukola, Nsanja and, Gen. Allied
- Bukoola and Gen. Allied are licensed to repackage
- CropLife Uganda is the major industry association for importers and suppliers

- There are ~2,600 agro dealers, ranging from very small independent retailers to larger distributors
- Only 1,300 of these dealers are registered through UNADA, the national agro dealer association
- Agro dealers are located in both rural and urban trade centers

- Sugar and tea estates account for much of the branded herbicide sales

\* Explanation on next page

## Counterfeiting within the herbicide sector in Uganda primarily occurs in one of three forms . . .



... and is the result of four underlying drivers (which are the same as in Ghana).

### Drivers of Counterfeiting in Uganda's Herbicide Market

1

Package Integrity  
across  
Distribution  
Chain

**High Degree of Intermediation** – The supply chain for herbicides is highly fragmented. Rather than having established contracts with 1 or 2 distributors, agro-dealers will often source their product from multiple different intermediaries, as well as sell to several agro-dealers further down the supply chain. In addition to a lack of vertical integration, the product will change hands 4-6 times before it reaches the consumer.

*"I sell WeedMaster through my retail shops. Agro dealers buy it straight from there. Then the rural agro-dealer buys it from the Kampala agro dealer who sells it to a mobile salesman..."*

2

Manufacturers  
Willingness to  
Intervene

**Out-of-Stocks of Reputable Brands** – Brands play a key role in the purchasing decisions of smallholder farmers; if they cannot buy the brand they want, they may not purchase a herbicide at all. During periods of limited supply in semi-urban and rural areas, agro-dealers are thus incentivized to provide the brand the farmer wants through counterfeiting activities.

**Limited Channel Accountability** – After the manufacturer sells the herbicide to the importer, very little is done to ensure that the product/package is not adulterated

*"The majority of agro dealers do not have inventory systems to manage inventory and project demand. Their tracking is what they see on the shelves."*

3

Smallholder  
Context/  
Behaviour

**Difficulty Identifying Adulterated or Sub-Standard Herbicides** – It is difficult for farmers to determine if a label has been tampered with or if the label represents the formulation actually in the bottle. He typically won't know if the product is authentic for weeks after usage. Because of this uncertainty, farmers will often simply choose the cheapest alternative (in which case the opportunity cost is the lowest), which is likely a counterfeit.

*"Farmers are unaware counterfeits exist on the market; even those that know find it difficult to differentiate."*

4

Distribution  
Chain Actors'  
Behaviour

**Profit Potential of Selling Counterfeits** Counterfeit herbicides command a higher profit margin than authentic herbicides (see slide 73); as such, producers of counterfeit will source identical packaging from China and fill it with sub-standard or adulterated materials in order to make greater profitability. There are also no legal deterrents: fines for counterfeiting are low (~US\$10) and the CIRD is under-resourced and unable to conduct randomized testing of products on the market.

*"Counterfeiters even put the phone numbers of genuine companies on the fake labels, they are very inventive and not afraid of the police."*

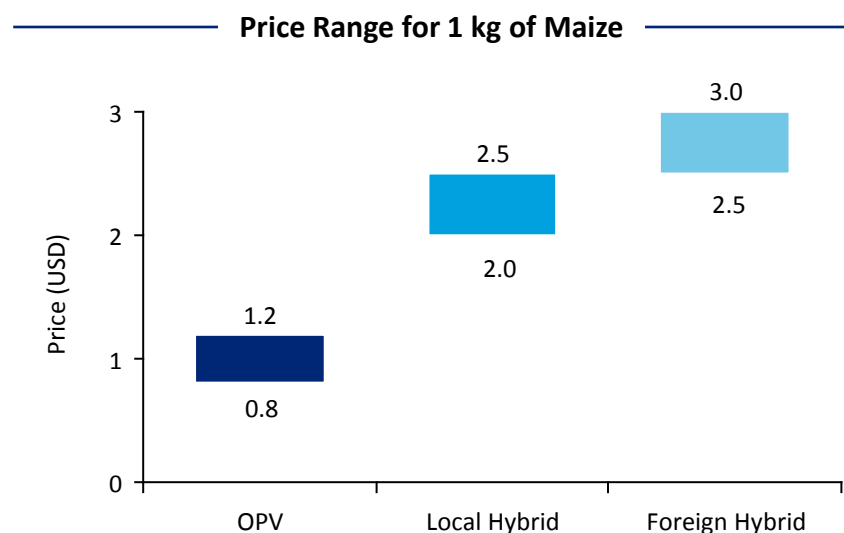
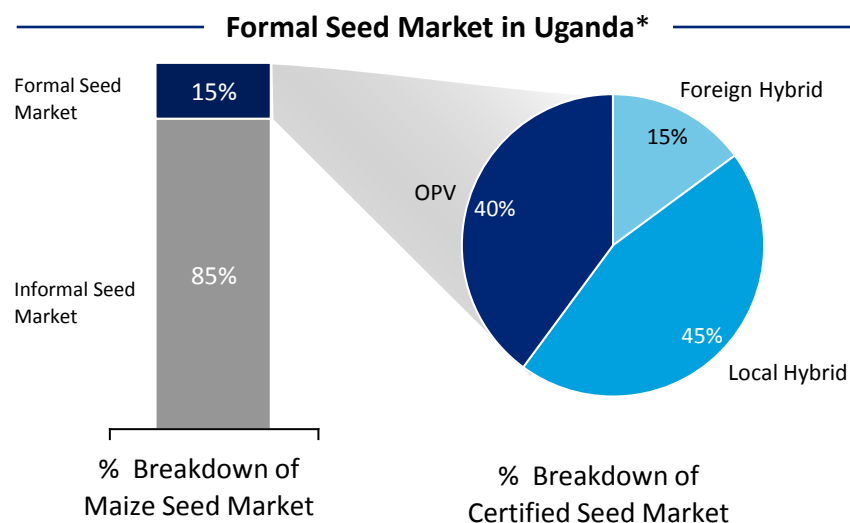
*Drivers of counterfeiting are interrelated and do not function in isolation*

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# Maize accounts for ~60% of the volume sold on the formal Ugandan seed market, of which 60% are hybrid varieties



## Maize Seed Packaging



- Maize seed is typically sold in 2 kg bags, packaged by the seed company
- Many companies are trying to innovate their packaging to combat counterfeiting. East African Seed Company has introduced a paper bag with a seal, whereas NASECO started packaging in special plastic bags

## Leading Brands in the Hybrid Maize Sector

- The most well-known and respected seed companies are: Fica, East African Seed and NASECO. All these companies control quality and brand through their own production plots and packaging of their seeds
- Brands influence purchase behavior as seed companies have well-known reputation
- Certain foreign hybrid brands are also well known and sought out by farmers (Pannar, Dekale, etc.)
- Popular hybrid maize seed varieties include: Longe 9H, 10H and 11H ,PAN 67, KH500 - 43A





## Uganda's seed laws and draft regulations include many international standards, but the capacity to enforce the enacted and proposed regulations is currently insufficient

### Key Players

**PARLIAMENTARY COMMITTEE ON AGRICULTURE** – Mandated to review and approve sector policies and strategies

**NATIONAL SEED CERTIFICATION SERVICES (NSCS)** – Mandated to regulate quality assurance, monitor and enforce regulations including licensing of seed dealers, field crop inspection, sampling and laboratory testing, official certification, and the sealing of seed bags

**NATIONAL AGRICULTURAL RESEARCH ORGANIZATION (NARO)** – Responsible for the production of breeder and foundation/parent seed (main source of new crop varieties); coordinates public agriculture research and development

**NATIONAL AGRICULTURE ADVISORY SERVICES (NAADS)** – Aims to empower farmers to access and utilize advisory services provided through extension network of contracted government workers

