CEREALS

The leading journal for field crops

April - June 2023

Ksh.400 Tsh. 7,387 S.A Rands 45 USD 4

Managing Agricultural Risks

Hon. Mithika Linturi-CS Agriculture

Take the guesswork out of farming

Our Lab services include:

- Soil Testing
- Maize Disease Testing*

*Maize pathogens tested include Maize Chlorotic Mottle Virus (MCMV) & Sugarcane Mosaic Virus (SCMV) - the causative agents of Maize Lethal Necrosis Disease (MLND)

CROPNUTS
grow more, with less

Crop Nutrition Laboratory Services Ltd. (CROPNUTS)

Mashiara Park, Kaptagat Rd, Off Waiyaki Way, Nrb
www.cropnuts.com
support@cropnuts.com
0720639933
Cropnuts_Ag
@Cropnuts

KENYA ACCREDITATION SERVICE
KENAS
ISO/IEC 17025 ACCREDITED

TABLE OF CONTENTS

Managing Agricultural Risks

Crowning of Agriculture Enthusiasts

Bayer Pledges to Help Tackle Global Water Crisis

Editorial

Food Security

The consequences of the ongoing and accelerating global climate change will have its most severe impact on the world's poorest countries. It is correct that Kenya is as well increasingly hit by unpredictable conditions for rain fed agriculture, and that some parts of the country are starting to experience the process of desertification.

Nevertheless, our relatively rich partners have good possibilities to deal with the challenges and compensate or find alternatives for the struck populations. Kenya is tremendously more vulnerable, and already suffering serious consequences of desertification and drought caused by climate change. National food security is severely threatened, partly by reduced crops nationally, partly by the rapidly rising prices of food and feed on the world market.

Drought, combined with slow economic development, and high prices on imports, may reverse positive trends we have seen in many poor countries lately, and send national economies into recession. The cost of imports of basic foodstuffs to the world's 37 Low Income Food Deficient Countries increased 20% only last year, and the tendency is continuing. Spreading social unrest, as has been seen is one of the consequences towards proper planning

Land rights that ensure access for vulnerable groups to land and other natural resources, improved land use through crop rotation and range management, water management, irrigation systems and water harvesting, all these points requires adequate state extension systems as well as formal education in these fields.

Masila Kanyingi
Editor

Cereals **EDITOR:** Masila Kanyingi **SUB-EDITOR:** Mary Mwende Mbithi **EDITORIAL ASSISTANT:** Cornelius Mueke **CONTRIBUTORS:** Victor Ongoma, Timothy Njagi, Bayer, Elgon Kenya Ltd, MOA, GHACOF, HRAC, KNTC, Yara, CGIAR **PHOTOGRAPHER:** Alexander Mainga **GRAPHICS DESIGNER:** Evelyne Ndiema **MARKETING:** Florinews Ltd **ADMINISTRATION ASSISTANT**: Christine Muthoki

EDITORIAL BOARD: Nicholus Mbatha - Corteva, Doris Kawira, Joseph Kioko, Maina Ngunju- Bayer East Africa, Martin Mwobobia - Consultant

ADDRESS: P.O.BOX 79396 - 00200 Nairobi. **TEL**: 020-2440908 • **CELL** 0732-558172, **EMAIL**: info@cereals co.ke **Website:** www.cereals.co.ke

Managing Agricultural Risks

Hon. Mithika Linturi - CS Agriculture

While handicapping growth, unmanaged risks are also a significant factor contributing to chronic poverty in Kenya. Shocks to agricultural production and markets adversely impact household wellbeing in a variety of ways: by limiting food availability, weakening food access, and negatively affecting future livelihoods through income disruption and depletion of productive assets.

Chronically vulnerable groups with high exposure to risks experience a disproportionately large impact from adverse events and typically lack coping mechanisms available to other groups. Understanding these and other risk dynamics is key to developing appropriate risk management responses that can help reduce production volatility, safeguard livelihoods, and put the sector and the broader economy on a firmer footing for growth. Effective strategies can also make a meaningful contribution to poverty reduction efforts.

Management of agricultural risk is not new to Kenya. The Government of Kenya has a long track record of investing in risk mitigation, transfer, and coping mechanisms. Moving forward, Kenya's Vision 2030 recognizes the need to strengthen existing risk management systems and the Government has launched a range of new initiatives to confront the most severe threats facing the country.

Kenya's agricultural supply chains remain highly vulnerable to myriad risks that disrupt the country's economic growth, cripple poverty reduction efforts, and undermine food security. A more targeted and systematic approach to agricultural risk management is needed in Kenya.

Strengthening Resilience

Strengthening ex ante resilience requires moving beyond individual practices to integrate through a whole-farm and whole-landscape systems approach. Many gains will come though better and more equitable management of natural resources such as soil, water, and landscapes, which will require knowledge generation and sharing, and integration of investments at multiple levels. These will need to be supported by policy and institutional reforms.

Equally critical will be ensuring that producers have good access to needed productive inputs, including market and weather information, credit, and well-functioning markets.

Based on an assessment of existing risk management practices and programs in Kenya, the following recommendations are tailored to address Kenya's unique risk landscape, fill existing gaps, and scale up effective strategies. The interventions encompass a broad range of interrelated, mutually supportive investments that align with the Livelihoods Enhancement goals within Vision 2030 and aim to strengthen the resilience of vulnerable farming to shocks.

1. Improved Water and Soil Management

Addressing climate-change-induced water stress and promoting better water-use efficiency, particularly in marginal rainfall zones, will be required to strengthen resilience in Kenya's agricultural sector. Similarly, curbing soil erosion, increasing soil fertility, and improving access to high-quality, drought- and disease-tolerant seed varieties are crucial to enhancing the productivity of smallholder systems. In most parts of the country, access to irrigation remains limited, and farmers are at the mercy of rainfall.

Perception of high production risks drives their ex-ante decisions and discourages them from investing in fertilizers, improved seeds, and better crop husbandry practices. Irrigation infrastructure build-out is costly and not suitable for many areas where long-term access to groundwater is uncertain. However, water harvesting and improved soil management offer a

sustainable and cost-effective way to favour investments in yield-enhancing practices.

In order to strengthen risk management at the farm level, increase the effectiveness of productivity-enhancing programs, and improve the effectiveness of public support systems, the following is recommended:

Incentives

• Incentivize farmer/community–driven investments in improved rainwater harvesting and storage measures such as terracing, water harvesting pans, roof and rock catchment systems, multi-pond systems, furrows, small basins, sub-surface dams, and micro irrigation systems.

Broader Awareness

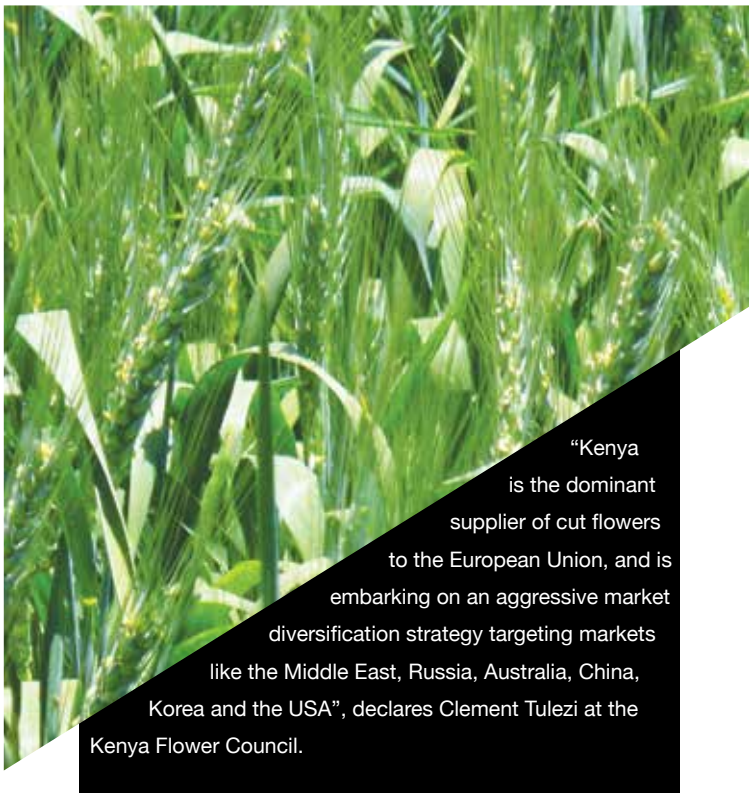
• Promote broader awareness and adoption (via Farmer Field days and other participatory extension approaches) of improved soil and water conservation practices such as zero tillage, mulching, integrating livestock, composting and use of organic fertilizers, crop diversification and rotation, terracing and grass strips, and agroforestry.

Stronger Linkages

• Create stronger linkages with continental-level initiatives such as the Comprehensive Africa Agriculture Development Programme's African Alliance for Climate Smart Agriculture to better leverage expertise and scale up best practices technologies.

Strong Management

• Strengthen management of subsidized seed and fertilizer distribution schemes to better incentivize farmers to adopt "best practice" soil and water conservation technologies that build climate resilience and improve productivity.



"Kenya is the dominant supplier of cut flowers to the European Union, and is embarking on an aggressive market diversification strategy targeting markets like the Middle East, Russia, Australia, China, Korea and the USA", declares Clement Tulezi at the Kenya Flower Council.

Research

• Strengthen seed research, developing credible and commercially-driven certified seed production and distribution systems, and upgrade monitoring and enforcement of seed-quality standards to curb counterfeiting and adulteration.

• Create linkages between research centres and county governments to ensure that nationally funded research is aligned with farmers' needs and county development priorities.

Support research to address gaps in the empirical evidence related to the costs/benefits of climate smart adaptation and mitigation technologies.

2. Climate Services for Better Decision Making

Improving the productivity and climate resilience of smallholder farmers and pastoralists requires timely, cost-effective, and relevant information on improved agricultural practices, markets, prices, inputs, weather, and news of impending disasters. Yet, access to and quality of these climate and market information services are critically low or non-existent

TO PAGE 4

FROM PAGE 3

in many parts of Kenya. There is need for developing integrated, modern agro-weather forecasting and marketing information systems to equip farmers with the right information to make better decisions and manage climate variability.

These tools will also enhance extension services delivery by providing advice on agronomic best practices, agro-input use, storage technologies, and marketing of production.

> Shocks to agricultural production and markets adversely impact household wellbeing in a variety of ways: by limiting food availability, weakening food access, and negatively affecting future livelihoods through income disruption and depletion of productive assets

Weather

Upgrade existing weather infrastructure and install new automated weather stations to improve agro-weather observation monitoring.

Strengthen institutional capacity for downscaling climate models, numerical weather prediction modelling, processing and satellite weather data analysis, visualization of the data, and improved weather communications in conjunction with national and international universities.

Develop big data crop-weather analytics to help reduce risks and uncertainties, and assist farmers in making decisions on what, when, and where to plant.

Leverage multiple delivery channels (traditional extension, radio, SMS) to disseminate weather and market advisories to rural farmers and pastoralists. These delivery channels should be integrated with the agro-weather and market information support systems and allow for bi-directional information exchange to maximize collection of data from farmers.

Conclusions

The risk assessment process highlight opportunities for strengthening the climate resilience of Kenya's agricultural sector. The country is currently undergoing a revolutionary transformation within its political, fiscal, legal, and administrative makeup. Launched in 2012, the devolution process has decentralized power and resources across key sectors of the economy to local levels of government.

For agriculture, this means that 47 county governments are now in the driver's seat. While this presents near-term challenges, it also presents a unique opportunity for more localized and more targeted planning and decision making on agricultural sector growth and development priorities.

It also empowers more localized, more effective responses to the growing threat of climate variability and extreme weather.

Kenya's Seasonal Rains Keep Failing-What needs to be done

What's known about changing weather patterns in Kenya?

Kenya's weather patterns are changing. The change in rainfall patterns has a huge impact on Kenya because 98% of the country's agriculture is rain-fed. The major challenge that farmers face is timing. It's critical for them to know when rains start and stop so that they know when to plant or harvest their crops.

Most parts of Kenya experience two rain seasons: March to May's "long rains" and October to December's "short rains". The months of June to August are mainly cool and dry over most parts of the country except for some parts in the western region that report some rains. Hot and dry conditions are observed over the entire country in January and February. In recent years, the delay in rains has become a norm.

Other than rainfall patterns, studies show a reduction in the amount of rainfall, especially during the March to May "long rains". This is a worrying trend given that this is the main growing season.

What might be causing these changes?

The changes in Kenya's rainfall patterns have been linked to climate change. Global warming is known to cause an overall warming in the atmosphere and the ocean, resulting in complex shifts that affect our planet's weather and climate systems. Research shows that rainfall is reducing while temperature is on the increase with time over Kenya, as is the case in other countries in the Great Horn of Africa.

In the case of Kenya's delayed rains, another culprit has also been identified: cyclones. It's normal for cyclones to happen on the southern African coast from February to March. But their magnitude is dictated by sea surface temperatures.

These are currently warming as a result of increased emission of greenhouse gases in the atmosphere, leading to global warming. This means the intensity and frequency of cyclones is likely to increase.

How prepared is Kenya for these changes, both in the short term and in the long term?

Because Kenya's economy relies so heavily on rain-fed agriculture, it has to be prepared. Agriculture also accounts for 70% of the workforce and about 25% of the annual GDP.

In the short term, the country relies on food reserves. This is mainly maize stored by the National Cereals and Produce Board. Unfortunately, with conflicting statements, it's not clear just how prepared the government is and how much is actually in the reserve.

In the long term, the country isn't doing enough to respond to these changing rainfall patterns. Given that drought is not new in Kenya and is not going away any time soon, one would expect to see large scale water harvesting operations. We'd hope that available food resources were being properly utilised, too, but the reality is that a lot of food is ending up as waste.

Research institutions like the Kenya Agricultural Livestock Research Organisation and the International Livestock Research Institution are working hard to come up with drought tolerant crop varieties – but more needs to be done.

What should the government be doing?

