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### A new Green Revolution a Must

*The situation of small scale farmers speaks volumes about the challenges faced by poor rural people in Africa, but also their hope for the future.*



*Whether this hope is fulfilled, or whether it remains an empty promise, will depend on making progress – not just the progress of words, but the progress of action.*

*What is clear is that there must be a fundamental reform of agriculture and food systems – we cannot continue on the current course. I see growing momentum towards a rapid change of thinking on how we look at agriculture. I see long-held attitudes -- shaped in a different era, during the original Green Revolution -- changing quickly. The message during the first Green Revolution was relatively simple: apply better seeds, increase fertilizer and improve irrigation and yields will increase.*

*But we have known for years now that we will need a new Green Revolution with a more nuanced message. We need to maximise the use of natural processes and ecosystems. We must reduce excessive use of external inorganic inputs. And we must also enhance the diversity of production; using a mix of traditional and new technologies.*

*Masila Kanyingi  
Editor*



'What will I eat today' vs. 'will I eat today?'

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# ‘What will I eat today’ vs. ‘will I eat today?’

## It’s Time To Trust African Scientists. *By Dr. Mwimali Murenga*

In the West, on a daily basis, people are asking themselves, “What will I eat today?” But in my home, Africa, people daily are asking themselves a more challenging question: “Will I eat today?”

In reflecting on the second question, I have come to the conclusion that it is time for the public to put their trust in scientists about the role that genetically improved organisms can play in answering it.

It’s sad that Africa continues to lag behind in the adoption of biotech crops 23 years after they were first commercialized, with only two of the continent’s 54 countries now growing them. The delay is especially tragic since there is more than enough evidence that biotech crop adoption could help tremendously in addressing the challenges of hunger and malnutrition globally.

### Commentary

In Africa, it is time we focus on diligent and accelerated regulatory regimes, as well as decisions based on science and the benefits of agricultural biotechnology. It is time we focus on agricultural productivity with an acknowledgement of environmental conservation and sustainability. It is time we give strong consideration to the millions of people who are hungry and impoverished across our continent and

how modern agricultural biotechnology can help resolve these food insecurity challenges, instead of focusing on perceived risks and concerns that have never been backed with any evidence. Reluctance to adopt the

mycotoxins in maize. This multiple data



“African leaders need to care about these studies and others that have endorsed the safety of GMOs and let credible scientific evidence guide them in decision making.”

challenges that we do.

Recently, in 2017, a team of scientists from Italy published an analysis detailing the potential impacts of genetically modified (GM) maize on the environment, agriculture and toxicity. The data generated over 20 years concluded that genetic engineering increased maize yields by 10 percent on average and reduced conventional

technology is partly attributed to safety concerns, heightened by strong activism propagated from the west by countries that don’t face the same

analysis provides very reliable evidence that GM maize can tackle a serious problem that has afflicted the continent for a long time – aflatoxin. Lower levels of natural mycotoxins, which are reported to be both poisonous and carcinogenic to humans and livestock, were observed in GM maize compared to its conventional counterpart. The study, like many before it, endorsed the safety of GMOs.

In 2016, the US National Academy of Science published a report on GMOs which reinforced the scientific consensus that there is no substantial evidence that GM crops are less safe than non-GM crops. The question that lingers on my mind is this:

how many studies will it take for our leaders to trust scientists? What is the scientist supposed to do beyond providing evidence that the technology works?

There is evidence, too, that “stacking” several GM traits in one crop is beneficial, resulting in yield increases of over 25 percent. In the same vein, no significant impacts have been observed on non-target organisms and other beneficial organisms, including bees, ladybirds, beetles, lacewings and spiders. In previous data analyses, it has been documented that adoption of GMOs reduces the use chemical pesticides by about 37 percent compared to their conventional counterparts. Why then would our leaders want to get in the way of people enjoying such benefits, long after safety concerns have been put to bed?

Regardless of the scientific consensus and countless studies endorsing the safety of GM crops, there is widespread public perception that they are not safe. Worse still, some African governments have even hampered their production, only



***“It is disheartening when those entrusted with the responsibility of making key decisions about this continent’s food and nutrition security continue to let half-truths impede them from taking decisive action. They shy away from making evidence-based decisions and developing facilitative policies that can enable this viable technology to blossom.”***

to allow imports of food and feed resulting from or containing GM products. This only benefits farmers in countries that have adopted the technology, while indirectly affecting our research progress, further delaying our access to improved seeds. This is a worrying trend in a continent viewed as the final frontier for agricultural transformation and bringing the massive numbers of unemployed youth into smart farming.

It is disheartening when those entrusted

with the responsibility of making key decisions about this continent’s food and nutrition security continue to let half-truths impede them from taking decisive action.

They shy away from making evidence-based decisions and developing facilitative policies that can enable this viable technology to blossom.

Approximately two decades after the technology has proved itself both in terms of safety and delivery of socio-economic benefits, some of our leaders continue to hide behind precautionary measures and demand for “never-ending research.”

African leaders need to care about these studies and others that have endorsed the safety of GMOs and let credible scientific evidence guide them in decision making. In Africa, we have many collaborative initiatives on GM crops under various projects in many countries, and others that continue to face regulatory bottlenecks leading to significant lost opportunities for farmers and their families.

The narrative of “what will I eat today?” versus “will I eat today?” cannot continue. It is time African governments take action. We need products in the farmers’ fields and food on the table, and the time is now!

# By banning pesticides and GMOs, the EU is sleepwalking into a food security crisis

The world is sleepwalking into a food crisis and politicians are doing nothing to stop it. Instead of supporting new innovations which can help to feed an exploding world population, they are pandering to scientific illiteracy.

By Rémi Dumery, a french farmer



Many people are opposed to the cultivation of genetically modified organisms (GMOs) and believe they are dangerous for your health. Many also are opposed to the use of pesticides, and believe that there are 'natural' alternatives to their use in farming. Both of these beliefs are not just wrong: they are dangerous.

As the population of the world is set to grow to 10 billion by 2050, we urgently need to recognise that many of the commonly-held views on agriculture are simply not based on fact.

For most of human history, hunger and starvation were facts of life globally. Famines caused by crop failures would periodically wipe out hundreds of thousands of people. Each year, families would pray for the right weather which would allow them to survive to the next.

Thanks to modern agricultural techniques, this experience is today a memory. Modern

pest and weed control technologies protect crops from pests, weeds and diseases.

Scientific innovations make more resilient crops, meaning farmers are not defenceless against capricious weather systems. These techniques allow us to grow enough food to feed billions people (and counting) in the world.

As a result of this, some parts of the world like Europe have become used to a world of plenty. Most children and young adults do not know what it is to not have enough food to eat.

The privilege of living in such an affluent society seems to have made people across Europe complacent. They think that because they have never known true hunger, starvation is a problem we have tamed forever. This ease of living has led some to attempt to cast aside the very technologies which make this abundance possible.

Pesticides are used in every form of modern agriculture, both organic and conventional. Without them it would be many times more difficult to protect crops from disease and pests. It is only through use of pesticides that farmers can produce enough food to feed all the mouths on this continent.

GMOs are not dangerous for human health. The science on this has been settled for 30 years. GMOs are instead one of the best technologies we have for making crops robust to pests and harsh weather, and are one of most promising methods we have of feeding the world as the climate changes and populations grow.

As the populations of cities grow and rural populations decline, people's connection to the land weakens.

Across Europe, people know less and less about where food comes from and how it is grown on farms. This can be called the



'Nespresso effect': what people eat and drink arrives pre-packaged, without them ever seeing what goes into it or how it is made.

This lack of connection and knowledge with the processes of modern farming means that people tend to be fearful when they hear about new technologies they do not understand. Compounding this problem, however, are politicians who seek to use this lack of understanding for political gain.

In France, for example, Emmanuel Macron has said that we can find a replacement for the herbicide glyphosate within three years. This is quite simply impossible without a miracle. He has promised to phase out glyphosate use in France. This will be hugely harmful both for French farmers - who will pay the price initially - and for European agriculture in general, as it will reinforce myths around pesticides. Macron knows how important pesticides such as glyphosate are, but because of their unpopularity, it is a politically advantageous thing to be against them.

The negative effects of removing the most important method of weed control available to farmers probably will not be felt until he has left office anyway, so why should he care?

The same applies for GMOs. In many countries, opposing the cultivation of GM crops is hugely popular even if it is not in the interests of the people.

Motivated by short term political considerations, our politicians are disregarding the long terms consequences of their decisions by supporting populist (and hugely damaging) policies when it comes to agriculture. By pandering to delusions, politicians do a disservice to their constituents, and make decisions that will ultimately harm us all.

Some politicians, think that there are alternatives to GMOs in agriculture. The use of gene editing techniques, such as CRISPR, could have the potential to provide an adequate supply of food in the future. Unlike GMOs, gene editing

involves changing the genetic makeup of crops without adding in genes from other organisms.

However, the European Court of Justice ruled that gene editing techniques are to be covered by the same rules in Europe as GMOs, making it almost impossible to get authorisation for these techniques. As countries like France take the lead on the anti-GMO movement in Europe, the most promising alternative technologies are being halted by the EU.

Europe is sleepwalking into a food crisis and politicians are doing nothing to stop it. Instead of supporting new innovations which can help to feed an exploding world population, they are pandering to scientific illiteracy.

If any ban on pesticides is introduced, food production will decrease in the affected countries. This loss of production will have to be offset by imports from other countries, where use of the pesticides and GMOs is allowed. Is this really in the best

interests of citizens? Through this attempt to maximise their popularity, politicians are saying that agriculture and food security are no longer state priorities.

Politicians across the world need a wakeup call. Most of us have never known true hunger and starvation. If our leaders do not take action to protect and advance modern agriculture, our children may not be so lucky.



Supporters must build consensus around successful crop research to make a case for lifting Kenya's ban on genetically modified organisms (GMOs), a top agriculture official says.

"We need to overcome our inhibitions about GMOs," said Professor Hamadi Boga, principal secretary of Kenya's State Department of Agriculture and Food Crops in the Ministry of Agriculture Livestock and Fisheries.

He said the nation's science around GM crops has "been ready since 2016. We are reaching out to other stakeholders to move forward. Even Kenyan citizens are ready for Bt maize. From the interaction we have had with church leaders and farmers, they are ready, and they want the technology like yesterday. We will make sure that they get it."

However, Kenya first needs to complete National Performance Trials (NPTs) on insect-resistant Bt maize, Boga said. "We are hoping to start NPTs in the coming long rains. Once we conclude within one year, then we will have the technology."

Kenya has the potential to produce 80 million bags of maize annually if it adopts new technologies, according to Boga. Currently, the country produces 17 million bags.