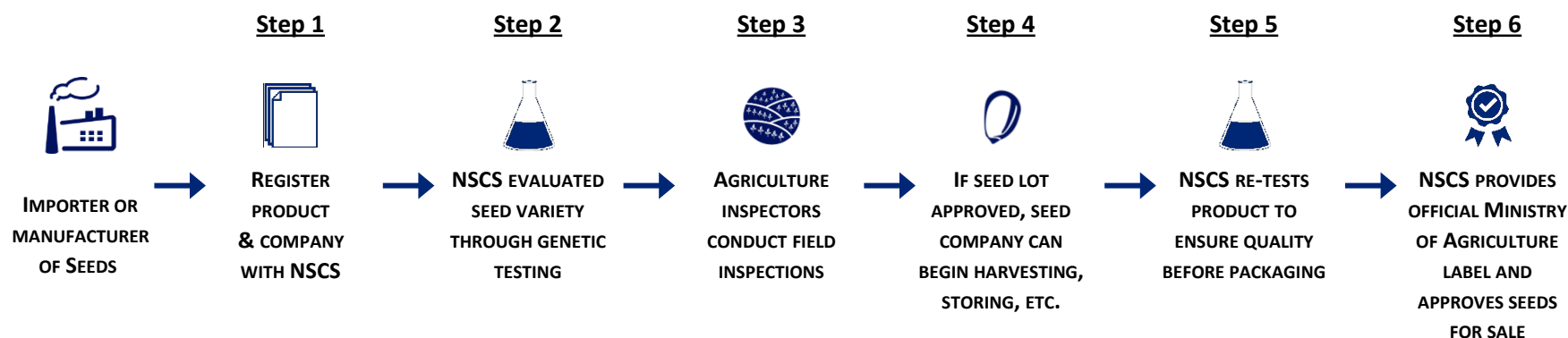
### Relevant Seed Regulations<sup>1</sup>

**SEED ACT AND PLANT ACT OF 1996:** Requires all new varieties to be tested for two seasons before release and for all seed offered for sale to be properly labelled and sealed

**SEEDS AND PLANT ACT REGULATIONS – DRAFT (2011):** Regulatory framework to outline how seeds should be regulated (including certification, storage, multiplication, and testing)

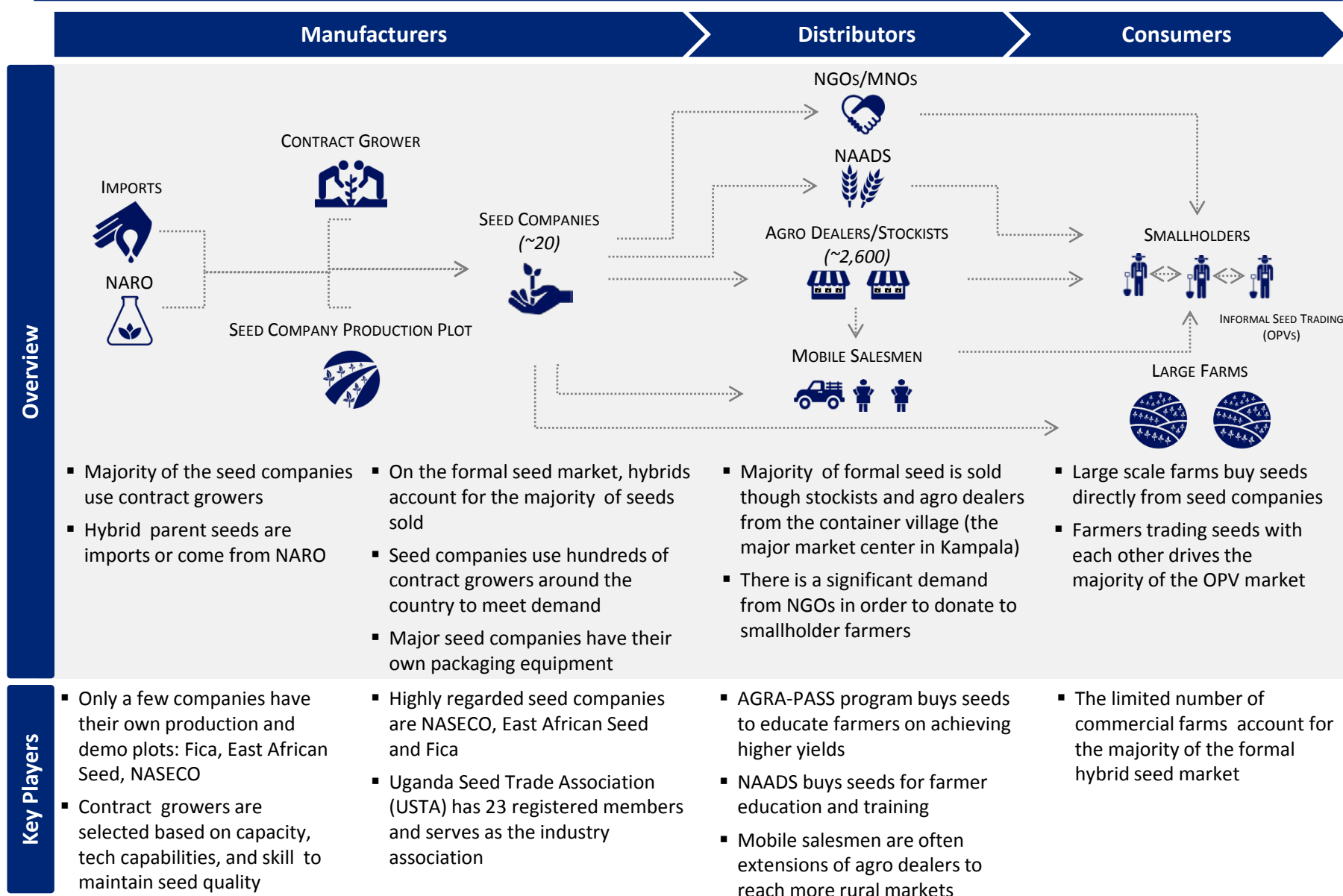
**PLANT VARIETY PROTECTION BILL (2011):** Suggested policy to grant plant breeders' the rights to provide high quality seeds and planting materials to farmers – once enacted, it will spur investment in the seed sector

### Steps to License Seed Product and Company<sup>1</sup>

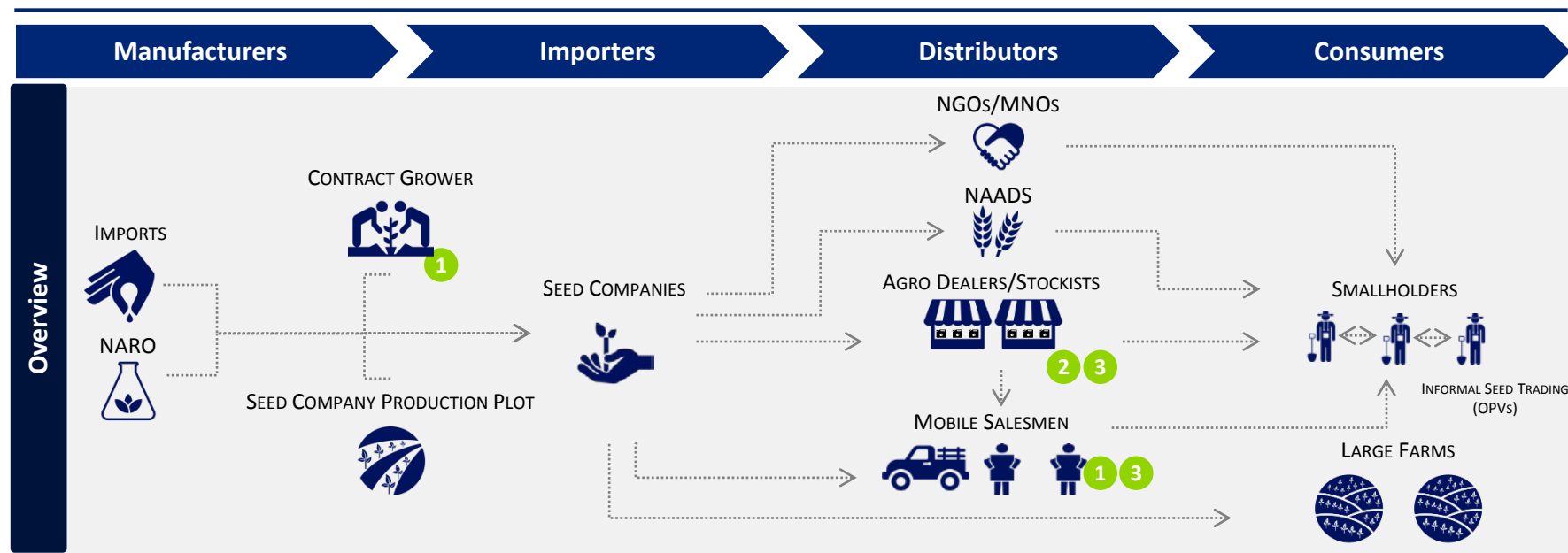


*Entire process takes approximately 6 months – to complete for a cost of ~US\$250*