The government must put measures in place that reduce the agricultural sector's over-dependence on rain-fed agriculture.

The easiest way is to invest in irrigation infrastructure. This enhances food security, increasing the country's resilience to the effects of climate variability and change. This has been tried before and pilot projects have been successful. They now need to be systematically rolled out.

Kenya must invest more resources in the climate sector. It must train experts and provide the necessary tools for carrying out regional climate projections.

There also needs to be a clearer picture of the projected climate. Existing climate projections are based on Global Circulation Models that fail to capture the climate of Kenya and east Africa at large. Reports from the Intergovernmental Panel on Climate Change and regional studies, for instance, show that over the last 17 years rainfall was projected to increase over East Africa. In reality, we've seen that the opposite is true.

This article was updated to reflect additional failed rainy seasons.

Victor Ongoma is an Assistant Professor, Université Mohammed VI Polytechnique

BAYER

Skyway® Xpro

A Foliar Fungicide For Control of Diseases in wheat with Yield Boosting Effects

Skyway® Xpro is a broad spectrum cereal fungicide with protective, curative and eradicative action for control of diseases in wheat.

It contains three active ingredients:

- **Bixafen - *75g/l***
- **Prothioconazole - *100g/l***
- **Tebuconazole - *100g/l***

It contains an advanced formulation system (Leafshield) that enhances the performance of theactive ingredients. The unique distribution in cereal leaf tissue means an extended duration of activity. The product protects the leaf both from the inside and the outside.


Leaf Rust


Yellow stripe rust


Stem rust

Leafshield technology enhances:

- High crop coverage
- Uptake of actives for enhanced efficacy
- Rainfastness.
- Leafshield formulation system helps Xpro fungicides perform well with a range of standard practice water volumes, nozzle types and forward speeds

Skyway® Xpro provides excellent broad-spectrum activity. It is highly effective against Leaf Rust, Stem Rust, Yellow stripe rust and other diseases in wheat.

leafshield formulation system

Skyway® Xpro

BAYER

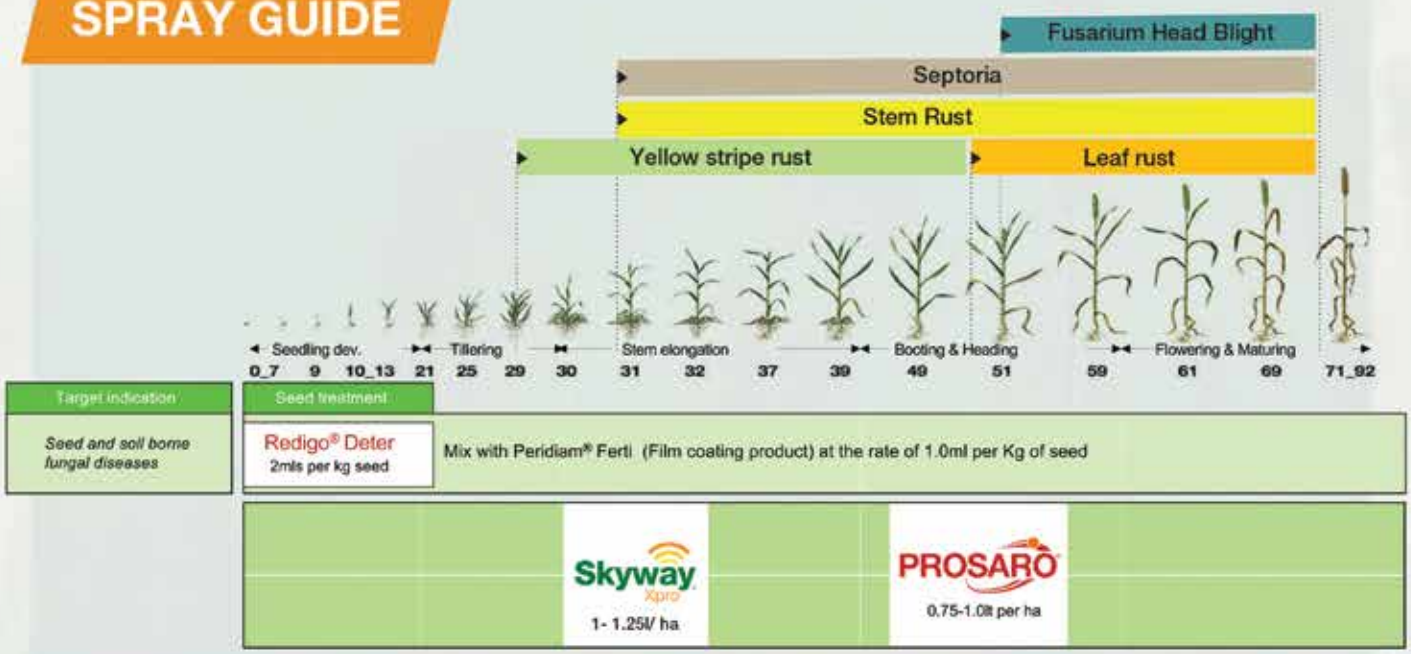
Anti-ageing technology

Skyway® Xpro also gives a boost to the crop's physiology making wheat crop stay greener and a healthier for a longer period. This gives a significant boost to yield potential and also extends to the crop's ability to recover after drought stress.

Skyway® Xpro features.....

- Combination of three strong partners with different mode of action
- Excellent control of key wheat diseases
- Boosting yield through high disease control and positive impact on plant physiology
- Unrivalled long-lasting disease control
- Specifically designed for an efficient anti-resistance strategy

SPRAY GUIDE



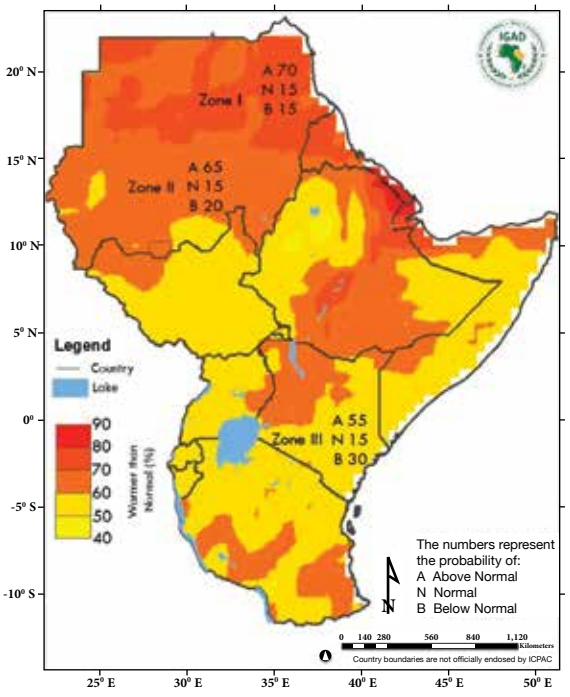
Target indication	Seed treatment	
Seed and soil borne fungal diseases	Redigo® Deter 2mls per kg seed	Mix with Peridiam® Ferti (Film coating product) at the rate of 1.0ml per Kg of seed

Skyway Xpro 1- 1.25l/ ha	PROSARO 0.75-1.0lt per ha

leafshield formulation system

For more information please contact a Bayer Representative near you
Nakuru: Martin Irungu 0724 355 527 • **Narok:** William Masikonde 0715 407 493 • **Eldoret:** Phylis Kosgei 0724 355 848

Climate Outlook for the March to May 2023 Rainfall Season



March to May (MAM) constitutes an important rainfall season, particularly in the equatorial parts of the Greater Horn of Africa (GHA), where MAM rainfall contributes up to 60% of the total annual rainfall. Analysis of global climate model predictions from 7 Global Producing Centres (GPCs) customized for the GHA indicates that drier than normal conditions are most likely to continue over the drought affected regions of Ethiopia, Kenya, and Somalia. Enhanced probability for below normal rainfall is also expected over parts of Uganda, Rwanda, Burundi, Tanzania, and western South Sudan. On the other hand, wetter than normal conditions are expected over the cross-border areas of Ethiopia and South Sudan, north-western Kenya, and parts of central and southern Tanzania. In other parts of the region, including parts of central to western Kenya, north-eastern and southwestern Uganda, northern Burundi, central and northern Tanzania, and eastern South Sudan, there is no favoured rainfall category with predictions indicating equal chances of below, normal, and above normal rainfall.

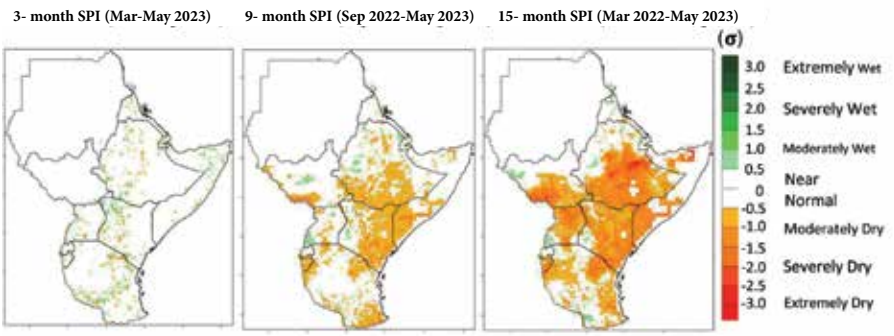
The consolidated objective temperature forecast from 7 GPCs indicates an increased likelihood of warmer than normal surface temperatures over the entire region. Probabilities for warmer than normal temperatures are most enhanced over Djibouti, Eritrea, Sudan, north-western South Sudan, southern, central, and north-eastern Ethiopia, northern Somalia, northern and western Kenya, and parts of south-eastern and western Tanzania.

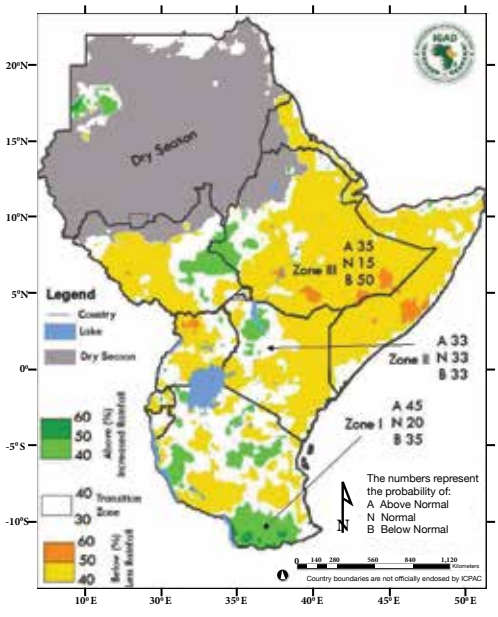
Standardized Precipitation Index (SPI) analysis of observed and predicted precipitation for 3-, 9- and 15-month timescales ending on 31 May 2023 indicates that the extended drought in many parts of the equatorial and southern regions will continue. Notably, the 15-month SPI shows moderate to severe multi-season drought conditions in the region, particularly over Kenya, Uganda, southern Somalia, southern and south-eastern Ethiopia, southern South Sudan, Burundi, and parts of eastern Tanzania. This indicates that the long-term rainfall deficits, experienced over consecutive seasons, are expected to persist in these areas.

The predicted start of the March to May 2023 season, based on 5 Global Climate Model forecasts that provided daily outputs. There are raised chances of a delayed onset over north-eastern Tanzania and raised chances of an early onset over much of western South Sudan. Elsewhere probabilities generally favor a normal onset timing, with delayed or early onset favored only in small pockets.

The World Meteorological Organisation (WMO) and the major global climate centres have noted that Sea Surface Temperatures (SSTs) anomalies over the equatorial central Pacific Ocean are likely to return to neutral over the coming months with El Niño development becoming the most likely outcome during summer 2023. Likewise, global models further indicate that the Indian Ocean Dipole (IOD) will likely remain neutral. Updates on the El Niño Southern Oscillation (ENSO) conditions will be provided regularly by WMO and the major climate centres.

Whilst the MAM season contributes a larger fraction to the annual total for much of the GHA, seasonal anomalies are generally less predictable compared to other seasons.



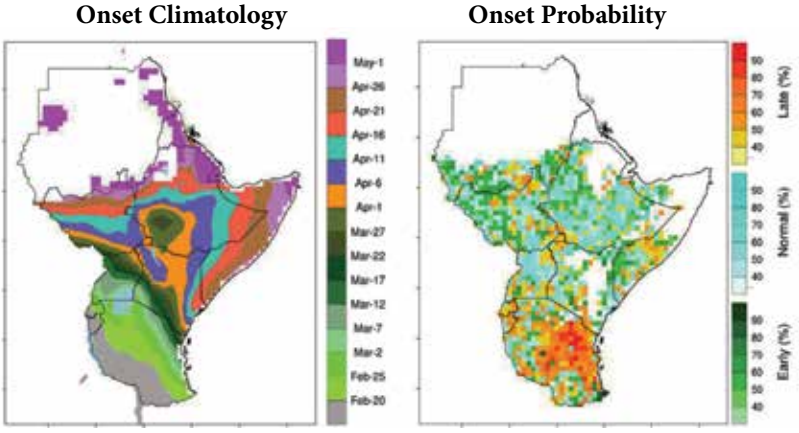


This is largely a consequence of the weak linkage between rainfall and global large-scale modes of variability such as ENSO and IOD.

The outlook is relevant for seasonal timescales and covers relatively large areas. Local and month-to-month variations might occur as the season progresses. Spells of heavy rain and above normal rainfall may occur in areas with an increased likelihood of below normal seasonal totals and vice versa. ICPAC will provide regional updates on a regular basis while the National Meteorological and Hydrological Services (NMHSs) will provide detailed national and sub national climate updates.