"We have seen that without protection from Bt, you can only succeed if you use a lot of pesticides to protect the crops, a challenge which our farmers struggle with," he said. "There is almost 50-60 percent crop loss if you do not use any intervention."

Joseph Gatuna, a maize farmer in Trans-Nzoia County in Kenya's Western Region, is among those excited to gain access to the technology. "We have really suffered from fall armyworm and stem borer infestation," Gatuna said. "I have tried even using detergents to control pests. If I start using Bt maize, I will solve the challenge of using pesticides on my farm."

Boga noted that a recent demonstration site featured the "stacked" GM traits of drought tolerance and insect resistance. "We are exposing these technologies to stakeholders so that we can move forward. Repeating the same

## Kenya needs to overcome inhibitions about GMOs, official says

experiment forever is unnecessary and costly," he said.

"I have seen the difference between Bt maize and non-Bt, asked questions, and I have been left with no doubt the GMO one is working properly," Gatuna observed. "If we go by the old technologies, we may end up with no food for farmers and consumers."

Kenneth Kagai, who is in charge of crops for the Trans-Nzoia County Department of Agriculture, agreed. "We have seen that the technology works. The difference between the Bt and non-Bt maize is clear and if we adopt Bt we are likely to increase yields by up to 50 percent. We need this technology and it is a better option for our farmers."

Gatuna said that the cobs of Bt maize "are cleaner and have few rotten grains compared to the conventional maize. We will have less post-harvest losses with this technology as well as help beat the impacts of climate change." Boga noted that efforts to "put technologies in the hands of farmers that protect against drought and insects cannot be taken lightly," especially since farmers are still struggling with high production costs.

"We are showing the Bt technology to farmers, county government officials and other stakeholders such as Kenya Plant Health

Inspectorate Service (KEPHIS), National Biosafety Authority (NBA), Department of Public Health, and National Environment Management Authority (NEMA)," Boga said. "We have been working with NEMA and public health all along because they have a regulatory role to play," he added, noting that all the government agencies previously sanctioned NPTs for Bt cotton.

Gatuna urged stakeholders who are concerned about food security to "join hands and embrace the technology."





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# Can a healthy Soil Reduce the Reliance On Synthetic Inputs?



Despite the high amounts of tillage required in the high value cropping rotation, there are methods that can be used to improve soil health and reduce the reliance on synthetic inputs. This will require investment in machinery and time to trial new ways to grow high value crops.

### Regenerative Agriculture

RA a farm system built around mimicking nature's management to regenerate degraded soil and restore it to a highly functioning soil ecosystem that is able it to support and sustain healthy plant growth and the long-term future and profitability of the farming business. This in turn benefits the wider landscape, the people and the local community and beyond. The primary focus of RA is a highly functioning healthy soil, which subsequently improves the quality of food produced and social aspects of farming.

Healthy soil is defined as the capacity of the soil to function, sustain life, healthy plants, animals and humans. There are five principles of maintaining a healthy soil. These principles are based on observations of the natural ecosystem and how soil is managed in nature to maintain the balance and services required to support healthy plants. The principles are:

1. Keep the soil covered
2. Minimise soil disturbance
3. Diversity
4. A living plant all year around

**W**orldwide, soil is being degraded and lost through misguided farm practices which severely depletes the capacity of the agricultural community to feed the world.

Expanding knowledge of the complexity of soil ecosystems, is awakening farmers to the services provided by the living component of soil. The soil provides ecological services that support life on the planet, yet many farming practices do not harness these services and rely heavily on synthetic inputs. This reliance is accentuated as soil degradation progresses.

Regenerative Agriculture (RA) defines a management paradigm aimed at restoring the soil ecosystem and is gaining momentum across the globe. As the soil ecosystem gains health reliance on synthetic inputs is reduced. This paradigm involves farming with nature rather than against it, to embrace soil complexity and living biology. The five principles for healthy soil management, underpinning Regenerative Agriculture are:

1. Keep the soil covered

2. Minimise soil disturbance
3. Diversity
4. A living plant all year around
5. Livestock integration

These five principles are derived from observing how nature sustains a living soil ecosystem and are used in a farm system to maintain a highly functioning soil while producing productive crops. Through many complex interactions and synergist links these principles maintain a highly functioning soil that supports productive crops.

While the principles are universal, the implementation is varied and diverse. Every farm is different, and each farmer needs to find ways to integrate the principles onto their farm.

Strategies include cover crops, companion planting, cattle, crop residues, direct seeders, strip tillage, and relaying cropping, however, there is no simple recipe.

RA requires commitment to the soil and allowing time for soil to regenerate into a self-supporting system.

## 5. Livestock integration

An understanding of the principles is critical to progress in RA. Only with an understanding of the 'why' that a well thought out 'how' plan can be established and implemented to improve the soil. This understanding provides the ability to critically analyse farm practices, to identify practices that degrade the soil, and to understand what could be improved to repair and achieve a highly functioning soil system that does not require synthetic inputs to produce crops.

RA is similar to conservation agriculture, except that it has a greater level of complexity and achieve more resilience in the soil and farm business. Conservation agriculture principles, although a step above modern agriculture in terms of restoring and maintaining soil, misses key points vital to make a soil function.

### Benefits of Regenerative Agriculture

While RA mainly focuses on regenerating the soil, there are many other benefits that follow through taking a systematic approach to farming. As the soil improves, the land can support more, and therefore provide other business opportunities, which builds farm business resilience. This in turn provides flow on benefits to the local community as money begins to flow. There is also benefit to human health both mentally and physically as everything improves, with more profitable crops being grown with higher nutrient density.

### Reduction in synthetics

A major benefit of RA is the achievement of a reduction in the use of synthetic inputs over time, through soil health improvements. Although it is apparent that there has to be an initial mindset shift in the way synthetics are used in the system. Coupled with the integration of the soil health principles, a reduction in synthetic use is initially required to kick start or speed up the recovery of the soil ecosystem. As the soil recovers, further reductions in synthetics is inevitable.

Methods of reducing synthetic input include; questioning if the inputs are needed in the first place, switching to biological forms of control for disease and pest, foliar applications of nutrition, using management strategies and cultural practices and looking at the application process and efficiencies. In some trials it has resulted to reducing the amount of chemicals applied by up to 30% resulting in a huge saving to the farmer and in soil improvement. This saving on input costs freed up income that could be channelled into experimentation on methods to integrate the principles of healthy soil.

### Way forward

Across the world, farmers and scientists are realising that soil is a living ecosystem providing a complexity of interwoven connections

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Healthy soil is defined as the capacity of the soil to function, sustain life, healthy plants, animals and humans. There are five."

**From page 11**

both above and below ground, which supports life on earth. This understanding has resulted in a paradigm shift in soil management to ensure soil is kept alive and thriving, allowing all the services it provides to be utilised. Farmers who have undergone this shift are producing crops that are self-sufficient with minimal input for profitable yield.

Farmers are now managing the farm as a whole system, embracing the complexity and integrating the five principles of healthy soil derived from nature to rebuild and regenerate the soil to its full capacity and build resilient farms. This requires a good understanding of the natural system and how the five principles of healthy soil work together if one is to succeed in this new frontier of farming. Improving soil health has worked to reduce inputs but it is not an overnight fix to reducing synthetics.

Years of soil degradation cannot be restored in one year. Addicted soil needs a transition to good health over a five to ten-year period, and there must be well thought out plan in place to help this journey to good health. Transition must progress in small steps to ensure a viable farm system and business. There are no recipes to follow in the transitioning process, and it requires a high level of commitment to the cause as there are unknowns, risks and inevitable mistakes. A great deal of trial and error, thinking outside the box of modern agriculture and full belief is required to make RA work.

As Lance Gunderson (2018) points out “don’t forget to believe your own eyes and ears even if you don’t understand what you are seeing and hearing yet” as the complexity of a living soil with a multitude of interactions happening is far from being fully understanding and may never be.

Currently, RA is being successfully integrated in farming systems that grow combinable crops to improve soil and reduce synthetic inputs. However, it is proving to be more

difficult, and requires more creative thinking, in farming systems that produce high value crops that require high levels of tillage and grown from non-competitive seed. Despite this, with paradigm shifts, and outside the box thinking of modern agriculture, solutions can be found to integrate the five principles into a high value crop rotation. Companion cropping peas with potatoes, controlled traffic, the addition of composts, including diverse cover crops and reducing the depth of tillage used to prepare the soil for crop production where some methods used by vegetable growers across the world to improve the health of the soil. While high levels of tillage are required in a system, it becomes a much harder and slower process to regenerate the soil and get to the point where the soil is able to support healthy plant growth that is not reliant on synthetic inputs.

It may be all too easy to say the task is impossible, that it's too hard to improve the soil to a point where reduced synthetics are possible. Yet with further understanding of the living soil, the determination to improve the practices, will come. It will require some out of the box thinking, and investment into equipment. There is also the option of using organic farming methods during the transition period to a self-sustaining system. The most important part of the process is to just get started and having a go, learning along the way as one sees the soil come alive!

Although fungicides have been largely dropped out of the system through improvements in soil health and questioning the actual need for them, some farmers are using alternative inputs in their place to ensure a yield is produced.

Seed dressings of fungicide and insecticides were another area where synthetics had been removed from the system. They are not used on seed planted for cash or cover crops by the majority of farmers, despite it being difficult to find untreated seed. The use of insecticide and fungicides on seed is thought to be disruptive to the soil ecosystem and may aggravate insect issues and are only

required if the system is out of balance. The use of no synthetic seed dressings has had no negative impact on yields when grown in functioning soil.

Herbicides are still widely used in RA to control weeds in cover and cash crops, although significant reductions have been made. Some weeds like black grass are effectively controlled through growing barley crop for two or three consecutive years as well as improving soil health.

Soil ecosystem improvements have allowed reductions in fertiliser use. There is an awakening that the heavy use of fertiliser is the cause of many problems observed in modern agriculture. Granular applied fertiliser causes the biology to become redundant as the plants do not need to feed or interact with them for their nutrition requirements, hence the biology starves and soil ecosystem collapses.

Despite the damage caused by fertilisers, the importance to wean the system off high fertiliser inputs to ensure profitable crops is still grown, emphasised and practiced. Farmers using this system, can reduce use of fertiliser and still get high yields.

Cultural practices are also observed as a means to reduce synthetic inputs. Farmers can successfully reduce fungicides by stepping away from growing a single crop e.g. wheat, rather combining a number of crops from different family and disease resistance lines. This practice helps reduce fungicide resistance and aids with adding diversity to the field.

Companion planting has helped reduce insecticide applications to zero, and cover crops help reduce the number of herbicides required for weed competition and suppression. It has become apparent that many interactions are at play in farm systems and the importance of building a healthy soil ecosystem is key to reducing synthetic inputs along with building the above ground ecosystem.