# Hybrid seeds originate from NARO or are imported from abroad; seed companies are involved in the multiplication process and distribute through various channels



## Counterfeiting within the seeds sector in Uganda primarily occurs in one of three forms . . .



**1**  
**Mislabeled / Diluted Seed** occurs in one of two ways:

1. Seed growers adding grains or OPVs to packages to “top-up” orders when they face constrained supply and cannot meet the contracted amount with genuine seed.
2. Mobile salesmen selling fake seed/grain out of the back of trucks along with genuine seeds when smallholder farmers cannot afford standard package sizes.

~50%

**2**  
**Label Imitation / Adulterated or Sub-standard Seed** occurs at the agro-dealer level (large dealers/distributors). Imitation packages of leading seed companies are imported from overseas and filled with grain and/or fake seeds; traders create fake hybrid seeds by dyeing locally produced cereal grains before repackaging them.

~40%

**3**  
**Label Reuse / Adulterated Seed** occurs when seed supply is constrained. Because farmers are brand-conscious, agro dealers acquire and re-use bags of reputable seed companies and refill them with grain and/or fake seeds.

~10%

Estimate of breakdown of counterfeit seed market

... and is the result of four underlying drivers.

### Drivers of Counterfeiting in Uganda's Seed Market

1

#### Package Integrity across Distribution Chain

**High Level of Intermediation** – The seed value chain is highly intermediated (as illustrated by the previous slides), which introduces a structural risk for the seed sector – the more times seeds change hands, the higher the risk. In addition, farmers often want smaller volumes than the supplied packages; this bulk breaking provides mobile salesmen an opportunity to dilute seeds.

*“Bags go on bicycles, then from the bicycles to the bus, then from the bus to the retailer. This chain can be long...”*

2

#### Manufacturers Willingness to Intervene

**Out-of-stocks of Brands During Planting Season** – Brands with good reputations attract high demand, and in the case of a supply/demand mismatch, reputable brands will be the first ones to be faked or diluted. Many seed companies are also reluctant to invest in inspection of their product at the point of sale, which in turn leads to more counterfeit activities.

*“Counterfeit products always pop-up during the planting season, when demand is high.”*

3

#### Smallholder Context/ Behaviour

**Identical Look of Grain and Seed** – There is no noticeable visual difference between maize seed and grain. Without genetic testing, even seed experts cannot tell the difference between grain and genuine seed. It is only after germination, or a lack thereof, when the farmer realizes the quality of the seed. This lead-time enables opportunities to engage in counterfeiting.

*“Traders load counterfeit seed and drive through rural districts distributing to uneducated agro dealers, who cannot tell the difference”*

4

#### Distribution Chain Actors' Behaviour

**Profit Potential of Selling Diluted Seeds** – Contract grower yields are often unable to fulfill demand for seed in Uganda (given its relatively mature and growing seed sector); to fulfill their orders, growers may “top-up” seed packages with grains.

*“If the contract says 50 tons, you will get 50 tons, but you might get 5 tons of grain in it.”*

*Drivers of counterfeiting are interrelated and do not function in isolation*

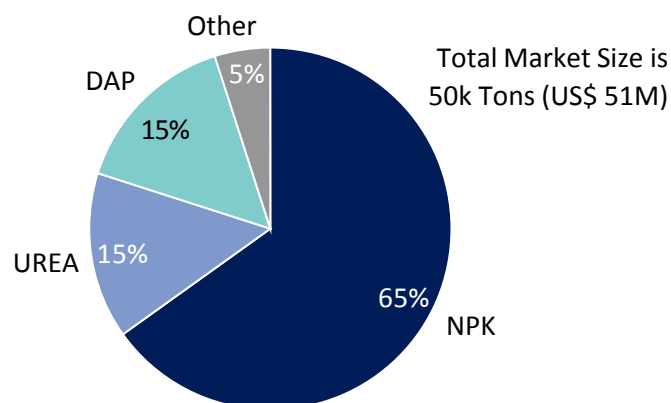
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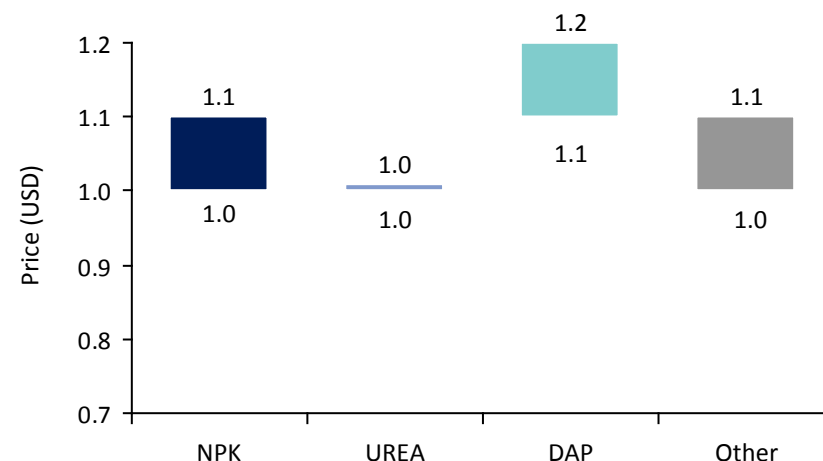
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**Fertilizer usage in Uganda is one of the lowest in Africa, amounting to only ~50,000 tons of inorganic fertilizers sold ; current market size is about US\$ 51 million**

### Inorganic Fertilizer Market in Uganda



### Price Range for 1 kg of Inorganic Fertilizer



### Sizes of Herbicide Packaging



**Various smaller sizes**  
1kg and 2kg and 5 kg bags  
(recent development)



**50 KG**  
Industry standard  
(majority of product sold)

### Leading Brands in the Inorganic Fertilizer Sector

- Fertilizers are generally not marketed as brands but by ingredients (NPK, DAP, UREA etc.)
- Export Trading Group (ETG) is the largest importer, their trade brand is "Falcon"
- Majority of fertilizer demand comes from sugar and tea estates or commercial farms
- Smallholder farmers buy very little fertilizer for staple crop production



## Uganda's current crop protection legal infrastructure covers fertilizer; separate fertilizer regulations to monitor organic, liquid fertilizer have been drafted but not been enacted

### Key Players\*

**CROP INSPECTION AND REGISTRATION DEPARTMENT (CIRD)** – Newly mandated department (2013) to license agro dealers and importers; assess and certify quality of agro-chemicals; monitor and enforce compliance of agro-chemical regulations in imports and exports

**CROP PROTECTION BOARD (CPB)** – In coordination with CIRD, approves registration of crop protection products and agro-dealers; the Agricultural Chemicals Control Technical Committee reports to and makes recommendations to CPB (see below for role of ACCTC)