The Climate Outlook Forum

The 63rd Greater Horn of Africa Climate Outlook Forum (GHACOF63) was convened on 22 February 2023 by the IGAD Climate Prediction and Applications Centre (ICPAC) in collaboration with the National Meteorological and Hydrological Services (NMHSs) of IGAD Member States, World Meteorological Organization (WMO), and other partners. The objective of the forum was to document and share the climate impacts across the region and formulate responses to the regional climate outlook for the March to May 2023 rainfall season over the GHA. The GHA region comprises Burundi, Djibouti, Eritrea, Ethiopia, Kenya, Rwanda, Somalia, South Sudan, Sudan, Tanzania, and Uganda. The forum reviewed the state of the global climate system including the ENSO conditions, IOD, and SSTs over the Pacific and Indian Oceans, and considered their impacts on the GHA during March to May 2023 rainfall season. Climate information users from all relevant sectors (disaster risk management, agriculture and food security, livestock, health, environment, water resources, conflict, and media) as well as NGOs and development partners actively participated in the formulation of mitigation strategies.



Rainfall Outlook for March to May 2023

The rainfall outlook for various zones within the GHA region is given below.

Zone I: In this Zone (light green), the wetter than normal rainfall category has the highest probability (45%). The probability for near normal and drier than normal categories are at 20% and 35%, respectively.

Zone II: In this Zone (white color), the probabilities of below, normal, and above are equal at 33%. This equal probability zone is also considered a transition zone.

Zone III: In this Zone (orange), the below normal rainfall (drier) category has the highest probability (50%). The probabilities of the normal and above normal categories are 15% and 35%, respectively.

Temperature Outlook for March to May 2023

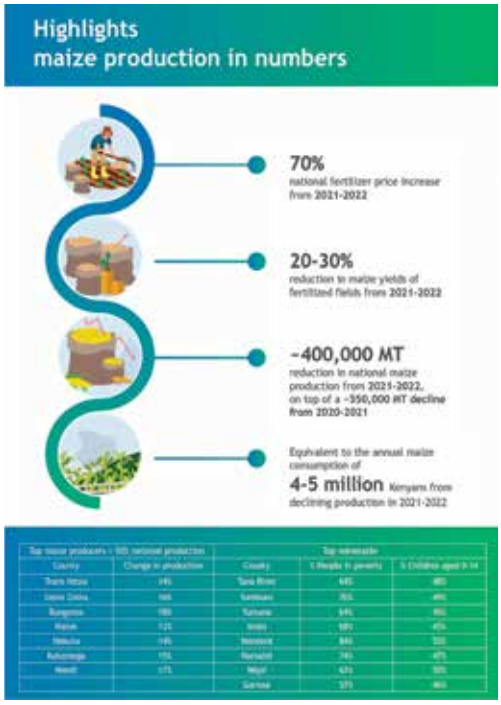
The temperature outlook for various zones within the Greater Horn of Africa is given below.

Zone I: In this Zone (dark orange), the above normal mean temperature (i.e., warmer) category is most likely at 70%. The probability for near normal and below than normal categories are each at 15%

Zones II: In this Zone (orange), the above normal mean temperature category has the highest probability (at 65%). The probabilities of the normal and below normal categories are 15% and 20%, respectively.

Zones III: In this Zone (light orange) also, the above normal mean temperature category has the highest probability (at 55%). The probabilities of the normal and below normal categories are 15% and 30%, respectively

Note: The numbers for each zone indicate the probabilities of rainfall/temperature in each of the three categories, above-, near-, and below-normal. The top number (A) indicates the probability of rainfall/ temperature occurring in the above-normal category; the middle number (N) is for near-normal and the bottom number (B) for below-normal category. For example, in Zone III, there is 50% probability of rainfall occurring in the below-normal category; 15% probability of rainfall occurring in the near-normal category; and 35% probability of rainfall occurring in the above-normal category.



Impact of Increased Fertilizer Prices on Cereal Production.

Global fertilizer prices have risen nearly 30% since the start of 2022, following 2021 is 80% surge, driven by a confluence of factors, including surging input costs, supply disruptions caused by sanctions and export restrictions.

According to the World Bank, urea prices have surpassed their 2008 peaks, while phosphates and potash prices are inching closer to 2008 levels. Fertilizer prices are perfected, correlated with food prices in the long-run and both have climbed to even higher levels following Russia's invasion of Ukraine last year, hitting their highest levels ever. In the Eastern Africa region, fertilizer prices have soared in line with international trends, more than doubled in Kenya, Uganda and Tanzania. Given most countries in Eastern Africa import fertilizers from either Kenya or Tanzania, it's highly likely that fertilizer prices have increased even higher in those countries given price transmission and increased transport costs because of higher fuel prices. High prices inhibit access to fertilizers by farmers, disproportionately by smallholder farmers. This result in either non-optimal use, which reduces yields, or reduced area/acreages under cultivation. Fertilizer price spikes and concerns about availability, therefore, cast a shadow on this year's harvests, and thus risk keeping food prices high for the better part of the year.

It's on this backdrop that the analysis seeks to estimate the likely impact of increased fertilizer prices on cereal production in eastern Africa. The analysis uses existing estimated fertilizer price elasticities to fertilizer demand/use to estimate the cereal production reduction for the 2022 cropping year. With 2021 Food and Agriculture Organization (FAO) production estimates as a base, we then estimate the likely expected 2022 cereal production in Eastern Africa.

Eastern Africa Fertilizer Origins

Other than for Kenya and Tanzania, which import the bulk of their fertilizers from Russia, most of the Eastern Africa countries predominantly import fertilizers from region (exports and re-exports from Kenya and Tanzania), with the exception of Sudan and Ethiopia which respectively source about 50% of fertilizers from Egypt and Morocco. Fertilizer manufacturing plants in Kenya, Morocco and Egypt focus on blending imported components to deliver the required N, P and K compounds required by farmers. Trade disruptions that have been occasioned by the Ukraine-Russia conflict resulted in either cancelled or delayed deliveries of these inputs during the critical MAM seasonal planting window, resulting in increased fertilizer prices.

The region is, therefore, highly exposed to global fertilizer shocks and, in particular, the ongoing Ukraine conflict that led fertilizer export bans. China, Russia, Ukraine, Kyrgyzstan and South Korea have banned nitrogen-based fertilizer exports for most of 2022. Fertilizer prices are, therefore, expected to continue rising throughout the year.

Fertilizer Consumption Trends (1961-2019) and Fertilizer Use

Ethiopia has the largest annual fertilizer consumption in the region, followed by Kenya, Sudan and Uganda. The yearly fertilizer demand for the rest of the countries is below 50,000

TO PAGE 12

- 1.38m wide.
- 76Hp.
- Warranty 2 years or 2.000 hours.
- Synchronized transmission with nine speeds forward and 3 reverse.
- PTO 540 and 540E economic.
- PowerTech , technology and highly efficiency guaranteed.
- Exclusive interest rate savings now available.

5076EF Narrow tractor

JOHN DEERE FINANCIAL | CfC Stanbic Bank
A member of Standard Bank Group

JOHN DEERE

www.JohnDeereSub-SaharaAfrica.com | africa@johndeere.com

FROM PAGE 10

mt. The three top fertilizer consumers also lead the pack in per capita demand and use. Use of fertilizers is currently highest in Ethiopia (55.5%), Kenya (31.4%) and Sudan (31.4%), but lower in the remaining countries (below 5%). This implies that Kenya, Ethiopia and Sudan have the highest risk of fertilizer shortages and price hikes compared to their counterparts in Eastern Africa.

Fuel Price Changes

Since the onset of the Ukraine crisis, there has been a hike in fuel prices region-wide, except in Djibouti where they are relatively stable because of strict price controls. Fuel prices during the 2022 seasonal planting season were significantly elevated in Burundi, Somalia, Kenya, Ethiopia and South Sudan. This has impacted farmers' ability to use farm machinery and transport, and will further reduce their ability to grow sufficient crops this year.

Fertilizer Price Impact on 2022 Cereal Production

Studies have shown that the cost of fertilizer, availability of alternatives to fertilizer and weather patterns have negative effects on fertilizer use. Studies have shown that applying a relatively small amount of mineral fertilizer can have a major impact on crop yields. Studies in Kenya, Uganda, Rwanda, Malawi and Ethiopia have shown that yields of maize, rice, cowpea and millet could be doubled through the judicious use of fertilizers. While fertilizer use improved maize production by 36% to 45% in Kenya, increased fertilizer prices reduced demand and use of fertilizers resulting in lower yields in cereal production. A 100% increase in fertilizer prices have been found to result in a 37-38% decline in maize production in Kenya. In other words, in the long run, holding other factors constant, an average fertilizer price increase by 10% would reduce maize output by about 38%.

However, price elasticity to fertilizer demand is low, especially for large-scale farmers who have higher incomes, but higher for smallholder farmers. In Kenya's high-potential areas, there is a price response elasticity of 0.52 (a 10% increase in fertilizer price leads to a 5.2% decline in application rates per acre). Based on these assumptions, there is about 38% reduction in crop production on the scenario of 100% increase in fertilizer prices. However, not all farmers use fertilizers. This calls for readjusting the cereal reduction estimates by the proportion of farmers that use fertilizers country by country.

In line with high demand and use of fertilizers, the highest cereal production decrease in 2022 was approximately (21.1%), Kenya (11.9%) and Sudan (11.9%), while relatively below 2% in the rest where both fertilizer consumption and use are relatively low.

In addition to the fertilizer impacts on crops, parts of the region (Eastern Horn of Africa) are facing a fourth consecutive drought that has affected crop production, particularly in Southern Ethiopia,

marginal agricultural areas of Kenya, Somalia and parts of Karamoja and Northern Uganda. Although the main March-April-May season is still on course, poor seasonal rainfall performance has increased prospects of below-average crop production this year in the belg-producing areas of Ethiopia, marginal agricultural areas of Kenya and Somalia. It's, therefore, notable that the cereal production estimates are conservative and could potentially be higher, especially in Somalia that has been worst affected by drought conditions.

The 2022 cereal production has been estimated assuming at least 100% increase in fertilizer prices and about 52% reduction in fertilizer use in all the countries, discounting for proportion of farmers using fertilizers. Holding other factors constant, the total 2022 cereal production in Eastern Africa was be about 37.8 million Mt, down from 45.2 million in 2021, which represents a 16% decrease.

Implications of Reduced Cereal Production for Food Insecurity

Reduced domestic cereal availability will likely result in more food imports to bridge the gap, putting additional pressure on already weaker local currency, resulting in higher food inflation in the short run and adding to food security concerns in the region.

Higher food prices combined with low household stocks will further compromise household purchasing, limiting physical and economic access to food by majority.

Directly affected farmers and majority of poor urban and rural households relying on markets will be the worst hit. There is a likelihood of the number of food insecure people in the region rising by nearly 6-7 million by the end of the year solely because of the reduced crop production because of the fertilizer price increase and attendant reduction in use.

MAGNAR
Irrigation System

DESIGN, SUPPLY & INSTALLATION

- SPRINKLERS
- MICRO SPRINKLERS
- DRIP LINES & FITTINGS
- DRIP KITS
- BUTTON DRIPPERS
- FOGGERS / MISTERS
- CONTROLLERS
- UV TREATED DAM LINER
- FILTERS - (Disc / Screen)
- PVC, PE & GI FITTINGS
- GREEN HOUSE POLYTHENE

ELGON KENYA
TRANSFORMING FARMS & LIVES THROUGH TECHNOLOGY

National Park East Gate Road, Off Mombasa Road
Office Line: 0717 88 88 77 / 0733 509 509
Mobile Line: 0707 96 45 96 / 0736 708 546
E-mail: info@elgonkenya.com www.elgonkenya.com

Elgon Kenya limited @elgonkenya

SEEDS | PACKAGING | FERTILIZER | AGRO CHEMICALS | IRRIGATION | ANIMAL HEALTH

Rice

Rice is currently the third important staple crop after maize and wheat in Kenya. It can be considered as an alternative cereal to supplement maize as it is preferred by households in ASAL regions (WB 2011).

Despite the achievements in the last decade of NRDS Phase 1 (2008-2018) in doubling rice production, the consumption has continued to rise bill. The increase in demand is attributable to the changing eating habits coupled with a growing population with high consumption by the youth. To meet this demand and reduce the import bill, calls for hard work among achievable through expansion of area under rice production as well as during the NRDS Phase 2 implementation. The actual irrigated area is targeted to increase from 32,988 - 171,676 Ha, while rain-fed production area is targeted to increase from 10,631 - 42,000 Ha by 2030. Paddy rice productivity under irrigation is targeted to increase from the current average of 4.0 to 7.5 t/Ha, rain-fed upland from 1.5 to 2.5 t/Ha and rain-fed lowlands from 2.0 to 3.5 t/Ha.

This NRDS targets to address various challenges faced by the stakeholders in the rice value chain and offers various opportunities for increased production and productivity. These challenges include high costs of production (seed, fertilizers, chemicals, machinery, labour); lack or access to these inputs; lack of credit facilities; erratic weather and water supply; high harvest and post-harvest losses; poor infrastructure in neighbouring countries and low rice value addition; among others.

The interventions include development and dissemination of improved production technologies, introduction of high yielding rice varieties, along the value chain, improved knowledge and skills on harvest and postharvest handling and value addition in rice and rice by-products.

Research and extension will play a key role in ensuring that this objective is met. To address nutrition issues, deliberate efforts will be made to ensure production and consumption of nutritious rice meals. It is with this in mind that the NRDS Phase 2 (2019-2030) has been developed.

The NRDS Phase 2 will build on achievements made in phase 1 which

included use of hybrid seeds, development of the Water Saving Rice Culture, improved mechanization along the rice value chain, development and release of improved varieties, development of rice seed distribution system, capacity building for staff and farmers, construction of two rice research laboratories and improved networking among others.

It is notable that about 80% of rice in Kenya is mainly grown in irrigation schemes by small scale farmers while the rest is produced under rainfed conditions. The producers are highly fragmented which poses a challenge in meeting quality and quantity requirements for development Cooperative Society (MRGM) based in Mwea Irrigation Scheme is a good example on how farmers can benefit from organized rice farming.

