

KAKAMEGA SHOW REPORT ON INNOVATIONS

The Agricultural Society of Kenya plays a vital role in economic development in Kenya through its significant support to the agricultural sector towards realization of the Kenya Vision 2030. Its main objective is to promote agriculture in Kenya. Agricultural shows provide important platforms for sharing critical knowledge and showcasing technological innovations and best practices for improvement of food security, and increased incomes to our farmers and other stakeholders as they emerge. This is in addition to creating opportunities for stakeholders' interaction and establishment of business linkages. ASK theme for 2018 is "Promoting innovation & technology in Agriculture and Trade".

The main innovation at the AFA stand was done by Food Crops Directorate on Aflatoxin, concerns raised by farmers and stakeholders during the show included; the effects of climate change, what aflatoxin poisoning/contamination means and how they can manage the menace.

AFLATOXINS

Aflatoxin definition: a poison produced by a fungus (*aspergillus flavus* can be S, L P or T, the aspergillus flavus S and P being the most toxic/poisonous). Is a health hazard and is found in soil, decaying matter etc. It reduces the value of affected food crops.

Aflatoxins are toxic chemicals produced as by-products by some strains of *Aspergillus flavus* fungi (moulds) that grow on maize, groundnuts, cassava and other food crops. These toxins also affect feedstuffs, which then contaminate milk, meat and eggs. The toxins occur everywhere in the world and contaminate an estimated one-quarter of agricultural products worldwide, but pose particularly high risks in tropical developing countries where certain staple foods, such as maize and sorghum, comprise a large part of the diets of the poor. Aflatoxin is a tasteless and odourless poison whose effects are all over our stores and dinner tables through contaminated grains. They can cause liver failure and liver cancer. Kenya has experienced multiple aflatoxicosis outbreaks in recent years, often resulting in fatalities.

Aflatoxin is exacerbated by a host of factors that start from pre-planting phase to post-harvest phase. Primarily lack of crop rotation interferes with soil nutrients and increases susceptibility to aflatoxin contamination.

After planting susceptibility is worsened through lack of weeding, water scarcity during growth of the plants and inadequate application of pesticides. After harvest of grains, aflatoxins can flourish through both improper drying and improper storage.

Contamination beyond certain levels means they are not safe for consumption. The permissible threshold vary greatly for Kenya is 10ppb (KEBS allows 10 parts per billion),

European Union (EU) levels 2 ppb, United States of America (USA) 20ppb and international standards World Health Organization (WHO) 4ppb.

PREDISPOSING FACTORS

- Temperature 10-40oC
- Grain moisture above 13%
- Humidity 65-70%
- Stress conditions resulting in shriveled grains which are more susceptible to attack by Aflatoxin producing fungi
- Harvesting methods
- Drying methods
- Shelling methods
- Dusting

Kenya is one of the world's hotspots for aflatoxins, with what is believed to be the highest incidence of acute toxicity ever documented. The country suffered severe outbreaks of illness from aflatoxins in 2004 and 2010, poisoning more than 300 people in the 2004 event alone, and killing more than 100 of them. Domestic animals that consume feeds contaminated by aflatoxins also can become sick and die.

During the course of 2018, Eastern is likely to experience an aflatoxin outbreak according to Famine Early Warning Systems Network forecast released in February 2018 by KALRO. Other affected regions include: Kitui, Makueni, Tharaka Nithi, lower Meru and Embu. Outbreak also likely to occur in Machakos, lower Meru and parts of North Rift, where temperatures are above 25 degrees Celsius, therefore soil temperatures likely to raise above 10° C.

Control includes; Prevention of pest attacks, harvesting when crops attain physiological maturity and drying/storing produce appropriately, reducing contamination and using safe and cost effective bio products like aflasafe (have to use together with other crop management practices)

Other mechanism for spread of Aflatoxin

- Maize rejected as unfit for human consumption is fed to livestock as feed

Aflatoxin hotspots

- Include Eastern, Coast (Kilifi, Kwale), Central (Embu, Meru and Muranga), though with climate change, North Rift and other maize growing regions are becoming hotspots. Use of Aflasafe as a preventive measure is encouraged

Efforts to reduce aflatoxins (that AFA as regulator should be involved in).