**UGANDA NATIONAL BUREAU OF STANDARDS (UNBS)** – Mandated to enforce the use of standards across industries primarily at points of entry; UNBS is under the Ministry of Trade

**NATIONAL AGRICULTURE ADVISORY SERVICES (NAADS)** – Provides advisory services and subsidized inputs through network of government extension workers (e.g. training on safe pesticide use, subsidized herbicides in Northern Uganda)

\*Note: Key players are similar to those for CPPs

### Relevant Fertilizer Regulations<sup>1</sup>

**FERTILIZER REGULATIONS (2011) - DRAFT:** Regulatory framework outlining how fertilizer, specifically, should be regulated; primarily focused on inorganic liquid fertilizers; proposed regulations are less strict than those for crop protection chemicals

**CONTROL OF AGRICULTURAL CHEMICALS ACT (2006):** Requires any agro-chemical (including fertilizer) that is manufactured, stored, imported or distributed in Uganda to be registered, packaged and labeled in accordance with the law

**NATIONAL AGRICULTURE ADVISORY SERVICES ACT (2001):** Mandates the provision of agricultural advisory services to improve farmer's access to quality agricultural inputs; responsible for extension services across Uganda

### Steps to Become A Licensed Fertilizer Importer or Manufacturer<sup>1</sup>



Source: (1) Interviews conducted with Crop Inspection and Regulation Assistant Commissioner

Notes: (2) PVoC is an international standard that issues a Certificate of Conformity to verify all regulated products are in fact what they claim to be.

## Fertilizer is imported into Uganda, through Kenya, and is primarily used on commercial farms

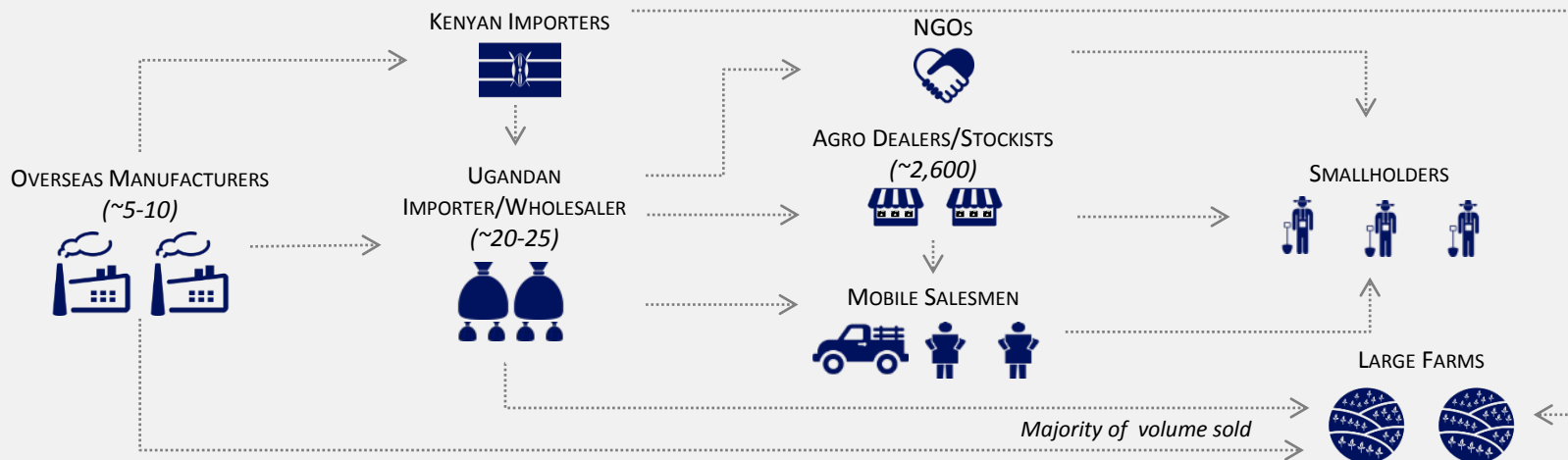
### Manufacturers

### Importers

### Distributors

### Consumers

#### Overview



- All fertilizer in Uganda is manufactured overseas; there is no domestic production
- Fertilizer is generally imported through waterways – Uganda is landlocked, there is no direct access to a port

- Importers source their product directly or through Kenyan/Tanzanian importers located in Mombasa and Dar es Salaam where bulk shipments arrive
- Significant informal trade exists through neighboring countries

- Because fertilizer is imported in bulk, importers and wholesalers repackage it into smaller volumes before selling to agro-dealers
- Bulk breaking is done by all distributors selling to smallholders

- Over half of fertilizer consumption in Uganda comes from commercial farms
- Large farms source agricultural input products directly from the manufacturer or the importer

#### Key Players

- Major manufacturers include Potash Corp. and Mosaic – the leading fertilizer manufacturers in the world

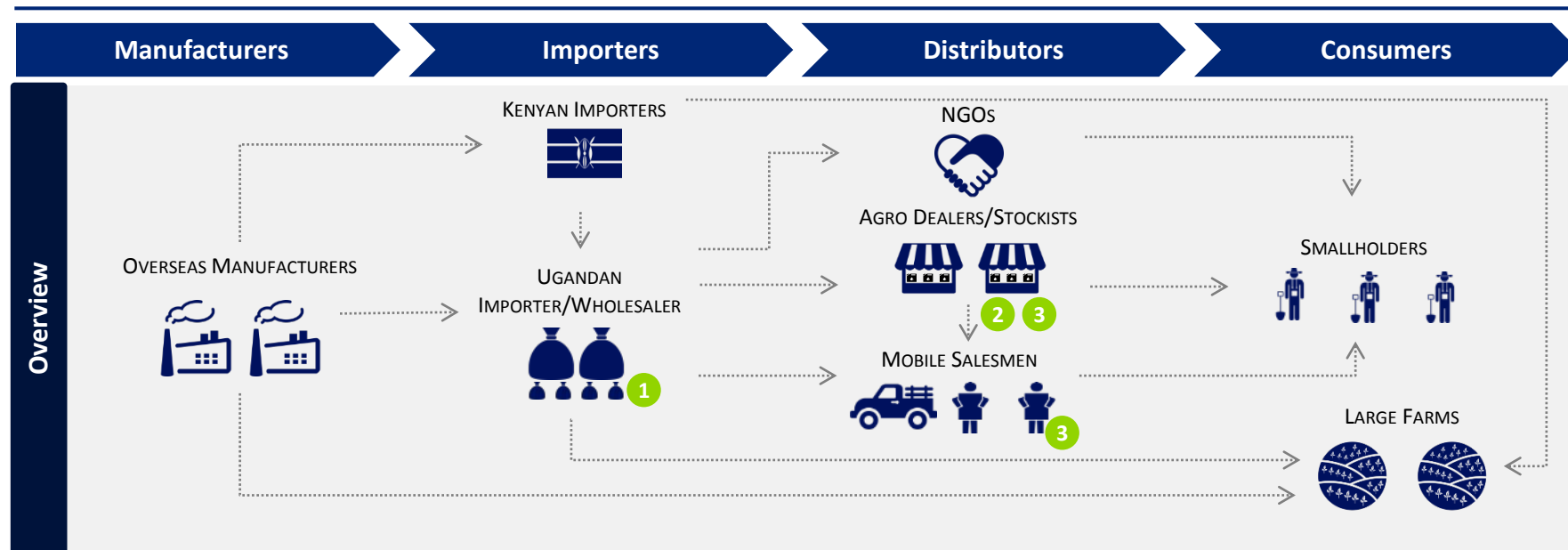
- ~5 major importers, 15 to 20 wholesalers
- Export Trading Group (ETG) commands ~40% of the inorganic fertilizer market

- NGOs source and distribute some fertilizer, largely for use on demo plots (USAID IDEA project)
- ~250-300 rural stockists

- Major users are sugar and tea estates



## Counterfeiting within the fertilizer sector in Uganda primarily occurs in one of three forms . . .



1

**Mislabeled / Underweight Product** occurs when a large bag is opened, some fertilizer is removed, and then the bag is resealed; the label may say 50kg, but the contents in the bag are only 48kg. This is the most frequent form of counterfeiting.

