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An Emergency



We may be 30, 50, 60 harvests away from the fundamental eradication of [soil] fertility in parts of our country. We can withstand amazing things, horrific things. Countries can withstand wars and conflicts. But what no country can withstand is the loss of its soil and its fertility and therefore there is an emergency.

We have incentivised and encouraged a type of farming that has damaged soil. If you have heavy machines churning the soil, impacting it, if you drench it in chemicals, which of course were redesigned to ensure that yields could increase but in the process also undercut the future fertility of that soil, yes you can increase yields year on year on year, but ultimately you really are cutting away the ground from underneath you.

The future of our farms, and the food on our plates, relies on all of us taking steps to save our soils. Restoring our soils to health should be the heart of our mission, as campaigners and farmers, for 70 years.

To turn this vision into reality, bold new measures to protect and restore soil health must be at the very heart of the current and forthcoming generation

Happy new soil healthy year

Masila Kanyingi
Editor



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Cereals

EDITOR: Masila Kanyingi EDITORIAL ASSISTANT: Cornelius Mueke CONTRIBUTORS: CIMMYT, Bitange Ndemo, KARLO, KEPHIS, FAO, Doris Kawira, PHOTOGRAPHER: Jairus Ndani, GRAPHICS DESIGNER: Evelyne Ndiema MARKETING: Edwin Kirwa

EDITORIAL BOARD: Thomas Kipkorir - BASF E.A Ltd, Agnes Gitonga - Sygenta E.A Ltd., Doris Kawira - Dowdupont., Joseph Kioko - Agribase Bioscience Int. Ltd., Patrick Gachanja - Bayer East Africa, Martin Mwobobia - ETG,

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For maximum yield and income, the farmer must ensure they maximise on the good practices and avoid cost cutting. Maximum recommended fertilizer, certified seeds, good land preparations and timely agricultural practices. (land prep, planting, weeding, top dressing, and Harvesting). Farmers should also ensure the storage of the produce is suitable and dried to the recommended moisture level and coated with insecticide to prevent borers from destroying the grain. This will enable them hold on to their maize until prices are suitable to dispose of their produce. Avoid selling to the middlemen and form cooperatives which can be their vehicle to bargaining.

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Maize farming and production business in Africa is a high-potential opportunity for the continent. Maize is one of the most common and important food crops across Africa. It is widely eaten in various forms and more than 900 million Africans depend on maize every year because it is often cheaper than rice and wheat, two of the other most consumed cereals.

In fact, many of the daily diets contain maize either directly or indirectly. Production of meat, eggs and dairy products (like milk and yoghurt) would be difficult without maize, which is a hugely important ingredient in animal feed.

Although our continent produces over 50 million tons of maize every year, Africa still spends over \$2 billion to import maize from abroad. As Africa's population continues to grow, the demand and consumption of maize will increase rapidly over the coming years.

This article explores the lucrative market for maize within and without Africa. You will also learn the secrets of this business including FREE manuals and materials to guide you.



Why is maize an interesting business opportunity?

Maize is totally an amazing crop. By planting just one seed of maize, you get over 500 kernels in return at harvest. That's an incredible return on investment!

In fact, maize was made for developing regions like Africa. It utilises sunlight very effectively and Africa has sunlight in abundance. Maize can grow on a vast array of soils and can survive in different climatic conditions on the continent.

Maize also matures really fast. From the time it is planted, maize requires only between 90 to 120 days (about 4 months) to reach harvest. This allows it to survive in areas with short periods of rainfall and irregular water supplies.

One of the reasons maize is in high demand as a food crop is its high energy and nutritional value. It is rich in Vitamins A, C and E, several essential minerals, and contains up to 9 percent protein. It is also rich in dietary fibre and carbohydrates which are a good source of energy. It is no surprise that in many parts of East Africa, maize accounts for an average of one third of the daily caloric intake.

Maize remains a key food crop in Africa, Latin America and Asia. Although it is primarily used as



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human food in developing regions of the world, maize is one of the most important raw materials for animal feed production and biofuels in developed countries.

Maize is also a versatile food product for Africans. It is processed and prepared in various forms depending on the country and culture.

Ground maize is prepared into porridge in Eastern and Southern Africa, while maize flour is prepared into porridge/pap in West Africa. Ground maize is also fried or baked in many countries. In all parts of Africa, green (fresh) maize is boiled or roasted on its cob and served as a snack. Popcorn is also a popular snack derived from the maize crop.

Because of its huge strategic importance and versatile uses as human food, animal feed



Planting dates should be chosen so as to ensure that it coincides with normally favourable growing conditions. Water supply is important because wilting of plants early in the morning detrimentally affects pollination.

and a valuable industrial raw material, the production of maize is taken very seriously around the world.

How to start and succeed in the maize production business

According to IITA estimates, about 800 million tons of maize is produced worldwide every year. Africa produces 6.5 percent of this volume which is still insufficient for local consumption.

Nigeria remains Africa's largest producer with nearly 8 million tons produced per annum. It is closely followed by South Africa, Tanzania, Kenya and Uganda. The United States remains the world's largest producer with 42 percent of all maize produced globally.

Maize is a food crop that is in high demand across Africa.

There are three major segments that make up the biggest demand for maize in Africa – human beings, animals and industries. These segments possess different reasons and the lucrative

potentials which trigger their demands.

Human beings

Africans directly consume about 30 percent of all maize that is produced worldwide. Unlike in developed countries where a major portion of maize produced is used for animal feed, maize is a significant part of diets in Africa.

More maize is eaten per person in Africa than in any other part of the world. Lesotho has the highest consumption per capita of maize in the world (174kg/person). Eastern and Southern Africa use 85% of harvested maize as food, while Africa as a whole uses 95%, compared to other world regions that use most of their maize as animal feed. Africa has one of the fastest growing populations in the world with an annual population growth rate of nearly 3 per cent over the last 20 years.

With the world's highest birth rate, its current population of nearly one billion people is predicted to be more than double in 40 years. It is expected that the demand for maize as human food will grow in step with Africa's population. The demand for more maize in the coming years is certain. Whether the increased volumes of maize will be produced locally or imported from outside the continent remains uncertain.

Animal Feed Producers

Maize is a favourite raw material for animal feed. It is cheaper than many of the other feed alternatives and provides the required nutritional content for livestock. As a result, over 60 percent of maize produced worldwide is used in feed production.

In Asia, and many of the developed countries, more maize is used in animal feed production than for human consumption. For example, the United States, the world's largest producer of maize, uses over 80 percent of its maize harvest to produce animal feed.

The growing production and demand for meat is having a strong effect on the demand for maize. In the future, less maize may be eaten directly and more will be consumed indirectly (through poultry, meat and dairy products).





Industrial consumers

Maize has quite a high starch content which makes it a high-demand industrial raw material.

The starch obtained from maize is processed into several additives, agents and ingredients such as dextrine, sorbitol, sorbic acid and lactic acid. You may not recognize these substances but they are used in many household items that you know and use such as: ink, cosmetics, paint, medicines, syrups, ice cream, shoe polish, fireworks batteries and glue.

Yes, all of these things contain starch.

Starch from maize is also heavily used to produce bioethanol, a form of renewable fuel used as an alternative to petrol (gasoline) to power cars, trucks and buses. Ethanol is also used as a solvent in the manufacture of varnishes and perfumes; in the preparation of essences and flavorings; and in many medicines and drugs.

Some of the biggest industrial buyers of maize are food producers and breweries. International food processing giants like Nestle and Kelloggs (just to mention a few) purchase a lot of maize

to produce some of the famous cereal-based breakfast brands like Cornflakes.

Breweries also use maize as a major raw material for beer production. Africans consume millions of litres of beer every year and this volume is expected to rise significantly due to population growth and economic prosperity.

The more beer that is produced, the more maize that will be purchased by brewers across the continent for production. Compared to many other crops, maize is quite easy to produce.

Main Requirements

Succeeding in the maize production business requires knowledge and skill. Based on research, there are some things entrepreneurs should consider and keep in mind if they plan to get involved in the maize business.

Find suitable land

The first and most important thing you will need to get started with maize production is land.

Maize grows best in rich loamy or sandy-loam soils in a well-drained area that has a flat or fairly flat landscape. Maize will not do well in waterlogged land. If the land is not well drained, you could make ridges or mounds to protect the crops from waterlogging. Because the maize plant loves sunlight, the land has to be in the open and free from any kind of shade (such as tall trees or man-made structures) that prevents sunlight from reaching the planted maize. The land has to be cleared and tilled before the rainy season starts and the maize should be planted immediately after the land is prepared. If this is not done, weeds may grow fast and compete with the maize for nutrients and sunlight.

Use the right varieties

There are different varieties of maize in the world today and the type you choose to produce will depend on consumer preferences and market demand in your area.

In some localities, white maize is more popular than the yellow variety. In some other areas, it is vice-versa. However, the best maize



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varieties grow fast, are high yielding, mature earlier than the local varieties and are resistant to major pests and diseases.

There are now some hybrid varieties that use much less water and can often survive in drought-prone areas.

There are also late-maturing and early-maturing varieties of maize. Late-maturing varieties mature in 110-120 days and are good for zones with a long rainy season.

Early-maturing varieties mature in 90-100 days and can be planted after a late-maturing variety in zones with two seasons of rainfall.

There are also extra-early varieties which mature in 80-90 days. These can be planted in zones with very short rainy season (usually 2-3 months long).

When and how to plant maize

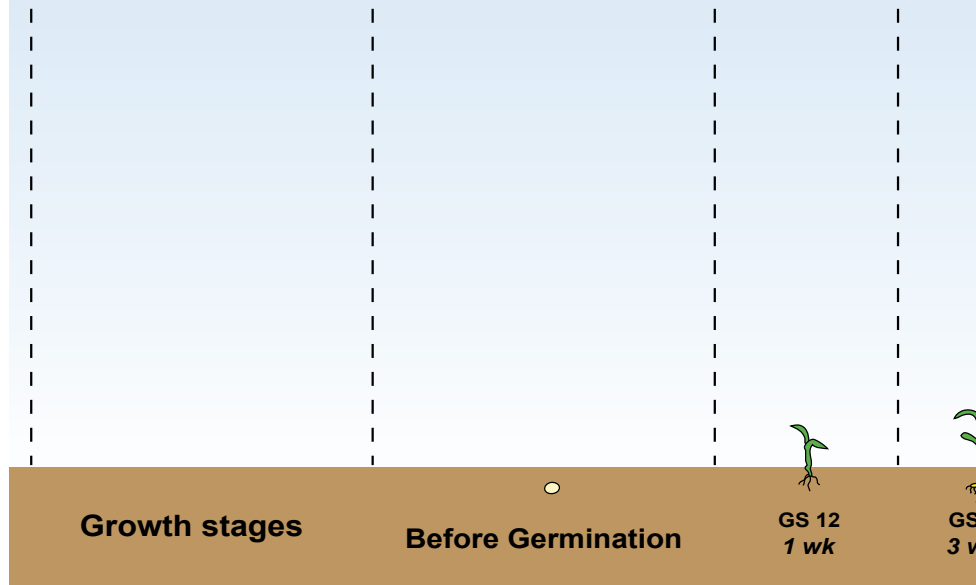
Time was when rainfall patterns were predictable. Climate change is 'changing' everything nowadays. Currently there are no specific dates to plant maize. Depending on your region, you could follow the previous history of rains in the area. However, it's best to plant after it has rained consecutively for 2 to 3 times.

Planting only when the rains have come will help the maize seeds to germinate and grow well. Some maize varieties need between 450 to 600 mm of water per season to grow, most of which it gets from moisture reserves in the soil. According to research, at maturity, it is estimated that each maize plant will have consumed about 250 litres of water.

It is also very important that you pay very close attention to the health of the maize seeds you plant. You should only buy maize seeds for planting from dependable sources. For best results, avoid buying maize seeds from the local or open market near you. These seeds could be rotten or already contaminated by disease which will likely affect its growth performance.

Watch out for weeds, pests and diseases!

There are several types of weeds, pests and diseases that affect maize plants such as stem



borers, army worms, grasshoppers, larger grain borers, downy mildew, maize streak virus and Striga among others. Fortunately, there are several herbicides, pesticides and disease control methods you can apply to prevent a breakout on your farm.

Harvest: what can you expect?

The amount of maize that can be harvested (per hectare) depends on the variety you planted, amount of rainfall, sunshine and the level of weed, pest and disease control management that was applied.

Although Africa has some of the lowest maize yields in the world, it is not uncommon to expect between 2,000 to 4,000 kilograms per hectare.