- Know seed source, plant recommended resistant varieties, avoid contamination
- During growth of crops carry out timely operations, early planting, use right inputs, control weeding, insects
- Promote the use of Aflasafe - a bio control method. It contains live fungus (the active bio control agent). Developed by International Institute for Tropical Agriculture (IITA) in collaboration with US Dept. Research Service, it fights against development of aflatoxin in maize and groundnuts. Application by hand broadcasting. Aflasafe grown on sorghum which acts as both carrier and feed for the fungus.
- Use of herbicides/fungicides at least 2 weeks before aflasafe otherwise its efficacy will be greatly reduce
- Aflasafe reduced aflatoxins by over 80% in contaminated areas.
- Companies which deal in lab materials and kits: helica, apex etc may ask for rapid test kits (to test at any level). Cost of aflatoxin testing...cheapest for a single sample is ksh 4,000. Can only be done in specialized mycotoxin labs in KEBS, KALRO etc
- Destruction of contaminated crop is through incineration in a kiln etc
- Aflasafe registered only to be applied in maize crop.

DIGIFARM APP – SAFARICOM LIMITED

What initially started as a humble social innovation plan to solve farmers' problems has developed into a fully-fledged department in Safaricom, this product targets smallholder farmers while the second one is tailored for Saccos and cooperatives that buy produce.

Safaricom has ventured into agriculture by developing programmes aimed at facilitating delivery of solutions to farmers countrywide. They are already offering two products; Digifarm and Digifarm for Enterprises.

Digifarm for Enterprises

The Digifarm for Enterprise ensures that for example when a farmer takes milk to a collection centre, the facility has a bluetooth-enabled weighing scale. The system then takes details of the milk and corresponds it with the farmer, since through the programme, Safaricom already has the farmers' registration and identification details.

At the end of the day, the farmer gets an SMS notification of how much he has delivered. This gives one an idea of what to expect, while the collection centre also

easily keeps tabs of what it has received. The system effectively eliminates manual record-keeping by farmers and the organizations.

From an enterprise point of view, it ensures that a processing manager sees how much is collected and from which farmer.

The system is also integrated into stock management for the cooperative societies so that the enterprises involved can easily issue stock to farmers on credit and retain their payment details.

This has been achieved by digitizing the end-to-end processes and integrating them with payment systems.

Digifarm

“Digifarm”, on the other hand, is a business solution that addresses small-scale farmers’ matters using a simple mobile device that does not necessarily need to be a smartphone.

A market research identified significant issues that hamper the farmers’ productivity, and which the programme is expected to address.

The issues include:-

- 1) Poor farmer and farm profiling
- 2) Farmers not knowing what, where and when they should grow
- 3) Lack of agricultural e-extension services
- 4) Lack of quality farming inputs, costs, affordability and quality of the farm inputs
- 5) Lack of access to local and international markets, most of which are controlled by brokers and middlemen.

After registration, the farmer is given a profile which enables him/her to start learning different aspects of agriculture and agribusiness that touch on most of these issues at the comfort of their bed or seat through this platform.

The farmer can learn about;-

- Crop and farm management
- Animal administration
- Record keeping
- Pest and disease control
- Livestock production

- Proper ways to market their produce and other agricultural e-extension services

The products and services are being offered through feature phones. However, Safaricom is developing the Digifarm app, which should be ready by the end of the year, he added.

Digifarm essentially has been fronted to be the brand name for Safaricom's M-Agri solutions; just like M-Pesa. Safaricom is also toying with the idea in which its call centres will at some point be transformed to incorporate an agricultural e-extension segment.

Digifarm, and its related components are expected to transform Kenyan farmers' lives and effectively boost the country's food security in the long run, according to the developers of the programme.

NEW GB SEED POTATO VARIETIES ACCREDITED FOR KENYA

Three UK potato varieties have been recommended for release in Kenya, opening the door for British exporters.

It's thanks to the joint efforts of the Agriculture and Horticulture Development Board (AHDB), James Hutton Ltd, Science and Advice for Scottish Agriculture (SASA), and Seeds2B Africa (part of the Syngenta Foundation).

Ten potato varieties were trialled at three separate farms over two seasons, with free variety Cara, and two James Hutton Ltd varieties, Gemson and Lady Balfour, making the grade.