Currently, as part of the gazette notice of the Public Finance Management (Strategic Food Reserve Trust Fund) Regulations 2015, the strategic food reserve include maize, beans, rice, fish, powdered milk and canned beef. However, since 2015, the majority of the purchases have been for maize (>95%) with the rest of the purchases consisting of beans and powdered milk. The Government through a presidential directive through Kenya National Trading Corporation (KNTC) in the Ministry of Trade and Enterprise Development will be purchasing rice with a revolving fund of six hundred and sixty million in the major rice growing areas of West Kano and Mwea for purchase by local institutions in the country. This implies there will market for locally produced rice.

The NRDS proposes formation of a Rice Council of Kenya that will increase private sector involvement in the rice value chain and mobilise funding to address the challenges. Mobilisation of a Rice Millers Association of Kenya will be done and the forum created to coordinate issues of mechanisation in the value chain. It is also expected that this increase will create 100 new enterprises along the rice value chain and 3 new producer marketing organization formed thus creation of employment and increase in the country's gross domestic product. Value addition in rice and rice by-products will also be promoted so as to have at least three new value added products developed.

Harvested Rice

The achievement of rice self-sufficiency as envisaged in this strategy will require cooperation of all rice stakeholders. The strategy encourages private sector participation along the value chain to unlock key areas.

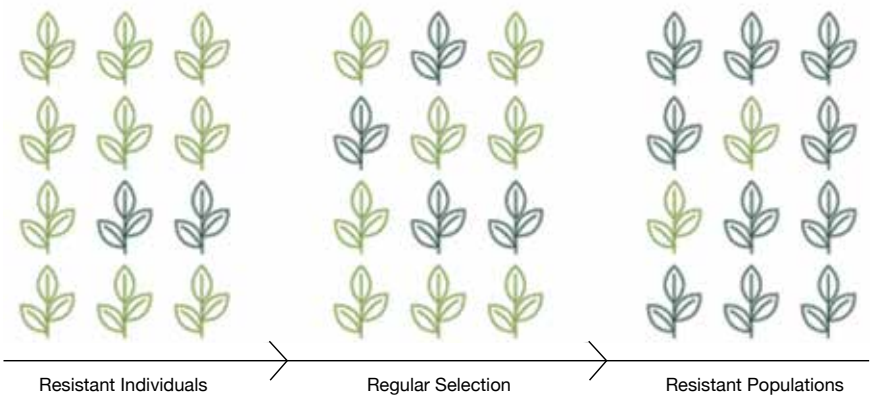
Best Management Practices

Use these tools to assess the risk of developing herbicide-resistant weeds and to manage fields with resistant weed populations. By bringing diverse crop management techniques to their farms, growers can mitigate the development and spread of herbicide-resistant weeds.

Weed populations typically have a wide range of genetic variability. A small number of plants in any weed populations may include genetic traits that are resistant to specific herbicides. When a herbicide is applied, most of the susceptible plants are controlled, but resistant plants continue to grow. If allowed to set seed, these resistant weeds could grow and set seed the next year if the same herbicide was used.

With continued application of the same herbicide, eventually susceptible plants would be killed, resistant plants would be selected for and the weed population would be dominated by resistant plants.

The process of selection for herbicide resistance



Resistance risk assessment

For farmers to assess the risk of developing herbicide resistance, they need to evaluate their farming practices as well as the biology and herbicide susceptibility of their target weeds. The table below provides a checklist of resistance risk factors and can rank the risk of resistance development from LOW to HIGH.

Cropping System Evaluation - Risk of Resistance

MANAGEMENT OPTION	LOW RISK	MODERATE RISK	HIGH RISK
Herbicide mix or rotation in cropping system	> 2 modes of action	2 modes of action	1 mode of action
Weed control in cropping system	Cultural*, mechanical and chemical	Cultural and chemical	Chemical only
Use of same mode of action per season	Once	More than once	Many times
Cropping system	Full rotation	Limited rotation	No rotation
Resistance status to mode of action	Unknown	Limited	Common
Weed infestation	Low	Moderate	High
Control in last three years	Good	Declining	Poor

**Cultural control can be by using cultivation, stubble burning, competitive crops, stale seedbeds, etc.*

Farming practices that increase the risk of resistance:

- Frequent use of herbicides with a similar mechanism of action – this is the most important of all factors
- Monocultures and crop rotations that rely on the same herbicide mechanism of action for weed control
- Lack of non-chemical weed control practices such as cultivation, stubble burning, stale seedbeds and competitive and cover crops

Weed biology:

- Density of weeds – more weeds means a higher chance of resistance
- Frequency of resistance in the population – greater genetic diversity means a higher chance of resistance
- Reproductive capacity – weeds that produce a high number of seeds can spread resistance more quickly.

Substandard weed control

If a farmer does not achieve expected weed control levels that does not mean resistance is an issue. Analysis of herbicide use, rates, weed type and growth stage, climatic conditions and agronomic practices should be reviewed.

Following a thorough investigation, if resistance is still suspected, review the field history and the following questions:

- Has the same herbicide or herbicides with the same mechanism of action been used for several years?
- Has the uncontrolled weed been successfully controlled by the same herbicide in previous years?

TO PAGE 18

TARZEC™ 320 WG

Arylex™ active

HERBICIDE

Post – Emergence Herbicide for the control of Grasses & Broad leaf weeds on Wheat

Active Ingredient:

Arylex™ active 69.5 g/Kg & Pyroxsulam 250g/Kg

Application Rate:

90g/ha, 9 g/20l

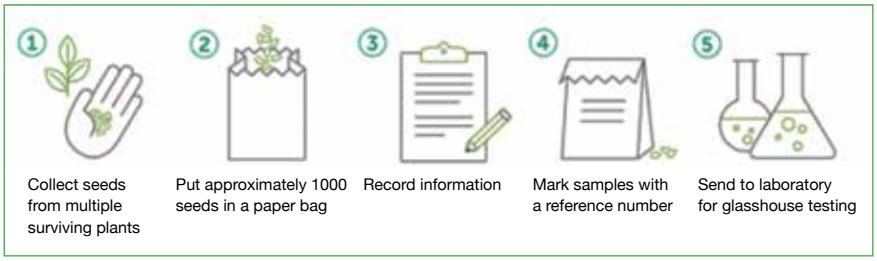
PHI: 71 Days

FROM PAGE 16

- Are there live weeds beside dead weeds of the same species following a herbicide application?
- Has a decline in control been noticed in recent years?
- Are there resistant weeds in local fields, roadsides, farms, etc.?
- Are other species in the same location being adequately controlled by your herbicide application?

With a number of 'yes' answers and other factors ruled out, resistance may be strongly suspected. At this point, leave a small area of weeds to collect whole plant or seed samples to test so resistance can be determined.

Seed sample from suspect plant



Integrated Weed Management

Integrated Weed Management (IWM) refers to using chemical, cultural, mechanical and biological methods, in an integrated fashion, to control weeds. It does not rely excessively on any one method. When used in a integrated approach, the following tools help reduce selection pressure and survival of resistant weeds.

Chemical

Applying herbicides to a crop.

Mechanical

Includes measures such as hand-weeding using cultivation or ploughing to control emerged plants and bury non-germinated seed. It also includes harvest weed seed destruction such as stubble burning and cutting for hay or silage to prevent the weeds from setting seed.

Cultural

Includes altering the crop planting date, row spacing and harvest timing to disrupt the weed cycle. It also includes planting crops that can out-compete weeds, buying certified seed that's free of weeds and using a diverse crop rotation. Growers should also sanitize farm equipment when moving between fields.

Biological

Includes introducing insects and pathogens that control target weed species and introducing post-harvest grazing of growing weeds.

Using a diversified crop rotation allows farmers to use these different weed techniques. Avoid successive crops that use herbicides with the same mechanism of action to control the same weed species in the same field.

Herbicide rotation and mixtures

When planning a weed control program, herbicides should be selected from groups that use different sites of action to control the same weed and used in successive applications or in mixtures. The global HRAC has developed a classification system for herbicides based on site of action that the herbicide uses.

Guidelines for the sustainable use of herbicide site of action groups:

- Use mixtures or sequential treatments of herbicides having different sites of action. Each herbicide in the mixture should target the same weed species.
- Consider all chemical control options before planting, in-crop and after harvest.
- Avoid continued use of the same herbicides, or herbicides with the same site of action in the same field, unless integrated with other weed control practices.
- Limit the number of applications of a single herbicide or herbicides with the same site of action in a single growing season.
- Herbicide mixtures and herbicide rotations alone are not enough to prevent resistance. They must be used in a diversified plan than also incorporates mechanical, cultural and biological practices.

Growers should also do the following:

- Follow label use instructions, such as application rates, timing and equipment recommendations.
- Know the weeds in their fields and nearby non-crop areas and tailor their weed control program to weed densities and economic thresholds.
- Monitor herbicide results and be aware of any trends or changes in weed populations.
- Maintain detailed field records to confirm cropping and herbicide history.

What to do when resistance is confirmed

When a control failure is confirmed as resistance, immediate action is required to remove any surviving weeds and limit seed production. Action depends on the crop stage and extent of the problem.

How Will Reach Kenya Low-price Food Households?

The government through the Kenya National Trading Corporation (KNTC) is importing a range of household foodstuffs under a Sh24 billion programme as it seeks to ease the pain of the high cost of living, which pushed inflation to 9.2 percent in February.

KNTC, a State corporation under the Ministry of Agriculture, has been allowed to import 150,000 tonnes of rice, 80,000 tonnes of beans, 200,000 tonnes of sugar, 25,000 tonnes of wheat and 125,000 tonnes of cooking oil to tame the current runaway prices of basic commodities. The duty-free import programme, which has been rocked by controversy, will run for one year from February. Here is what to expect.

How will the food be distributed?

KNTC, whose mandate is to participate in the promotion of wholesale or retail business and e-trade, says it has mapped shops across the country targeting vulnerable populations in low-income areas. The agency has identified 500,000 kiosks but it will start with 120,000 as it targets selling to the households that are most affected and with low disposable incomes.

Who will do the distribution?

The government has tapped technology firms Twiga Foods, iProcure and Market Force for the distribution of these commodities.

The choice of the three firms is based on their vast distribution coverage and experience in last-mile delivery.

The firms' retail sector services allow their clients to reach targeted consumers in remote areas with technology-enabled supply chains that will allow the State to monitor the price at which the products are sold.

How will KNTC ensure that there are no cases of price manipulation?

The e-commerce platform that KNTC has tapped will ensure compliance and enforcement of the Recommended Retail Price (RRP), with any breach in the selling price detected in real-time.

How will KNTC ensure that the goods are in stock in the selected shops?

Through the distribution, application and mapped shops, KNTC expects to have access to information in real-time to ensure daily stock replenishments in all the participating shops across the country.

Will the market collapse in the wake of two sets of market prices running at the same time?

The RRP price will be managed by supply and demand forces. KNTC says this will not collapse the market but increase competition as it will ensure other traders and manufacturers manage their pricing, achieving the overall objective of price stabilisation.

How will consumers identify the goods sold by KNTC?

All commodities sold by the government under this programme will have the KNTC brand name on their packaging. The corporation will also publicise the Recommended Retail Price for all its commodities in the market through posters and advertisements in mainstream media.

KNTC has facilitated the branded packaging artworks for all its suppliers to use. The goods being imported by the agency have already been packaged in smaller quantities for distribution.

How will KNTC ensure the goods reach deserving households?

KNTC is counting on an e-commerce platform to help it manage last-mile delivery. In addition, it will deploy a team to carry out spot checks and collect market intelligence data and drive awareness among the population.

Which commodities are KNTC stocking currently?

The agency has bought rice worth Sh1.9 billion from local farmers in central and western Kenya since it got the mandate from the government. Cooking oil is expected to dock at the Port of Mombasa.

The source of funding for the project

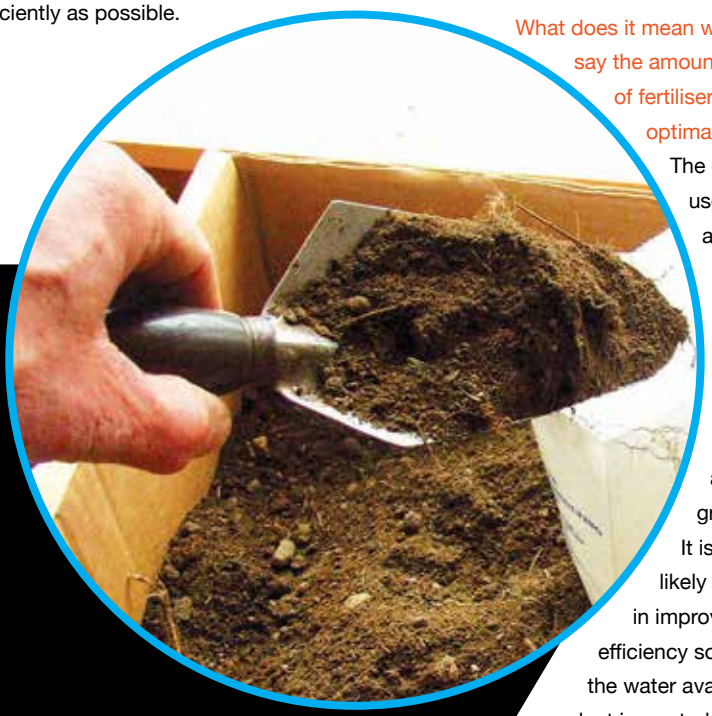
KNTC has secured a 24 billion facility from KCB to back the programme. The agency says the funds are not enough and is in discussions with the Egyptian Bank Afreximbank and Trade Development Bank to secure enough funding for price stabilisation.

Stay on Top of Your Game-Do Top Dressing

If you are going to plant maize, then it stands to reason that you intend to get the best yield possible off the plants growing in that field. This means you will have carefully considered all your seed, fertilisation and weed control requirements.

One of the most important factors to consider is plant nutrition. It is important to use the right fertiliser to ensure the plant roots can take up all the nutrients available in the soil and convert this into grain. It is therefore necessary to take regular soil samples, so you know how much fertiliser to apply. There is still more to the science of fertilisation though, because it is equally important to apply the necessary nutrients at the right time, so the plant can use it as efficiently as possible.

Maize Farm



What does it mean when we say the amount and type of fertiliser is used optimally?