# Controlling Witchweed Infestations in Africa

Farmers who grow cereal crops in most African countries are all too familiar with the challenges presented by striga, a parasitic plant also known as witchweed that infests farmers' fields and causes lower yields, or even no harvest at all.

Now African scientists are breeding maize that can resist this pest plant as extension agents are offering farmers various solutions for improving yields in areas where the invasive weed is especially prevalent.

Striga infests the roots of the host plant, especially cereals belonging to the grass family. It survives by siphoning water and nutrients from host plants such as maize, rice, millet and sorghum, thus stunting and wilting the hosts. Striga has affected production in numerous crops, but the problem is



particularly serious for those who grow maize, which is considered a staple food crop by a majority of Africa's population.

While 80 percent of striga species are found in Africa, the weed is a truly global challenge. It began showing up in maize fields in both

the US and Australia in the 1950s before the massive application of chemical inputs was used to eliminate it.

That experience has African scientists, particularly those in Uganda and Kenya, devising new means for farmers to overcome this challenge in a bid to improve production of the affected crops.

## Crop and economic losses

A January 2018 report in the journal PLOS Pathogens stated that striga has expanded from its native range in the Semien hills of Ethiopia and the Nubian Hills of Sudan to over 40 countries in Africa. In infested fields, striga causes 20 to 100 percent crop losses, which in turn lead to significant economic losses. For example, striga causes an estimated loss of \$111 million to \$200 million annually in African rice fields alone.

In a 2011 Swedish University of Agricultural Science publication, researchers Jenny Anderson and Marcus Halvarsson found that in Nigeria's Northern Guinea Savannah, sorghum has lost 50 percent of its vigor due to striga. In Kenya, sorghum production where there is striga infestation is at 550kg per hectare, compared to 1,200kg per hectare where the weed is not present.

Dr Micheal Otim, the head of cereal and legumes research programs at Uganda's National Agricultural Crops Resources Research (NARO), has identified four major striga zones in East Africa: the Lake Victoria zone, the inland dry zone found in Tanzania, the inland moist zone in Uganda and a continuous coastal zone along the Indian ocean in both Kenya and Tanzania.

The most affected of these is the Lake Victoria zone, where striga is said to cause 50 to 80 percent crop losses across the entire region. Tanzania has the largest area of striga infestation totaling over one million hectares of land and over one-third of its three million acres under maize production

# Why Students Should Now



When we talk about it as food security and creating employment, we may not see where the money is.



# Why Choose Agricultural Studies

The importance of agricultural studies and working in the sector could not have been made clearer than during the Youth Agritalks held recently on the University of Nairobi's College of Agriculture's Upper Kabete Campus.

Speaker after speaker pointed out the need to change the current negative thinking towards agriculture, especially among youth. With the world population growing rapidly, while arable land and water resources are declining, it is important to find solutions to ensure sustainable food production, and security through sustainable environmental measures.

"Who will provide food for the 9.8 billion people on the planet by 2050, while ensuring that the environment is protected?" In his presentation, Mr Anthony Nyutu, a senior education solutions specialist at Microsoft, pointed out that while one out of nine people are undernourished today, by 2050, some 70 per cent more food will be required to feed a population of 9 billion.

"We need more food and water. What are we doing about it? You are now here (at the university), how are you going to help us to achieve food security?" he asked.

"The average age of a farmer today is 60 years," said Mr Steve Kombo, Managing director of Finetex and developer of Zalisha, a mobile-based application, which directly links farmers to buyers. "What is the future of our food production in the next 10 years or the plans to ensure sustainability? There will be a huge gap in food production. What are we going to do about it?"

"As youth, we are energetic, open-minded and risk-takers. We have to come up with innovative solutions and use technology for maximum productivity and to avoid post-harvest losses," he added. Mr Joseph Kamau, the Kiambu CEC member for Agriculture, said that in the next 10 years, his and other counties might find themselves without farmers or staff

because 60 per cent of the current farmers and county staff are over 50 years old.

The speakers were addressing about 400 participants, most of them youth from the university, during the Youth Agritalks convened by Smart Farmer Africa, in partnership with the University of Nairobi's College of Agriculture and the Nairobi University Agriculture Students Association (Nuasa).

The students had reached out to Smart Farmer through Nuasa chairman Linus Odhiambo.

"Most of us feel sidelined and demotivated because of the negative perception towards agriculture. We need motivation and to see the opportunities in the sector," Mr Odhiambo had said.

The college principal, Prof Rose Nyikal, said:

"We have many universities and colleges offering agriculture and related courses, yet we still talk about food insecurity." She told about one of her students who had joined the faculty because it was his mother's choice and "so he was doing it for her".

In another instance, one of her friends changed her course to education because her father

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told her that she could not study 'digging'.

Prof Nyikal said: "Agriculture is not just digging." Prof George Chemining'wa, the Dean, Faculty of Agriculture, said: "I normally face challenges during admission of new students. They often want to change to courses such as engineering and nursing."

Nuasa chairman Odhiambo urged his colleagues to change their attitude towards the sector: "This is not a field for people who have lost hope; it is for those seeing the future," he said.

Mr Gilad Milo, formerly a senior executive at Amiran Kenya, and now an award-winning artiste and CEO of Harmony Limited, a company that focuses on positioning brand's through strategic and creative use of PR among others, entertained the audience and challenged the students to recognise their unique position, which presents an opportunity for them to lead an agricultural revolution.

"You underestimate your position in the world right now. We are in a blessed country. We have water, land, one of the best climates; the people, the technology, and the willingness. You should be thinking about how to take advantage of these assets at your disposal," he said.

"We live in a generation where you can post a ridiculous message and become a personality overnight with a million followers. Online marketing, apps, and connectivity; none of these was available for your parents," he said.

"Right now if you are growing mangoes, you can sell them in New York, just by using social media and the internet," he added.

Mr Milo, a former Deputy Ambassador of Israel to Kenya, drew comparatives between the two countries to highlights the myriads of advantages the latter had over his country.

"Kenya is 26 times bigger than Israel, which is the size of Kitui County, and has a population of about 50 million compared to Israel's eight million;

yet, it is the 22nd biggest economy in the world and the largest supplier of horticulture to Europe," he said. Only three per cent of Israelis are in agriculture, and they are the ones supplying Europe with horticulture.

"This tiny country, which lacks water, sells water to its neighbours. How? Through innovation," the diplomat added.

According to him, Lake Victoria is three times the size of his country, and while it rains in Kenya consistently, a lot of water is lost instead of storing it for irrigation during dry seasons.

"And when the rains are over, the country faces drought and starvation. Maybe one of you will make use of this wasted water and earn some money from it," he told the students.

"M-Pesa has shown that Kenya can create solutions that can change the world, including solutions in agribusiness. You (students) need to find solutions to the problems farmers are facing. Create start-ups and innovations from what is available. Kenya can lead the change in agribusiness," he said.



According to the Kiambu CEC, there are many opportunities in value addition. “You don’t have to own land to be a key player in agriculture,” he said. “Look at agriculture through the whole value chain starting from production, inputs, processing, transport, marketing, and consumption,” he urged. Ms Mercy Limbua, a youthful food chain consultant, said that agriculture is a job like any other job.

“We cannot all go into the office to find jobs. Agriculture is all-inclusive. You can offer ICT solutions, finance, marketing, and all related kinds of solutions for the sector. Start now and in 10 years, you will be enjoying the fruits of your labour. Don’t wait until you are 65 when your energy is done,” she urged.

Ms Muiruri from Equity argued that agriculture should be looked at from the business perspective to reduce the risk and make it appealing so that it starts attracting money.

“When we talk about it as food security and creating employment, we may not see where the money is,” she said.

“There are no different business principles for agriculture and other sectors. They are all the same. If you can import clothes and sell them, why not sell cabbages the same way?”

Students, Ms Muiruri advised, should start positioning themselves now. “Do small things; maybe you have a dairy cow or something. Show commitment and have an entrepreneur’s mindset. “Manage your parents’ farm or for people around you to give you experience, and when you are done with schooling, you can go out and become an employer.”

Mr Silvano Assanga, from RTI, advised the students that they do not have to start big or with machinery.

“Start with things like tomatoes, chickens, and Sukuma wiki (kales),” he said giving an example of a youth group in West Pokot that had become millionaires from selling goat meat and are the main suppliers in Chebararia Division in the county.

“You can make money from agribusiness through ingenuity, innovation, and creativity, and that’s why you came here to study this course,” he told youth.

“Students across the world make revolutions. If you don’t, someone else will because the revolution of a youth-led sector has already begun.

The students were enlightened that the days of the jembe are already gone, and there is the fourth agricultural revolution, the digital age.

Mr John Muthengi, a data scientist at Microsoft said: “The future of agriculture is technology-driven, with precision farming coming out as the driver in a few short years. It is upon you to tap into these solutions, and come up with others.”

**The jobs question**

No jobs in the sector? You must be joking, Microsoft’s Mr Nyutu said.

“Everybody has to eat, yet we consider this course boring? This college produces over 1,000 graduates annually. Where are they? Where do they go,” he asked.

“I have goats, cows, and some poultry, but sadly, I have not been able to find a veterinary doctor in my area (Namanga). My workers are sometimes forced to send photos of the animals through Whatsapp to my cousin in Murang’a for diagnosis,” said Mr Nyutu.

He and his wife have been considering going back to college train as veterinarians.

“I am investing in farming so that it can give me returns when I retire. I want it to be my retirement plan. Sadly, some of you guys are here just for the certificate and not to serve us!”

There are many opportunities and institutions, which can give you jobs in this sector, said Ms Esther Muiruri, the associate director in charge of agribusiness at Equity Bank.

“But you must be aggressive enough to look for jobs. Sometimes when we advertise them, we get very little response. In the last three months, we have only managed to employ 50 people, yet we were looking for more,” the director says.

The limitations are not about opportunities, said Kiambu CEC Kamau, who had a similar experience to that of Equity Bank.

“We lack enough people to fill the positions,” he said, explaining that when he worked in the private sector, it took three advertisements before they could get the right people to employ.

The reason is because most students do not know where they can work after graduation.

Mr Eric Ogumo, of IFC/World Bank Group and the chairman, Society of Crop Agribusiness Advisory of Kenya, said: “I recently spoke to third-year students, 80 per cent of them did not know where they could work after graduation. It is important to know potential companies.

Ms Judy Maina of FAO said: “The opportunities are immense, but because the students and youth, in general, do not have information, the gap keeps growing.”

# Steps to successful rice production

To create a crop calendar, farmers must determine the best date to plant, the time the variety takes from planting to harvest (short duration, 100–120 days; medium duration, 120–140 days; long duration, 160 days or more). Most varieties take 50–55 days from panicle initiation to harvest.



