

Case Study 11: Managing Counterfeit Seed Using Seed Labels in Kenya

Component: National Quality Assurance

Title:

Managing counterfeit seed using seed labels in Kenya

Executive Summary:

Government seed inspection services across Africa protect farmers from buying poor-quality seeds. High-quality seeds enable farmers to boost crop productivity, improve livelihoods, and feed a growing population. In recent years, there has been an increase in illegal seed practices, including counterfeit seeds, intellectual property infringements, regulatory offenses, trademark infringements, and theft of proprietary material. In some countries, more than 50% of crop seed sold to farmers was either illegal or counterfeit. Counterfeiting seeds are low-quality seeds, disguised as popular seed varieties often created through miss-labeling of seed products, misusing seed company logos, adding illegitimate trademarks to packaging, or making the counterfeit seeds appear genuine. Counterfeit seeds have adverse impacts on-field productivity, regulatory systems, and farmers' livelihoods.

Approaches to reduce counterfeit seeds include:

1. Market-based practices
 - a. End-user authentication using scratch-off labels, holograms, and pin codes
 - b. E-tag system with GPS traceability
2. Companies' practices
 - a. Building local import facilities and distribution centers to have direct access to seed marketing channels
 - b. Packaging and labeling innovation
3. Enforcement measures
 - a. Penalties and punitive measures
 - b. Awareness campaigns
 - c. Consumer protection rules

In Kenya, counterfeit seed enters the market as grain painted to look like a treated seed, packaged in illegal, counterfeit packaging (Kenya Markets Trust, 2021). Kenya enacted mandatory labeling of seed packets and used end-user authentication in 2016. The results have been dramatic with the high adoption of the scratch-off seed label system and millions of labels purchased by seed companies. By 2018, the level of awareness of the labels averaged 85%. Seed company satisfaction in addressing fake seeds improved from 39% in 2013 to 70% in 2019, attributed to the use of sticker labels since 2017. There has been a marked decline in the incidences of counterfeit seed being sold in the market with counterfeit seed cases in the country reduced from 36 in 2013 to 12 in 2019. CESSA should extend awareness and approaches for anti-counterfeit to all African countries for the benefit of farmers, seed companies, and crop breeding institutions and restore trust within the African seed market.

Context:

Seed is the most important input in crop production. Reliable, quality seeds are vital to agriculture and the food supply chains. High-quality seeds enable farmers to boost crop productivity, improve livelihoods, and feed a growing population.

In recent years, there has been an increase in illegal seed practices, including counterfeit seeds, intellectual property infringements, regulatory offenses, trademark infringements, and theft of proprietary material. In some countries, more than 50% of crop seed sold to farmers was either illegal or counterfeit (World Bank, 2017). This growing international problem known as seed fraud is damaging farmer trust in improved seeds, impairs farmers' livelihoods and efforts toward sustainable agriculture. Moreover, illegal seed practices carry intellectual property (IP) implications which may reduce farmer access to products from reputable producers (CropLife, 2021).

Counterfeit seeds defined

A counterfeit is something that is made in exact imitation of something valuable with the intention to deceive or defraud. It's a fraudulent imitation of something else. It is fake if it is not real but made to look or seem real. All counterfeits are fakes, but not all fakes are counterfeits. Counterfeit seeds, therefore, are low-quality seeds, disguised as popular commercial seed varieties.

Counterfeit seed may be either adulterated such as an authentic seed product that has been either diluted or entirely fake or sub-standard seed that does not perform as it should.

Counterfeit seeds are low-quality seeds, disguised as popular seed varieties often created through mislabeling of seed products, misusing seed company logos, adding illegitimate trademarks to packaging, or making the counterfeit seeds appear genuine. From this definition, counterfeit seeds will have some or all of the following features: unknown compositions, untested and unapproved for use, and unsafe and pose an unacceptable risk to the farmer, the consumer, and the environment.

Challenges and Objectives:

Counterfeit seeds intend to mimic original products. They intend to copy legitimate branded products and typically feature well-adulterated labeling and packaging, reproducing the outer appearance of the originals (ISF, 2018). Sophisticated counterfeits are often difficult to distinguish from originals and as a result, are unintentionally purchased by distributors and farmers. The use of counterfeit seeds can dramatically reduce the yield of the crop and deteriorate the quality of the product and can result in the complete loss of the harvest.