The effective use of fertiliser applied at the correct time means you are more likely to extract the maximum amount of grain possible. It is also most likely to result in improved water efficiency so that none of the water available to the plant is wasted. This means the plant will produce more grain per millimetre of water available – in other words secure 'more crop per drop'!

Some important factors to bear in mind when topdressing

- Ensure that the fertiliser does not come into direct contact with any part of the plant to avoid burning or scorching.
- The best method to top-dress is band placement as it is much more economical.
- The earlier you can do your topdressing the better e.g. once before it reaches knee height and then again when the plant is waist height and still in its pre-tasselling stage.
- It may be necessary to top-dress at least twice in areas where soils are less fertile.
- It is a good idea to split the dressing so that your fertiliser concentration is decreased and less likely to cause sub-soil acidification which will scorch the roots and harm the plant's potential to uptake nutrients anyway.
- Top dressing should preferably be done when the soil is moist.
- Avoid top dressing during heavy rains as the fertiliser will be leached from the soil or washed away.
- Weed control should be done prior to top dressing. This simply means the weeds will not get a chance to

take up any of the nutrients intended for the crop.

- Weeding should always be done to avoid competition for both nutrients and sunlight.
- Do not be tempted to apply all the fertilisation prescribes in one application process. The negative effects are too serious to take this risk as not only scorching of the roots but also fertiliser will fall outside of the optimum band area and nutrients will be wasted.
- Remember the maize plant's nutrient requirements increase steadily and the final yield potential is determined in the V12 stage. This is the stage when maize is rapidly growing, and a new leaf

appears every two days as well as significant root development.

- It is important to do accurate calibration of the fertiliser spreader before you start your application. It is crucial to apply the prescribed amount of fertiliser in order to achieve optimum results.

These factors are important to keep in mind when applying your topdressing fertiliser. But the most valuable factor is to be pro-active and to get it done! Often, we don't apply at the correct time or we don't apply the correct amounts which result in poorer yields. As mentioned before; in order to achieve the best possible yields, we need to consider all the growing factors of a plant. Don't neglect the top dressing factor.

Application strategies in maize production

Broadcasting of fertilizer is suitable for high fertility soils.

Broadcasting

Broadcasting is a low risk method of application, if the fertilizer is applied pre-planting or during early growth stages. But, after the crop has developed a leaf whorl there is an increased risk of fertilizer particles lodging and causing leaf burning.

While the effects of this scorching rarely adversely affects yield as a result of plant recovery and regrowth, French research shows that broadcasting is best carried out prior to the V6 stage.
Broadcast application or surface banding of urea will also increase the risk of high ammonia losses, particularly in high temperature conditions.

Band applications

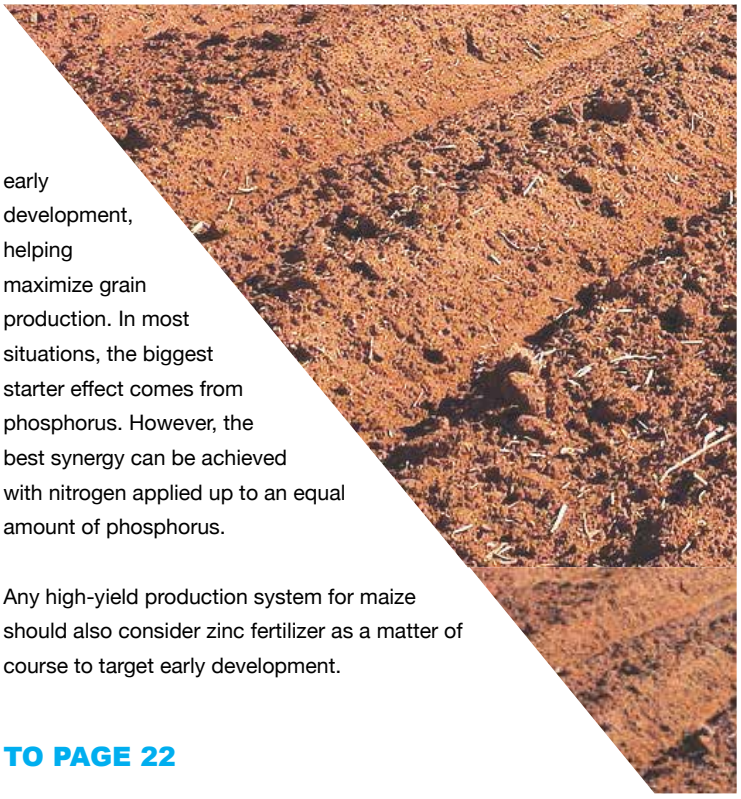
In grain maize production systems, practices that place the fertilizer in bands within 5cm of the seed row allow better targeting of nutrients such as nitrogen, phosphorous and zinc during establishment when the root system is not as effective at taking up nutrients.

Pneumatic spreaders that place ammonium nitrate on top of the soil, underneath the plant leaves are particularly effective and minimize the risks of scorch due to broadcasting.

Banding in the soil enables growers to provide a high nutrient concentration in the vicinity of the developing roots where the crop can take it up more easily. It is a good way of top dressing ammonium nitrate fertilizers (e.g. NPK), reducing the risk of leaf scorch.

Starter fertilizers

Starter fertilizers target the emerging plant and are used to encourage good early establishment and growth. Starter fertilizers based on phosphorus, with low amounts of nitrogen improve rooting and speed early development, helping maximize grain production. In most situations, the biggest starter effect comes from phosphorus. However, the best synergy can be achieved with nitrogen applied up to an equal amount of phosphorus.



Any high-yield production system for maize should also consider zinc fertilizer as a matter of course to target early development.

TO PAGE 22

FROM PAGE 21

1. Pop-up Application

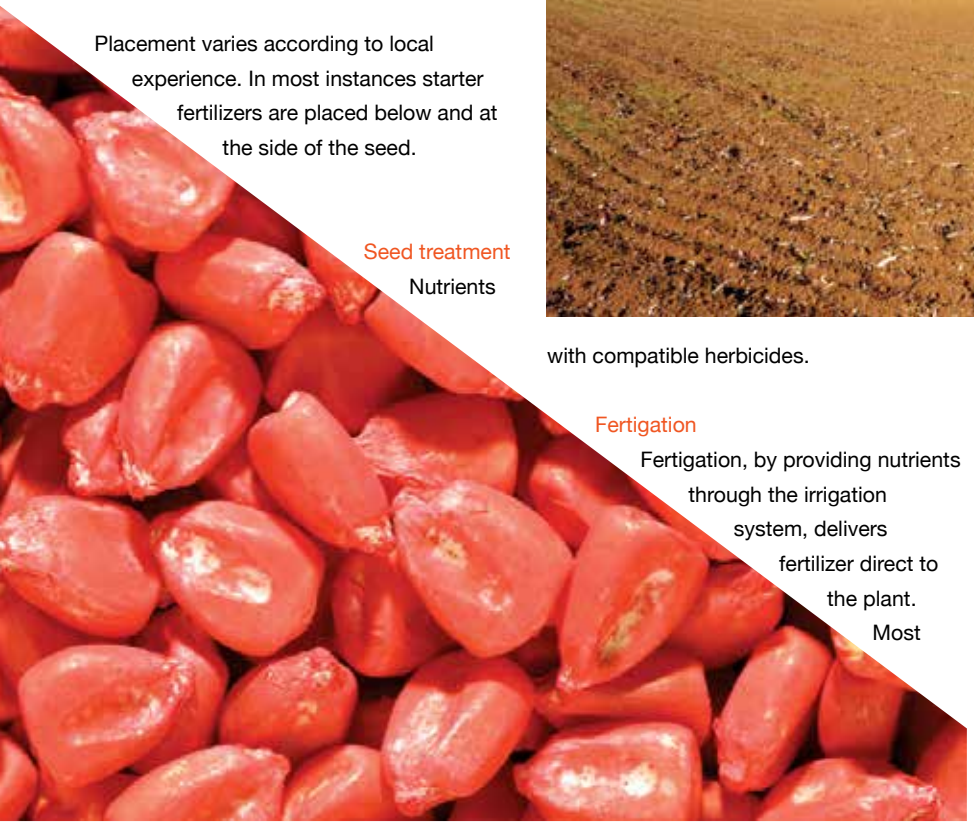
Pop-up application places starter fertilizer in the row with the seed. It is so named because in theory it leads to faster emergence and establishment. Good responses are found from using phosphorus and nitrogen applied close to the seed alongside limited levels of potassium.

NPKs are commonly used as pop-up fertilizers to improve early plant development. However, care is needed with some nitrogen forms and urea should be avoided, especially on high pH soils, as they can injure the seed and inhibit or delay germination.

2. Fertilizer Placement

An alternative method is to use starter fertilizers applied below and/or beside the seed. This approach is particularly useful in helping overcome temporary nutrient deficiencies in cold and low phosphorus soils.

Placement varies according to local experience. In most instances starter fertilizers are placed below and at the side of the seed.



Seed treatment

Nutrients needed to boost initial growth are increasingly applied around the seed prior to planting. These commonly include zinc and phosphorus, both of which have a direct effect on root growth and which can be unavailable in difficult planting conditions.

Foliar application

Foliar application is used to address an immediate nutritional need or where soil conditions restrict availability of specific nutrients. Properly formulated products are increasingly important in ensuring balanced maize crop nutrition. Applications can be made as soon as sufficient leaf area is available – usually from the V2 stage onwards, perhaps applied in a tank mix with compatible herbicides.

Fertigation

Fertigation, by providing nutrients through the irrigation system, delivers fertilizer direct to the plant. Most common fertigation method in maize is through centre pivot irrigation systems.

This allows nutrients to be timed closer to peak demand – a practice which is difficult to achieve through other means because of difficulties of travelling through the crop with the farm fertilizer spreader or sprayer once it has passed the V8 stage. Where centre pivot irrigation is employed, growers can usefully split nitrogen and potassium use, specifically tailoring applications, to suit plant needs at each phase of growth.

SOURCE: https://www.yara.co.ke/crop-nutrition/maize

> In order to achieve the best possible yields, we need to consider all the growing factors of a plant. Don't neglect the topdressing factor.

www.agrichemafrica.com

HERBSTAR 200SL®

SOLUBLE LIQUID

Paraquat Dichloride 276g/L

A non-selective post-emergence fast acting contact herbicide

Control of Grasses and Broad-leaved weeds in Baby Corn for minimum cultivation

For more information please visit our offices or contact our sales team at

AGRICHEM AFRICA LIMITED®
WINSFORD PARK off BABA DOGO ROAD RUARAKA
P O BOX 27151 G P O 00100 NAIROBI KENYA
PILOT LINES +254 733 806 200 +254 727 531 010 +254 720 325 144 +254 20 2642115
E-MAIL marketing@agrichemafrica.com

Bayer Pledges To Help Tackle Global Water Crisis With New Water Strategy

Holistic approach to improve water use and quality across the entire value chain and contribute to an impactful change / Integration of water stewardship in business and investment decisions / Shaping a water-resilient agriculture system with key contribution in rice

Bayer is launching its new water strategy at the UN 2023 Water Conference in New York. The company is making water an integral part of its business decisions, investments and selection of suppliers. Bayer's water strategy reflects its position as a key player in the fields of health and agriculture and aims to have an impact that goes beyond the company's own business.

"The world is facing a severe water crisis affecting ecosystems, food security and human health," explains Bayer CEO Werner Baumann. "As a leader in health and nutrition we have an intrinsic motivation to address the water crisis and make a valuable contribution. With our global footprint and strong supplier engagements, Bayer will create value and encourage sector-wide action. Our ambition is to play a leading role in promoting corporate water stewardship and rallying other businesses to take action to protect the world's water resources."

Bayer's commitments go beyond the company's own operations and are reflecting its ambition to generate impact.

Werner Baumann - CEO Bayer

The activities will encompass the entire value chain, from Bayer's own operations to the farmers Bayer serves. Key elements of the water strategy are:

- ***Resilient agriculture:*** On average, 70% of global freshwater withdrawals are in agriculture. Bayer commits to driving positive change in water productivity in water scarce regional cropping systems, starting with rice, which is responsible for up to 43% of the world's irrigation water withdrawals. The company is committed to improving water use per kilogram of crop by 25% by 2030, by transforming rice-cropping systems for smallholder customers in the relevant regions where Bayer operates. In addition, Bayer's existing commitment of reducing the environmental impact of its crop protection portfolio by 30% by 2030 also contributes to water quality.

- ***Business and investment:*** Bayer is developing a concept to integrate water quality and quantity into business decisions and processes that will be rolled out from 2024 onwards. The company will develop a methodology to place a value on water and incorporate it into investment processes. Already in 2021, water and wastewater matters represented approx. 10% of Bayer's total CapEx projects.

- ***Suppliers and growers:*** Bayer evaluates the sustainability performance of all key suppliers and of selected high-sustainability-risk suppliers using a sustainability risk classification that includes water. As an important step forward, Bayer has launched its new Supplier Code of Conduct, with dedicated items to address water and wastewater. At

the same time the company will continue to drive improvements in water-use efficiency with growers across seed production.

- ***Sites and facilities:*** Bayer is committed to providing safe drinking water, sanitation and hygiene (WASH) to all employees at its sites. Bayer will further expand its engagement to selected communities where Bayer operates. Bayer continues to minimize emissions at its sites worldwide, including emissions into wastewater. Beyond that, Bayer has established very strict voluntary discharge limits for active ingredients into wastewater at all sites where they are produced. Bayer will build upon the already existing water management systems to optimize the use of water at relevant sites in water-scarce areas and extend them to sites that are forecasted to be in water-scarce regions by 2030. Bayer will set context relevant water targets for our own operations by 2025 that are to be achieved by 2030.

- ***Ambassador and partnerships:*** Addressing the water crisis will require broad-based, joint action from a myriad of stakeholders. Bayer is well connected in the water space via its involvement in the World Meteorological Organization for Water and Climate Leaders, its active participation in the Water Resilience Coalition and also its partnership with activist Mina Guli as well as with the International Drought Resilience Alliance (IDRA), an initiative launched during COP27 at the UNCCD Ministerial Meeting. Bayer will make use of these strong partnerships to assemble and connect the right leaders and ensure appropriate private sector engagement in the upcoming water debate.