*Note: Bulk Breaking*

~50%

2

**Mislabeled / Diluted Product** occurs after the product has been imported and flows through the distribution channels; agro-dealers will open the bags, remove some authentic fertilizer, and refill them with ash or other low value material.

*Note: Bulk Breaking*

~30%

3

**Mislabeled / Adulterated Product** occurs when agro-dealers or mobile salesmen break-up large bags (i.e. 50kg) and repackage them into smaller ones (i.e. 5kg) that are more affordable to smallholder farmers. In such instances, ash or low value material may also be added to fertilizer.

*Note: Bulk Breaking*

~20%

Estimate of breakdown of counterfeit fertilizer market

... and is the result of four root causes.

### Drivers of Counterfeiting in Uganda's Herbicide Market

1

#### Package Integrity across Distribution Chain

**Bulk Breaking Along Value Chain** – All import companies distribute 50kg bags (global industry standard). In Uganda, farmers cannot afford bulk packages, so agro-dealers and mobile salesmen have to break the packages into small packages in order to cater to farmer demand. During this bulk breaking process, adulterated/diluted product is easily introduced.

*"Everywhere in the world you find 50kg fertilizer bags. You need at least that much for an acre, but in Uganda, farmers can't afford a whole bag."*

2

#### Manufacturers Willingness to Intervene

**Low Incentives to Supply Market** – Uganda's usage of inorganic fertilizer is the lowest in East Africa. It is not profitable for manufacturers to supply smallholders because there is such limited demand for fertilizer (low volumes). Furthermore, those smallholders who do purchase fertilizer demand 1 kg, 2 kg or 5 kg bags – sizes that the manufacturer does not produce.

*"If I tell my CEO that I need a couple extra thousand pounds of fertilizer, they just laugh at me. You can't make much money in this market."*

3

#### Smallholder Context/ Behaviour

**Lack of Product Knowledge** – Many farmers as well as agro-dealers do not have the product knowledge to distinguish between genuine and fake inorganic fertilizer. Counterfeit products (e.g., ash, sand, etc.) often look very similar to authentic fertilizer.

*"Agro-dealers don't know what they are selling - especially when it comes to fertilizer because it's so seasonal and such a small part of their shop."*

4

#### Distribution Chain Actors' Behaviour

**Agro-Dealers Seek Higher Margins** – By the time the product arrives in Kampala from Nairobi, it has incurred numerous costs associated with transportation, storage and handling, and certification. In order for agro dealers to make more than a slim profit on the sale of fertilizer, they are incentivized to dilute the product (thus creating more volume to sell).

*"The middle of the supply chain is long. Prices start at UGX 200 and become UGX 700 as the product changes hands."*

*Drivers of counterfeiting are interrelated and do not function in isolation*

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- Introduction to Potential Solutions

## Several efforts have been piloted to address counterfeiting in Uganda; however, each has potential shortcomings (1 of 2)

### Key Anti-Counterfeiting Initiatives<sup>1</sup>

Solution Type	Initiative Name	Description	Key Learnings	Sector Applicability
<b>END-USER AUTHENTICATION</b>	SMS Verification Pilot	<ul style="list-style-type: none"> <li>18-month pilot funded by USAID and implemented by CropLife, IFDC, and Grameen Foundation to test e-verification/ coin-scratch technology</li> <li>Conducted retailer training and farmer outreach to discourage counterfeit crop protection products</li> <li>76 agro-dealers participated; 30,000 packages sold with coin scratch labels</li> </ul>	<ul style="list-style-type: none"> <li>Coin-scratch label drove sales; market share of pilot products doubled</li> <li>If code is authenticated, effectively verifies that the product was produced by the stated manufacturer</li> <li>However, there is some concern that counterfeiters will take advantage of farmers who do not text in the code (7.3% of products were authenticated)</li> </ul>	<input checked="" type="checkbox"/> CPPs <input type="checkbox"/> Seeds <input type="checkbox"/> Fertilizer
<b>SMALLHOLDER EDUCATION</b>	Video Blasts & Training Program	<ul style="list-style-type: none"> <li>Funded by aBi Trust, CropLife collaborated with the Ministry of Agriculture to develop videos warning against the effects of counterfeit goods</li> <li>Videos were translated into 4 languages and screened approximately 100 times over 2 years in Northern Uganda villages</li> <li>Simultaneously, aBi Trust funded a project to educate extension officers, NGOs, and agro dealers on counterfeit inputs</li> </ul>	<ul style="list-style-type: none"> <li>Anecdotal evidence shows the project was successful in sensitizing farmers in rural villages</li> <li>17,000 people viewed the video and CropLife received many requests for additional viewings; farmers were receptive and engaged</li> <li>Despite increased education and awareness surrounding the issue, counterfeiters are getting more and more sophisticated so that even with training it is difficult to discern between genuine and fake products</li> </ul>	<input checked="" type="checkbox"/> CPPs <input checked="" type="checkbox"/> Seeds <input type="checkbox"/> Fertilizer

(1) Note: See appendix for additional information on key industry associations and extension networks

## Several efforts have been piloted to address counterfeiting in Uganda; however, each has potential shortcomings (2 of 2)

### Anti-Counterfeiting Initiatives Continued<sup>1</sup>

Solution Type	Initiative Name	Description	Key Learnings	Sector Applicability
<b>QUALITY ASSURANCE &amp; TRACK AND TRACE TECHNOLOGY</b>	Feed the Future	<ul style="list-style-type: none"> <li>The USAID-funded project has 2 primary anti-counterfeiting components:               <ol style="list-style-type: none"> <li>Improvement of the regulatory environment through the facilitation of industry associations to lobby government players</li> <li>Market-facing anti-counterfeiting initiatives; activities under consideration include: anti-counterfeiting hotline; e-verification; preferred distributor program</li> </ol> </li> </ul>	<ul style="list-style-type: none"> <li>Feed the Future initiatives have only been underway for 6 months; therefore, it is difficult to assess the project's activities</li> </ul>	<input checked="" type="checkbox"/> CPPs <input checked="" type="checkbox"/> Seeds <input type="checkbox"/> Fertilizer
<b>PRODUCT, PACKAGE, OR CHANNEL INVESTMENT</b>	Tamper-Proof Packaging	<ul style="list-style-type: none"> <li>Private companies have invested in high-end packaging material and labels that are more difficult to imitate or re-use (e.g., NASECO invested in local packaging equipment to create bags that are more difficult to counterfeit)</li> </ul>	<ul style="list-style-type: none"> <li>Improved packaging deters some forms of fraud, however packages did not include <i>technologies</i> to tackle counterfeiting (e.g., end user authentication)</li> </ul>	<input checked="" type="checkbox"/> CPPs <input checked="" type="checkbox"/> Seeds <input checked="" type="checkbox"/> Fertilizer
<b>SMALLHOLDER EDUCATION</b>	Radio Programs	<ul style="list-style-type: none"> <li>Private companies, such as Monsanto and Keith Associates, use radio programing to raise awareness of counterfeits and encourage people to call in with questions about counterfeit products</li> </ul>	<ul style="list-style-type: none"> <li>Helps farmers more easily identify counterfeit products</li> <li>However, education alone may not be sufficient to prevent counterfeiting without coupling with another solution (e.g., quality assurance, end-user verification)</li> </ul>	<input checked="" type="checkbox"/> CPPs <input checked="" type="checkbox"/> Seeds <input type="checkbox"/> Fertilizer

(1) Note: See appendix for additional information on key industry associations and extension networks

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- **Introduction to Potential Solutions**

## We have shortlisted four key solutions to counterfeiting

### Market-Based Solutions to Address Counterfeiting<sup>1</sup>

1

#### End-User Authentication

**Description:** End consumers verify that an agricultural input was produced by a credible, certified manufacturer; solution leverages either coin-scratch labels or holograms as the medium to conceal PIN code, and mobile phone (text or call) to authenticate source

**Potential Intervention:** Work with manufacturers to include special label on product package; partner with tech. service provider to implement solution

3

#### Quality Assurance / Certified Channels

**Description:** The quality of the product is assured through independent testing, and actors along the value chain are certified to distribute the product; solution would require an external evaluator to test the product at each point of intermediation in the value chain

**Potential Intervention:** Invest in resources/testing facilities to conduct independent testing of product at each point in the value chain

2

#### Track-and-Trace Technologies

**Description:** Manufacturers verify the movement of an input at each point along the value chain; solution leverages either RFID tags (passive or active) or barcode applications (2D or QR codes).