**R**ice is Kenya's third staple food after maize and wheat. Rice production is estimated at between 33,000 and 50,000 metric tonnes, while consumption is between 180,000 and 250,000 tonnes. About 95 percent of rice in Kenya is grown under irrigation in paddy schemes managed by the National Irrigation Board (NIB). The remaining five percent is rain-fed. The average unit production under irrigation is 5.5 tonnes a hectare for the aromatic variety, and seven tonnes for non-aromatic varieties.

## Crop Calendar

A crop calendar is a picture of your rice growing season: crop production from the fallow, land preparation, crop establishment, and maintenance through harvest and storage. By using a crop calendar, farm activities are better planned, and performed at the right time. It is easier to organize labour and obtain inputs such as seed and fertilizer. Better planning will decrease input costs and increase yields

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variety takes from planting to harvest (short duration, 100–120 days; medium duration, 120–140 days; long duration, 160 days or more). Most varieties take 50–55 days from panicle initiation to harvest.

Mark on the calendar the date of planting and when each other operation needs to be done (ploughing, weeding, fertilizing, and harvesting). It is advisable to pin the calendar in a prominent place to remind you when things need to be done.

## Right Seed

The most suitable variety is the one best meeting farmer's and consumer's needs. It may not always give the highest yield and will be influenced by availability of water (either

from rain or irrigation), soil type, and field elevation, and whether the rice will be sold or consumed at home.

Varieties should be selected based on good yield potential, resistance to disease, good eating qualities, high milling yield, and

are suitable for the market. When selecting a variety it is important to understand:

**Crop duration:** Long-duration varieties (160 days and longer) suitable for irrigated areas or flood-prone areas. Medium-duration varieties (120–140 days) suitable for both rain fed and irrigated areas. Short-duration varieties (less than 120 days) suitable for drought-prone areas or for double cropping.

**Crop height:** Tall varieties (1.4 m and taller) are suitable for flood-prone and unlevelled fields, lodging may be a problem. Medium height varieties (1–1.2 m) are suitable for most areas and are not as susceptible to lodging when fertilizer is used. Short varieties are best suited to level fields especially in irrigated areas. They are responsive to fertilizers and are normally less than 1 m in height.

**Grain quality:** A premium is often paid for aromatic varieties, but yields are normally lower. Eating quality such as softness, stickiness, and colour after cooking are important.

High-quality seed reduces the required seeding rate and produces strong, healthy seedlings, resulting in a more uniform crop with higher yields.

Good seed is clean with no stones, soil, or weed seed; pure containing grains of one variety; and healthy having full big grains of the same colour with no cracks or spotting. High-quality seed can be bought as certified seed or produced by the farmer.

#### Field Preparation

A well-prepared and levelled field gives a uniform, healthy crop that can compete with weeds, use less water, and give higher yields at a lower cost. The field should have many small soil clods to give good seed-soil contact and with no weeds. It should also have a harder plough layer at 10 cm to stop water penetration, level and smooth surface after working; and well-constructed bunds.

To prepare the field, farmers should plough immediately after the previous harvest using a disc or mold board plough to kill weeds and incorporate crop residue, preferably 6–8 weeks before planting with maximum depth of 10 cm. Levelling the field will give better water coverage, better crop establishment, and better weed control.

Second ploughing across the field with the disc or tine harrow should be done 2–3 weeks before planting at least twice to make small clod sizes. Last harrowing 1 week before planting with maximum depth of 5–7.5 cm.

#### Planting

Planting the crop on time will help produce a fast-growing, uniform crop that will have higher yields and will be better able to compete with weeds and pests. The best time to plant depends on the locality, variety, water availability, and the best harvest time. Rice can either be transplanted from a nursery or direct-seeded in the field.

Transplanted crops will normally take less time in the production field but 10–15 days longer for the total crop duration. In both cases, a well prepared seedbed is needed.

#### Effective weed management

Weeds compete directly with the rice plants and reduce rice yield. Each 1 kg dry matter of weeds is equivalent to 1 kg grain loss. Weeds cause most yield loss within the first 20–50 days after crop establishment. Weeding after panicle initiation may also be important to prevent weeds shedding seeds in future crops.

For better management ploughing and harrowing in fallow should be undertaken at least 10–14 days apart or after rain. In addition farmers must level the land well, select varieties which have vigour and apply

permanent water early.

First weeding begins within 2–3 weeks after establishment and the second in another 2–3 weeks. It is advisable to weed before fertilizer application. Farmers can apply pre-emergence herbicides after planting prior to establishment and post-emergence herbicides after emergence being careful of crop damage.

#### Fertilizer Application

Most soils provide only limited amount of nutrients to the crop, therefore fertilizers need to be applied to increase grain yield. In some cases, fertilizers are also added to improve the soil's physical condition. The amount and type of fertilizer applied are determined on the assumption that 1 ton of grain will remove 15 kg nitrogen (N), 2–3 kg phosphorus (P), and 15–20 kg potassium (K). These base rates need to be modified according to the soil type, the season, the crop condition, prevailing weather conditions, and efficiency of application. It is advisable to use organic fertilizer (manure, compost, straw, husk, plant leaves) whenever possible, especially in nurseries.

#### Water Management

Water availability largely determines the potential crop yield. For a crop to continue to grow, the water supply needs to be similar or a little above evaporation. In an efficient system,

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each 1kg of grain produced will require a minimum of 2,000 litres or 2 m<sup>3</sup> of water. Good water control increases crop yields and grain quality as well as improving the efficiency of other inputs such as fertilizer, herbicide, and pesticides. To maximize water-use efficiency farmers should maintain the bunds, level the fields, puddle the fields where possible use direct-seeding techniques, use short-duration crops and harvest on time.

Good-quality water is necessary to maximize crop growth. The rice plant is susceptible to salinity especially at the seedling stage and during the panicle development stage from panicle initiation to booting.

Symptoms of salt toxicity include “firing” of

seasons by managing stubbles and ratoons, and by maintaining & repairing bunds. Choice of clean seeds and resistant varieties is recommended. Farmers can use cultural and chemical controls, however early diagnosing is key to management. Over application of fertilizers especially nitrogen can increase susceptibility to certain diseases and pests. Main pest include white rice borer, birds, rice stem borer, stalk eyed fly and rice leaf hoppers. Mainly they can be controlled through practice good field hygiene, plant resistant varieties and use systemic insecticides. For birds farmers can also use bird scaring devices and monitor regularly for breeding sites.

Main diseases include blast, sheath blight, sheath rot and rice yellow mottle virus. These

grain weathering, resulting in breakage and downgrading due to undesirable grain colour.

Crops should be harvested when grain moisture is between 20–22%, which is normally about 30 days after flowering, 80–85% of the grains are straw-coloured, grains in the lower part of the panicle are hard, not soft; and grains are firm but not easily broken when squeezed between the teeth.

After cutting, maximize grain quality by ensuring the panicles do not touch the ground or lay in water. Minimizing the time the cut panicles remain in large bundles in the field and drying them immediately after threshing maximizes quality. It is important to turn or stir the grains at least once every hour when



leaves and reduced dry matter production. The effects of high salinity during panicle development are less obvious as there is little leaf effect, but florets and grain numbers per panicle are reduced greatly reducing yield.

### Pest and Disease Management

Farmers lose an estimated average of 37% of their rice crop to pests and diseases every year. In addition to good crop management, timely and accurate diagnosis can significantly reduce losses. The best control for pests and disease problems is prevention. To limit pest and disease incidences in a rice crop, farmers should practice good cleaning of equipment. It is also important to clean the field between

can be controlled through Plant resistant varieties, proper plant spacing, avoid excessive nitrogen application in the field, practice good field hygiene, use suitable broad-based fungicide and control of insect vectors.

### Harvesting

Harvesting the crop on time is very important to maximize yields and grain quality. Crops harvested too early will have many unfilled and immature grains. Immature grains break easily when milled and will not germinate when used for seed. If crops are harvested late, heavy losses will occur through shattering and bird attacks. Quality will also decrease due to

sun drying to achieve uniform drying. Farmers should also cover the grain on hot days during mid-day to prevent over-heating and clean through repeated winnowing after drying. Rice should be Stored in a cool, dry, and clean area — preferably in sealed containers for seed.

### Storage

Rice is best stored as paddy because the husk provides some protection against insects and helps prevent grain quality deterioration. A safe storage system will prevent the grain from getting wet after drying and also give protection from insects, rodents, and birds. Rice can be stored for longer periods if moisture content is maintained at less than



“Immature grains break easily when milled and will not germinate when used for seed. If crops are harvested late, heavy losses will occur through shattering and bird attacks. Quality will also decrease due to grain weathering, resulting in breakage and downgrading due to undesirable grain colour.

14% for grain and 12% for seed. Protection from insects, rodents, birds; and re-wetting by rain or from the surrounding air.

A rule of thumb for seed is that the life of the seed will be halved for every 1% increase in moisture content or a 5°C increase in storage temperature above recommended levels.

Grain can be stored in bulk in containers made from wood, metal, or concrete and located under or inside the house. Sealed or hermetic storage systems are an effective means of controlling grain moisture content and insect activity for seed or grain stored in tropical regions.

#### Milling

Milling rice paddy removes the husk and bran layer to produce white rice. Rice is best milled at 13–14% moisture content. Best results are attained when the process is completed in a number of stages. Grain temperatures should not exceed 45°C during the process. An efficient mill removes the husk (20%), the bran or meal (8–10%), and leaves 70% as white rice. Rice grown in irrigated systems should attain 60% white rice as head rice (unbroken, white kernels) and rain fed systems 40–50% as head rice. Rice is milled in several ways mainly hand pounding using a mortar, one

step milling, two step milling and multi stage milling.

#### Marketing

The value of milled rice in the market is determined by a number of physical and chemical characteristics, and the consumers, which will vary.

**Physical characteristics: Milling degree or colour.** The degree of milling or amount of the brown rice removed affects the colour of white rice and often the price. Under-milled rice absorbs water poorly, does not cook well, and is normally cheaper.

Head rice percentage or % broken. Head rice (whole kernels) also includes broken kernels that are 75–80% of the whole kernel. High head rice yield is one of the most important criteria for measuring milled rice quality. High-quality rice normally has less than 5% broken.

**Whiteness or translucency:** This characteristic is a combination of varietal physical characteristics and the degree of milling. During milling, the whitening and polishing process greatly affects the whiteness of the grain and its transparency.

**Chalkiness:** Grain appearance is affected by the amount of chalkiness or white belly. Chalkiness is caused by interruption of the final grain filling. Though chalkiness disappears upon cooking (and has no direct effect on cooking and eating qualities), excessive chalkiness often downgrades the quality and reduces milling recovery.

#### Chemical characteristics

##### **Gelatinization temperature or cooking time:**

Environmental conditions such as temperature during ripening influence gelatinization temperature. There is normally a preference for rice with intermediate gelatinization temperature.