Production Management Guidelines

Growth stage 0: from planting to emergence

Planting depth affects the period from planting to emergence, because the seedlings of deeply-planted seed will take longer to emerge than shallowly-planted seed. If planted too deep, the mesocotyl may open below the soil surface and cause the seedling to die off.

The seedling obtains its nutrients mainly from seed reserves. Primary roots may be in

contact with band-placed fertiliser even before emergence. Too much fertiliser close to the seed may cause burning.

Growth stage 1: four leaves unfolded

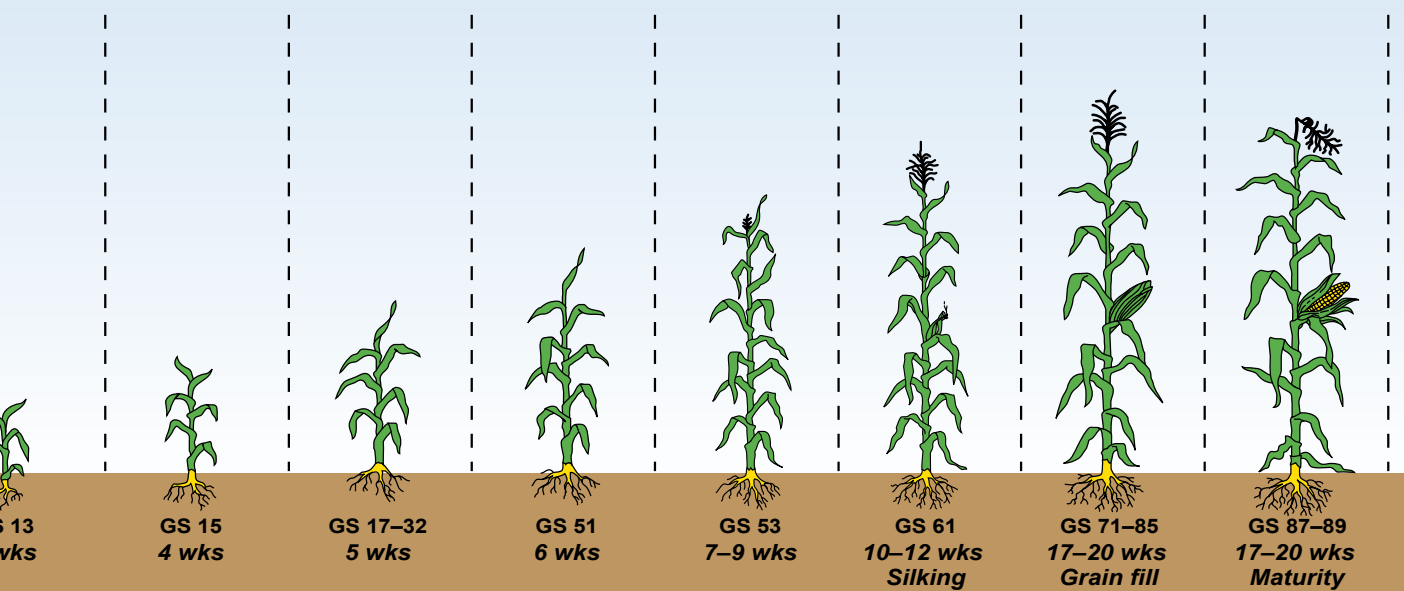
Some of the problems encountered during this stage should not have a permanent effect on yield, provided the problems are rectified promptly.

During this stage plants are very susceptible to drift-sand damage. Hail and light frost may damage the exposed leaves, but because the growth point is still below the soil surface, damage should be negligible. Waterlogging at this stage may be harmful to the seedling, because the growth point is still below ground level.

Tilling close to the plants may harm the roots, which will put the plants under stress and detrimentally affect yield.

Growth stage 2: eight leaves unfolded

Nutrient deficiencies will restrict leaf growth. If necessary, this is the correct stage to apply a fertiliser as side dressing. Nitrogen should, however, be applied to moist soil and roots should be damaged as little as possible.



Defoliation by hail or other factors may cause a yield loss of 10 to 20 %. As long as the growth point is still below ground level, waterlogging may cause damping off of plants. Flooding at later stages, when the growth point stays above the water, is not as detrimental.

Growth stage 3: twelve leaves unfolded

Stress as a result of water or nutrient deficiencies during this stage will affect the ultimate size and yield of ears. Plants, breaking below the growth point, will not recover.

Growth stage 4: Sixteen leaves unfolded

Hot soil surfaces may affect the development of prop roots. The tassel begins to show in the calyx. Water and nutrient deficiencies may detrimentally affect silk development and therefore the number of kernels per ear.

Growth stage 5: appearance of silks and pollen shedding

Planting dates should be chosen so as to ensure that this stage coincides with normally favourable growing conditions. Water supply is important because wilting of plants (water stress) early in the morning detrimentally

affects pollination.

Growth stages 6 and 7: hard dough

Denting of kernels begins and this is the right stage to make silage.

Growth stage 9: Physiological maturity

Monitor moisture content of grain regularly to start harvesting as soon as possible (below 14 %) to reduce grain losses.

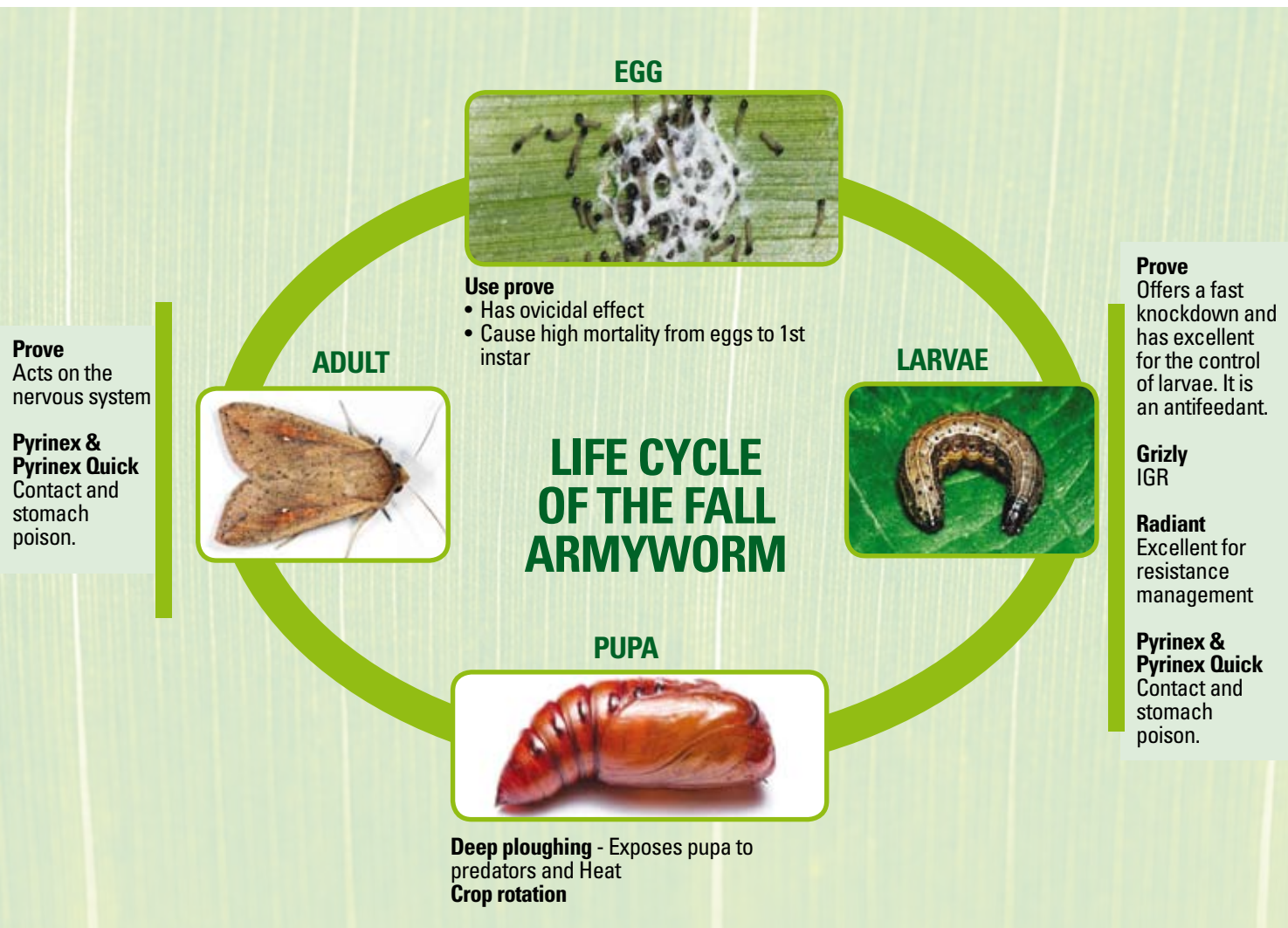


Fall Army worms:

Enjoy Amiran's Knowledge, Succeed in Control

Fall Armyworms (Spodoptera frugiperda) is a migratory pest that occurs in large numbers and its caterpillars cause severe damage to more than 80 plant species especially cereal crops such as: maize and rice. Recently FAW has spread to Southern and Eastern Africa and has brought havoc to maize farmers. In Kenya, the fall armyworm (Spodoptera frugiperda) is becoming a nightmare to cereal farmers especially in Trans Nzoia, Vihiga, Kakamega, Kisii, UasinGishu, Nandi, Kericho, Baringo and Kilifi.

"FAW damages corn plants in nearly all stages of development but will concentrate on later plantings that have not yet silked. Offseason planting, late planted fields and later maturing hybrids are more likely to become infested. To win the war on FAW insecticides of different chemical classes need to be alternated because they mutate very fast. Good efficacy has been recorded to farmers who spray insecticides in late evenings as opposed to during daytime. This is attributed to the fact that FAW are nocturnal", states Timothy Munywoki, Amiran's Cereal Agronomist.



“FAW damages corn plants in nearly all stages of development but will concentrate on later plantings that have not yet silked.

FAW moths have a capacity of flying in long distances and lay large number of eggs that enables the pest to quickly establish in a new area. Movement of infested plant materials; (green or dry stover for animals, green maize cobs) can aid in carrying the different FAW stages within the same farm or in the locality. To curb the pest, early detection and proper timing of an insecticide application are critical. Farmers need to be educated on proper IPM measures to curb the pest. To contain FAW, one has to target the four stages of the pest which include: Eggs, Larvae, Pupa and Adult.

Eggs

The female lays tiny eggs in masses of 150-200 on host plant and are covered with protein sheath to protect them from attack by natural enemies and pesticides. In her lifetime, a female lays 1,500-2,000 eggs. Eggs hatch in 3 to 7 days. According to Amiran's Cereal Agronomist, Timothy Munywoki, “We front Prove on this stage. Prove has an ovicidal effect and causes high mortality from the eggs to first instar. Oil based insecticides may be used in this stage like Saf-T-side.”

Larvae

The larval stage is the most destructive phase, feeding on soft plant tissues. There are usually six instars in fall armyworm. “In Amiran Kenya we have a basket of solutions to curb FAW larvae. First we recommend Pyrinex and PyrinexQuick especially on initial stages of maize crop. i.e during Germination and population establishment. Pyrinex has fumigant action and will not only work on FAW but also other stubborn soil pests like termites, chaffer grubs and cutworms. Pyrinex Quick has a unique combination of micro-encapsulated formulation of chlorpyrifos and a pyrethroid. The combination of the two active ingredients brings fumigant action and quick knock down on army worms. Secondly, we recommend Prove, asuperior product which offers unmatched protection against FAW. Prove is a non- systemic insecticide with the ability to penetrate leaf tissues by trans-laminar movement. Prove once applied on army worms, feeding and egg laying stops and death occurs after a few days. Prove has a long residual effect and no cross-resistance has been recorded due to its unique mode of action. Thirdly we recommend Grizly. Grizly is a combination of benzoylureas (IGR) and neonicotinoids with contact, translaminar and systemic and contact activity. Grizly is readily taken up by the plant and further distributed acropetally through the entire crop. Grizly has both Ingestion and Contact activity on larvae of armyworms and is a growth regulator thus prevents the FAW from proceeding to the next instar. Finally, we recommend Radiant. Radiant is an excellent product for resistance management. In addition, Radiant has unique active ingredient and has relatively low usage rates. All the said products should be alternated to achieve full control of FAW.

Pupa

Normally, pupation takes place in the soil at a depth 2 to 7 cm.



Timothy Munywoki, Amiran's Cereal Agronomist.