The approval will allow British producers to export to Kenya where potatoes are the second most important food crop after maize.

Between two and three million tonnes of potatoes are grown annually in Kenya. However, most farmers use home-saved seed and achieve yields of as little as 10t/ha.

In the trials Cara yielded very strongly over the course of both seasons with a combined average yield of 52t/ha. However, the top performer in terms of yield was Lady Balfour at 56t/ha. Gemson yielded 42t/ha on average.

Two of the varieties bred for Greenvale AP and Grampian Growers have performed so well in these trials that the producers are engaging with representatives of the Kenyan potato industry in order to open up this potentially important new export market.

Hermes Variety

As Kenya is keen to approve more processing varieties, the team are considering resubmitting Hermes for a third season. These three varieties recommended for release so far have only been approved as table varieties.

While processing variety Hermes performed very well in both seasons its average yield of 41t/ha was very slightly too low to be recommended for release.

However, with processing varieties, they are looking for at least 21% dry matter content and as Hermes has a recorded dry matter of 23%, there's reason to believe that with a third season of trials and additional testing, it can achieve recommendation as a processing variety.

5TH AGRITECH EXHIBITION AT KICC

AFA participated in the 5th Agritech Exhibition held at the KICC from 20th to 22nd June, 2018. Some of the innovations showcased were:-

1. Phosphate Rich Organic Manure

This is an emerging alternate of DAP fertilizer that can be used on wheat, cotton and Rice. There were case studies done by cotton farmers which showed an increase in production this is due to the possibility that cotton roots go deep down the soil, which is softened on account of stabilization and multiplication of microbial counts due to successive applications of the organic manure.

2. Processing of Banana flour

This is a project under the Ministry of Agriculture, Livestock, Fisheries and irrigation. The Banana fruit being a horticultural commodity can be processed and preserved to increase its marketing value. Various processed banana products have already been developed such as, sun-dried banana and banana crisps. A new product with potential commercial value is the banana flour made from fresh ripe bananas.

3. Collective Marketing

This product is developed by MoALFI) under the State Department for Crops Development. The purpose of this programme is to Increase market access through market-oriented production **"Produce what the Customer Wants"** Collective marketing is when individuals or groups gather their produce together and market collectively. This is one of the ways of attaining economies-of-scale through the bulking of products. By working collectively, farmers for example, can also improve the quality of their products by growing the same variety, synchronizing their farming operations and collectively sorting and grading their products. The groups can also improve on post-harvest handling through acquiring central storage.

Through collective marketing, small scale farmers can consolidate their production, sort, grade, package and even process and transport the products to the customers and thus get vertically integrated in the market chain. They are able to negotiate for better prices as well as terms of payments, decide whom to sell to and when and ensure quality is maintained. This enables them to be

horizontally integrated in the market chain since they are able to make important decisions concerning their products.

4. Save Grain Bags

These are specialty bags made of two unique co-polymers, ethylene and vinyl alcohol, that prevents the multiplication and helps in complete eradication of chemicals, during grain storage, without fumigating with harmful chemicals.

They can be used to store Seeds, Dried herbs, dried food grains, dried feeds and flour.

Advantages:-

- Quality – Preserves original moisture content
- Quantity – There's no quantity loss
- Preserves Aroma
- Germination – Maintain high germination rate
- No chemicals – Toxic and harmful chemicals are not required
- There's minimum oxidation.
- Affordable – the bags are retailing at Kshs. 200 each

5. Drip Irrigation

There's a new paradigm in drip irrigation that gives farmers best value on their investment at a much lower cost than the traditional methods.

Companies are using laser-punched dripline which are highly economical, energy efficient and virtually maintenance free.

AFA Potential Areas of Collaboration

- a) Promote the use of Aflasafe - a bio control method. It contains live fungus (the active bio control agent). Developed by International Institute for Tropical Agriculture (IITA) in collaboration with US Dept. Research Service, it fights against development of aflatoxin in maize and groundnuts. Application by hand broadcasting. Aflasafe grown on sorghum which acts as both carrier and feed for the fungus.
- b) Collaboration with Safaricom to transform Kenyan farmers' lives and effectively boost the country's food security.
- c) Market Linkages - Create links between seed producers in Britain and Kenyan farmers so that they can take advantage of this opportunity.