Amylose content or stickiness. The amylose content of rice usually ranges from 15–35%. High-amylose rice has high volume expansion, grains cook dry, are less tender, and become hard upon cooling. Low-amylose rice cooks moist and sticky. Intermediate-amylose rice (21–24%) is preferred in most rice-growing areas of the world.

Gel consistency measures the tendency of the cooked rice to harden on cooling. Varieties with a softer gel consistency are preferred if rice is to be consumed after cooling or if cooked rice with higher degree of tenderness is desired.

# Boosting East Africa's Rice Productivity and Competitiveness

*Africa Harvest and Africa Rice join forces with national partners to boost East Africa's rice productivity and competitiveness*



With support from the International Fund for Agricultural Development (IFAD), the Africa Rice Center (AfricaRice) and the Africa Harvest Biotech Foundation International (Africa Harvest) have launched a project in partnership with national



programs to enhance the performance of the local rice value chains in Kenya, Uganda and Madagascar, based on innovative institutional approaches and knowledge products.



“This important IFAD-funded project comes at an opportune moment, as we have announced this year that our aim is to achieve self-sufficiency in rice by boosting output to 400,000 tonnes by 2022, under our ‘Big Four’ economic agenda,” stated Hon. Mwangi Kiunjuri, Cabinet Secretary, Ministry of Agriculture, Livestock, Fisheries and Irrigation, Government of Kenya. “We count on the expertise of AfricaRice, Africa Harvest and our scientists to assist in capacity strengthening and reduction of postharvest losses.”

Titled ‘Strengthening the rice sector for poverty reduction in East Africa for improved productivity and competitiveness of domestic rice’ (EARiSS), the 3-year project will adapt appropriate rice technologies and innovations to address emerging rice value chain constraints, strengthen functional linkages among key rice stakeholders using multi-stakeholder innovation platforms (IPs), and improve capacity of farmers and other rice value chain actors, including input dealers, millers and marketers.

About 18,000 stakeholders, including rice farmers, seed producers, extension service providers, processors and national research staff in



Kenya, Uganda and Madagascar are expected to benefit directly from this project. At least 40% of this target group is expected to be women, and at least 20% youth aged 15-35 years.

Indirect beneficiaries include other rice value chain actors, such as farm input dealers, equipment fabricators, transporters, micro-finance providers, non-governmental organizations and policymakers. The outputs of the project will be relevant for at least 100,000 rice-farming households in East Africa.

“We are fortunate to work with Africa Harvest and our national partners in Kenya, Uganda and Madagascar on this project, which will help harness our combined knowledge and experience to address challenges along the rice value chain of these three countries,” said Dr Harold Roy-Macauley, AfricaRice Director General. “We take this opportunity to convey our sincere thanks to IFAD for enabling research outputs to contribute directly to targeted development outcomes.”



Rice is one of the key strategic crops for food security and a source of income for rice value chain actors in the project countries. Despite increases in rice production, the local supply however, has not been able to meet

the growing demand, driven by changing consumer preferences and rapid urbanization. The rice import bill has therefore risen sharply and is estimated at US\$ 500 million per year, in East Africa.

“It is unacceptable that 80% of Kenya’s rice is imported, when we have all the potential to produce it here,” stated Dr Florence Wambugu, Chief Executive Officer of Africa Harvest. “That is why, it is so important that AfricaRice, which is known for its climate-smart technologies, adapted to African conditions, can bring to bear its expertise in boosting the rice sector in the project countries.”

Expressing her optimism about the project’s potential, Dr Wambugu said, “Equipped with knowledge, innovative technologies and requisite skills along the rice value chain, in combination with strong political support and adequate investment in the rice sector, our rice stakeholders can make local rice production internationally competitive.”

In addition to helping bridge the widening rice production-consumption gap, the project is expected to contribute to the improvement of food and nutrition security, sustainable agricultural development, creation of rural employment for

women and youth, reduction in the rice import bill and economic development in the project countries.

The project is linked to the national rice

development strategies (NRDS) in the three countries and is aligned with IFAD objectives, as it will

- (a) promote the out scaling of innovative, pro-poor approaches and technologies through the IPs to achieve greater impact;
- (b) strengthen partners’ institutional capacities;
- (c) enhance advocacy and policy engagement; and
- (d) enhance and share generated knowledge for development impact.

It will be implemented in association with the Kenya Agriculture and Livestock Research Organization (KALRO) and the National Irrigation Board (NIB) in Kenya; the National Center for Applied Research on Rural Development (FOFIFA) in Madagascar; and the National Agricultural Research Organisation (NARO) in Uganda.

Key project activities include; promoting promising varieties and agronomic practices for enhanced productivity and reduced yield gap in the rice hubs, promoting appropriate seed production practices and delivery mechanisms and enhancing the capacity of rice value chain actors in post-harvest management and marketing of quality rice whilst promoting gender related activities.

“The project activities will be implemented in an interdisciplinary manner through IPs located in rice hubs in the project countries,” said Dr Edgar Twine, AfricaRice Marketing and Rice Value Chain Expert and EARiSS project Coordinator.

The EARiSS Project was launched during the inception and first planning meeting held in Nairobi, Kenya in August 2019 that was attended by project partners from IFAD, AfricaRice, Africa Harvest, NARO, KALRO and FOFIFA. Other participants included Kenya’s Ministry of Agriculture Rice Promotion Program, rice farmers, millers, traders, seed companies, International Rice Research Centre and African Agricultural Technology Foundation.

# Africa Cuts New Cases of Top Maize Disease

**I**nterventions such as disease-free seeds and field hygiene have helped cut new cases of maize lethal necrosis in Sub-Saharan Africa, scientists say.

Maize lethal necrosis, a disease caused by a set of viruses, results in up to 100 per cent yield losses, thus having a devastating impact on food security and smallholders' incomes in Sub-Saharan Africa, according to the International Maize and Wheat Improvement Center (CIMMYT).

"We have seen clear reduction of severity [of the disease] in a number of countries across East Africa," said Boddupalli Prasanna, director of the global maize program at CIMMYT, during a meeting in Kenya to review progress in fighting the disease. "This disease has been a big threat to agricultural production in East Africa in the last six years."

For example, new cases of the disease in Kenya, Rwanda and Tanzania have reduced from 65 per cent, 35 per cent and 43 per cent to about 29 per cent, 25 per cent and 11 per cent, respectively from 2015 to 2018. "We have seen clear reduction of severity [of the disease] in a number



of countries across East Africa." Boddupalli Prasanna, CIMMYT. According to Prasanna, interventions such as destruction of infected plants and control of insect vectors in Rwanda aided the improvement in fighting the disease.

Fidele Nizeyimana, a maize pathologist at Rwanda Agriculture Board, added that an awareness programme facilitated the country's progress in reducing new cases of the disease.

The review meeting brought together research scientists, commercial seed companies and policymakers from countries such as Ethiopia, Kenya, Malawi, Tanzania, Zambia and Zimbabwe to discuss lessons learnt and experiences in managing the disease in Sub-Saharan Africa.

Francis Mwatuni, manager of CIMMYT's project for

diagnosing and diagnosing the disease, added that interventions such as disease-resistant maize varieties have helped cut the threat of the disease's spread in East and Southern Africa.

According to Johnny Masangwa, a plant pathologist from Malawi's Ministry of Agriculture, Irrigation and Water Development, surveillance has shown Malawi as being free of maize lethal necrosis in the past three years.

Prasanna cautioned that East Africa is not yet free of the disease because there are new reports in Uganda. He told participants that the new reports of the disease in eastern parts of Uganda should be analysed and managed quickly because it could lead to the upsurge of the disease in the bordering areas of western Kenya.

Isaac Macharia, a senior research fellow at the Kenya Plant Health Inspectorate Service, lauded commercial seed companies in the region for ensuring that farmers get disease-free seeds.

Macharia said that more than 12 maize varieties resistant to the disease have been released and are ready for commercialisation in Kenya, Tanzania and Uganda next year.

"What we want is ensuring that these products are readily available and accessed, especially by smallholders." Macharia said. "We want to ensure that we are fully in control of the disease."

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# What it takes to bring the best seed to farmers

CIMMYT's board witnesses the results of impactful research and market partnerships in Kenya.



**P**artnerships

and how to increase impact were two of the key issues discussed by the Board of Trustees of the International Maize and Wheat Improvement Center (CIMMYT) during their meeting in Kenya in October 6-10, 2019. Management and strategy discussions were combined with field trips and interactions with CIMMYT researchers and partners. Board members visited the research stations in Kiboko and Naivasha, as well as two partner seed companies in Machakos and Nairobi.

"To ensure CIMMYT's crop breeding research benefits smallholder farmers, it is important for us to better understand how partnerships between CIMMYT and seed companies work

East African Seed, a family-owned seed business established in Nairobi in the 1970s, sells over 300 products, from maize and vegetable seeds to phytosanitary solutions. The company works through a large network of stockists and distributors across Burundi, the Democratic Republic of Congo, Kenya, Rwanda, South Sudan, Tanzania and Uganda.

Rogers Mugambi, chief business manager of East African Seed, underlined the successful partnership with CIMMYT, getting access to high-yielding disease-resistant germplasm and receiving technical support for the company's breeding team. Mugambi highlighted CIMMYT's contribution to contain the

on the ground, to know how seeds move from our research stations to the farmers," said Marianne Bänziger, CIMMYT's deputy director general for research and partnership.


devastating maize lethal necrosis (MLN) outbreak since 2011. Most commercial varieties on the market fared badly against this new viral disease, but in 2020 East African Seed will launch two new MLN-tolerant varieties on the market thanks to CIMMYT's breeding work. Dryland Seed, another partner seed company, was established in 2005 in Kenya's Machakos County. It commercializes the drought-tolerant SAWA maize hybrid, based on CIMMYT lines. Featured recently on Bill Gates's blog, this hybrid is a success among farmers, thanks to earliness, nitrogen use efficiency and good yield potential in water-stressed regions. Dryland Seed's production grew from 25 to 500 tons of seed per year, reaching out 42,000 farmers a year.

## Keeping seeds in business

When asked about the uniqueness of East African Seed, Mugambi highlighted trust and consistency in quality. They nurture their agrodealer network by investing in extension services and organizing evening meetings with stockists to discuss how to farm and be profitable.


"Knowing and supporting the agrodealers selling your products is crucial, to make sure the stockists sell the right seeds and inputs, and store them well," Mugambi explained.

"Many seed companies could learn from you. Quality control is crucial for any seed business as you sell genetics and any crop failure at farm level will jeopardize farmers' trust in the company's seeds," said Bill Angus, CIMMYT Board member.