The use of poor quality or un-certified seed costs African farmers hundreds of millions of dollars annually (AGRA, 2020). Current estimates indicate the trade in illegal seeds is rising by about 5 % every year in Southern and Eastern Africa (AGRA, 2020).

Counterfeit seeds have unfavorable effects including:

- Counterfeiters mislead and exploit farmers
- They place farmers' livelihoods and families at risk and decrease the overall capacity of sustainable food production
- Threatens farmers' confidence in the seed sector
- Prevent farmers from receiving important supporting benefits available from seed producers and suppliers, such as crop production advice to achieve the best harvest
- Can ruin the reputation and economic prospects of an entire agricultural region or a key national commodity

- It undermines continuing investment by breeders and seed producers to develop, produce and deliver better quality seeds
- These practices are commonly connected with criminal activities, such as tax evasion, fraud, corruption, and even labor exploitation, all of which hurt society.

Common drivers of counterfeit seeds:

1. **The difficulty in identifying poor quality or diluted seeds** – It is very difficult for smallholder farmers to determine the quality of seed based on sight alone – seed and grain are almost indistinguishable. Furthermore, if yields are lower than expected, several other factors could have been the cause such as improper fertilizer usage to weather. Farmers only know if the seed is authentic after planting – visually there is no way to tell the difference. Therefore, identifying and tracing the sale of counterfeit seed proves difficult for seed consumers.
2. **High Level of Intermediation** – The seed value chain is highly intermediated, 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.
3. **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 the inspection of their product at the point of sale, which in turn leads to more counterfeit activities.
4. **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 seeds and drive through rural districts distributing them to uneducated agrodealers, who cannot tell the difference.
5. **Profit Potential of Selling Diluted Seeds** – Contract grower yields are often unable to fulfill the demand for seed in Uganda and to fulfill their orders, growers may “top-up” seed packages with grains. If the contract says 50 tons, a farmer will get 50 tons, but there might be 5 tons of grain in it.

Taken together, counterfeit seeds have adverse impacts on-field productivity, regulatory systems, and farmers’ livelihoods.

Good quality seed is crucial to helping small-scale farmers who grow much of sub-Saharan Africa’s food. But some farmers struggle to find the cash to pay for better seeds, including hybrid varieties - one reason cheaper options continue to be a temptation or the only option.

Licensed seed dealers and reputable seed producers provide dependable seed products which meet strict quality standards, providing guaranteed benefits for farmers. Unfortunately, farmers in some countries are suffering from little or no regulation to protect them from illegal seeds. In countries where laws against illegal seeds exist, they are often not enforced or impose only nominal penalties on violators (World Bank, 2017). Many administrative bodies charged with certifying the quality of commercial seeds lack the training and resources needed to effectively manage this pressing issue. This has led to a rise in the sale of illegal seeds, undermining the IP rights of developers and reducing farmer

access to products from reputable distributors, as they may no longer be developed and commercialized. Law enforcement agencies should be provided with effective laws and empowered to act against counterfeiters and illegal seeds. If IP laws are not upheld, the innovation cycle breaks. The impact this has on farmers' livelihoods cannot be overstated.

Counterfeit seed affects the business viability of both farmers and seed companies. For example, an estimated 30% of the seed on the Ugandan market alone is fake, according to the Uganda National Bureau of Standards (Access to Seed Index, 2019).

Counterfeit seed in Kenya is produced by very sophisticated operators, lured by the opportunity to make quick cash during the rush of the planting season, often working in concert with rogue agrodealers who agree to sell the counterfeit seed (Kenya Markets Trust, 2021). In Kenya, seed counterfeiters enter the market, usually with grain painted to look like a treated seed, packaged in illegal, counterfeit packaging (Kenya Markets Trust, 2021).

Interventions:

In summary, potential solutions include:

1. **End-user authentication** - End consumers verify that an agricultural input was produced by a credible, certified manufacturer. The solution leverages either E-verification codes, scratch cards or coin-scratch labels, holograms as the medium to conceal a PIN code, and mobile phones (text or call) to authenticate a seed source. Intervention includes working with manufacturers to include special labels on product packages. This requires a technology service provider to implement the solution.
2. **Track-and-trace technologies** - Manufacturers verify the movement of input at each point along the value chain. The solution leverages either Radio-frequency identification (RFID) tags (passive or active) or barcode applications (2D or QR codes). Potential Interventions include working with manufacturers to include codes on product packaging; invest in tools required for the implemented technology (i.e., scanners, smartphones).
3. **Quality assurance/certified channels** - The quality of the product is assured through independent testing, and actors along the value chain are certified to distribute the product; the solution would require an external evaluator to test the product at each point of intermediation in the value chain. Potential interventions include investing in resources/testing facilities to conduct independent testing of products at each point in the value chain.
4. **Manufacturer-led interventions** - Manufacturers invest in direct access to the channel (e.g., building 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 like tamper proof packaging (e.g., smaller packs) or even hard to fake shiny stickers. Unique dyes enable farmers to identify counterfeit seeds more easily. However, the possibility that sophisticated counterfeiters learn to mimic these seed dyes remains. Potential Intervention includes working with manufacturers to address challenges that keep them from investing in product, package, or channel innovations.

Seed companies in Africa have developed multiple strategies to limit the circulation of counterfeit seeds, mostly through improved seed packages (ASTI, 2020). About 60% of companies have implemented measures to address counterfeit seeds, particularly in Uganda and Kenya. East African Seed, FICA Seeds, Equator Seeds, and Kenya Highland Seed use an e-tag system called "Kakasa" to help farmers purchase genuine agro-inputs. This system, which is free of charge to farmers, relies on a unique scratch code that

the customer can access after purchasing the product. After the code is submitted via SMS, the customer receives a message confirming the package is genuine. In addition, companies including Equator Seeds, Kenya Seed Company, and Technisem collaborate with authorities to fight counterfeit seeds. SeedCo works with seed trade associations to monitor counterfeit issues at a broader level. Other companies use more traditional methods, such as tamper-proof packaging (NASECO) and shiny, hard-to-fake stickers used by East-West Seed and Seed Co (Access to Seeds Index 2019 - Eastern and Southern Africa, 2019).

Countering counterfeit seed in Kenya

Stemming the tide of low-quality and counterfeit seeds in Kenya was proving to be problematic for both seed companies and KEPHIS (Kenya Markets Trust (KTM), 2021). KMT teamed up with Agri-experience under DfID-funded Market Assistance Program (MAP) in 2013. MAP worked with both public (regulators, policymakers, advocacy groups, and crop variety researchers) and private sector (seed companies, Seed Trade Association of Kenya (STAK), and agro-dealers) stakeholders to improve the enabling environment and create lasting positive systemic changes in the market.

The following were accomplished:

1. Enactment of mandatory labeling of seed packets in 2015. The Seeds and Plant Varieties Regulations make it mandatory for all certified seeds sold in packets of 5 kilos and below to have a verification sticker label affixed to the seed packet.
2. Seed labels with enhanced security features ensured a farmer could confirm certification at the point of purchase and receive additional information in 2016.
3. Revised seed regulations were gazetted which included the requirement that seed labels should be affixed on every seed packet under 10 kilograms as a step toward protecting farmers from poor quality and fake seed in 2016.
4. Release and use of mPedigree Scratch-off Seed Label.

After scratching the label, a farmer sends the 12-digit unique number hidden under the scratch label to a short code number using a phone. Within seconds the farmer receives a message communicating if the seed purchased is genuine or not, in addition to confirmation of the variety in the package, the seed company, and the date of testing. The text is free to the farmer as the charge for the message is incorporated into the cost of the label. Also included on the label is a KEPHIS hotline number for addressing farmer concerns.



Figure 1. Smart label and sample confirmation SMS ¹

What farmers can do to avoid the use of counterfeit seed

1. Buy seeds only from a known and trustworthy dealer and never buy from the “black market”

¹ Kenya Market Trust - Scratch off labels for seeds. Available on (<https://www.kenyamarkets.org/agri-inputs-research-scratch-off-labels-for-seed/>)

2. Ask for a correct and complete receipt, including the name of the variety purchased.
3. Be suspicious if products or varieties are offered at an unusually low price or with foreign labels.
4. Check that the packaging is originally sealed at the time of purchase.
5. Ensure Safety Seals are unbroken and with no signs of manipulation or damage.