The pupa is reddish brown in color, and measures 14 to 18 mm in length and about 4.5 mm in width. The larva constructs a loose cocoon, oval in shape and 20 to 30 mm in length by tying together particles of soil with silk. If the soil is too hard, larvae may web together leaf debris and other material to form a cocoon on the soil surface. Duration of the pupal stage is between 7 - 14 days. Timothy Munywoki, Amiran's Cereal Agronomists states that, “Proper control of this stage revolves around damaging the pupa which is burrowed either in the soil or leaf debris. For instance, deep ploughing exposes the pupae to predators and solar heat.”

Adult

The moths have a wingspan of 32 to 40 mm. In the male moth, the forewing generally is shaded gray and brown with triangular white spots at the tip and near the center of the wing. The forewings of females are less distinctly marked, ranging from a uniform grayish brown to a fine mottling of gray and brown. The hind wing is iridescent silver-white with a narrow dark border in both sexes. Adults are nocturnal and are most active during warm humid nights and mates in the evening. After a pre-oviposition period of three to four days, the female normally deposits most of her eggs during the first four to five days of life. The adult moth is capable of flying 30kms in one night drifting through air current. On average, duration of adult life is estimated to about 11 days to 14 days. Timothy Munywoki states that, “To control posts a great challenge on the use of chemicals. Pheromone traps will work effectively in this stage. However, proper timing of application of the insecticide can control the adult moth. Insecticides like Prove, Pyrinex Quick and Pyrinex will have a proper control if applied at the right timing.”



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Maize Production:

Enhancing Soil Fertility for Greater Productivity

The staple food crops in Kenya include maize, beans, rice, potatoes and sorghum. The yields of food crops per acre are on the decline due to adverse effects of climate change, low adoption of quality farm inputs and continuous farming without adequate soil nutrients replenishment. This calls for better soil management practices through soil investigations that provide farmers with soil amendment and management solutions that not only increases crop productivity but also conserve the environment.

Optimal Conditions for Maize Growth

Maize can be grown on a wide range of soils but performs best on well-drained, well aerated and deep soils containing adequate organic matter content and well supplied with available nutrients. High yields of maize results in heavy drain on soil nutrients and therefore requires regular replenishment with soil nutrients to replace nutrients taken up after every harvest. To sustain yields at a certain level, nutrients out of soil must always be almost equal to nutrients applied within a growing period taking into consideration nutrient losses through harvested materials, leaching, volatilization, and erosion. For optimum production, factors such as soil moisture,

Maize crop grows generally well in soils with a pH range of 5.0 to 8.0 with an optimum pH range for growth at 5.5 to 7.0. The pH outside this range usually makes certain elements more or less available, so toxicity or deficiency develops and growth rates of the crops is reduced. It is very important to maintain the pH as close to the optimum range as possible because below a soil pH of 5.0, alluminium and manganese toxicities may occur and deficiencies of P, Mg and Ca become common.

temperature, pests and diseases, weed control, and soil chemical and physical conditions must be taken into consideration.

Maize crop grows generally well in soils with a pH range of 5.0 to 8.0 with an optimum pH range for growth at 5.5 to 7.0. The pH outside this range usually makes certain elements more or less available, so toxicity or deficiency develops and growth rates of the crops is reduced. It is very important to maintain the pH as close to the optimum range as possible because below a soil pH of 5.0, alluminium and manganese



toxicities may occur and deficiencies of P, Mg and Ca become common. At pH above 8.0, deficiencies of Fe, Mn, Zn and P tend to occur. For example if pH is lower than 6.0, P starts forming insoluble compounds with iron (Fe) and aluminum (Al) and if pH is higher than 7.5, P starts forming insoluble compounds with calcium (Ca) making it unavailable to the plants.

Soil suitability evaluation is a useful tool to guide farmers, farmer groups, extension providers, dealers in fertilizers and other stakeholders on the types and levels of fertilizer application for different areas in the country. Farmers and other stakeholders are encouraged to acquire the soil test information and use the fertilizer recommendations to improve their crop productivity and guide agro dealers in procurement of fertilizer for various regions in the country. Further, the long term goal is to encourage farmers to test their soils before applying organic and inorganic fertilizers.

The National Agricultural Accelerated Input Access program (NAAIAP) is a pro poor program in the State Department of Agriculture that offers support to resource poor farmers through fertilizer subsidy and an Agricultural Credit Guarantee Scheme. The primary objective of NAAIAP is to improve the availability of

farm inputs to vulnerable households by offering start-up inputs grants in the form of seeds and fertilizers for one acre of maize. The targeted subsidy is intended to uplift beneficiaries out of the vicious cycle of poverty and enable them to participate in commercial agriculture through their own resource mobilization initiatives and the credit guarantee scheme.

To maximize on inputs use, soil sampling and analysis was incorporated in the program to provide information on the nutrient status of soils to enable farmers apply the right types and quantities of fertilizers to minimize problems of land degradation through build up of soil acidity as a result of blanket fertilizer recommendations.

A strong agricultural sector provides a sound foundation for a prosperous country. From this recognition, the goal of the government is expressed in Kenya Vision 2030; that is 'a viable and vibrant agricultural sector that is commercially oriented' and can compete at international level with more advanced world economies

The sector, however, faces a number of challenges which include reduced productivity, high cost of farm inputs, inefficient utilization of inputs, poor adoption of mechanization, impacts of climate change and lack of access to agricultural credit.

The country's fertilizer market is fully liberalized with the bulk of fertilizers imported and distributed by the private sector. However, since 2008, the government through the

fertilizer subsidy program has procured 494,000 metric tonnes of fertilizer in support of the agricultural sector.

A Kenya Government report provides recommendations on the most appropriate fertilizer formulation or blend for maize.

However, the farm specific results may be interpreted for other crops. A data base for soils in the sampled sub counties has been compiled and this report can be uploaded on the ministry's website www.kilimo.go.ke. The report is an invaluable resource for use by farmers, agricultural extension providers and stakeholders as a tool for appropriate fertilizer use.



In Summary

- The pests have so far damaged an estimated 287,000 hectares of maize in East and Southern Africa.
- Researchers at Kalro and the African Agricultural Technology Foundation say if approved, the Bt maize will give farmers some protection against the armyworms.
- The African armyworm is capable of destroying whole crops in a few days. By Christabel Ligami

Scientists in East Africa are pushing for the approval of genetically modified maize (BT), saying it can withstand the armyworm that has caused farmers massive losses. A survey carried out in Kenya, Uganda and Tanzania found that the armyworm has infested crops in the three countries, threatening the livelihoods of farmers. The pests have so far damaged an estimated 287,000 hectares of maize in East and Southern Africa.

According to Murenga Mwimali of the Water Efficient Maize for Africa (Wema) programme at the Kenya Agricultural and Livestock Research Organisation (Kalro), the findings have been forwarded to the countries' ministries of agriculture for action. Researchers at Kalro and the African Agricultural Technology Foundation say if approved, the Bt maize will give farmers some protection against the armyworms. The scientists are particularly worried about the advance of the fall armyworm (*spodoptera frugiperda*), which was first reported on the African continent in Nigeria.

It subsequently appeared across parts of West and Central Africa, before extensively invading fields in Southern Africa in December 2016. The destructive activities of the fall armyworm have only served to add to the devastation caused by the native African armyworm (*spodoptera exempta*) and the severe drought caused by the El Nino weather phenomenon in 2015-2016. As farmers await the approval of the BT maize by governments in East Africa, Dr Mwimali advises them to use

commercial formulations of Bt that are available locally.

Kenya's National Biosafety Authority approved the environmental release of the BT maize in February 2016 with conditions: Submission of environmental impact assessment reports to the National Environment Management Authority for review and approval. "This would then allow us to undertake national performance trials to identify suitable varieties as required by the Seeds and Plant Varieties Act so that farmers who are affected by stem



Call for GM Maize to Fight Armyworm

borer reduce insect damage and protect their yields through the use of the Bt maize," said Wema project manager, Sylvester Oikeh.

"However, despite the submission of the report in April 2016, we are yet to get the EIA licence from NEMA. Coincidentally, the Wema confined field trials in Uganda show the Bt (*Bacillus thuringiensis*) gene can control the fall armyworms," said Mr Oikeh. The MON810 Bt maize entries showed resistance to the fall armyworm compared with non-transgenic maize materials. This, however, needs to be further confirmed through additional experiments.

According to Dr Mwimali, the African armyworm is capable of destroying whole crops in a few days. The larvae feed on all types of grasses, early stages of all cereal crops. The pest is migratory, and exists in East Africa. However, with climate change and the associated increase in temperatures, these could change from being a minor pest to a major pest in all kinds of grasses.

Scientists at the International Maize and Wheat Improvement Centre (CIMMYT) are currently researching available breeding resources with potential resistance to fall armyworm, and screening elite maize germplasm to identify possible sources of resistance. CIMMYT, which has its headquarters in Mexico, is a non-profit research and training institution dedicated to the development of improved varieties of wheat and maize.





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Help or Hinder? How Media Portrays Farming to the Public

Studies prove that effective agricultural communication and rigorous, balanced journalism are not mutually exclusive. This should motivate farmers to engage with the media; and encourage journalists to take a constructive and open-minded approach to agricultural stories.

How much coverage does agriculture receive from main stream media? Is this somehow irrelevant? This has become far more an exploration of tone and perception, the angles journalists take, the questions they ask and how farmers respond, under pressure, to scrutiny and challenge. Worryingly there are problems on both sides of this divide, there is a deep disconnection between conventional agriculture and the metropolitan news media.

The job of journalists is to give readers, viewers and listeners the best obtainable version of the truth, balanced and impartial information and to clearly signpost the difference between fact and opinion. News media has been unconsciously reinforcing stereotypes and naively swallowing preconceived ideas about modern agriculture, driven, by urban bias, a lack of specialism and

a lack of curiosity about rural life. However there is a growing appetite for rural affairs features and documentaries, particularly on radio and television. Farming is trending.

Some unhelpful attitudes within the farming industry are shocking. An inward-looking snobbery about the perceived cluelessness of the mainstream media, a lack of transparency on key issues of public interest, disproportionate defensiveness in the face of legitimate challenge and a tendency to 'shoot the messenger' instead of taking a long, hard look at itself and the way it communicates with the public. Farmers have played the victim for too long, complaining of attacks on their industry when they should be rising to the challenge, opening doors, building relationships and championing their point of view.

There are too few farmers and journalists who

have a foot in both urban and rural life; who can see, without prejudice or preconception, the frustrations on both sides. This should fill them with determination and passion to build a bridge; to challenge both the media and the farming industry to walk in each other's shoes.

The world's media has never been more powerful – or less trusted.

Its role in shaping the outcomes of the EU referendum and US presidential election of 2016 cannot be overestimated. The spread of 'fake news', an unfamiliar phenomenon has been deemed a threat to democracy.

Yet farming, with an uncertain future arguably needs the media more than ever before. It has some convincing to do – that agriculture is worthy of public money; that consumers should shun foreign labels and choose national instead; that the environment is safe in farmers' hands.

Exploring how the mainstream media can 'help or hinder' that mission – and what lessons can be learned from around the world – forms the basis of this report. Farmers often complain of a 'disconnect' between themselves and urban people and blame negative or simply non-existent media coverage. But traditional media, in the face of shrinking resources

and shortening attention spans, is fighting for survival in a ruthlessly competitive digital landscape. It must target audiences with content that is relevant to their everyday lives. The vast majority of that audience – more than 80% of the population are urbanised

How relevant is agriculture to them?

Studies confirm that the 'disconnect' is real, more so in urbanised societies, and both the industry and media have a role to play in it. Urban bias is endemic within the mainstream media. This can spill over into bias against intensive and large-scale farming systems, driven, at times, more by stereotypes and ideology than informed understanding of the subject. There is no evidence of urban bias leading to deliberate falsehoods, but it can influence story selection and the way in which a story is told (i.e. the angle).

There is deep-rooted suspicion of the mainstream media among farmers. Many believe journalists attack them unfairly on issues like the environment and animal welfare, but some farmers struggle to separate criticism from legitimate challenge. Knee-jerk defensiveness and a lack of transparency are key barriers to a constructive relationship with the media.

These challenges are not insurmountable. The case studies shared prove that effective agricultural communication and rigorous, balanced journalism are not mutually exclusive. These findings should motivate farmers to engage with the media; and encourage journalists to take a constructive and open-minded approach to agricultural stories.

This is not a quantitative study of media content, but a qualitative analysis of perceptions and personal experience. 'Agriculture' in this context refers mainly to conventional production and the term 'mainstream media' to national press and news broadcasters, with some regional and specialist contributions. This is not a study of social media. The urban/rural disconnect is real, more so in Western and urbanised societies, and both the media and farming

industry are contributing to it. While 'rural affairs' is a growing genre, agricultural specialism in the mainstream media remains incredibly rare.