**Potential Intervention:** Work with manufacturers to include codes on product packaging; invest in tools required to implement technology (i.e. scanners, smart phones)

4

#### Product, Package, or Channel Investment

**Description:** Manufacturers invest in direct access to the channel (e.g., build local import facilities and distribution centers); or invest in product innovation that is difficult to counterfeit (e.g., seed dyes) or invest in package innovation (e.g., smaller packs)

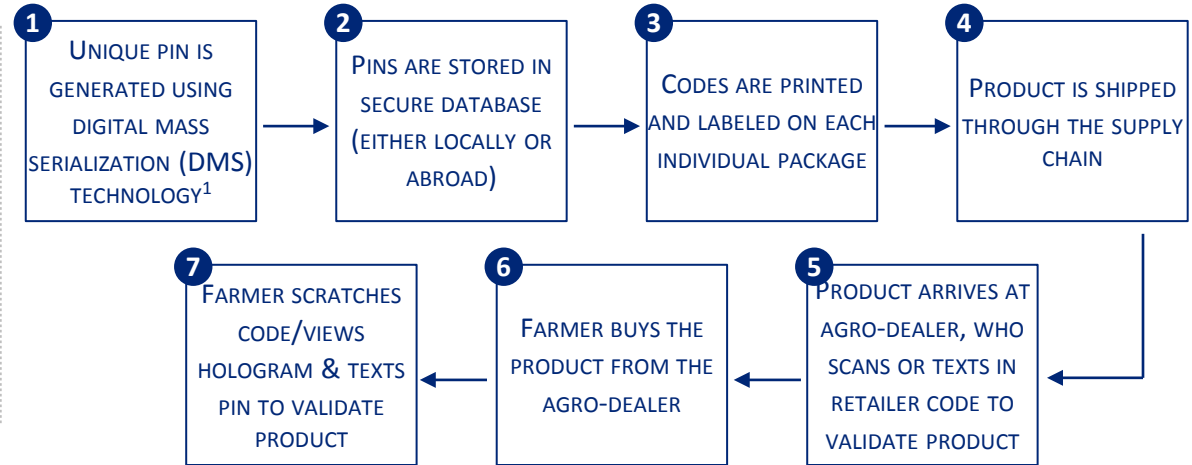
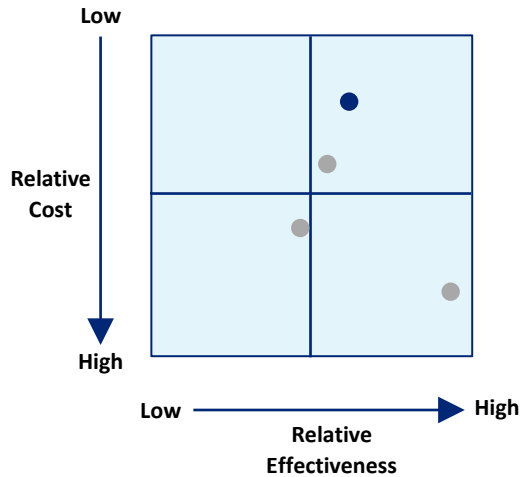
**Potential Intervention:** Work with manufacturers to address challenges that keep them from investing in product, package, or channel innovations.

**All of the solutions would need to be complemented with a degree of agro-dealer and smallholder training**

(1) One additional solution would be to strengthen the enforcement of government regulation; because the study focused on market-based solutions, enforcement of government regulation has been not been considered as a potential solution.

## End-User Authentication (Coin Scratch Labels/Holograms with Mobile Authentication)

### Solution Overview



### Potential Advantages & Disadvantages



- Very effective at authenticating that the product purchased was produced by the stated manufacturer
- Smallholder farmers are very familiar with technology (especially coin scratch labels); mobile penetration in SSA is high (above 90%)
- Difficult to replicate serialization process
- Labels are fairly tamper proof; pulling a coin-scratch label or hologram off of the package tears the label



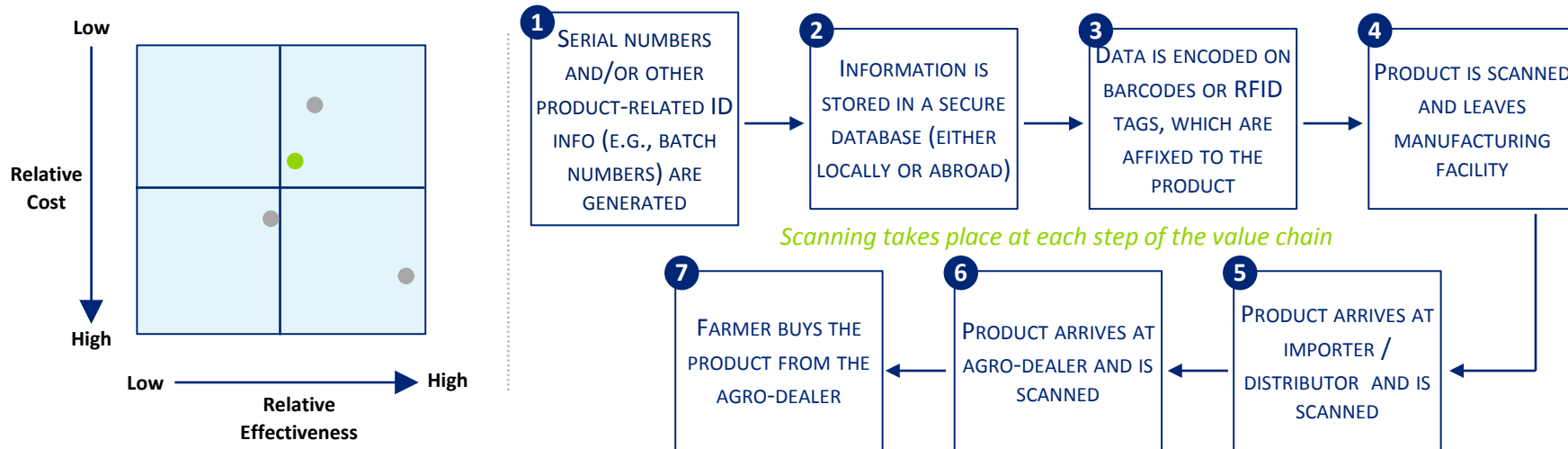
- Presence of coin-scratch or hologram label does not mean the product in the package is high-quality; sub-standard brands could leverage the technology
- Solution would be made ineffective in instances when bulk breaking occurs along the supply chain
- For low-margin, high-volume products, the cost may be a barrier to implement technology

(1) DMS – process of generating unique serial codes through random, pseudo-random, or sequential manner ; Digital Mass Encryption (DME) could also be leveraged