Results:

Benefits from scratch labels on seed bags:

1. By mid-2018, the scratch-off seed label system was adopted, and over 115 million labels were purchased by companies. A study commissioned by the Seed Trade Association of Kenya (STAK) showed that across eight counties, the level of awareness of the labels ranged from 65 to 100%, with an average of 85%. However, the level of utilization of seed labels was significantly lower, ranging from 9 to 50%, with an average of 35% (Agile Consulting, 2020). The study recommended increasing awareness of the seed sticker labels through agrodealers to convey the message to farmers on the benefits of seed labels.
2. Seed companies started changing their behavior regarding expired seed and warehouse release practices. For example, seed company satisfaction efforts to address fake seeds improved from 39% in 2013 to 70% in 2019, attributed to the use of sticker labels since 2017 (TASAI, 2020). The TASAI study focused on four grain and legume crops that are critical to the country's food security demands - maize, beans, sorghum, and cowpea - which cover 84 percent of Kenya's harvested land area according to the Food and Agriculture Organization (FAO).
3. With this technology now fully in use, there has been a marked decline in the incidences of counterfeit seeds being sold in the market. For example, counterfeit seed cases in the country have reduced from 36 in 2013 to 12 in 2019 (TASAI, 2021).
4. Smallholder farmers have become more confident in investing in certified seed and can expect good yields at the end of the season; all factors are held constant.
5. KEPHIS has benefited from increased traceability of seed, including preventing the stocking of expired seed.

Challenges encountered in implementation:

1. Farmers only scratch a few seed packages when buying multiple packets of seed.
2. The lack of a broad, effective channel for communicating with agrodealers about the labels negatively impacts the system's effectiveness, especially since issues arising will most probably emerge at agrodealers shops.
3. It's difficult to mandate this kind of label on small crop seed packages, especially since it is not cost-effective for the seed company.
4. The system does not work as well for root and tuber seeds.

In conclusion, the system helped curb the sale of counterfeit seeds in the market. It is expected that farmers will increase their yield. With increased farmer confidence in the quality of seeds in the market, the trust in seed companies has increased. An increase in farm yield will eventually contribute to improved food security for the smallholder and the country at large.

Supporting Visuals or Quotes:

“With increased farmers' confidence in the quality of seed in the market, the seed companies' reputation is enhanced. Unscrupulous businesspeople will not get an opportunity to smuggle counterfeit seed to the market.” Joseph Cheptaiwa, KEPHIS, Kenya.

Future Plans:

It is important to estimate the extent and spatial distribution of counterfeit seeds in Kenya. A USAID-CEGA project is estimating the impact of anti-counterfeit measures on maize hybrid seed in Western Kenya by analyzing genetic markers of maize seed samples collected from sources along the seed supply chain. Both the identity and germination rates of the seeds were tested. Near-infrared spectroscopy is being used to differentiate between counterfeit and genuine seeds. Near-infrared spectroscopy is a very quick and easy-to-use method that enables the swift, non-destructive testing of the seed's authenticity (Esteve et al., 2014; Mohan et al., 2016). The study fills a critical gap in our understanding of the extent and impact of counterfeit seeds in the region. Providing a quantitative assessment of counterfeit seed sold in local markets will better inform the government and other organizations developing solutions to the counterfeit seed problem.

CESSA will explore partnerships on extending awareness and approaches for anti-counterfeit to all African countries for the benefit of farmers, seed companies, crop breeding institutions, and governments in Africa.

Call to Action (CTA)/Key takeaways:

The aspects of Kenya's system that make scratch-off label systems possible include the availability of clear standards for packaging and labeling, the availability of information technology infrastructure in rural areas of Kenya, and the wide use of mobile phones in rural communities.

All stakeholders in the seed value chain, from plant breeders to seed producers, processors, traders, and distributors, need to operate in line with the applicable laws to deliver legal seed products to farmers so they can be confident in the integrity of the formal seed industry.

Governments are expected to establish and maintain strong legal protection for seed and plant products through appropriate laws and regulations and to enforce them effectively against those who engage in illegal seed practices.

Lessons from Kenya's anti-counterfeit seed efforts include:

1. Innovative anti-counterfeiting measures exist and are still being rolled out,
2. Measures that integrate multiple aspects of the supply chain seem to be more effective (e.g., packaging, repackaging, storage, and labeling), and
3. A robust consumer protection system that is accessible and available, with appropriate resources and legal processes, can be an important anti-counterfeiting tool for farmers and consumers.

To combat counterfeit seeds, the following needs to be done in each African country:

1. Advocacy for policy changes, enforcement, monitoring, capacity building, and public education by governments and the entire seed value chain,
2. Strengthening seed laws and pertinent regulations like the PVP act,
3. Enforcement laws to combat illegal seeds,

4. Awareness through conventional and multi-media channels, training, and consultation dialogues.

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