Urban bias is endemic. This can lead to farming and rural issues being ignored, oversimplified or viewed purely from a metro-centric angle. Healthy journalistic scepticism can cross the line into ideological bias against conventional, intensive or large-scale farming systems.

Farmers and the industry are fuelling the disconnect through a lack of openness and transparency, disproportionate defensiveness in the face of legitimate challenge, disunity among farming sectors and a sense of 'exceptionalism' or entitlement to positive coverage.

Taken in a global context and in spite of urban bias, farming receives a fair amount of media coverage, relative to the industry's size. Programmes like Country file, which have broadened the appeal of farming to huge audiences, are doing the industry a valuable service.

Finally, the public narrative around agriculture is being dominated by farming unions and lobbyists. Politics at an industry level is drowning out individuals at a farm level, contributing to more distrust in the mainstream media.

This has something, a mission to set up a network of independent, trusted and diverse on-farm communicators. This is a new and original concept for British farming; and an exciting challenge. These have been structured for two key stakeholders who have equal influence and a shared responsibility in shaping the story of what farming is, what farming does and where farming is going.

For Farmers:

- Farmers must get better at talking to journalists and the mainstream media. Challenge is not criticism, questions are not attacks. Fight the red mist and learn to embrace scrutiny by acknowledging, and responding to, the views of those who think

differently.

- Increased openness and transparency. Particularly around controversial subjects like intensive production. Access to farms is absolutely essential in order to bridge the urban/rural disconnect. Attempts to keep journalists in the dark about the realities of modern food production are doomed to fail. Farmers must be prepared to not only defend, but champion their production systems. If they don't believe in them, no one else will.

A diverse network of independent farmers. Work with the industry to develop an inclusive network of free-thinking farmers, from across all agricultural sectors and systems, willing to speak openly to journalists with passion and without politics. Providing personal, 'on the ground' testimony on topical issues without pushing an industry agenda or denigrating other farming systems.

For the Media:

Journalism with integrity. If farms and agribusiness are to open their doors, they must be able to trust the media to deliver constructive journalism. While continuing to report the problems in agriculture, editors and programme makers have a duty to report solutions too. Adopting Ulrik Haagerup's 'third pillar of journalism' (solutions-based stories) would be a step forward for news culture.

Urban bias. Tackle urban bias by challenging metro-centric stereotypes about farming and rural life. Cultivate curiosity - not preconceptions - about all farming systems. Facilitate specialism in rural affairs. Differentiate between campaigners and informers.

- Inspire passion for rural affairs. It's time to generate interest in agriculture and rural life among young, trainee journalists by speaking to urban schools, colleges and universities. Established and respected journalists would be of enormous help in this mission. Journalists who have made a career out of rural affairs specialism must share the passion and inspire others to follow in their footsteps.

Weed Control in Maize Farming

Herbicides in the past were highly effective, cheap and easy to use. But reliance on herbicides alone has contributed to the widespread herbicide resistance problems that we are seeing today. If you look at the problem simply, herbicide resistance is nature's way of telling us herbicides alone are not sustainable and introducing more diverse weed control methods is required to disrupt the weed's life cycle.



Weed identification is the key to an effective maize weed management program. Incorrect identification can mean the difference between profit and loss. Although a weed's life cycle, including its method(s) of reproduction, is the most important identifying characteristic, it is sometimes necessary to know the exact species before selecting weed management measures.

Maize growers should make a weed inventory to aid in the selection of weed control programs. By tailoring control programs to fit the problems in each field. Growers can minimize weed control costs while maximizing yields and profits. An inventory can be made by scouting fields two or three times during the year and

recording the types (such as broadleaf annuals or annual grasses) of weeds present in each field.

The first observation should be made by the time maize is 3 or 4 inches tall. These early-season observations reveal how effective preplant or preemergence herbicides used and suggest the possible need for cultivation or for postemergence herbicide applications. A second look at the fields is before the maize is waist high and can provide information on the overall effectiveness of weed control practices and provide clues on how the program might be adjusted in future years. This also is a good time to record the types and numbers of weeds present and to map

the location of special problem areas in the field. Additional notes on weed types and numbers can be taken at harvest to complete the weed inventory.

Weed Management Methods

Although herbicides can provide effective weed management, maize growers should not depend on herbicides alone. Growers should use good cultural practices so the maize is competitive with any weeds and should integrate chemical control programs with cultivation, especially with difficult-to-control weeds or when weather conditions reduce herbicide effectiveness.

The first step in cultural weed control is the selection of a seed variety that has adapted to local growing conditions. Timely planting along with proper fitting in tilled situations or proper adjustment of no-tillage planters ensures rapid germination and a competitive advantage for the maize. Another cultural practice that favors rapid establishment of maize is proper band application of fertilizer at planting.

All primary (plowing) and secondary (fitting) tillage operations help provide a weed-free seedbed. Cultivation of row crops is an effective way to control annual weeds between maize rows. Band application of herbicides over the row at planting, combined with one or two cultivations, provides good control of annual weeds. Although rotary hoes effectively destroy weed seedlings in small maize, a row cultivator adjusted to minimize pruning of maize roots should be used after maize is 5 or 6 inches tall. Creeping perennials are not adequately controlled by one or two cultivations. These weeds regrow from rhizomes (underground stems) following cultivation and are controlled with tillage only if the operations are repeated over long periods. Biennial and simple perennial weeds do not persist in fields that are plowed but can be a problem in reduced and zone/no-tillage fields.

A variety of herbicides are available for preplant, preemergence, and/or postemergence weed control in maize. These herbicides vary in their effectiveness in controlling different weeds and in the length of time they remain active in the soil. Some maize herbicides can carry over to affect triazine-sensitive rotational crops such as legumes, small grains, and soybeans. Knowledge of the weeds present, herbicide effectiveness, and rotational plans should be considered when selecting herbicides.

Cost of chemical weed control dictates that herbicides be applied when they will provide maximum return. Label guidelines for the timing of herbicide applications are based on research and are geared for maximum weed control and minimum crop injury.

Factors Affecting Soil-Applied Herbicides
To be effective, soil-applied herbicides must be available for uptake by the roots and/or shoots of germinating weed seedlings. This means that they must be dissolved or suspended in the soil solution. Soil properties that affect the availability and activity of soil-applied herbicides include soil texture, organic matter level, and pH. All should be considered when determining herbicide rates.

Soil texture is determined by the relative percentages of sand, silt, and clay in a soil. Names describing texture such as loamy sand and clay loam are assigned to soils depending on these percentages. Clay particles are negatively charged and have a large surface area. As a result, soils high in clay content (heavy soils) have the capacity to adsorb or tie up herbicides and generally require higher herbicide rates than coarse-textured or light soils.

Organic matter content also affects adsorptive capacity of soils. Although un-decomposed plant and animal residues can influence herbicide performance,

the well-decayed, fine organic matter particles known as humus are of greatest importance. Like clay particles, humus particles are negatively charged but exhibit an even greater capacity to adsorb or tie up herbicides than clay. Consequently, herbicide rates also have to be adjusted to the soil organic matter level.

Rates for soil-applied herbicides are mostly based on for medium-textured (loam) soils with organic matter levels of 3 to 4 percent. Fine-tuning the rates for other soils can be done by consulting the herbicide label for different soil textures and for varying organic matter levels.

Soil pH can also affect the availability of some soil-applied herbicides. This is important for the triazine herbicides. These herbicides are most strongly adsorbed (tied up and unavailable for uptake by weeds) on clay and organic matter particles at low pH levels. Although the amount of triazine adsorption increases at all pH levels below 7.0, adsorption is most dramatic at pH levels of 6.0 and below. This is an important consideration for continuous zone/no-tillage fields where the surface inch of the soil profile may have a lower pH than is reflected in the results of a normal soil sample analysis. It may be helpful to check the pH in the top inch of the soil profile with a soil pH kit in fields that have been in zone/no-tillage for extended periods.

Soil pH also affects availability of some herbicides. These herbicides should not be applied to areas where soil pH is greater than 7.8 as this may result in unacceptable crop injury. In addition, soil applications of these herbicides should not be made to soils with more than 5% organic matter if soil pH is less than 5.9 as reduced weed control will result.

Herbicide Resistance Management
Herbicide resistant biotypes are common. Populations of these weeds were originally controlled with one or more of the

herbicides at normal use rates. However, shifts to weed populations dominated by the resistant strains have occurred in many locales. These resistant strains are not controlled with extremely high herbicides use rates. In addition, there is cross-resistance among the different herbicides used in maize.

This situation has prompted refinements in the control guidelines for annual broadleaf weeds in maize. Herbicides have played, and will continue to play, an important role in maize weed control programs; however, effective control programs for these herbicide-resistant strains will involve the use of crop rotation and cultivation along with herbicide rotation and/or use of herbicide combinations that include herbicides with different sites of action (how they affect weeds). These practices will also delay development of weed populations that are resistant to the herbicide.

Rotating herbicides with different sites of action and the use of tank mixes or sequential applications that involve herbicides with different sites of action are key elements in herbicide resistance management plans. To do this most effectively, everyone involved in decisions about weed management must have site of action classification for herbicides readily available. The Weed Science Society of America (WSSA) has approved a numbering system to classify herbicides by their site of action (Mallory-Smith, C.A. and Retzinger, E.J. 2003. Revised classification of herbicides by site of action for weed resistance management strategies. *Weed Technol.* 17:605-619). In this system, a group number is given to all herbicides with the same site of action. To further efforts in management of existing herbicide-resistant weed populations and to delay or avoid development of new herbicide-resistant weed populations, these "GROUP NUMBERS" are included in the "Chemical weed control tables" in each crop section of this guide.

Realizing Sustainable Land and Water Management in Farming Under Climate Change



By 2050, global food production must increase by 60%. Innovations for water management are essential in achieving this, Alan Nicol from IWMI highlighted. "For smallholder farming, managing agricultural water availability, access and use is key to success," he noted. He shared case studies, including solar energy to strengthen access to water for agriculture, increasing availability via rainwater harvesting, improving usage via the wetting front technology, and understanding scale for food security monitoring and hazard risk mapping, as well as index-based flood insurance.

When it comes to water management, "it's really about blending water-smart agricultural techniques and approaches; but also social and institutional environments in which they exist, into climate-smart agriculture," he said. Theo de Jager, president of the the WFO gave the farmer perspective reiterating the importance of land and water for agriculture. He noted that unlocking the wealth in land and water required investments yet the world's poorest farmers in the world cannot access financing.

De Jager called for better support and

Land and water
are the absolute
nexus of agriculture -
there is no agriculture
without land and
water."

investments to ensure sustainable land and water use by farmers. "There are smart ways of using water and land because of new technologies - but they cost a lot of money," he noted. Without access to finances, new technologies remain elusive for smallholder farmers. Yet with climate change, farmers cannot continue with the business as usual approach. "Many are caught up in a poverty trap; there's no new technology, nothing has evolved. Irrigation, if there is any, is only flood irrigation," he added. Smallholder farmer productivity is quite low and future farmers

cannot continue the same way given scarce water and land resources. De Jager called for better support and investments to ensure sustainable land and water use by farmers.

In response to Theo's call, James Kinyangi from the African Development Bank (AFDB) highlighted how the bank was building a supporting enabling environment in Africa for agricultural transformation. "We are working on seven enablers to support agricultural growth, productivity and value addition," he noted. These include: increase productivity; value addition; hard and soft infrastructure; agricultural finance; agribusiness environment; inclusivity sustainability and nutrition; and coordination. Also, he highlighted work on risk management, asset protection and inclusion of women and youth as being crucial in providing a supporting enabling environment.

Kinyangi further highlighted various platforms and partnerships for mobilizing agricultural finance. These are: development finance institutions; AfDB country offices and local banks; co-development partners such as research institutions, policy and investor platforms; small and large scale agribusinesses, farmer organizations and food companies; investment funds; and donors, foundations and government organizations.

In his closing remarks, Dhanush Dinesh from CCAFS reflected on the question:

Is sustainable land and water management compatible with small scale farming under climate change? "If we work on these factors appropriately, it is possible to be a yes," he said. Such factors, as highlighted by various speakers included: having investments at different scales, in context and holistic models; leap frogging using data, science and research; social inclusion with a focus on women as well as youth who are farmers of the future, and building partnerships at scale very quickly.