"Until now, the topic of water has been overlooked in the climate debate despite the many interlinkages, but with the UN 2023 Water Conference it is gaining momentum. There are new opportunities to take the right sustainable actions, and we must seize these opportunities now. This is why we make water an integral part of our business and investment decisions across the entire value chain. With these decisions, we will contribute to climate resilience and to more sustainable water usage," says Cristina Alonso Alija, Head of Sustainability, Safety, Health & Environment, and responsible for the water strategy at Bayer.

About Bayer

Bayer is a global enterprise with core competencies in the life science fields of health care and nutrition. Its products and services are designed to help people and the planet thrive by supporting efforts to master the major challenges presented by a growing and aging global population. Bayer is committed to driving sustainable development and generating a positive impact with its businesses. At the same time, the Group aims to increase its earning power and create value through innovation and growth. The Bayer brand stands for trust, reliability and quality throughout the world. In fiscal 2022, the Group employed around 101,000 people and had sales of 50.7 billion euros. R&D expenses before special items amounted to 6.2 billion euros.

For more information, go to www.bayer.com.

Bayer will build upon the already existing water management systems to optimize the use of water at relevant sites in water-scarce areas and extend them to sites that are forecasted to be in water-scarce regions by 2030.

What explains food price hikes in Kenya. And what should be done

Kenyans are caught in the grip of higher food prices brought about by a combination of adverse weather, rising input costs – which have been worsened by the Ukraine war – as well as policy adjustments the government agreed to access funding from the International Monetary Fund. The prices for the staple commodities in the food basket used to compute inflation by the Kenya National Bureau of Statistics, such as maize flour, wheat flour, irish potatoes, onions, tomatoes, cabbages, kales and cooking oil, rose by an average of 20%. By the end of February 2023, 3.1 million Kenyans out of a total population of 47 million were in need of food assistance. Timothy Njagi Njeru (Left) explains what's driving prices up and what can be done.

What's driving food price increases in Kenya?

One of the biggest drivers has been disruptions in global production and trade stemming from the COVID pandemic. The production and distribution of commodities were affected by public health measures such as lockdowns and curfews. Although demand for goods soon rebounded, production and distribution took time to get going leading to shortages – and price increase.

These disruptions also increased the costs of imports to Kenya which is a net importer of food. Cereal commodities such as wheat and rice are some of the largest food imports in terms of both volumes and value.

The Russian invasion of Ukraine has added further pressure to food prices. Russia accounted for almost a third (32%) of wheat imports, making it the country's lead supplier. Ukraine accounted for 94% of soya imports. It also contributed 2% to wheat and 3% to maize.

Another external factor is that input costs for food production have gone up.

Kenya imports most of the raw materials for animal feeds manufacturing. The raw materials include soya and sunflower, maize, wheat, rice and sorghum. Last year livestock farmers were hit by rising costs of animal feeds, attributed to shortages in raw materials such as soya in the global markets.

The government announced a duty waiver for raw materials for animal feeds in December 2021. But rising global prices means that the expected effect in reducing local prices for animal feeds has not been realised. Prices for most of the raw materials have increased month on month. Soya which priced at 551 USD/ton in November 2021, was priced at 606 USD/ton in January 2022, while maize also rose from 248 USD/ton to 276 USD/ton over the same period.

Another input cost that's gone up is the price of fertilisers. These have gone up by 70% compared to two years ago. The rise, which started in 2021, was mainly attributed to supply chain disruptions due to the pandemic. In recent weeks prices have been driven up even further by the Russian invasion of Ukraine.

In 2020, Russia accounted for 17% of fertilizer imports to the country. Lastly, the expected rise in the cost of fuel will also increase food production costs.

What are the domestic push factors?

The government increased excise duty on most commonly used household goods from 1 November 2021. This was after Kenya signed a deal to secure loans from the International Monetary Fund as part of the pandemic relief interventions.

In addition, production shocks due to adverse weather and rising costs of transport are seen as contributors to the food prices. Northern Kenya is the leading producer of

beef in the country. The drought there means a shortage in food supply in the country. The increased transport costs means that adding cost to the distribution last mile – which in most cases is passed on to consumers.

What can the government do?

It's the government's responsibility to maintain the delicate balance between agricultural profitability and consumer price affordability. The government has sought to achieve this by supporting producers to lower the costs of production in a bid to keep prices down. When this is not sufficient, as was the case during the pandemic, the government provides welfare support to the most vulnerable households.

The current food price increases will likely increase the number of households requiring support. This is because most households are yet to recover from the economic effects of the pandemic. It's also because the government failed to cushion producers from the global price shock that will lead to increased costs of production.

Silos

For instance, a one time duty waiver for fertiliser would have helped maintain prices within the reach of majority of farmers. This was considered but it is now too late in the production cycle.

Going forward, Kenya should consider its stand on genetically modified products. The ban means that Kenya will struggle to replace countries such as Russia or Ukraine in supply of wheat and soya as most of the leading producers in Asia, Europe, Latin America and North America produce GM products. Such a step would also take the pressure off animal feeds. This policy waiver should definitely be considered even as a short-term measure.

In addition, the government needs to tackle the problem of poor data on food availability. Credible data is the basis of useful policies. The potential solutions for sustainably growing local production and ensuring stable and affordable food prices include investments in research, reviving the extension systems, providing incentives for increasing agricultural credit, climate proofing agriculture and building resilience for agricultural producers.

Effort should also be made to increase public and private investments in agriculture. The government has made efforts to implement some of these potential solutions such as climate smart programmes. But that won't work work on its own as they have to be integrated with agricultural markets, and the scale of the programmes has been limited to specific areas.

Indian High Commissioner to Kenya – Ms. Namgya C. Khampa, PS Kello Harsama, TAB Group Chief Executive Officer Tahir Bari and IFAD Country Director - Mariatu Kamara at Africa Agri Expo 2023.

Africa Agri Expo -6th Edition 2023

Africa's agriculture is not only the most aggressive industry in the world but also an industry that still thrives amidst challenges. There are so many innovations and developments underway and so much to explore in terms of international investment. Regardless of the dwindling agricultural output in the country due to the ongoing drought resulting from failed rains, the agricultural industry in Africa is witnessing an unprecedented development.

Presently Africa has over 50% of the world's fertile and untapped land. Reports forecast that; African agribusiness could be worth $1 trillion by the year 2030. However, in order to achieve this growth, Africa has to gear up for efficacy in irrigation and agri-technology, machinery and equipment, agro chemicals, inputs as well as solutions. Therefore, this presents a slew of business opportunities for local and international companies to find the right channel partners in the region. Therefore, as it is the norm, Africa Agri Expo - Africa's largest agricultural event promoting its rich Agriculture sector and presenting international companies with an unrivalled way to explore the huge business potential of the continent, recently held its 6th edition organized by the TAB group in partnership with the Ministry of Agriculture and Livestock Development and other stakeholders in agriculture at the historic Kenyatta International Convention Centre (KICC) in Nairobi, Kenya on Wednesday, 8th February.

Under the theme, 'Connecting Africa to the global Agribusiness Industry' the event highlighted the advancements in technology for the agriculture value chain, food security, nutrition, crop protection, water management and ways to mitigate post-harvest losses in Africa.

Moreover, the Expo (AAE 2023) was inaugurated by Ms Namgya C. Kahmpa – Indian High Commissioner to Kenya and PS Kello Harsama from the Ministry, who read the cabinet secretary's speech.
The CS stated that Kenya is reengineering its approach on how agriculture will be conducted in the Country with an aim of maximizing its potential.

CS Linturi further noted that the theme for the Agri Expo is aligned to Kenya's Vision 2030 as well as the government's manifesto on agriculture.

He further acknowledged that the Expo would provide a suitable environment for progressive learning in the emerging technologies, and urged the exhibitors to set up businesses in the country citing less bureaucracies that would enable businesses to thrive.

Conclusively, the PS stated that the government was going to put three million hectares of land under irrigation in the next 10 years to ensure food production in the Country and Africa at large. He noted that the government was investing in agro processing, value addition of fruits and legumes so as to harness the production.

The event organizer, TAB Group Chief Executive Officer, Tahir Bari said that over 100 investors and potential businesses were keen on setting up base in Kenya. There were numerous investors from different parts of the world such as the Middle East, Asia, Europe and USA with a keen interest in tackling major issues in the supply food chain by introducing new technologies to help the sector grow and become more attractive to the young people.

It also aimed at providing an excellent networking platform for Agricultural Companies, Machinery & Equipment Companies, Technology Companies, Agro-Chemical companies, Agri-Input companies, Poultry / Livestock companies & other agriculture Solution companies to strengthen agricultural business by identifying, connecting and establishing the right channel partners in Africa.

dudutech

Environmentally intelligent farming

Seed dressing with

TRICHOTECH®
and MYTECH®

protects seedlings from soil fungal pathogens and plant parasitic nematodes.

Tel: +254 (0) 704 491 120 | www.dudutech.com | **Email:** info@dudutech.com

Mineral Fertilizers are Ecological and Sustainable Plant Nutrition Tool

Chemical fertilizers are often portrayed as unsustainable and non-ecological components of present agronomical management. The purpose of this paper is to challenge this view, by arguing that mineral fertilizers are actually ecological and sustainable plant nutrition tools that can fully complement organic originating nutrients, found in composts and manures.

But, before entering into the arguments, one must take into account that worldwide population is struggling against twin problems of the shortage of fertile soil, and of adequate quality irrigation water.

	Per-capital; arable land (ha)		
	1960	**2050**	**% Change**
Worldwide	0.42	0.19	-55%
Developing countries	0.33	0.14	-58%

Table 1: Global reduction in per-capital arable land between mid-20th and mid-21st centuries

Therefore, the question of chemical and organic plant nutrition must be tightly connected with the urgent need to produce an increasing volume of nutritious food for the 9.7 billion people who are forecast to inhabit planet Earth by the year 2050.

Let's examine the relevant aspects of chemical and organic fertilizers, judging them by their chemical economic, nutritional, ecological and sustainable features

It's All Chemistry

Urea is one of the most concentrated nitrogenous fertilizers (46% N w/w), which explains immense worldwide demand, and positioning it as the most - used nitrogen fertilizer in the world (annual production of ~ 179 million tones, ref. Yara , 2022) . It is industrially produced by reacting ammonia and CO_2 , in many worldwide commercial facilities . Meanwhile, naturally occurring urea is the chief nitrogenous end - product of the metabolic breakdown of proteins in all mammals and some fish species. Urea occurs at appreciable concentrations in the urine of all mammals; hence, it is found at marked concentrations in organic manures utilized in organic agriculture and horticulture. But is there any difference between a urea molecule that has been produced in a cow's liver , excreted and applied to the soil in the form of cow manure , compared to a urea molecule that has been industrially produced by reacting ammonia and CO_2 in a commercial nitrogen manufacturing facility ?]

> "Protecting against nitrogen losses after field application is one way to increase plant's nitrogen use efficiency."

From the perspective of a plant root, the answer would be in the negative. The chemistry is the same. When plant roots sense nutrients, such as nitrate, ammonium, urea, phosphate, sulphate, etc., in their rhizosphere , it will not matter whether their sources are chemical or organic . The plant will take them up by the same absorption mechanism, and NUE (nutrient use efficiency) , regardless of their original source . The plant will also equally integrate these raw materials into its normal metabolic processes.

The environmental aspect of urea production

Putting aside the different caloric values of meat and crop production for human diets, both involve emissions. It is well documented that the gas methane (CH_2) is a byproduct of meat and dairy production. This gas is produced by microbes in the cattle's stomach during its normal digestion process.

hence it is called enteric. The majority of methane is excreted through its respiratory tracts Methane is a 28-fold stronger greenhouse gas than CO, Figure 1 shows methane emissions from livestock in 2020 in the US, showing that beef cows were responsible for some 72% of the country s enteric methane, while dairy cows share amounted to approximately 25%.

Figure 2 shows that enternc CH4 was the protagonist, representing 70% of all GHGs, well above the 23% manure derived CH, while the share of NO, was lower at 7%. The total from Figure 1 is 175 million metric tonnes CO, equivalent.

Industrial production of urea consumes CO, as a feedstock, at a 1:1 ratio. The nitrogenous feedstock for synthetic urea is ammonia, and an ammonia plant will produce combustion-derived CO2, in the production of ammonia, so the consumption of CO_2 in urea production is one reason that ammonia and urea production units are co - located.

Although there are emissions related to urea and ammonia production because of energy intensive nature of process, it is worth remembering that each tonne of urea involves the consumption of 0.73 tonne of carbon dioxide. This process, however, cannot be considered as environmental carbon sequestration, because once it is applied in the field, it will soon break down , releasing the carbon dioxide that was fixed during production.

The environmental price of the distribution of manures and composts

Since urea is the most concentrated solid nitrogenous fertilizer (46 % N), its transportation from the production plant to its application fields is very economical. But the situation is very different when manures and composts are used as nitrogen carriers because they are normally around 15-fold poorer in nitrogen contents, making its transportation to remote fields very costly in terms of carbon footprint In many ways, these delivery emissions are unavoidable unless nearly all fertilizers required for the crops' nutrition are manufactured locally.