Ngila Kimotho, managing director of Dryland Seed, pointed out the financial challenges for a small local seed company to grow in this risky but important agribusiness. The company has to pay out-growers, sometimes face default payment by some agrodealers, while low-interest credit offers are scarce as “banks and microfinance institutions target short-term reliable businesses, not climate-risky rain fed farming,” Kimotho explained. Combining drought-tolerant crops with insurance products could lower business risks for banks.

#### Bringing top-notch research to farmers



“I am worried about the mutating stem rust which seems to break down the resistance of some popular wheat varieties,” stressed Joseph Nalang’u, a farmer in Narok with 600 acres dedicated to wheat and 100 to maize. “The unpredictable weather is another major concern. When I started farming, we knew exactly when the planting season would start, and this helped us in our planning. That is no longer the case.”



African farmers need agricultural research. A research that is responsive to develop rapidly scalable and affordable solutions against numerous emerging pests and diseases like wheat rusts, MLN or fall armyworm. They need advice on how to adapt to unpredictable climate. While visiting the MLN Quarantine and Screening Facility in Naivasha, CIMMYT’s Board members discussed research priorities and delivery pathways with farmers, seed and input companies, and representatives of Kenya Agricultural and Livestock Research Organization (KALRO), Kenya Plant Health Inspectorate Service (KEPHIS) and the Ministry of Agriculture.



“When you visit Naivasha MLN research facility or Njoro wheat rust phenotyping platform, both co-managed by CIMMYT and KALRO, you see a partnership that works very well,” said Zachary Kinyua, the assistant director for crop health research at KALRO. “These facilities are open to public-private collaboration, they generate important public goods for farmers, large and small.” “If we develop or co-develop wonderful technologies but they don’t reach the farmers, that would be a fun and wonderful experience but with no impact,” said Kevin Pixley, CIMMYT’s director of the Genetic Resources program. “We depend on partners in the national agricultural research systems, seed companies and other private and public partners to realize the desired impact.”

“It is always so inspiring to see on the ground the results of years of research, to hear some of our partners talking about the real impact this research makes. The multiplier effect of what we do never ceases to amaze me,” expressed Nicole Birell, chair of CIMMYT’s Board of Trustees.



# Bag Of Goodies Lined Up For Farmers In 2020

After the ups and downs of 2019, a new year finally dawns with bundles of promises for farmers. Over the past few years, the agricultural sector has encountered a number of threats from unpredictable weather that resulted in massive crop failure and loss of livestock, crumbling cane farming in western Kenya following the collapse of milling factories, to collapsed fertiliser subsidy programme due to corruption. All these factors and many others have made farming profitless and unattractive amid joblessness and rising cost of living.

But despite the challenge, dozens of technologies and initiatives have been lined up for the new year to not only improve the sector, but to also make farming more appealing to the youth.





Crop

**insurance  
for  
smallholder  
farmers**

Smallholder crop farmers across 33 counties are set to benefit from the government's ambitious crop insurance programme, which rolls out at the beginning of this year. The Ministry of Agriculture says the programme will cover farm sizes ranging from 0.25 to 20 acres.

Agriculture Research Principal Secretary Hamadi Boga told Nation that the government has developed a comprehensive crop insurance programme covering a number of crop enterprises, starting with the main food crops namely maize, pulses and Irish potatoes.

He noted that farmers' compensation during a failed season is not only critical for stabilising their incomes, but also in building their resilience, thus leading to overall agricultural growth and development.

Speaking recently during AgriFI Kenya Challenge Fund, Prof Boga said that the government will cover 50 per cent of the insurance premium subsidy for every farmer taking up the insurance, while the farmer is expected to pay the remaining 50 per cent.

**Climate Change**

Agricultural insurance is part of a broader risk management framework that the government is now adopting as a key strategy to derisk

has recently rising impacts of The programme natural hazards pests and

***It is important to investigate existing programs based in industry, education and privately, that assist in a person's development towards a career in farm management.***

the sector, which been hard hit by climate change. covers loss due to such as weather, diseases.

"The programme between the county governments. We register farmers and hire insurance companies to underwrite the cover," he said, adding that more than 450,000 farmers had been insured in the past one year.

is a collaboration national and

Under the arrangement, the government will work with insurance companies responsible for developing products and selling crop insurance to farmers.

The crop insurance will cover 33 counties, namely, Uasin Gishu, Elgeyo Marakwet, Migori, Homabay, Bomet, Kisumu, Kwale, Kitui, Taita Taveta, Narok, Kakamega, Bungoma, Vihiga, Nyandarua, Kiambu, Nyeri, Kilifi, Kisii, Meru, and

To page 30



### From page 29

Laikipia among others.

The subsidy is based on first-come-first-served basis and once the subsidy limit is reached, the sale window is closed, the ministry said.

The department indicated that it will work with counties to identify the targeted beneficiaries as well as insured crops.

#### **Electronic vouchers for cheap fertiliser**

The Ministry of Agriculture has set aside Sh2 billion for farmers to acquire fertiliser using e-vouchers from agro-vet shops in a bid to curb corruption and offer growers quality inputs.

The government had earlier planned to rollout the e-voucher programme in 2019 but the plan failed. Under this scheme, the ministry had indicated that farmers would buy e-vouchers from agricultural offices in their counties and later redeem them at agro-shops for the subsidised fertilisers.

The e-voucher could also curb graft linked to the selling of subsidised fertiliser to non-farmers by NCPB

officials.

The government has also extended the number of crops to be covered under the subsidy programme to include Irish potatoes, coffee, and rice alongside maize, which has been enjoying the largest share of the cheap fertiliser.

Prof Boga said part of the funds would be used in soil testing and provision of lime to correct acidity, which is blamed for declining production.

Prof Boga said the planned supply model would also provide zones with fertiliser type that matches their soil profile in a bid to deal with declining fertility.

“We’re rolling out the issuance of e-vouchers to farmers in the next planting season to ensure that the fertiliser benefits farmers and that they get the type that suits their soils,” he said.

#### **Farming of genetically modified cotton**

The government recently approved the commercialisation of Bt Cotton after years of waiting.

Bt Cotton, which is a genetically modified cotton variety that is



resistant to bollworm, can yield up to three times as much as their conventional counterparts, making it a good deal for farmers, according to biotech experts.

Farming of the crop is set to begin in April during the long rains after the completion of environmental social impact assessment in cotton growing areas and farm demonstrations.

Commercialisation of the new crop offers new hope to local cotton farmers and struggling textile factories such as Rivatex that has been underperforming due to scarce raw materials despite being recently revamped.

Livestock Principal Secretary Harry Kimtai observes that Bt cotton farming will significantly benefit the livestock feed sector, which is currently struggling due to drought and climate change. Cotton seeds are a popular animal feed ingredient.

### **High Productivity**

Cotton farming collapsed in the mid '90s following massive bollworm attacks and high production cost. This made conventional cotton farming unprofitable.

Lack of quality seeds and low productivity of the crop resulted in the decline of raw materials for local ginneries hence reduced operations and closure.

Dr Margaret Karembu, director of International Service for the Acquisition of Agri-biotech Applications, said the farm demonstrations are done with a selection of lead farmers with large tracks of land in every region.

"The demo farms will also act as training grounds for smallholder farmers," she added.

The crop does well in semi-arid areas with black cotton soils.

Dr Karembu also noted that farmers can invest in Bt cotton seed multiplication, which is more profitable than farming the crop.

However, she cautioned that while there is a lot of excitement about cotton farming, the crop should be planted in cotton growing zones.

### **Revival of Mumias Sugar**

Mumias Sugar Factory is expected to roar back to life after two years of silence following the appointment of a new manager.

The factory, which sank into insolvency to the tune of Sh6 billion after making heavy losses, was taken over by Kenya Commercial Bank in November last year.

Revival of the giant miller is not only expected to revive cane farming in Western Kenya, but is also set to restore the livelihoods of locals and dozens of cane farmers, whose mainstay depended on the factory.

Mr Ponangapalli Venkata Ramana Rao, the receiver manager, said they are working on a revival strategy that will ensure that milling operations resume after carrying out repairs and maintenance of the factory.



The revival plan involves restarting ethanol production to generate revenue to sustain operations in the next one month after maintenance and repair of milling equipment.

It also entails preparation of 1,500 acres at the nucleus estate to plant cane within the next six months for supply of raw material to the factory.



## Sorghum and millet value chain project eases post-harvest handling and improves grain quality with mechanized threshing



**S**orghum farmers in Alego Usonga in Siaya County, Kenya can now look forward to harvesting and threshing their crop with ease, in less time and attain cleaner grain than before following the introduction of mechanization to this process by the Strengthening Sorghum and Millet Value Chains for Food, Nutritional and Income Security (SOMNI) Project.

Traditional sorghum threshing is a laborious, manual and slow exercise which is mainly done by beating the harvested heads with sticks on bare ground, in bags or in few cases on tarpaulins. In addition to the torturous exercise which exposes the people threshing to grain dust with skin and respiratory repercussions, it results in losses due to spillage, incomplete removal of grains from the heads, grain damage and contamination with soil, stones and other impurities. On the other hand, the fabricated portable sorghum thresher threshes and winnows the grain in one go, a process that produces clean grain ready for the market that does not need further processing.

The thresher can thresh five to 10 bags (500-1,000kg) per hour depending on the dryness of the heads. Drier heads thresh faster and result in cleaner grain. On the other hand manual threshing takes one man day to thresh and winnow one bag of sorghum. The fabricated thresher that has been introduced is portable and can be transported on a motorbike making it ideal for smallholder farmers as it can be moved easily from one farmer field to another once the harvested heads are ready for threshing.

Threshing has traditionally been the preserve for women. Machine threshing of sorghum has on the other hand attracted great interest among the youth and the men too as attested by the numbers that attended the demonstration conducted during a farmer field school held in Alego in July 2019. In attendance were 105 participants (47 men and 58 women) out of which 40 percent were youth. Six youths from the area were trained on the operation, repair and maintenance of the thresher.



“

Threshing has traditionally been the preserve for women. Machine threshing of sorghum has on the other hand attracted great interest among the youth and the men too as attested by the numbers that attended the demonstration conducted during a farmer field school held in Alego in July 2019.

The thresher will improve the quality of life for the farmers as it will save them time, drudgery, loss of grain and provide cleaner sorghum grain as well as strengthen the crop's value chain and contribute to food and income security. The adoption and use of mechanized threshers will also contribute to employment creation and in entrepreneurship opportunities especially for youth to provide threshing, repair and maintenance services to farmers at a fee. Farmers and other stakeholders attending the field school also took part in a participatory variety selection exercise at a farmer trial that also acted as a farmer field school site. The event was also attended by extension officers from the area, representatives from the Siaya County Ministry of Agriculture, local leaders, a private seed company, and from East Africa Breweries Ltd.