Pictorial: Opening of KEPHIS Laboratory



Hermetic Technology Keeps Off Grain Pests for Over Two Years, Averts Losses



By Laban Robert

Farmers can keep off grain destroying pests for two years without chemicals after the USAID Kenya and the Ministry of Agriculture launched hermetic bags, which suffocate any crop storage enemies.

The official launch follows years of testing for efficacy in taming maize, wheat, beans, cowpeas, among other grains destroying organisms such as weevils and moths. According to the USAID Kenya, more than three million bags of maize will be saved annually if farmers adopt the use of these bags. This would translate to saving at least 270million kilogrammes of grains per year, therefore boosting food security and profits for agripreneurs.

“Hermetic storage technology provides safe, cost-effective storage solutions. Hermetic bags enable farmers to keep grain year-round, without pesticide application, for household consumption while providing the household with a marketable asset in case of emergency.” “Improved grain retention also generates smart income for farmers by giving them the opportunity to sell when market prices are more favorable,” said USAID Economic Growth Chief Officer to Kenya Michael Nicholson.

Innovation in the insecticide sector has not marched the mutation of storage crop destroying agents. For instance the commonest weevil nick-named “Osama” by Kenyan farmers destroys tonnes of maize

even with excess application of pesticides. It starts from the fields into the stores. Osama can ground 90kg bag of maize into ‘flour’ and shells in a few weeks after storage.

But since the hermetic bags are air-tight as a result of the polythene layer linings, any living organism on the maize suffocates to death a few hours after packaging. The sack is tough, preventing any fresh invasion. Besides, the bags eliminate chemical residue on grains.

World Food Programme approximates that post harvest losses stand at 40 per cent globally. This includes rotting due to rotting as a result of poor drying or storage facilities and destruction by pests. The grains, for example maize, therefore, should be dried to attain a moisture content of 12 per cent to 14 per cent. Excess moisture leads to growth of aflatoxins, making the food unfit for consumption.

Hermetic Metal Silos

Farmers can save up to 25% of their cereals from losses by using hermetic metal silos to store their grains. The silo with a capacity of five 50 kg bags is an innovation of the Kenya Agricultural and Livestock Research Organization (KALRO) and is suitable for small scale farmers.



Due to unreliable storage options that consist of using discarded sacks and basins, many farmers are forced to sell their crops at harvest time when prices are at their lowest, and pay higher prices later in the year to purchase maize grain back for food. Farmers also often have to purchase chemicals to control pests

and rodents attacking their stored cereals. Grains constitute the basis for food security for the majority of the population in Kenya and Africa at large and are a central component in the livelihoods of smallholder farmers. Significant volumes are however lost through post-harvest operations due to attack by pests making farming an expensive venture. It is reported that the region loses 25 to 30% of cereals during market storage according to the Eastern African Grain Council.

Whereas quantitative post-harvest losses result into a direct loss of saleable weight, qualitative losses lead to a loss in market opportunity and grain nutritional value and may pose a serious health hazard of aflatoxicosis if linked to consumption of Aflatoxin-contaminated grain.

According to Eliud Njoroge, a crops researcher at KALRO, no chemicals are required for preservation purposes if farmers adopt this method of storage. Farmers can store grains for a longer period of time meaning more income in and out of season.

Procedure for storing grains in hermetic metal silos

- Dry and clean grain before loading into silo
- Put silo under a roof and on wooden platform to avoid corrosion and exposure to the sun or rain
- Load grains into the silo from the inlet at the top
- Place a candle on top of the grain and light it. The candle will consume oxygen in the silo and hence make the silo unsuitable for pests.
- While the candle is burning, place the lid and seal the silo using rubber band on both inlet and outlet. The candle will go off after exhausting the oxygen in 2 – 5 minutes.
- Don't open silo for 20 to 30 days after sealing so that weevils and eggs can die for lack of oxygen.
- When the silo is opened, always seal the outlet after scooping the desired amount of grain.



Sorghum boosts incomes, illicit liquor war

Economic empowerment is key in maintaining the mutually beneficial partnership, which has seen KBL pay more than Sh2 billion annually to local barley and sorghum famers. By Eric Kiniti.

Today, 80 per cent of raw materials used at Kenya Breweries Limited (KBL) is locally sourced—a milestone achieved through strategic partnerships in the value chain.

This has created employment for more than 30,000 farmers and continuously generates business value by supporting over 80,000 businesses.

A few years back, illicit liquor was one of the major challenges facing the country with thousands of youth opting for drinks such as chang'aa, which were cheap but often posed serious dangers to their health.

The drinks, contaminated with methanol and other concoctions, eventually caused blindness and resulted in death.

This led to the introduction of Senator Keg in the Kenyan market, which is

now providing a safe, affordable beer that is at the centre of the fight against illegal brews.

The ongoing formalisation to enable licensing of outlets that previously sold illegal alcohol, making them exclusive Senator Keg outlets, will also ensure that consumers get high-quality beer in hygienic conditions and at affordable prices.

Alcohol manufacturers have a responsibility to create a responsible drinking culture.

Farmers, who are changing the community for the better, deserve to have a comfortable and decent life. Through the keg, KBL supports this concept by providing a market for drought-resistant crops such as sorghum, which is diversifying the country's crop base and improving overall food security.

Economic empowerment is key in maintaining the mutually beneficial partnership, which has seen KBL pay more than Sh2 billion annually to local barley and sorghum famers.

Our engagement with these small-scale farmers also focuses on the "Jilishe Kisha Uuze" programme that encourages them to grow sorghum and millet to meet their household needs then sell the surplus to increase their income.

Enhanced value partnerships with farmers to provide quality sorghum will ensure the production of Senator Keg continues and that consumers have a healthy and affordable option, pulling them away from the jaws of illicit brews.

Eric Kiniti is the corporate relations director at EABL. Growing.Value. Together@eabl.com

EAC Policymakers Trained on Aflatoxins and their Effective Antidote, Aflasafe

“Aflatoxin is a silent killer and a major health problem all over the world. It has no smell, taste, or color, therefore millions of people in Africa including infants and children, are exposed to the poison without their knowledge.

A week-long training for policymakers from the East Africa Community (EAC) partner states on aflatoxins and progress on efforts to reduce its contamination in food and feeds in the region was done in Dar es Salaam, Tanzania.

The training was part of ongoing efforts by the EAC Secretariat in partnership with the Africa Union (AU), USAID, and the International Institute of Tropical Agriculture (IITA), among many other partners, to prevent and control aflatoxin contamination, a major threat to food security in the region, a health hazard, and which affects trade in food and agricultural commodities. The training was conducted at and by IITA experts

East Africa is a hotspot for aflatoxins—highly poisonous chemicals produced by the mold *Aspergillus flavus* which is found in soils. They affect both humans and animals that eat contaminated food and feed, and can cause liver disease (including cancer) and lower the body's immunity. In children, aflatoxins impair growth leading to stunting. Acute exposure can lead to instant death.

The aflatoxin-producing molds affect many crops but the key staples of



“Aflatoxins are often looked at as a postharvest issue while in fact they are a preharvest problem. This is because contamination takes place while the crops are still in the field.

maize and groundnut are the most susceptible. Aflatoxin contamination also affects trade as grains that have high levels of the toxins cannot be exported and must be destroyed—at a cost.

“The multi-sectoral impacts and effects of aflatoxin constitute a significant challenge to agriculture,

health, and trade. It is one of the challenges undermining the desired levels of social and economic transformation and regional integration in the East Africa Community,” said Fahari Marwa, a Principal Agricultural Economist at the EAC Secretariat.

“The EAC has been spearheading interventions aimed at addressing the incidences and impact of aflatoxins to enhance food utilization, nutrition, and food safety. The secretariat has developed the EAC Aflatoxin Prevention and Control Strategy which was approved at the 10th Sectoral Council on Agriculture and Food Security.

The training also focuses on strategies for preventing and controlling aflatoxin contamination including looking at the progress in developing and rolling out aflasafe—one of the technologies that has proven effective in reducing contamination—across the five EAC countries.

Aflasafe was developed by IITA in collaboration with the United States Department of Agriculture—Agricultural Research Service (USDA-ARS) and other local and international partners. Aflasafe is made up of the mold of the same family as the type that produces aflatoxins but which do not produce the toxin and can displace their toxin-producing relatives from the soil. Aflasafe has been able to consistently reduce aflatoxin contamination in crops

by over 80% in trials across the continent.

“Aflatoxin is a silent killer and a major health problem all over the world. It has no smell, taste, or color, therefore millions of people in Africa including infants and children, are exposed to the poison without their knowledge. Testing in the laboratories is the only sure way to know if aflatoxin is present in the food and feed but this is very expensive. Therefore, reducing the mold that produces aflatoxins is one of the effective ways to reduce the contamination,” said Dr Victor Manyong, IITA Director for Eastern Africa while also speaking at the training’s opening session.



“Aflasafe is a very cost effective and efficient technology in reducing aflatoxin contamination in food and feed. Together with our partners we are working with many countries all over Africa to develop their own product using locally sourced strains of the non-toxic mold. We have developed local products for over 10 countries in Africa,” he said.

In East Africa, Kenya is at an advanced stage as AflasafeKE has been registered in the country through a partnership between IITA and the Kenya Agriculture Livestock Research Organization (KALRO) and the construction of a plant to manufacture it locally is almost complete.

In Tanzania, the Ministry of Agriculture, Livestock and Fisheries and IITA have developed their local product AflasafeTZ and put together the dossier for its registration. In Burundi, Rwanda, and Uganda, the development of their local product is ongoing.

“Aflatoxins are often looked at as a



The training also focuses on strategies for preventing and controlling aflatoxin contamination including looking at the progress in developing and rolling out aflasafe—one of the technologies that has proven effective in reducing contamination—across the five EAC countries.

postharvest issue while in fact they are a preharvest problem. This is because contamination takes place while the crops are still in the field. The fungi then continue to produce aflatoxins during postharvest handling and storage. Therefore, preharvest management is a very critical stage for preventing and reducing contamination of crops while in the field as this will reduce contamination during storage,” said George Mahuku, IITA plant pathologist, and one of the trainers.

“Good postharvest and storage management of the aflatoxin-free produce is also important to reduce the risk of further contamination. These include not spreading the produce on bare soils to dry, ensuring they are dried properly to a safe moisture content of 12% or below, and use of clean and dry storage that will keep away moisture and pests,” he added.

The training enabled policymakers to get a better understanding of the aflatoxin problem and the biocontrol technology, Aflasafe. The training also covered efficacy of the aflasafe technology and its benefits, and how it is produced. Policymakers also reviewed the status and the progress made in the transfer and application of aflasafe technology in the EAC Partner States and discuss sustainable models and identify strategic pathways for upscaling and out scaling of aflasafe in the EAC.

Catherine Njuguna, IITA Eastern Africa, c.njuguna@cgiar.org, +255 767 361 255

Farming: Business or Hobby?



Sometimes the purpose of a business is very clear, however many times it is below the surface, as businesses simply get on and “just do it”, but are driven by something in them that is great. Some themes come up frequently in terms of purpose – whether the businesses are outwardly successful or struggling.

These are a willingness to:

- fulfil a personal drive and ambition to do something great or to be the best
- provide a foundation for family well being
- fulfill a way of life and a genuine love of farming
- provide something different that is good for people and the world
- enhance financial wellbeing
- simply do it, because it's what we do.

It is important to note that whilst most of the operations are operationally sound, run professionally, and inspirationally led, not all are overwhelmingly viable businesses from a profit and loss perspective, or necessarily successful farming operations. There are many reasons this might be the case, but common themes are vagaries of the market and fickle consumer behaviour affecting demand in market, distortion of markets due to government influence, bad luck playing a part in

business, or a lack of focus on profit and loss due to other factors being the prime driver of an operation.

How does an agricultural business maintain its essence and become better at fulfilling its purpose?

Many if not all business drivers are needed in some form to run a good business – and indeed many of the seemingly positive behaviours can be a negative and hold a business back if applied in the wrong manner (e.g. hyper competitiveness leading to low pricing, driving market share up

and profitability down).

Perhaps the key overarching factor is that these businesses affect what they can, take account of the factors beyond their control, and get on with the job and make things happen. They are results orientated rather than problem-focused. They work hard AND smart to make their own luck.

Why do people farm – what is the essence of their purpose?

What is better farming is very much affected by the organisations philosophy or the essence of the operation itself.

“Achievement is not always success, while reputed failure often is. It is honest endeavor, persistent effort to do the best possible under any and all circumstances.” - Orison Swett Marden

The key philosophies, which have driven impressive agri-business operations to improve their performance or offering to the market. It is clear that they are driven by a number of factors which result in them becoming great at what they do.