## Track & Trace Technologies (RFID chips, Barcode Applications – 2D or QR)

### Solution Overview



### Potential Advantages & Disadvantages



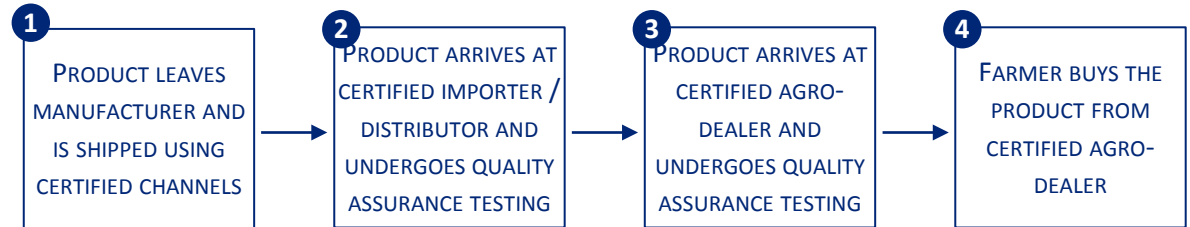
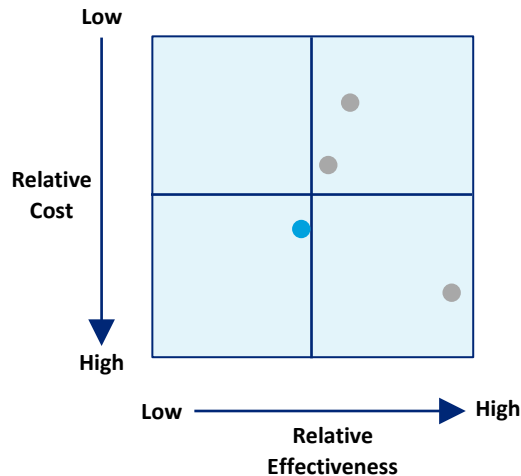
- Effective for manufacturers to track a product's movement through the value chain, and verify that it is not adulterated or tampered with
- In addition to anti-counterfeiting effects, track and trace technologies also provide inventory and supply chain management benefits
- Marginal cost of 1D and 2D barcodes is low
- RFID tags do not require direct human intervention in order to capture digital information



- Requires end-to-end compliance across value chain to be effective; difficult to implement in fragmented markets with significant intermediation along value chain
- Given the limited use of tracking technology in the sector, implementation would require a large initial investment in infrastructure (scanners, etc.), as well as education for actors along the supply chain
- The high cost of RFID tags prohibits their use in many cases, except very high margin products

## Quality Assurance / Certified Channels

### Solution Overview



*Quality assurance takes place at each step of the value chain*

### Potential Advantages & Disadvantages



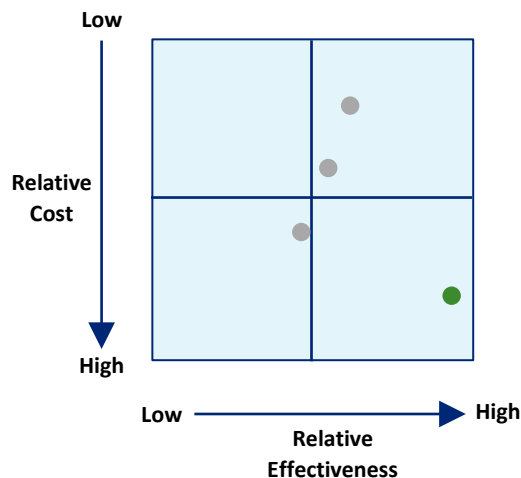
- Addresses both adulterated and sub-standard types of counterfeiting
- Product testing at each point along value chain would help identify point where counterfeiting occurs



- Since quality assurance and testing would be required at each step along the value chain, implementation could be complex and expensive
- Requires commitment and buy-in from multiple different players (e.g., certified agro-dealers, inspectors) or else potential to counterfeit remains
- Difficult to scale, as expansion would require additional investment in channel

## Product, Package, or Channel Investment

### Solution Overview



- **Product Investment** – Manufacturer invests in the product itself to reduce chances of counterfeiting; examples could include: unique seed dyes, or specialized chemical properties that distinguish appearance or smell of CPPs
- **Package Investment** – Manufacturer invests in the package; examples could include: smaller package sizes to reduce occurrence of bulk breaking; frequent changes to package shape or label to reduce potential for imitation; tamper-proof seals; distinctive identifiers (e.g., embossed logos, invisible inks, or holograms)
- **Channel Investment** – Manufacturer invests in the channel by establishing local importing and distribution agents and facilities

### Potential Advantages & Disadvantages

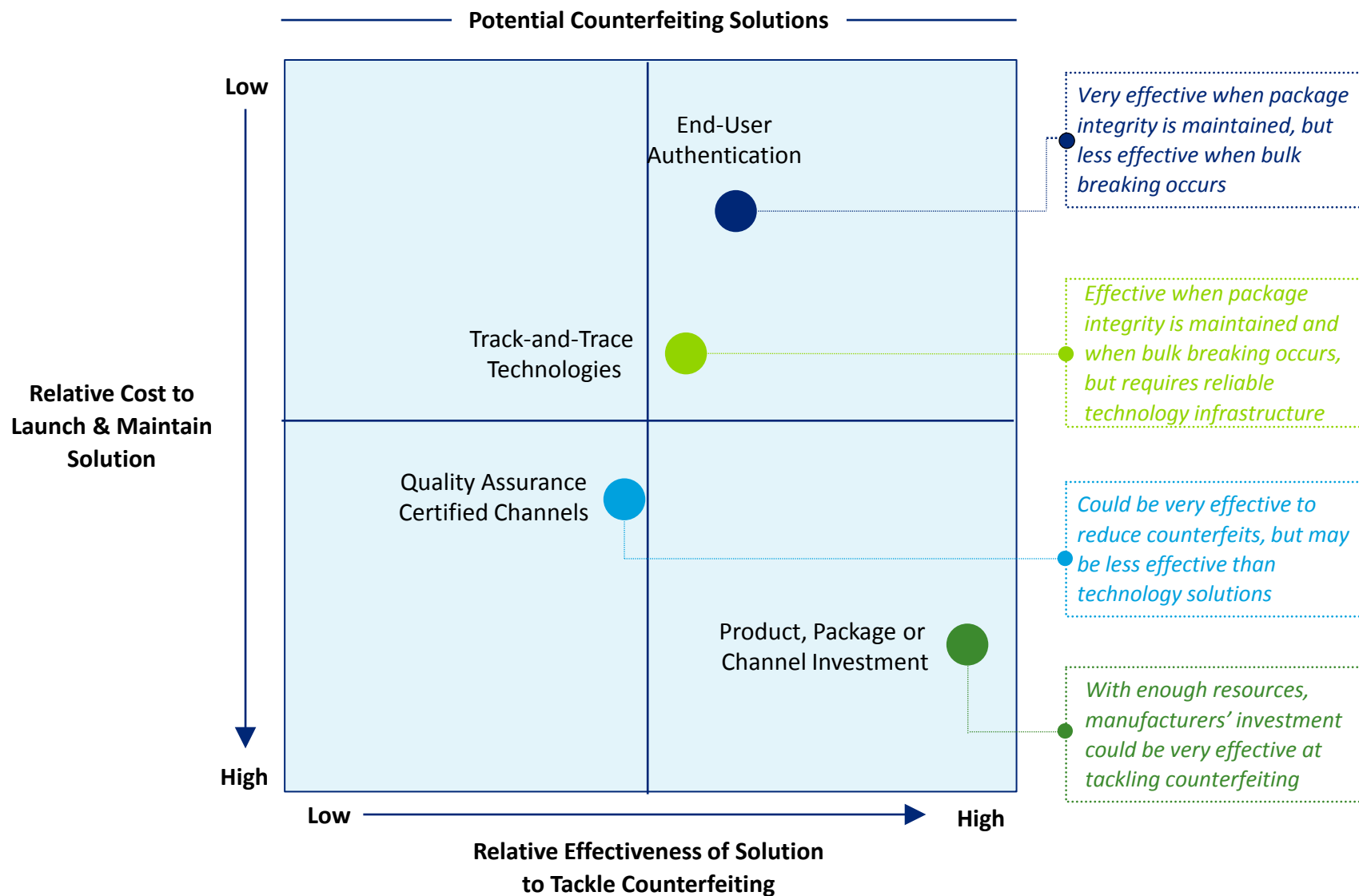


- Depending on the level of execution, product, channel, and package investments could all be highly effective anti-counterfeiting methods
- Channel investments would also help with demand forecasting and inventory management