The SOMNI Project which runs from 2016 to 2020 is being implemented in select

counties in eastern and western Kenya by the International Center for Research in Semi-Arid Tropics (ICRISAT) and Africa Harvest in partnership with Kenya Agricultural and Livestock Research Organization (KALRO) and the county Ministries of Agriculture Livestock and Fisheries. The Project is funded by the International Fund for Agricultural Development (IFAD).

The project goal is to improve food, nutritional and income security for enhanced livelihoods and gender equity among smallholder farming households in semi-arid lands of Kenya and Tanzania. The overall project objective is to identify, develop and test improved cultivars of sorghum and millets to increase dry-land cereal production and productivity for improved food and nutrition security, and increase household incomes while protecting local environments.

# Climate, Nutrition and Security Challenge

The 2019 Borlaug Dialogue explored solutions to feed the planet sustainably in the face of conflict and climate change.

Food and agriculture experts met in Des Moines, Iowa, to discuss these issues at the Borlaug Dialogue and awarding of the 2019 World Food Prize.

The focus has shifted over the last few years from food to food systems, now including health and nutrition. “We need an integrated agri-food systems approach for food security, nutrition, nature conservation and human security,” said Bram Govaerts, director of the Integrated Development program at the International Maize and Wheat Improvement Center (CIMMYT).

Speakers agreed that to meet the current challenges of nutrition and climate change, we need a transformation of the global food system. “We have something very positive — this narrative of food system transformation,” said Ruben Echeverría, Director General of the International Center for Tropical Agriculture (CIAT).

In the discussions, speakers highlighted several areas that must be taken into consideration in this transformation.

Food security for peace and development  
The theme of the year’s Borlaug Dialogue was “Pax Agricultura: Peace through agriculture.” Panels addressed the interconnected issues of food security, conflict and development.

In the keynote address, USAID Administrator

Mark Green issued a call to action and challenged participants “to take on the food and economic insecurity issues that are emerging from this era’s unprecedented levels of displacement and forced migration.”

Ambassadors, ministers and development experts gave examples of the interdependence of agriculture and peace, how droughts and floods could create conflict in a country, and how peace can be rebuilt through agriculture. “Agriculture could root out the insurgency better than anything we did,” said Quinn about the Khmer Rouge surrender in Cambodia, where he served as an ambassador.

In the 1994 genocide in Rwanda, more than 1 million people died in 100 days. Geraldine Mukeshimana, Rwanda’s minister of Agriculture and Animal Resources, explained that in the country’s rebuilding process, all policies centred on agriculture. “Almost no country has come out of poverty without an agricultural transformation,” said Rodger Voorhies, president of Global Growth and Opportunity at the Bill & Melinda Gates Foundation, in a fireside chat with 2009 World Food Prize Laureate Gebisa Ejera. Agriculture is vital because without food, we cannot build institutions, processes or economies. “You cannot talk about human rights if you don’t have any food in your

stomach,” said Chanthol Sun, Cambodia’s minister of Public Works and Transportation. Josette Sheeran, president and CEO of Asia Society, echoed this thought, “Nothing is more important to human stability than access to food.”

In a luncheon keynote, Victor M. Villalobos, Mexico’s Secretary of Agriculture and Rural Development, spoke about CIMMYT, the MasAgro project, and the need to improve food systems and agriculture to fight violence and forced migration. “Agriculture, prosperity and peace are inextricably linked together.” How to make technological innovations work  
Innovations and technology can support a global food system transformation and help to achieve the Sustainable Development Goals. In a panel on food security in the next decade, speakers shared the agricultural technologies they are excited about: data, gene editing, synthetic biology, data science and precision farming.

Josephine Okot, managing director of Victoria Seeds Ltd said, “We must have mechanization.” She described the fact that Ugandan women farmers still rely on hand tools as a “disgrace to humanity.”

The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) organized a session where panelists



# Challenges Require Global Food System Transformation

discussed how to realize a transformation in food systems through next generation technologies, highlighting the role regulatory frameworks and policies play in the adoption of new technologies.

Making innovations work is about more than developing the product. “It takes a lot more than just a good seed to get a farmer to use it,” said 2019 World Food Prize Laureate Simon Groot. “It includes good distribution, good marketing, good training, etc.”

Technology adoption requires a human emphasis and cultural element in addition to technology development.

Breeding demand-driven crops for all “The real enemy of farmers is lousy seeds,” said Simon Groot in his speech after receiving the World Food Prize.

CGIAR took the occasion of the World Food Prize to launch a new initiative, Crops to End Hunger. “We are looking for big solutions at CGIAR. Crops to End Hunger is one of them,” said CIMMYT Director General Martin Kropff. This program aims to meet the food, nutrition and income needs of producers and consumers, respond to market demands and increase resilience to challenges of the climate crisis.

“CGIAR released 417 new varieties last year. However, we can do more. Crops to End Hunger will rapidly excel breeding cycles,” said Elwyn Grainger-Jones, CGIAR Executive Director.

Felister Makini, deputy director general for Crops at Kenya Agricultural & Livestock Research Organization (KALRO), explained that focusing on the end users is what will have real impact. “It is

“Can we sustainably feed the nine to ten billion people in our planet in 30 years?” asked Kenneth M. Quinn, president of the World Food Prize Foundation. “This question becomes even more challenging with two current game changers: conflict and climate change.”

important to develop technologies that are demand-driven so that farmers want to grow them and consumers want to buy and eat them.”

In a session to

unpack the Crops to End Hunger initiative hosted by Corteva Agriscience and CGIAR, Marco Ferroni, Chair of the CGIAR System Management Board, said that CGIAR is shifting toward a more demand-driven agenda for plant breeding, where markets dictate what the research priorities should be.

“We must consider the human aspect in breeding,” said Michael Quinn, Director of the CGIAR Excellence in Breeding Platform (EiB). “This is where success will really come.”

Panelists discussed gender-conscious breeding, or taking both women and men’s desired traits into account.

The theme of gender was also emphasized by 2019 Norman Borlaug Field Award winner Hale Ann Tufan. She asked the Dialogue attendees to question gender biases and “not only to ‘take it to the farmer’ but take it to all farmers.”





Canola Product



Wheat Product

## Time to Brand Kenyan Cereals sector

Everywhere you turn in the agriculture industry you hear about how consumers want more transparency regarding the food they eat. They want to know where it was grown, how it was grown, and if sustainable and ethical practices were followed.

Recognizing the need for increased transparency by consumers, it is important to look at the opportunity to brand commodities, like Kenyan Cereals, that are further processed into ingredients. If brands can be developed, how can they be leveraged to help drive consumption of Kenyan cereals products and increase consumer demand, ultimately leading to more opportunities for Kenyan Cereal producers?

*Cereals Magazine* spoke to numerous farmers and identified that there are opportunities to brand commodities that are further processed into ingredients. The best way to achieve this is to start with the development of a grain label. To be successful, this needs to be done at a national level. To really connect with consumers, the label and accompanying brand campaign need to focus on more than just geographical location. It needs to tie into an additional element like sustainability to help drive it forward. To identify those elements that should be used in building a label and accompanying brand, consumer research needs to be conducted to identify the attributes consumers are looking for in cereals and cereals-based products. From here, a label can be developed that allows the consumer the opportunity to easily recognize Kenyan cereal-based products and help influence their purchasing decisions.

Throughout our visits to farmers, it became evident that there is a need for Kenya to develop a strong easily identifiable brand and marketing program for our cereals sector. While there are some programs throughout the country working to support local food products, there are not any that focus on the entire cereals sector.

It is critical for us as an agriculture industry to work together to develop a comprehensive initiative that can help each of our individual grain sectors grow. We have been given the perfect platform to build off, with the increase in demand for food transparency wanted from consumers and their desire to support local. Without embracing this, as an industry, we risk missing the opportunity to provide a further connection to the consumer about Kenyan Cereals production.

Through the development of a brand and marketing campaign we can drive utilization of cereals-based products while also increasing the education and awareness of Kenyan cereals.

Although we had the opportunity to meet with several different farmers, companies and organizations, we were not able to come across any specific branding programs focused solely on cereals. The applications being used by other agriculture sectors, however, are applicable to grain with the opportunity to achieve similar success.

There are several lessons we learned while meeting with farmers, companies, organizations and government agencies. While you can

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Barley

Compared to other agriculture sectors across the country, the cereals sector has not been successful at building an identity with consumers. As a result, they have lost the direct connection with them. The development of a cereals sector label allows not only to create an identity for the sector but helps build up the trust of consumers on cereals-based products.

“Only those who will risk going too far can possibly find out how far it is possible to go.”



have tremendous success with a well thought out brand and are:

**Commodities can be branded:**

There is an opportunity to brand commodities that are further processed into ingredients. The way, in which to achieve this, is through the development of a cereals label with an accompanying brand campaign. The label provides an opportunity not only for companies to better highlight their cereals-based products, but also a way for consumers to easily identify products made with Kenyan cereals. From the label, you can develop a complete brand that builds off the attributes of the label and allows for the story of Kenyan Cereals to be told. Studies have shown that to be successful this label should be done at a national level. When you look at all the successful brand campaigns related to agriculture products, they are all national in focus. Whether this is Kenyan flowers or True Aussie in Australia, they have all used the power of the nation to help drive their brand. Kenya's cereals sector needs to look to do the same.

**Include locals as part of the brand, but do not make it the only focus**

While many consumers are supporting local, it is often because it is tied in with being more sustainable or leading to higher welfare standards. There needs to be an additional component that ties into the local aspect in order to be successful. For the Kenyan cereals sector, sustainability, and especially that of environmental sustainability, should be the linking arm. Known for producing some of the highest quality cereals, the brand provides the opportunity to share the sustainable practices Kenyan farmers use that help achieve this high level of quality. This could include the use of minimum tillage, the commitment to increasing biodiversity on the farms and the use of precision agriculture to be more efficient with inputs.

**Keep the brand simple:**

The more aspects you try to bring into the brand and marketing campaign, the higher likelihood you have of causing confusion with the consumer and losing them altogether.



Identify the one or two things, you want your brand to stand for and run with these. While additional elements can be pulled in, they should always tie back into the one or two main objectives of the brand.

**Take time to do research**

Today more than ever it is critical to understand what the consumer is looking for. Take the time, prior to building the brand, to conduct consumer surveys and focus groups to identify exactly what it is Kenyans are interested in regarding the cereals sector. While sustainability would be a natural tie-in to a Kenyan cereal brand, this perhaps is not a high priority for consumers and some other aspect may be more suitable to incorporate.

**Provide support to the brand**

It is critical for the Kenyan cereals industry to develop support material that goes behind the brand and to offer resources to companies who are interested in using it. While large multi-nationals will have resources in-house, many small stakeholders will not have these resources available, and without outside assistance, may move away from being involved in the initiative.