Enhancing Community Service and Keep Reputation.

It is not a given that an Agri-business with a solid philosophical grounding will be successful by all measures. This is most obvious with organisations with no stated objective of being financially successful, such as initiatives that focus on community outcomes. However it also is common in agribusinesses.

Often times the necessarily long term focus of a farm operation can make it look unviable – when other factors are in fact more important than short term viability.

Some agri-businesses are completely integrated, offering food grown on farm (both vegetable and animal), an amazing farm shop, distribution through premium outlets, and accommodation. Some offer extensive classes in a state of the art, the key philosophy is to do everything the best way possible. The story behind the product – based on old techniques, pedigree breeds and organics, is far more prominent than any concern for profitability. Enhancing the farm's reputation, and sustaining its future, is the key driver.

Enhancing financial well-being

While a day-to-day focus on financials is important and may be a key factor in maintaining or growing an agri-business, this is seldom the central driving force in businesses. It is a means to an end – a stable financial grounding allows businesses to thrive and pursue the other philosophical goals that they have. While financial well-being is a pillar of good business practice, it is not the key driver.

While other philosophies may drive a business, it is clear that every viable business must be run with some focus on the bottom line.

How does an agricultural business maintain its essence and become better at fulfilling its purpose?

However, a lot more underpins business. While quality and "can do" attitude are also guiding strategies, recognition of the importance of commercial drivers is also ever

present. Philosophy on sustainability is to give something back to the environment. So some started planting more trees. Every tree should have a commercial value though, otherwise the business is going backwards. Without commercial success you can't achieve the other more holistic philosophies.

Passion

To fulfill a way-of-life and a genuine love of farming on a personal level, and to provide something different that is good for people and the world

A genuine love of farming and a way-of-life is a prime motivating factor for many farmers. This is primarily for personal satisfaction stemming from a preference for living and having your family based in a rural environment. This can also be accompanied by a wish for "providing something different to people" as a central motivation, in that this may involve personal sentiment about how people should live a happier and healthier life.

But you Must Make Money

The key philosophical foundations of well-run and aspiring agribusinesses is basic and various traits are common in most of these businesses.

However, one factor that need to be identified is simple because it's what we do' attitude. The philosophy is cited, but does not reflect actual practice. Often times people assume that they are farming the way their forefathers did – even though they are using far different techniques in the field, and operating at a far different level in the market. This is a purpose that allows top performance – to be rooted in a philosophy that does not allow improvement which is a recipe for bad business performance.

That said, the multi-generational aspect of farming remains a key strength in the industry.

Multigenerational knowledge is important. Often times farming and business intuition is well honed due to the amount of time and

situations that famers have been exposed to over their lifetime. However, they still welcome innovation, and organise themselves well. All of them are expert in technical operation of their business.

Perhaps the most common theme in agribusinesses which have succeeded in growing their businesses beyond their natural trajectory has been that they have taken a leap at the appropriate time. They have a structured strategic operation of their business – but at the same time know when to take a risk and grab an opportunity. While they have a structure, if needs-must they will over-rule their board.

One of the other most evident aspects of organisation in good farm businesses is the involvement of other people in helping manage and run the every-day activities of a company.

This applies to both operational and strategic decision-making. Business people essentially have to identify what they are good at and pay for the rest.

Farms also require relationships along the supply chain. In the least, good agri-businesses have productive relationships along the value chain, with some owning the value chain. A willingness to do better results in businesses integrating their business both horizontally and vertically to gain market advantage.

Essentially, successful agri-businesses are not prepared to compromise on providing the right product to the market. This is a combination of point of difference AND providing the necessary volume to have presence in a market.

What agri-business does best is affect what it can, take account of the factors beyond its control, and get on with it.

Uhuru's land policy proposals may be a turning point in managing resources

There are no two ways here. Change is imperative and the President got it right in his policy proposals. He now needs our support.



By Bitange Ndemo

Kenya is among the unfortunate sub-Saharan African (SSA) countries that are likely to face a food crisis in the next five to 10 years unless some drastic policy interventions are made.

The government seems to be aware of this lurking danger. President Kenyatta, in his speech to the nation on his second inauguration, made some far-reaching policy proposals with respect to agriculture, land ownership and land use. The following

is an extract from the President's speech:

"We shall take steps to address idle arable land ownership and utilization. We shall take steps to encourage and facilitate large-scale commercial agriculture to help diversify our staples. We shall redesign subsidies to the sector to ensure they target improvements in food yields and production quality. We shall provide, together with other actors, key enablers within the farming process that will address distribution, wastage, storage and value-addition of agricultural commodities". This may be the turning point to effectively managing the country's resources,

considering that in the past, planning has been an anathema.

Poor Land Use

The President's proposals come on the heels of a freshly launched National Spatial Plan that will ensure seamless implementation and compliance with planned resource utilisation. The NSP "establishes the National Spatial Structure as a framework to achieve integrated and sustainable spatial development of the country. ... It shall also be the basis for preparation of lower tier development plans to achieve integrated



and sustainable land use planning and to promote harmony and mutual cooperation in planning in the country.”

This is a welcome move, considering that agricultural productivity has been in decline due to poor land use practices.

Multiple sources of data (see for example, the World Bank’s 2010 study *Achieving Shared Prosperity in Kenya*) over several years show that while in the 1980s farmers could easily harvest more than 40 ninety-kilogram bags of maize per hectare, today farmers can hardly harvest 20 bags from a similar piece of land. Excessive subdivision of land, soil erosion and climate change undermine productivity and creates more poor people.

In a country where more than 80 per cent of land is either arid or semi-arid, such policy proposals are overdue. The little arable land that Kenya has must be put to use in the most productive way possible.

Land Consolidation

To fully benefit from the new policy proposals, land consolidation to create large tracts suitable for mechanised farming must be encouraged.

There will be a need for new business models especially in developing modern

supply chains that will create new employment for displaced subsistence farmers.

The thinking that subsistence farmers can be made productive must be discarded because it will never guarantee the development of an effective agribusiness model.

Years of subsidies to the subsistence farmer have yielded nothing but pain.

Post-harvest losses from subsistence farmers still hover around 50 percent due to poor storage of grain and an undeveloped supply chain.

The policy proposal also comes at a time when new technologies to sustainably manage land are widely available.

A 2006 World Bank study, *Sustainable Land Management: Challenges, Opportunities, and Trade-offs*, noted that, “these technologies will integrate the management of land, water, biodiversity, and other environmental resources to meet human needs while ensuring the long-term sustainability of ecosystem services and livelihoods.”

Emerging Technologies

There are other emerging technologies like

blockchain and Global Positioning System (GPS) that can be used to better manage land resources.

Blockchain (an open, distributed public ledger that records transactions between two parties in an efficient, verifiable and permanent way) is widely used to secure different types of transactions.

Its application in land management promises to do away with fraud. With the technology, it will be easy to establish land ownership and with GPS, it will be easier to monitor land use.

Land is a major factor of production that should not be left to individual decision-making when millions of people languish in poverty.

If large-scale land owners are not utilising their land, then they should at the minimum pay tax for non-use.

It is only through technology that the country can effectively manage the land resources in the most effective way.

Better land resource management will reduce conflict between pastoralists and game reserves.

There are no two ways here. Change is imperative and the President got it right in his policy proposals. He now needs our support.

Former US President Franklin D. Roosevelt said, “A nation that destroys its soils destroys itself. Forests are the lungs of our land, purifying the air and giving fresh strength to our people.”

Let us use this olive branch offered by President Kenyatta to ensure that we restore our water towers, purify the air we breathe and strengthen the people.

We have this opportunity to correct past planning mistakes and start all over again to better strategies for future generations.

Grain processing plant to benefit East Africa farmers

Shalem Investments Ltd., a grantee of the FoodTrade East & Southern Africa programme, launched a grain and pulses processing plant in Meru at an event held at the Kenya Industrial Estate (K.I.E). The plant is part of a wider project funded by the FoodTrade East & Southern Africa (ESA) programme. Under the programme, Shalem Investment Limited works with over 20,000 smallholder farmers to build their capacity as partners in agri-business.

The investment will enable smallholder farmers from Kenya, Uganda and Tanzania to access primary processing facilities and improve the quality and value of their produce. In a mutually beneficial relationship, farmers in the county will also have access to processed food at an affordable price for domestic consumption, helping to strengthen food security at the household level.

The processing plant is part of a wider project funded by the UK Government through the FoodTrade ESA programme. The project is aimed at building the capacity of smallholder farmers to produce the quality



and quantities of grains and pulses that will allow them to participate in regional trade. The state of the art equipment includes a mobile dryer, a grain & legume cleaner, an aflatoxin testing facility, as well as a milling plant. Grains that will be processed include maize, beans, sorghum, millet, soybeans and green grams.

“With support from the FoodTrade ESA programme, we work with smallholder farmers to increase their ability to produce what the market needs. We train them in climate smart agriculture, work with producer groups to build awareness of grades and standards, help them aggregate their produce and give them access to machinery and equipment,” said Ruth Kinoti, CEO of Shalem Investments

Ltd. “The project covers Meru, Tharaka Nithi, Embu, Nyamira, Homabay, Laikipia, Nakuru and Kitui in Kenya, and we source produce from smallholder farmers in Uganda and Tanzania through our agents. By setting up the processing plant, we will enable smallholder farmers to move further up the value chain from market takers to market makers.”

FoodTrade ESA provides grants to projects that bridge gaps in staple food value chains, to benefit smallholder farmers and consumers.

Through these projects, FoodTrade ESA is able to promote and enhance regional trade, and bring smallholder farmers closer to the centre of the production, processing and marketing functions of staple

food value chains.

“The East African grain market is highly unstructured, with unpredictable pricing, interference by middle men and limited cross-border trading, putting local farmers at a huge disadvantage. In addition to this, the sector faces very many external challenges including the recent drought,” explained Steve Orr, FoodTrade ESA Team Leader. “The project being implemented by Shalem Investments Ltd. is enhancing the collective marketing of grains from smallholder farmers. As we work to build farmers’ resilience to external shocks such as the effects of climate change, it is important for us to ensure the right infrastructure is in place to grow the local processing capacity.”

All farmers contracted by Shalem Investment Ltd under the FoodTrade ESA project will benefit from access to the processing plant. Initial buyers will include project beneficiaries and the public in the area, with the company aiming to grow its market even wider. Smallholder farmers in the area will also have access to the equipment and facilities at the plant.

Shalem Investment Ltd has focused on incentivising farmers and aggregators to take responsibility for the quality of produce available for consumption and sale. This has increased their bargaining power for better prices. By working closely with farmers, the company is attracting higher rewards from buyers for the improved quality of its produce, translating to better prices for farmers and aggregators.

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Is agribusiness the magic bullet for youth unemployment in Africa?

Africa is facing a double employment crisis—a lack of jobs for youth, and an increasing number of young people in need of work. While agriculture is the largest sector of employment in Africa with promising job opportunities for youth, the sector is often regarded as unattractive for and by young people.

Africa has the largest population of young people in the world, with 226 million people aged between 15 to 24 years. Every year, young graduates from schools and colleges seek to enter the continent's workforce, often with no success. What role can the agriculture play in addressing the unemployment challenge in Africa? According to a World Bank report on "Growing Africa: Unlocking the Potential of Agribusiness", Africa's farmers and agribusinesses could create a trillion-dollar food market by 2030 if they can expand their access to more capital, electricity, better technology and irrigated land to grow high-value nutritious foods. National governments, however, need to work side-by-



We need to think of new ways to create new opportunities or expand existing ones for youth employment in agriculture.

side with agribusinesses, to link farmers with consumers in an increasingly urbanized Africa.

To stimulate discussions on developing a framework for concrete youth engagement in agribusiness in a changing climate, the CGIAR Research Program on Climate Change, Agriculture and Food Security, the CGIAR Research Program on Livestock, the Climate Smart Agriculture Youth Network

(CSAYN), AgriProFocus and ICCO Cooperation put together an online discussion and a webinar.

I gladly applied to study agricultural economics in the university but was surprised that 90% of my classmates then, did not have interest in the course. In fact, most of them left the course before our graduation while few struggled to finish. Based on the question asked, agriculture is not a preferred career or choice course for young people because of wrong mindset and poor orientation of youth and parents about agriculture.

Youth engagement in climate-smart agriculture

Divine Ntiokam from CSAYN set the scene for the discussion by sharing CSAYN's work on youth engagement in Africa. The group, run on a voluntary basis, promotes and strengthens climate-smart agriculture among youth. More specifically, CSAYN aims to raise awareness of the contributions youth can make in agriculture for a better future, especially through the application of climate-smart practices.