- Given level of investment required, channel, product, and package innovations require a longer-term commitment to the market in order to be successful
- Packaging innovations could decrease the amount of bulk-breaking that occurs, but alone may not be sufficient to prevent counterfeiting without coupling with another solution (e.g., quality assurance, end-user verification)
- Product and packaging innovations may not prevent highly sophisticated forms of counterfeiting

## Potential market-based solutions vary in terms of cost of implementation and efficacy in addressing the challenge of counterfeiting



## **'Package integrity across the distribution chain' is the primary root cause of counterfeiting; any market-based solution to address counterfeiting should address this root cause**

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### **Summary of Root Causes of Counterfeiting**

1

#### **Package Integrity across Distribution Chain**

*There are many points of intermediation along the value chain within Africa's agricultural input sectors, and often a high degree of fragmentation; it is thus difficult for manufacturers to track the product flow along the value chain, and difficult for end consumers to authenticate the source.*

2

#### **Manufacturers Willingness to Intervene**

*Many European manufacturers of agricultural inputs (namely, CPPs and fertilizers) are not investing in African markets; as a result, they do not conduct demand planning, manage inventory, or ensure channel accountability beyond the point at which product is sold to importers.*

3

#### **Smallholder Context/ Behaviour**

*It is very difficult for smallholder farmers to determine if a product has been adulterated (diluted or fake) or if it is a sub-standard product (expired or poor quality) based on the label alone; labels and bottles are often tampered with and reused, and the product itself may look and smell the same as an authentic product.*

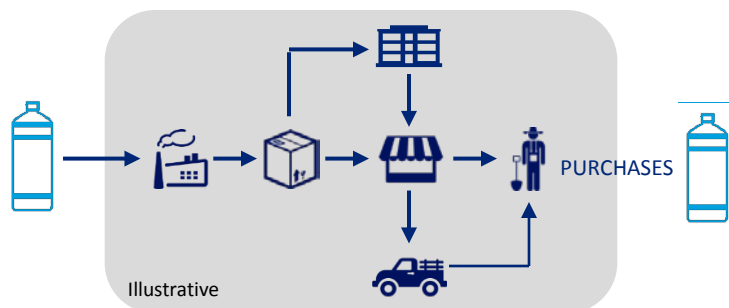
4

#### **Distribution Chain Actors' Behaviour**

*The profit potential of dealing counterfeit products motivates ill-intentions within actors across the value chain; weak enforcement of regulation means that actors who behave illegally are rarely caught and prosecuted. When prosecution occurs, existing fees and punishment do not serve to deter commitment of further crimes.*

# There are two primary types of value chains across the agricultural input sectors studied in Ghana and Uganda

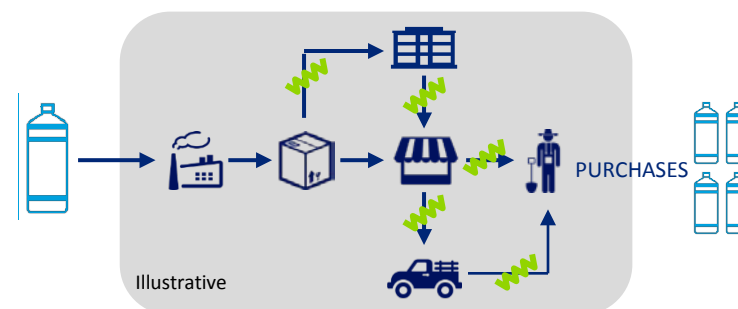
## Value Chains with Package Integrity



*This distribution structure is evident within the following value chains studied . . .*

- ✓ **Ghana's Herbicide Market** – Product is imported in 1L packages from abroad; smallholder farmer buys product in same package as initially imported
- ✓ **Ghana's Maize Seed Market** – Seed companies package seed in 1kg bags; smallholder farmer buys 1kg bags of seed<sup>1</sup>
- ✓ **Uganda's Herbicide Market** – Product is imported in 1L packages from abroad; smallholder farmer buys product in same package as initially imported
- ✓ **Uganda's Maize Market** – Seed companies package seed in 2kg bags; smallholder farmer *usually* buys 2kg bags of seed

## Value Chains with Bulk Breaking



*This distribution structure is evident within the following value chains studied . . .*

- ✓ **Uganda's Fertilizer Market** – Fertilizer is imported in 50kg bags (or larger); smallholder farmers will usually buy fertilizer in 1kg, 2kg, or 5kg bags
- ✓ **Uganda's Seed Market (Limited Quantity)**– Some smallholder farmers demand smaller quantities than 2kg; because seed companies don't package seeds in quantities smaller than 2kg, dealers will sell scoops of seed out of a 50kg bag

Note: (1) The 1kg bags are primarily issued by the government (only a few seed companies produce their own proprietary packages); therefore, Ghana's maize seed sector would need to be privatized before a market-based solution would be effectively implemented

## The applicability of each of these solutions would vary by the two value chain archetypes identified

### Value Chains with Package Integrity



- **Rationale:** Effectively addresses counterfeiting; least expensive & least difficult to implement
- **Key Challenge:** Fragmentation in the market; many players would need to align on solution for it to effectively tackle counterfeiting



- **Rationale:** Challenge could be addressed with simpler and less expensive solution
- **Key Challenge:** Expensive; key actors along supply chain lack enabling tools/technologies



- **Rationale:** Challenge could be addressed with simpler and less expensive solution
- **Key Challenge:** Fragmentation in the market; informal rural distribution networks



- **Rationale:** Challenge could be addressed with simpler and less expensive solution
- **Key Challenge:** Manufacturer ultimately would need to make the commitment to the market

### Value Chains with Bulk Breaking



- **Rationale:** Would not address counterfeiting further up the value chain
- **Key Challenge:** Bulk breaking occurs along value chain, not only at the retailer level



- **Rationale:** RFID tags or barcode applications at each step along value chain would help identify point where counterfeiting occurs
- **Key Challenge:** Complex to implement (many points of intermediation); expensive



- **Rationale:** Product testing at each point along value chain would help identify point where counterfeiting occurs
- **Key Challenge:** Complex to implement (many points of intermediation; rural); expensive



- **Rationale:** Manufacturers investing in alternate package sizes, or investing in direct access to channel would address the challenge
- **Key Challenge:** Manufacturer ultimately would need to make the commitment to the market

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## Appendix

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## Counterfeit Agro-Chemicals in Ghana

**Dursban:** Authentic brand manufactured by Dow AgroSciences



**Dursband:** Counterfeit brand by unknown manufacturer



## Counterfeit Agro-Chemicals in Ghana

**RoundUp:** Authentic  
brand manufactured  
by Monsanto



**RoundUp:** Counterfeit  
brand manufactured  
by Sunshine



# Counterfeit Agro-Chemicals in Uganda



	Genuine	Fake
Price	US\$6.1 (UGX15,000)	US\$4.0 (UGX10,000)
Cap-seal	Closely in-tact	Gaps appears ; may have been broken
Foil	Follows shape of bottleneck	Does not follow shape of bottleneck
Consistency	Less foam	More foam
Print	High-quality, professional appearance	Lower quality label
Hologram	Next to the “d,” right side up	Covering part of the “d,” upside-down, slanted



## Generic brands intended to take advantage of name and packaging similarities



## Counterfeiting in Uganda