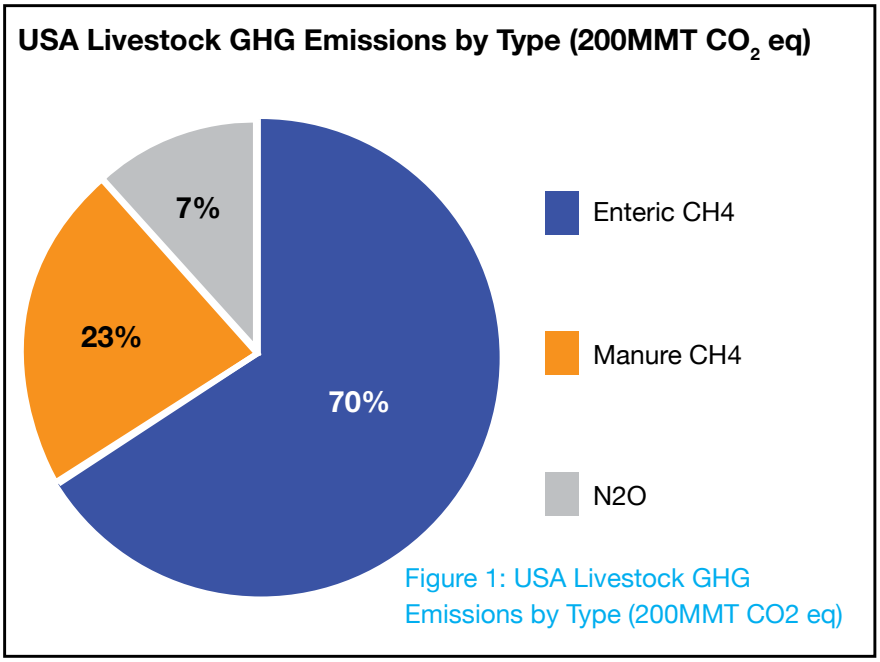


Figure 1: USA Livestock GHG Emissions by Type (200MMT CO2 eq)

This is not very realistic and would also be subject too different levels of efficiency and environmental sustainability.

Nevertheless, it could be argued that large-scale nitrogen plants in certain parts of the world are actually a more efficient way of producing nitrogen for the world, and therefore it is necessary to accept some emissions in its transport.

The challenge then moves to maximizing the efficiency of the urea that is applied.

Protecting against nitrogen losses after field application is one way to increase plants nitrogen use Efficiency. There currently exists an extensive array of methods that effectively protect industrially produced nitrogenous fertilizers, from disintegration, and from losing their nutritional value, shortly after field application. Some such methods are formulating them as slow-release and controlled-release fertilizers. Other effective methods are applying the fertilizers together with urease inhibitors, like NBPT 4-bromophenylboronic acid and acetohydroxamic acid, or with nitrification inhibitors, such as DMPP Nitrapyrin, DCD and Ethoxyquin. These agents are now widely used in agriculture and horticulture, by blending them with chemical fertilizers or coating their granules during their production processes. These methods remarkably increase the NUE of these chemical fertilizers.

Trials intending to apply the latter methods to organic fertilizers have resulted, thus far, in very low success rates , mainly

TO PAGE 32

FROM PAGE 31

because some components of the manures neutralize the activity of nitrification inhibitors . A recent description of this neutralization pathway reveals that it is based on the competition between DMP (and its derivatives) and soil chelates , on acquisition of copper (Cu) and Zn (Zn^{2t}) cations , which are indispensable for the activity of DMP (Corrochano Monsalve , et al . , 2021) .

Other plant nutrients.

So far , the arguments were focused on nitrogen , because it is , by far , the major nutrient applied in agriculture . But very similar considerations are valid regarding other nutrients applied to plant crops in the form of chemical fertilizers, or as organic manures, namely potassium, phosphate, calcium, magnesium, sulphur and trace elements. Actually the feed stocks of many industrially produced mineral fertilizers are naturally found ores, or precipitates of ancient remnants of plants and living beings, such as calcium, phosphates, mined in in various parts of the globe such as Morocco Florida or in Finland. Therefore, in many cases, even industrial fertilizers originate from geological organic resources. It is necessary to relate here also to the common prejudice that chemical fertilizers contain noxious materials while organic fertilizers are free from such compounds. This is an unfair representation because modern fertilizer producers are now very sensitive towards the quality and pureness of their products, due to their obligation to comply with very strict human health and environmental regulations Organic fertilizers, on the other hand, suffer from low N contents, coupled with their frequent sodic or saline contents, and of herbicides, pesticides and heavy metals contamination. As the preparation of composts and manures is often done on farms that do not necessarily follow health standards and processing regulations, these products may harbour harmful pathogens. Additionally, their low nutrient contents negatively affect their large-scale usage due to very high energy costs and carbon footprint associated with their transportation and application. On the other hand, organic fertilizers contain a wide array of natural chelating agents that enhance the nutrients uptake by plant roots.

Integrative approach

The previous paragraph briefly outlined the various pros and cons regarding the usage of chemical andorganic fertilizers. But this does not imply that growers should stick to one type only. It is strongly recommended that a judicious combination of mineral fertilizers with organic and biological sources of nutrients be promoted for normal agricultural management, at flexible ratios that depend on the local agronomical conditions, actual prices and on the grower's approach.

Furthermore, the well documented positive impact of biostimulants and biofertilizers, or soil conditioners, Suggests an approach that also integrates them in normal agricultural management, combined with both chemical and organic fertilizers. According to IFA's publication at July, the world's forecast consumption for 2021 amounted to some 111 million tonnes of N, 50million tonnes of P and 39 million tonnes of K. The continuous, almost metronomic consumption growth trend of mineral fertilizers leaves no doubt about their central role in agricultural management for decades to come. And the organic fertilizers are a welcome addition to the increasing demand for specialty fertilizers worldwide.

For better livelihood, Kenyan farmers rush to climate-adaptive sunflower

Maize and sugarcane farmers in Kenya are now turning to sunflower, which grows faster, is less labour-intensive and gives higher yields.

When cooking oil and animal feed prices became too high for Marystella Wabwoba, she decided to produce her own. Today, sunflowers are all she grows.

"About five years ago, I realised I could grow sunflower on the farm and use it to produce oil which has no chemicals as preservatives and use its by-product to feed my animals," the small-scale Kenyan farmer said.

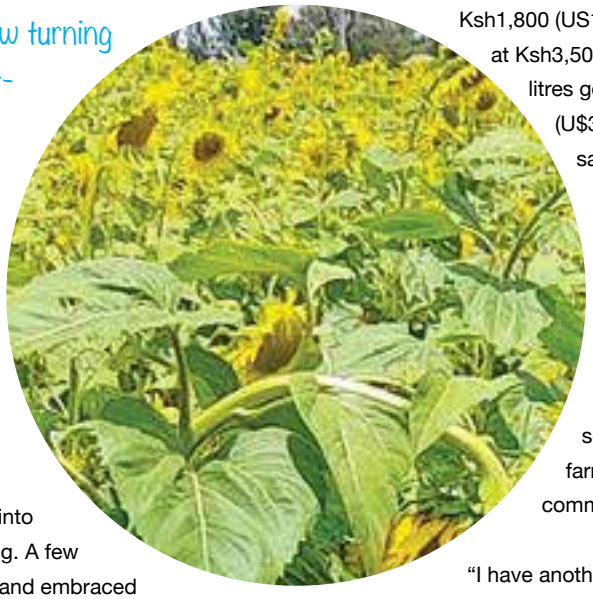
Wabwoba's homestead in the village of Sinoko in Bungoma County is a flurry of activity, with a constant stream of customers buying sunflower oil.

After harvesting the sunflower seed, she crushes them using an oil press to extract the oil, then uses the by-product as feed for dairy animals, pigs and poultry. Wabwoba is also spreading the word about her success in the surrounding community.

"Given that I'm an agricultural officer, I also mobilised women and youth groups and educated them on the need to venture into sunflower farming. A few bought the idea and embraced the venture," said Wabwabo, who has a PhD in food security and sustainable development.

"In an acre piece of land, you get at least 1000 kilograms of sunflower seeds. When you crush it, for every 4kgs of sunflower seed cake, you get a litre of cooking oil," Wabwoba explained.

"When you harvest 1000kgs of sunflower seeds, after crushing, you get 250 litres of sunflower cooking oil, translating to Ksh100,000 (U$770) per acre."



Sunflower

Simulations based on cost of production studies suggest that the cost of maize production will likely rise by an average of 60% for the 2022 main season.

The farmer has a seven-acre piece of land on which she grows sunflowers - and from where she retails her oil.

"I sell a half litre of sunflower cooking oil at Ksh400 (U$3.079), five litres at Ksh1,800 (US13.86), 10 litres at Ksh3,500 (26.94) and 20 litres goes at Ksh4,500 (U$34.642)," she said.

Wabwoba not only grows her sunflowers but is also involved in contract farming, buying seeds from other farmers in the community.

"I have another 20 farmers, each with an acre for growing sunflowers. Last season, they produced 20,000 kilograms of sunflower which I bought from them at Ksh100 (U$ 0.77). After crushing, I got 5000 litres of sunflower oil," she said.

She also explained that a sunflower crop is more drought-resistant, and its oil has no cholesterol. She added that it helps reduce non-communicable diseases like hypertension and cancer that people get by using chemically-preserved cooking oil.

Key Issues on Kenya's Agricultural Produce and Products Marketing Infrastructure

The available marketing infrastructures across the country are dilapidated, poorly designed and lack the required facilities and amenities such as value-addition facilities, storage facilities, water supply, electricity, and ICT facilities. Their layouts and designs do not provide the required market facilities and designated areas for wholesale, retail, and even specific commodities. This has resulted in produce deterioration, wastage, congestion, inaccessibility of produce by customers and difficulties in produce loading and offloading. Sanitation in these markets is wanting, and in certain situations, the facilities are not conducive for use by persons with special needs.

The ideal agricultural produce market infrastructure should include the physical trading space and aggregation centres in addition to essential facilities and amenities such as value-addition facilities, storage facilities, and water supply, electricity and ICT facilities among others. Aggregation centres enable small-scale producers who produce smaller quantities to consolidate their produce or products to ease access to larger markets at competitive prices.

Market requirements for Agricultural Produce and Products

In the standardization :

unstandardized units of measure such as goro goro (perceived to be approximately 2 kg tin) for grains, bales of varied weights for hay. In addition, producers undertake minimal quality enhancing value-addition activities. The use of unstandardized units and uncalibrated equipments exposes small-scale producers and consumers to exploitation by middlemen and traders.

Standards are meant to regulate the quality, quantity and safety of agricultural produce and products. Standardization entails establishing and maintaining uniform measurements of produce quality and/ or quantity, simplifying produce and product trading. This ensures the producers get the right price for their produce and consumers get value for their money.

The stringent food safety traceability requirements with respect to food safety, sanitary and phytosanitary (SPS) standards and the maximum residue limits demanded by markets form major challenges for small-scale producers.

> Most of the produce are exported in raw form, with a few processed, branded offshore and then re-imported for domestic consumption at very high prices. There is inadequate access to facilities and technologies that can prolong the shelf life of and add value to agricultural produce.

Mandated authorities have inadequate capacity to carry out sampling and testing of agricultural produce and awareness creation on market requirements.

Supply of Agricultural Produce and Products

Kenya's agriculture is predominantly small-scale production that accounts for 75% of the total agricultural output and 70% of marketed agricultural produce. The majority of these producers and existing farmer groups are producing at subsistence levels with minimal surpluses for the market. In addition, the existing marketing organizations are weak in collective marketing and linkages with upstream value chain actors and are constrained by poor governance. The low quantities of surpluses from individual small-scale producers and producer groups often do not meet the market threshold required by the major buyers.

The supply of agricultural commodities in the country depends on the rainfall seasons in any given year. This results in fluctuating supply of marketable agricultural commodities in certain periods of the year.

This seasonality of supplies has been worsened by climate change that has caused erratic weather patterns, production failures and outbreak of pests and disease among others.

Post-harvest losses in agricultural commodities are the measurable quantitative and qualitative losses in a given agricultural produce or product from harvest to consumption. These losses are a significant challenge in Kenya's agricultural sector, with an estimated loss of over 30% for harvested crops, 40% in dairy and 25% in fish. The causes of these losses include inadequate harvesting, handling and distribution techniques, poor storage facilities and perishability nature of agricultural commodities.

Value-addition of Agricultural Produce

Value-addition is the processes undertaken to increase the economic value of agricultural commodities. Most policy documents in Kenya have identified value-addition as one of the major challenges in the Agricultural sector.

Most of the agricultural produce and products are marketed in their raw form, leading to low returns. Most of the produce are exported in raw form, with a few processed, branded offshore and then re-imported for domestic consumption at very high prices. There is inadequate access to facilities and technologies that can prolong the shelf life and add value to agricultural produce. In most cases the facilities and technologies are unavailable, and where they are available they are located far from the majority of producers. In addition, the cost of utilities especially energy to run value-addition activities is comparatively higher than in neighbouring countries, thus reducing competitiveness of Kenya's value added agricultural products in existing markets. Most farmer-facing SMEs and other value chain actors lack capacity to undertake value-addition.

Marketing Channels

Most marketing of agricultural produce is done through conventional channels that includes producers, brokers, retailers, wholesalers and processors. Alternative agricultural markets are non-conventional marketing channels in an economy which may be new or modern ways of marketing agricultural produce and products.

They include structured marketing platforms such as warehouse receipt system (WRS), commodity exchanges, futures and derivatives markets, and auctions. Other forms of alternative agricultural markets are the digital and virtual markets. Alternative markets, particularly digital marketing platforms, also reduce time and market transaction costs through matching buyers and sellers.

In the wake of covid 19 pandemic there was an observed increase in the use of alternative marketing channels especially digital marketing. The pandemic exposed the limitation of conventional means of marketing as it involves the physical presence and interaction of actors at a trading point.

The warehouse receipt system council and the Kenya Multi-Commodity Exchange (KOMEX) are already in place, and systems are being established for their operationalization. In addition, Kenya operates commodities auctions. These platforms are currently being improved to enhance efficiency. The futures and derivative markets are not yet well-developed for agricultural commodities and are currently dependent on the functioning of WRS and KOMEX.

Transport Infrastructure and Logistics

Transport infrastructure and system include the physical transport networks, vessels, and operations, which are essential for the movement of goods and services to and from markets. This entails the transportation of produce from the producing areas to the market destinations, including collection centres or ports through the roads, rail, air and water.