CSAYN does outstanding work in this area. In Rwanda, for example, CSAYN partnered with SOS Children's Village Rwanda in February 2017, to train over 50 young students on how to protect the environment, particularly sensitization on the impact of climate change on agricultural productivity. In Mali, CSAYN organized environmental academies such

as climate justice ambassadors to raise awareness about climate change and created CSAYN Mali club, and planted 25 trees with children in two schools.

Agriculture offers many opportunities along the value chain. Victor Esendi from AgriProFocus emphasized that we need to think of new ways to create new opportunities or expand existing ones for youth employment in agriculture. "We see climate-smart agriculture as an opportunity for African youth to innovate and ensure continuous supply." While climate change affects

food production, young people can think of new technologies to produce or preserve food, and ensure supply to the market.

Opportunities are there, but how can we actually engage youth?

Wouter Kleijn from the International Livestock Research Institute (ILRI) addressed how policies and programmes can facilitate youth involvement in agribusinesses focusing on three questions: Should we engage more youth? There are legitimate arguments expressed against focusing on youth involvement; for example, increasing production on big farms can address food security without demand for more labor, or that population growth will

offset all the youth moving away from rural areas. But even if young people will stay in rural areas, it does not mean they will be involved in agriculture, Mr. Kleijn said and added that "there is an issue of too many youths with too few jobs in urban areas and this eventually will lead, if we are not careful, to violence".

What is different between youth today from youth from previous generations?

Climate change makes agriculture more knowledge-intensive and more difficult, and even less attractive for youth. There is also less land available

because of population growth and increased life expectancy.

Youth are also more aware of alternatives; "they see on their mobile phones, they see it on the television that there are other lives out there, other possibilities".

Knowing all of this, how can we involve youth?

There is no blueprint solution but there are a few things to explore. For example, addressing the 'usual suspects' such as infrastructure, corruption, education supporting existing youth entrepreneurs and encouraging them to scale up so they might employ other youth. There is need for practical examples and more youth

engagement. Catherine Mungai from CCAFS East Africa shared why it is important to engage with the youth in terms of research and policy-making. She gave example of CCAFS East Africa's work with the youth in the Nyando Climate-Smart Villages (CSVs), where youth are testing a couple of CSA practices and technologies. "There are a lot of opportunities to involve youth, such as in agroforestry, irrigation, fish farming, and in developing apps for climate information services, we need to find a way to present agriculture as an interesting opportunity for youth."

While climate change affects food production, young people can think of new technologies to produce or preserve food, and ensure supply to the market.

Way forward

During wrap up session of the webinar led by Alpha Gitau from ICCO Cooperation, participants emphasized that change does not happen overnight; we need to focus on youth who are already interested in agriculture. We need to start small and grow youth-led agribusinesses slowly, helping them get access to resources and encouraging them to innovate. We also need to support already-existing networks such as CSAYN and YPARD who are already addressing young people so that they can speak with one voice for those who support youth engagement in agribusiness, including CCAFS.

Billionaires, from Poor Men's Fields'

It is only when the average African realizes that digging dirt is an honorable job, and develops the desire to be actively involved in it because of the financial liberation it comes with.



Asked where the next crop of African Billionaires will come from, the President of the African Development Bank, Nigerian Dr Akinwumi Adesina, without batting an eyelid, declared that they will be farmers. And he is not the only person in his class endorsing agriculture as the next frontier. Technology success Strive Masiyiwa, a Zimbabwean, has indicated more than once that if he was to start over, he would go into farming.

Africa's richest man, Aliko

Dangote, too, is now venturing into farming, just recently investing \$4.6bn in Nigerian agriculture. Dangote plans to invest \$3.8bn in sugar and rice and \$800m in milk production in the next three years. Already greatly involved in agriculture, Dangote, through his Dangote Group conglomerate, is out to increase his sugar output by 50 per cent (from 100,000 tons), rice yield by 1 million tons, and start producing 500 million litres of milk a year by 2020.

Masiyiwa and Dangote are successful businessmen in

their own right, and being billionaires, they must know something that the average African doesn't.

Yet, for years, and even with front-seat access to data and consultant-advice from real billionaires, the majority of African governments have done little to reposition their economies as agricultural powerhouses. But things may now be set to change.

In 2014, African heads of state met in Equatorial Guinea, and vowed to work together

to open up the potential of the region's agricultural industry. This agreement was put into a document, now popularly known as the Malabo Declaration, which stipulated the specific commitments with clear indicators for tracking and measuring agricultural practice that needed attention.

Further, the Malabo Declaration, agreed that a new monitoring system would be set up to ensure that the Heads of State, and their respective authorities, maintained accountability to peers, and to their citizenry in delivering this agricultural transformation.

For this purpose, the Heads of State agreed to review their achievements every two years; popularly known as the biennial review. The first such review took place in the same way, the Heads of State agreed that there was an urgent need to create a scorecard that would show countries how they are faring on the different goals of the Malabo Declaration.

The scorecard, the first ever pan-African co-operation of its kind, is now under development and will be ready before the January 2018 African Union Summit of Heads of State. Once presented, it will provide a new and powerful tool for all stakeholders in identifying the specific areas of agricultural transformation that need attention.

A complementary tool for the Biennial Review process, the scorecard is powered by

data submitted by respective countries on their performance in the 43 agriculture growth indicators agreed on in Malabo. The beauty of the new agriculture scorecard is that it is least concerned with how countries perform against each other and provide an opportunity for sharing lessons.

The hope is that countries that are struggling to reposition their agricultural sectors for takeoff will use it to reach out to those who are proving successful for guidance, allowing the region to grow together, as a block.

This function of the agriculture scorecard, represents the intent and purpose of the discussions in Malabo, as a pan-African drive, where it has become clear that success is not owed to any country in Africa, and that the only way up is by nations becoming pillars of support for each other.

The scorecard will also be available online to encourage public participation in the interrogation of the information gathered, in the knowledge that by engaging with citizens, Heads of State can benefit from expert advice that may not be immediately available to them. The key principle for presenting the information publicly, however, is rooted in Jürgen Habermas' articulation that public engagement can influence decisions in ways that see key national objectives met more swiftly.

The ultimate goal remains to dispel the myth that scorecards

are complicated documents whose aim is to vilify non-performers while rewarding success. The leaders' meeting in Malabo rightly confirmed that Africa is moving into a space where competition in development no longer matters, and that the failure of some countries adversely affects the reputation of the region as a whole.

By the end of the second biennial review process, and with countries actively engaging with the agriculture scorecard, it is foreseen

that further improvement in regional integration will have been secured, with key successes in intra-African trade and increased investment in agriculture and hunger reduction efforts.

However, the speed at which the scorecard fuels that success depends on support, from governments and other stakeholders, in pursuing its underlying objective. The active interaction of Heads of State with the tool will introduce them to a new line of questioning that will allow them to identify

the specific weaknesses they need to overcome for further development. The hope is that by easily identifying critical areas of failure, the Heads of State can encourage both a policy and attitude shift that will eventually drive the desired changes.

Opinion leaders, such as Dangote, Adesina and Masiyiwa, are helping fellow Africans to appreciate the importance of achieving the Malabo goals. Masiyiwa has already emerged as a major influencer through his interaction with the youth on social media, and his voice is now gradually inspiring a radical shift in favour of agriculture. So are Adesina and Dangote, who are driving a new admiration for farming through their views voiced on television and radio. More of their peers are following suit too, but a lot more mouthpieces are needed around the continent to drive this revolution with the speed it deserves.

As experts note, it is only when the average African realizes that digging dirt is an honorable job, and develops the desire to be actively involved in it because of the financial liberation it comes with. Then the continent will begin to achieve its economic development goals.

The Malabo declaration and its biennial review process, as well as the new agriculture scorecard, are now providing a new base to drive that change.



Farm safety First

Farming is one of the most dangerous industries in the world. 9.7 in every 100,000 workers employed on farms die each year. The next most dangerous industry is construction where the number of deaths is around 2.1 per 100,000 workers. Year after year the same accidents are occurring on farms but the industry isn't learning or evolving.



In 2005 I was involved in a life changing accident where I became entangled in a PTO shaft and lost my left arm. Since then I have used my story to help educate others in the industry. To try to bring together best practices in the field of accident prevention and discover why farmers are still having farm accidents in their pursuit of feeding the world.

Farmers don't recognise risk to life in the same way other people do. As an industry they thrive on the risks associated with farming and relish the challenge of working in a dangerous environment. It must also be acknowledged that they have many

pressures to deal with in farming, like time, finance and weather to name a few. As farmers they are very much multi-skilled. However, formal health and safety training isn't one of the skills they possess, leading to a lack of understanding around the subject.

Safety initiatives need to be led by farmers for farmers. Safety also needs to be practical and easy to carry out: farmers don't have time for complex paper-based systems as the workplace is extremely dynamic. Safe practices need to be embedded in the minds of everyone involved in the business to allow autonomous safe working.

A culture change, which will take time but will have a longer lasting effect on the industry, is needed. To enable a culture shift strong and effective leadership is essential for us, both from our farming leaders and in our own businesses. Farmers who can passionately promote safety should be identified to deliver peer-to-peer training on safe work procedures, and push clear and consistent messaging.

The use of independent auditors should be to help farmers identify risks on the farm to enable change. This could be done by farm assurance inspectors, insurance companies or even other farmers who can bring a fresh set of eyes to the workplace.

Agricultural colleges and universities must work on developing the next generation of safe farmers by integrating safety into every aspect of agricultural education to enable the long term goal of reducing accidents permanently.

Focusing my thoughts

Increasing regulation or penalties will not have a positive effect on farm safety. The disconnect between the regulator and the farmer will only increase if more regulation is enforced. The existing laws are adequate to keep workers safe; however, a lack of knowledge by farmers of existing regulation has rendered these laws ineffective. A mistrust of the regulator is also hindering a working relationship with farmers which could otherwise prove beneficial in reducing accidents.

Strong leadership is needed within the agricultural industry to enable greater progress with safety initiatives. When difficult decisions need to be made our farming leaders, for the greater good of

the industry, need to put farm safety ahead of what might be popular with farming members.

Farmers sometimes find it difficult to recognise dangers on the farm, making it difficult to manage the problem. There is need to encourage more training in safe working procedures and then follow the training with continued development to keep farmers up to date with new techniques. This could be carried out in a class room type scenario, trade shows or even through web-based learning.

Agricultural education can and should help with creating a culture shift. We need to be creating a generation of safe farmers who will shape the future of agriculture. Social acceptance is a huge barrier to a shift in culture. They can start the shift at college and university but they must enable that culture to continue once the student arrives in the workplace. We must make safety "sexy"; many farmers don't take safety seriously for fear of ridicule by their farming

peers. A core of influential farmers needs to be empowered to create a "safety is cool" culture, and then the rest of the industry will follow, fearing exclusion by the new social group.

This group of "safe" farmers who are leading the way in safety will also be extremely good farmers, proving that safety won't hinder farming, but enhance the business. Being a safe farm is also a good indicator that the business is professional and profitable. The "safe" farmers will also help mentor others and facilitate farm visits to help others visualise how safety works in a real life situation.

Safety needs to be practical; if it's difficult then it won't get done. As Dr Fogg describes, there are many barriers to change, some are perceived barriers but some are very real. We must keep it simple, low cost and with low physical effort. Farmers have already got a lot to think about day-to-day so any extra safe working practices need to be easily adopted with little cost.



This is where technology could come into effect by helping farmers recognise risk but then manage it. Providing the technology remains inexpensive and easy to use there is huge potential to aid accident prevention. Near-miss reporting is a free lesson in safety and needs to be utilised possibly with the help of technology to enable anonymous reporting.

Alternatively we must empower farm workers to report near-misses without fear of ridicule or reprimand.