**Way Forward**

There are several steps that will need to occur for a brand to be developed as shown below:

**Development of Steering Committee**

The committee would include representatives from across the Kenyan cereals value chain, including farmers, processors, industry organizations and end users. The committee would help guide the direction of the formation of a Kenyan cereals brand by providing feedback through all the critical components. This feedback would lead to the development of a concrete business plan that could be shared with the industry to advocate for support. The steering committee would also solicit the necessary funds to help support the initial development work needed to develop

the brand.

**Conduct Consumer Research**

Identified by several successful brands from around the world, consumer research is a critical component of brand development. An initial consumer survey

along with focus groups should be completed to identify the area's most pressing for consumers on the Kenyan cereals sector. Questions should be targeted to ensure answers provided will give clear direction on the areas of focus the brand and supporting market campaign should incorporate.

**Determine Overall Objectives for Brand**

Based on the consumer research, overall objectives for the brand and marketing campaign should be developed. This could be the vision or mission statement for the brand. Based on this, a draft logo and supporting marketing material can be developed. Once a draft of the brand and marketing campaign have been developed, conduct additional focus groups to see how it identifies with the consumers.

**Present Concept to Industry**

The above four steps will provide a solid foundation for the development of a Kenyan cereals brand. Based on the information generated in these steps, a presentation should be generated that could be shared with industry members at a large cereal industry event. The presentation would highlight the concept of the brand and its ability to drive utilization for Kenyan cereals and increase consumer demand.

**Pilot**

Work with a food retailer to conduct a pilot of the brand. The development of a brand and marketing campaign for the Kenyan cereals sector is no small feat and will require significant resources. It will take the commitment of industry members and their respective organizations to be successful. It will also take significant financial resources. The steering committee should look to government-based funding that may be available to help support the initiative. While there will be many challenges, it also presents a great opportunity to create an identity for the Kenyan cereals sector.





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Wheat



Maize



Pig  
pe

# Africa's Food Security Threatened by Poorly Performing Seed Industry

The poor performance of Africa's seed industry is threatening food security on the continent, warns a new report.

"The overall picture is one of international and African seed companies falling short in delivering quality seed and new varieties to smallholder farmers. This limits the potential to address food security, nutrition and climate resilience," revealed the study by Amsterdam-based Access to Seeds Foundation on the performance of 23 major seed companies in 22 West and Central African countries.

Though an increasing number of seed companies have launched on the continent over the last decade, they are not investing in breeding new varieties locally for the benefit of farmers, the report found. Many of the companies apparently have built a business model around importing and distributing seeds, instead of investing in local plant breeding programs to develop new seed varieties.

"While there is a growing number of seed companies active in the region, both homegrown and international, less than half of the 23 companies researched conduct plant breeding in Western and Central Africa. This limits the release of new varieties adapted to the region," the report noted.

"Plant breeding is the core activity of many seed companies around the world, but this is not the case in Western and Central Africa," the report added. "Only 11 of the 23 index companies conduct plant breeding. In 15 of the 22 countries in scope (representing 70 percent), no breeding by index companies was found."

This has resulted in a situation where many of the varieties being sold by African seed companies are more than five years old, making it impossible for farmers to cope with rapid developments such as new pests and diseases or erratic weather conditions resulting from a changing climate.

"The lack of newly developed varieties seriously impacts the resilience to a changing climate and emerging disease and pests, which reduces yields," the report noted.

Earlier this year, a similar report by the group highlighted how global seed companies are not reaching smallholder farmers across the world, thereby making it impossible for them to produce crops efficiently.

Now, this latest report shows local companies in the West and Central African regions are struggling to fill the void created by the absence of global firms — despite their possible capacity to do so. "Our study shows the potential of homegrown seed companies. However, most operate only in their home markets, which causes geographic imbalances in

geon  
eas

seed sector development,” Ido Verhagen, executive director at Access to Seeds Index, observed.

Verhagen expressed concern that the situation means “capacity-building activities offered by companies only reach farmers in a handful of countries.” The report noted training is offered by index companies in only about 45 percent of the countries surveyed. “This limits the adoption of new technologies by farmers in overlooked countries,” he observed.

The study comes at a time when the number of undernourished people has been on the rise in sub-Saharan Africa since 2014. In West Africa, undernourishment has risen to 15.1 percent of the population in 2017, up from 10.4 percent in 2010. Climate change and weather extremes have been



## Barley

identified as a major reason for the increase.

The report noted a well-functioning seed industry has a vital role to play in helping farmers to adapt to climatic challenges while simultaneously raising production levels.

“The relevance of access to seeds and plant breeding should not be underestimated,” the report noted.

### Turn around needed

Concerns about the local seed industry failing African farmers have been a major issue under discussion among players in the continent’s seed industry for some years now.

The Integrated Seed Sector Development in Africa (ISSD Africa), a community of research institutions that includes the International Food and Policy Research Institute in the United States and Wageningen University and Research in the Netherlands — has identified lack of quality seeds as “one of the most pressing issues hindering productivity increase in Africa.”



## Sorghum

In a March 2019 publication, ISSD Africa noted seed sector development is a challenge across the African continent.

“Whereas every country is unique, often countries face similar challenges in seed sector development, like difficulties in assuring seed quality,” Wageningen’s Marja Thijssen noted. “Farmers in Africa lose millions of dollars each year using seeds with low germination rate or seeds that do not germinate at all.”

Scientists are calling for increased investments in the local seed industry across the African continent to help fix these challenges and ensure the availability of quality seeds to farmers. Dr. Emmanuel Chamba, a plant breeder at the Savannah Agricultural Research Institute in Ghana, said there is also a need for better regulatory policies in the local seed industry.

“You have to invest more resources in the local seed sector,” Chamba told the Alliance for Science in an interview. “But you don’t just invest and leave it to the farmer. You need to introduce better policies and properly regulate how things are done. That is how to grow the industry.”

Chamba also called for intentional efforts to establish structures like seed banks across the continent, noting these are needed for a properly functioning seed industry.

# 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	
-	<b>ELDORET</b>	-	-	-	-	
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
-	<b>ATHI RIVER</b>	-	-	-	-	-
Ausquest ltd		Stuart Barden	stuartbarden70@gmail.com	0703119444	Barley/ Wheat	Sorghum
-	<b>KITALE</b>	-	-	-	-	-
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
-	<b>MOLO</b>	-	-	-	-	-
EAML		Gacheru		0722791563	Contracted farmers	Barley
-	<b>KISUMU</b>	-	-	-	-	-
Dominion farms ltd		Okoth		27494585	Rice, Maize, Sugarcane	

# CEREAL FARMERS IN KENYA

FARM NAME	LOCATION	CONTACT PERSON	EMAIL	TELEPHONE	CROP MIX	ROTATION CROP
-	<b>MT. KENYA</b>	-	-	-	-	-
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	
-	<b>NAROK</b>	-	-	-	-	-
Simba Estate		SS. Dhillon	simbaestate@simbaestate.com	0722511460	Wheat	Maize
Farm Africa ltd		Raghu	raghu.penmetasa@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 Siox 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
-	<b>NAIVASHA</b>	-	-	-	-	-
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	
-	<b>NAKURU</b>	-	-	-	-	-
Lesiolo ltd		Tundo Franco	firtundo@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		Hamish Grant	md@gogar.co.ke	0722327718		Maize
Kinoru Farm		Barlow	barlow@africaonline.co.ke	0725777479	Wheat / Barley	canola, Peas, Sunflower
Comply industries		Sandhu	sckihumba@complyindustries.com	0729870025	Wheat / Barley	

# Farmers' Responsibility to Become More Competitive and Sustainable Employers

**A**ttracting people into the industry of farming has been a perpetual challenge, and will continue to be unless we can make it an attractive career choice, and working environment.

It is therefore important to encourage farmers to do all they can to create a place of work that people will see as a credible career path. It's a 'build it and they will come' approach; if the workplace is wrong, then solving the problem is doomed from the beginning.

The expanding agriculture sector is going to need thousands of people to enter it over the next few years, however this dilemma is not unique to cereals alone. The unemployment rate in is growing daily. Despite these challenges, it is amazing to learn that over 85% of the people in farming are from an agricultural background. This raises the question, "Why is a career in agriculture not appealing to those who do not come from a farming background?"

During my travels, I have the opportunity to meet many great farmers who all have their own approach to staff. Many of these are aware of their own strengths, and weaknesses, as a manager. They are also conscious of their own style of management and the effects it has on the employee engagement.

Some of the common themes I have seen run through the farms I have visited that are being very proactive regarding employees are,

- Great communication at all levels
- Continual investment in improving the working conditions
- Mentoring, training, team building
- High level of respect for employees
- Realistic expectations
- Awareness for their employees' priorities

**It is therefore important for farms to:**

- Create a workplace that has comparable working hours to careers in other sectors
- Embrace and communicate to others the opportunities within agriculture
- Educate themselves on the best recruitment approach to filling a position
- Become more aware of the importance and route to better employee engagement
- Be willing to train and develop people into their business
- Invest in building a workplace to be proud of as an industry

In order to attract and retain the employees it needs over the next few years then there may also be a role for other stakeholders.

- Creation of an improving workplace certificate for farmers
- Tax reliefs for employees
- More emphasis on HR and people management skills in our agricultural colleges
- Advisors trained and able to assist in the recruitment process on farms
- Lobby groups to place agriculture on a more positive footing with the media and public

## Conclusions

We must be willing to invest in the correct places on our farms to make sure we build a workplace that offers more than that of other sectors, varied work type, shorter commute, flexibility, less work or stress while off farm and improved health benefits. There must also be a career aspect, and good communication is essential if employees are to be included in the development and growth of the company. The business must show it values its employees and allow them to prosper in a personal, professional way and being assisted to meet their own plans.

My findings show that there is an opportunity to provide continual professional development

for farmers to aid them in their knowledge of Human Relations and employment law. From there it could be possible to create a certificate of performance which may lead to getting the backing of government to attract employees to farming.

Farming has a hugely positive, future proofed industry that has much to offer in the way of a career path. It is up to farmers, as employers in farming, to mend their ways and create the pathways for new people to work alongside them in the sector.

## What is the win if we improve?

It is healthy for farmers to make a great effort to ensure their employees choose working with them instead of seeking work elsewhere. The sector must work together to compete against other industries for staff before a worry about which farm they choose to work on.

There is a huge potential for expansion through collaboration and other agreements. If the industry does not overcome these weaknesses then the opportunities will become threats due to under-staffing and under-investment in the correct areas to create an attractive workplace.

Finding and attracting the people needed on farms should only be a stepping stone to the industry becoming a workplace that potential employees have a desire to work in. New Zealand has, for years, been known as the go to country for share-milking agreements and these have supported many families through a successful career. The Kenyan cereals sector can put its stamp on the world cereals industry as the workplace and employment capital of the cereal world.

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