CEREAL FARMERS IN KENYA

FARM NAME	LOCATION	CONTACT PERSON	EMAIL	TELEPHONE	CROP MIX	ROTATION CROP
Chemusian ltd		Too	chemusian@gmail.com	0722209754	Wheat / Barley	
Kikwai farm		Patrick	padykikwai@gmail.com	0731817804	Wheat / Barley	
-	ELDORET	-	-	-	-	
Sergoit farm		Yani/ Kruger	tingaspik@gmail.com	0718338099	Wheat / Barley	Maize
Komol farm		George Killi		0722732757	Wheat	Maize
Mohammed		Kaittany		053-2062234	Wheat	Maize
Elfam ltd		Ngetich		0721517701	Wheat	Maize
Mace foods		Margret Komen		0722840799	Wheat	Maize
Kuinet Tarus		Tarus		0721934176	Wheat	Maize
Moiben Chepkener		Chepkener		0719506980	Wheat	Maize
Chepkorio		Jelimo		0722571355	Wheat	Maize
Kenya ordnance		Chirchir		0721851931	Wheat	Maize
Kandelo		Kandelo		0720305041	Wheat	Maize
Kimoso		Kimoso		0734858619	Wheat	Maize
Silas Tiren		Tiren	skktiren@africaonline.co.ke	0725792463	Wheat	Maize
Shiv enterprises		Albert Kimwatan		0722652300	Wheat	Maize
Timothy Busienei		Busienei		0727085756	Wheat	Maize
Plateau Ngeria		Sile		0724752143	Wheat	Maize
Victoria Chebet		Chebet		0753466025	Wheat	Maize
Maji Mazuri		Ziwa		0723024971	Wheat	Maize
Kibogy Moiben		Kibet		0728706668	Wheat	Maize
Kapkabai Farm		John	wilchem@africaonline.co.ke	0722724990	Wheat	Maize
-	ATHI RIVER	-	-	-	-	-
Ausquest ltd		Stuart Barden	stuartbarden70@gmail.com	0703119444	Barley/ Wheat	Sorghum
-	KITALE	-	-	-	-	-
Bubayi		Jonathan Mayer		0735488001	Wheat	Maize
Panocal		Chris Carpenter	cereals@panocal.co.ke	0719505785	Wheat	Maize
Murmet		Chelimo		0722571355	Wheat	Maize
Cheptembe farm		Robin		0722817638	Wheat	Maize
Robert		Tuitoek		0722813381	Wheat	Maize
Biwott		Biwott		0720955748	Wheat	Maize
Express Farm		Mbugua		0722766176	Wheat	Maize
Western seed company		Harry		0720897860	Maize/ Wheat	
Kenya seed company		Mwarei		0722614639	Maize/ Wheat	Barley
ADC Farms Edward			edwardmwando@gmail.com	0728453942	Maize	Sunflower/ Pasture
-	MOLO	-	-	-	-	-
EAML		Gacheru		0722791563	Contracted farmers	Barley
-	KISUMU	-	-	-	-	-
Dominion farms ltd		Okoth		27494585	Rice, Maize, Sugarcane	

CEREAL FARMERS IN KENYA

FARM NAME	LOCATION	CONTACT PERSON	EMAIL	TELEPHONE	CROP MIX	ROTATION CROP
-	MT. KENYA	-	-	-	-	-
Oldonyo ltd		Brynn	brynn@oldonyo.co.ke	0722817163	Wheat/ Barley	Peas, Canola
Kisima ltd		Shaun	shaun@kisima.co.ke	0729924353	Wheat/ Barley	Peas, Canola
Wangu Investment		Ben	ben@wanguembori.co.ke	0724545475	Wheat/ Barley	
Marania ltd		Jamie	marania@maraniafarm.com	0721573634	Wheat/ Barley	Peas, Canola
Lengetia ltd		Sessions	Lengetiafarm@gmail.com	0722332647	Wheat/ Barley	Peas, Canola
Mastermind ltd		Gitonga	dgitonga@mastermindkenya.com	0722751488	Wheat	
Tumili ltd		David Beak	tumili@wananchi.com	0722823543	Wheat/ Barley	Peas, Canola
Thamba Ngombe		Thamba	thamba@gmail.com	0724927351	Wheat/ Barley	
Mt Kenya saw mill		shah	nainhshah@gmail.com	0722511691	Wheat	
-	NAROK	-	-	-	-	-
Simba Estate		SS. Dhillon	simbaestate@simbaestate.com	0722511460	Wheat	Maize
Farm Africa ltd		Raghu	raghu.penmetsa@farm-africa.com	0788299442	Wheat	
Lalela ltd		Neylan	neylan@macc.com	0722385329	Wheat	Sorghum
Mann Wheat ltd		Magal		0722518964	Wheat	
Green Farms		Wambugu		0722287337	Wheat	
South Six Farm		Guri	gurbir@southsiouxfarms.com	0722676878	Wheat	
Olerai ltd		Alistair	alandbill@olerai.co.ke	0728484659	Wheat	Seed Maize
Talent Farm		Paul	sarpau@internode.on.net	0729846736	Wheat	
Rm Farms		Amit and Sanju	rishi-amit2007@yahoo.com	0722225330	Wheat	Maize
Ndovu estate		Viney		0722824793	Wheat	Maize
Country motors		Singh	country@africaonline.co.ke	0722764763	Wheat	
Oldonyo Nairasha Estate		Karan	ssdhillon@africamail.com	0722323296	Wheat	Maize
Development Trust		David		0724741718	Wheat	Canola
Oratili ltd		Mahesh	farmpartsltd@africaonline.co.ke	0722848474	Wheat	Canola
Upland crops		Koos	fm@uplandcrops.com	0704681651	Wheat	Maize
-	NAIVASHA	-	-	-	-	-
Kijabe ltd		David Cullen	ndabibi@gmail.com	0729950910	Wheat/ Barley	
Soyonin ltd		Benjamin Kipkulei		0733605071	Wheat	
Livewire Ltd		Goddy Millar	info@livewire.co.ke	0722205992	Wheat / Barley	
-	NAKURU	-	-	-	-	-
Lesiolo ltd		Tundo Franco	frtundo@gmail.com	0724333322	Wheat / Barley	
Madrugada		Jonti	jonti@madrugada.co.ke	0722734179	Wheat / Barley	Maize, Peas, Canola, Sunflower
Tony		Hughes	hoozie@swiftkenya.com	0722808058		
Chepkonga		Andrew	andychep@yahoo.com	0710308917	Wheat / Barley	
Siruai		Rose	skvarose@gmail.com	0722865892	Wheat / Barley	Maize
Sasumua Agriculture		Luke	luke@sasumua-agriculture.com	0722779618	Wheat / Barley	Canola, Peas, Sunflower, Maize
Kenana Farm		Oliver	pkenana@africaonline.co.ke	0722725002	Wheat / Barley	Canola, Peas, Sunflower, Maize
Remsons Ltd		Mugambi	remsons.ltd@gmail.com	0722807773	Wheat / Barley	
Molodowns		Chris Foot	ckfoot@gmail.com	0722717130	Wheat / Barley	
Gogar Farm		Simon	md@gogar.co.ke	0722327718	Wheat	Maize
Kinoru Farm		Barlow	barlow@africaonline.co.ke	0725777479	Wheat / Barley	canola, Peas, Sunflower
Comply industries		Sandhu	sckihumba@complyindustries.com	0729870025	Wheat / Barley	



Aflatoxin infested maize

Farmers who have been grappling with aflatoxin on their maize and other food crops in Kenya can reduce aflatoxin by a process called nixtamalization developed by researchers at the Kenya Agricultural and Livestock Organization (KALRO).

Aflatoxin is a highly poisonous cancer-causing chemical produced by a fungus scientifically known as *Aspergillus flavus*. With maize being the staple food crop in Kenya, aflatoxin poses

Maize Nixtamalization Reduces Aflatoxin by 60-70%

a major public health scare to most consumers of the diet. The infestation by the fungus has led to a significant amount of harvested grains going to waste leading to importation of maize in Kenya.

Nixtamalization typically refers to a process for the preparation of maize, or other grain, in which the grain is soaked and cooked in an alkaline solution, usually limewater, and hulled.

To protect maize from aflatoxin, lime pre-cooking needs to be done using 4kg of dried maize, 6 liters of water and 100gm (2 table spoons lime). If lime is not available, use 1 cup of sieved maize cob or bean Stover ash (soaked in water and sieved).

Boil the water and the lime. Clean maize and

stir while cooking for 20 minutes or until the grain peels easily by hand. Remove the maize from the fire and let it cool for 3 hours. After that, wash while rubbing the grain on a sieve. Mill the grain when still wet to make a dough "Masa". Use the dough to make many products such as tortilla, crackles, scones, pancake, cookies, and crisps. Alternatively dry the pre-cooked maize, grind into flour and make Ugali.

Nixtamalization reduces aflatoxin in maize by 60-70%. The process improves bio-availability of protein & Niacin. Niacin prevents pellagra (drying cracking of the skin and mouth). It also increases calcium and phosphorus that give strong teeth and bones. The procedure also diversifies ways of utilizing maize and market potential.

Stress Tolerant Maize for Africa

The Stress Tolerant Maize for Africa (STMA) project aims to diminish devastating constraints in maize production that occur simultaneously across many regions in sub-Saharan Africa. The project develops new improved varieties and hybrids with resistance and tolerance to drought, low soil fertility, heat, diseases such as Maize Lethal Necrosis and pests affecting a large target of maize production areas in the region. Targeted countries are in eastern (Ethiopia, Kenya, Tanzania, Uganda), southern (Malawi, South Africa, Zambia, Zimbabwe) and West Africa (Benin, Ghana, Mali, Nigeria).

These countries account for nearly 72 percent of all maize area in sub-Saharan Africa and include more than 26 million households, or well over 176 million people who depend on maize-based agriculture for their food security and economic well-being.

Maize occupies over 35 million hectares of sub-Saharan Africa's estimated 200 million hectares of land and produced under diverse

climatic and socioeconomic conditions. Maize, which is grown mainly under rainfed conditions, is susceptible to increasing intensity and frequency of drought due to effects of climate change.

In addition, the majority of smallholder farmers cannot afford the recommended amounts of nitrogen fertilizers in these drought-prone areas where low-fertility soils are prevalent. These, in addition to other stresses increase the risk of crop failure that negatively affects income, food security and nourishment of millions of smallholder farmers and their families.

Scientists involved with the project are developing and promoting improved stress-tolerant varieties expected to increase maize productivity by 30 to 50 percent.

The project aims to produce estimated 54,000 tons of certified seed to put into the hands of more than 5.4 million smallholder farmer households by the end of 2019.

Besides promoting available stress tolerant varieties developed by the Drought Tolerant Maize for Africa and Improved Maize for African Soils Projects that concluded in December 2015, STMA will develop 70 new improved stress-tolerant varieties using innovative modern breeding technologies.

Objectives

Use innovative breeding tools and techniques applied for increasing the rate of genetic gain in the maize breeding pipeline.

To increase commercialization of improved multiple-stress-tolerant maize varieties with gender-preferred traits by the sub-Saharan African seed sector.

To increase seed availability and farmer uptake of stress-tolerant maize varieties in target countries.

Optimize investment impact through effective project oversight, monitoring, evaluation and communication.

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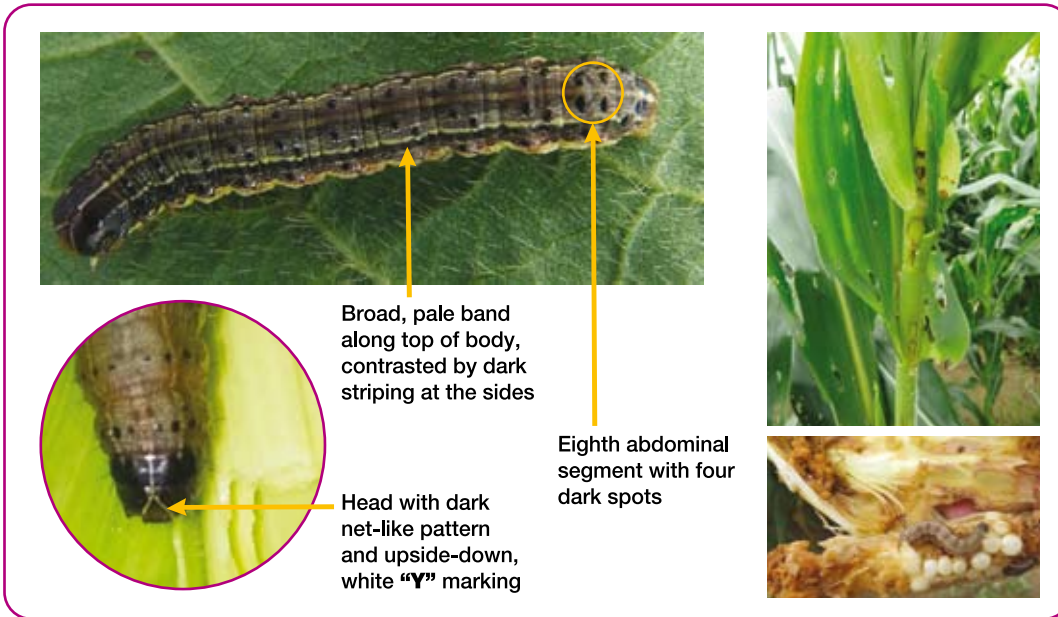


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