In Kenya, the common practice of transporting agricultural produce is by general purpose commercial vehicles that do not comply with required specifications and facilities, except for a few industrial and export-oriented agricultural produce. The state of the rural and market access roads is poor, resulting in delays in collection and delivery, loss of value of agricultural produce and high cost of transportation. The high transportation costs are passed on to the consumers.

The general state of cross-county transport network, including road, rail and port transport infrastructure, is

TO PAGE 36

FROM PAGE 35

not adequate for effective agricultural produce marketing logistics. Efficient transport and logistics facilitates market access, which is critical for agriculture since it boosts productivity, increases incomes, strengthens food security and allows producers to reliably sell more produce with better quality and at higher prices.

Agricultural Market Research, Intelligence and Innovation

An effective agricultural market intelligence, research and innovation system is crucial to improving access to and competitiveness of domestic, export, alternative and speciality markets. If marketing intelligence and research are to assist producers and agripreneurs in decision-making, data and information provided must be comprehensive, accurate,

timely and usable. For innovations to improve agricultural marketing, they should be accessible, affordable and easy to use by market players.

Currently, there are public, private, civil societies and international development organizations that are involved in agricultural market intelligence, research and innovation. Some of these institutions include Ministry of Agriculture and Livestock Development (MALD); Ministry of Mining, Fisheries and Blue Economy; Ministry of Trade and Cooperatives; universities; Kenya Agriculture and Livestock Research Organization (KALRO), private

agripreneurs and non-governmental organizations.

Web-based international and multilateral statistical databases such as the International Trade Centre - Market Analysis Tools (ITC-MAT), Trade Map and Food and Agriculture Statistics (FAOSTAT) are a very important source of international trade statistics. Some of these efforts are supported by development organizations and agencies such as the World Bank, World Trade Organization (WTO), Alliance for a Green Revolution in Africa (AGRA), GIZ and USAID, among others. However, there is limited capacity and use of these sources of information and innovations.

There is limited access to market research findings because of inadequate information sharing and exchange platforms among players generating and those using market research information. In addition, there are inadequate systems for identifying, nurturing, and commercializing innovations, which has resulted in low utilization of research findings and innovations in agricultural marketing.

Marketing Capacity

Marketing capacity is the ability to efficiently undertake the marketing function based on adequacy of the human resources (numbers, skills and competencies), financial, and institutional arrangements. Marketing capacity determines the ability of the agricultural sector to design and execute marketing functions that effectively increase Kenya's market share and competitiveness.

In Kenya, some of the value chain actors have inadequate capacity to carryout market survey, analyse and interpret market information. This is especially so for the SMEs and individual farmers. Human resource capacity in terms of staff numbers, skills and competencies required to effectively implement the marketing functions is poor in both public and private institutions.

Marketing of agricultural produce and products requires capital and insurance. The cost of credit provided by financial services providers remains high and lack of specific insurance products designed to meet the needs of the marketing function of agricultural commodities. This affects the ability to invest in marketing and thus affects participation in both the domestic and export markets.

Kello Harsama-PS. Agriculture giving remarks

Dr. Esther Kimani-PCPB graced the occassion too

Prof. Stephen Kiama - VC UoN

Registration

4K Club members with PS Harsama

Farmers receive awards

Awarding of Farmers

Dr. Bimal Kantaria, Managing Director Elgon Kenya

Awarding of Farmers

PS Harsama awards a farmer in the physically challenged category

A farmer receives an award

A group photo - the winners of the day

Audience keenly following speeches

Crowning of Agriculture Enthusiasts during the National Farmers Award

By Mary Mwende Mbithi

Dr. Bimal Kantaria- Managing Director Elgon Kenya Ltd

In a recently held Farmers' Awards Gala Dinner at a Nairobi, individual farmers as well as companies were among the awardees of the day. The event was presided over by the Principal Secretary, State Department of Crop Development, Phillip Harsama, on behalf of the Agriculture Cabinet Secretary Mithika Linturi, together with the PS state department of Livestock - Harry Kimtai and Elgon's Managing Director Dr. Bimal Kantaria

The event, formerly known as Presidential Farmers competition Scheme was launched in 2013 as a Public Private Partnership (PPP) between the Ministry of Agriculture and Elgon Kenya Limited. As a part of Corporate Social Responsibility (CSR), from the Elgon Kenya Group, the event is held annually. This year was a re-launch three years absence due to covid-19 pandemic. The core purpose of the event is to recognize the agricultural champions including the youth, women and the physically challenged people in the agriculture sector as well as flower farms with outstanding performance.

According to Dr. Bimal, the sponsors of the event were not part of the judging committee and thus assured the farmers and growers of a credible and thorough exercise purely based on merit where the government through a committee hand-picked winners after a keen scrutiny. Other companies that partnered with Elgon Kenya to make the event a success were; Bayer E.A, Excel Crop, FMC, Arista Life Sciences, UPL and BASF.

In a speech read by PS Harsama on behalf of the CS Agriculture, he pointed out the Public Private Partnership model as a proof that the private sector could actually apportion resources and join forces with the state towards a common goal.

"Promotion of agribusiness is a top priority for the government and I am glad this partnership is anchored on the major goal which is to promote agribusiness and encourage participation and adoption of commercial farming as a choice career," read the speech. He went on to extol the event organizers on addition of

The trophies for the

extra categories in the event from the inceptive three, which laid emphasis on soil conservation and farm management to the agro-dealers and SMEs.

"For instance, the inclusion of the agro-dealer category recognizes the important role they play in the supply of agricultural inputs and the complementary role of advising farmers on good agricultural practices," read PS Harsama. He also lauded Dr. Bimal Kantaria-Managing Director, Elgon Kenya Limited for his notable presence and efforts specifically in the agriculture sector.

Dr. Bimal on the other hand, announced that Elgon Kenya-currently blending NPK fertilizer for tea, coffee and horticulture, had gotten into a partnership with the University of Nairobi to put up an agricultural innovation and technology hub at Kabete in memory of his late father. Additionally, he said that Elgon Kenya had also introduced an internship programme project whereby the company was going to hire twenty interns from the

winning farmers

University of Nairobi for a period of six months, on a monthly stipend.

In an acknowledgement statement Professor Stephen Kiama, Vice Chancellor, University of Nairobi (UoN), said, “Agriculture has not taken off as it should because there are so many technologies but no system of how farmers can adopt them. The UoN has now teamed up with Elgon Kenya to implement the idea.”

The categories for the farmers’ awards were as follows; The first category was Floriculture farms with more than thirty hectares of land, the second was flower farms with less than thirty hectares of land, then the special category, Women in Agriculture, Youth in Agriculture and the final one was the physically challenged person in Agriculture category. The winners received Trophies, Certificates and Vouchers.

The categories as mentioned above saw many individuals and organizations get noticed and awarded based on merit. The category of Women in Agriculture had Ms. Beth Wairimu Kinuthia of Kenbet Farm in Oljororok in Nyandarua County awarded. Ms.Esther Muthoni Kahuho of Joes Farm in Kasarani, Nairobi came in second as the third position went to Ms. Prisca Jelagat Keter of Lutiet Farm in Soy, Uasin Gishu county.

The Youth in Agriculture category crowned Ms. Caroline Mukuhi Mwangi of Kimplanter Seedlings and Nurseries from Ruiru in Kiambu County as the winner. Lisper Kanana Muchiri from Kirinyaga County held the second position while the third position was taken by Mr. Reuben Kamuru Mwangi of Kamuru Farm in Kieni East, Nyeri County.

Mr.Jonathan keter from Kiminini in Trans-Nzoia county led in the Physically Challenged category. In the same category, the second position went to Mr. James Oyoo Ochieng of James Oyoo’s Farm in Nyando, Kisumu County. Mr. Daniel Meiteken Kimangat from Transmara west in Narok county came in third.

Re-Launch of 4-K Clubs

To crown the event was the launch of a new category- ‘The 4-K Club’ which targets over 800 schools countrywide. This was like a revamp of the 4-K Club considering the fact that it has been in existence since time immemorial though its uptake and adoption have been slow over the years.

Speaking during the event PS Harry Kimtai said, “The average age of a Kenyan Farmer is 59-60 years. Therefore there is a need to bring in the youth into farming and encouraging them to embrace agriculture thus the re-launch of 4-K clubs.”

The prizes for winners of the 4-K Club winners were also unveiled and included; a shield for top three patrons, Gold, Silver and Bronze medals for club members of top three clubs and trophies for the first and second leading 4-K Clubs. The last one was a trip to Nairobi for the winning club not limited to the head teacher, patrons and members.

Currently, Elgon Kenya awards 4K Club winners on a monthly basis. The winner for the month of January 2023 was Mr. Samuel Nyaga, Headteacher at Joseph Kang’ethe Primary School in Kibera.

Coclusively, PS Harsama said the distribution of subsidized fertilizer had already kicked-off in 12 counties in the North and South Rift as well as in Western Kenya. “The government is giving fertilizer at the cost of Kshs. 3500,” he said. “Initially, the maximum fertilizer bags one could get was 50 bags, but now we are giving you as many as 5000-6000 depending on the size of your land,” he added.

PS. Harsama awards a farmer

Villagers in Makueni bet on Green gram seed Production

Ordinarily, March marks the peak of a harvesting in Makueni County. But 2023 began on a tough note as the semi-arid region suffered massive crop failure following a prolonged drought. Curiously, Margaret Kimote, a peasant in Kathungu village where the sun burns fiercely, is not worried.

She is among 50 farmers enlisted in an ambitious climate change adaptation scheme that involves producing and distributing high yielding green gram (mung bean) seeds. “Maize farmers here have nothing more than feathery stovers to show. The drought has seen green gram growers command respect,” she said while supervising threshing.

Kimote has harvested thirteen 100-kilo bags of mung beans from a her five-acre piece.

A cereal dealer in Siembeni town on the Kibwezi-Kitui road, Kimote is a member of Ngamiteka CBO, which is on the frontline of the war on global warming. Mbithe Kisele, the chairperson of Ngamiteka CBO, says lack of certified green gram seeds pushed locals towards exploring production.

The group is made up of smallholder farmers spread across Makueni County.

“Although the mung bean crop is important in building resilience to drought, we established that many peasants ended up recording low yields as they could not afford certified seeds,” she says.

“Many who could afford the seeds found it difficult to access them. That is how farmers ended up with very low harvests. They actually grew food instead of seeds.”

But the production of mung bean seeds, as Ngamiteka CBO members later learnt, would not be a walk in the park. To join the green gram programme, a farmer needs to dedicate at least five acres to the crop.

Agronomists advise farmers to space green grams 15-20 centimetres between seeds and 60 centimetres from row to row. Extension officers inspect the crop regularly to enforce timely thinning, weeding, application of pesticides and other practices.

Agronomists and other agricultural experts say it does not make sense to produce green gram seeds in a plot that is less than five acres.

Ngamiteka CBO members begin by preparing their farms before using tractors or oxen-drawn ploughs. This is meant to enhance soil moisture conservation. The ripping is followed by the application of manure and establishing of seeds.

A production record seen by the Seeds of Gold shows that Kimote planted her crop on October 31 last year.

She started harvesting the mung beans on December 31.

A team of extension officers under Prof Paul Kimurto and Bernard Towett of Egerton University's Seed Unit works closely with Ngamiteka CBO.

The university provided the farmers with a tonne of the basic seed known as KS20. It was a key component in the programme, which is supported by the Makueni devolved government, the national government and the and International Crops Research Institute for the Semi-Arid Tropics.

Agronomists advise farmers to space green grams 15-20 centimetres between seeds and 60 centimetres from row to row. Extension officers inspect the crop regularly to enforce timely thinning, weeding, application of pesticides and other practices.

In addition to monitoring the growth and flowering characteristics of the mung bean crop, the army of extension officers visits Ngamiteka CBO farmers at least three times a month to ensure they do not grow any other variety of green grams at least 25 metres around the main plot. That ensures no contamination.

Mutula Kilonzo Jnr- Governor Makueni County

Dr Towett says the hybrid seeds produced by Ngamiteka farmers can go up to three generations without a risk of contamination as they are self-pollinated.

The bulk of the work in seed production starts after harvesting.

The farmers manually sort the good seeds from the deformed ones so as to retain quality.

Agronomists recommend the use of machines to thresh the pods instead of sticks, as these damage the seeds. "We have been advised to store the seeds in jute bags, not nylon as that will compromise viability," Kimote says, adding that a kilo goes for at least Sh200. Neighbours make the bulk of Kimote's customers. Makueni Agriculture executive, Joyce Mutua, says the county government is betting on the community seed production and distribution to address food insecurity.
She adds that Makueni County has been battling a huge seed gap, which has hampered production of mung beans.

"Whereas farmers in Makueni County require 900 tonnes of green grams every planting season, they can only access 350 tonnes of certified seeds. This makes them go for seeds that are not certified, thus compromising on their production and quality," the executive said.

After Dr Towett gave the green gram farmers thumbs-up, members of Ngamiteka CBO have begun the process of acquiring a licence to sell their seeds to farmers in and outside the county.

Increasing women's involvement in the workforce can improve dietary diversity

Co-authored by Nikita Sangwan, Centre for research on the Economics of Climate, Food, Energy and Environment (CECFEE), and Dr Shalander Kumar, ICRISAT.

- When women are more involved in the workforce, the dietary diversity of their households improves. The extra time that women use at work does not have adverse effects on their health.
- Women's paid and unpaid work impacts dietary diversity in different ways: paid work results in financial independence and empowerment in household decision-making that allows women to diversify diets. Unpaid work increases the number of food groups produced by women for consumption by their households.
- Policies and development programs can harness synergies between schemes to improve nutrition and increase women's employment to pursue global goals of ensuring better food for all.

Greater participation of women in the workforce can increase a household's income and allow them to purchase a more diverse food basket.

The generally held belief is that when women take up work outside the home, it can increase their time burden and leave them with less time for cooking and producing other food items. Consequently, it could impact the nutritional intake of their households because fewer food items would be prepared. The exhaustion from an increased time burden could also harm women's health. And these impacts could be aggravated if men do not share the additional time burden to compensate for the potential loss in women's time.

It is therefore important to evaluate the implications of policies aimed to enhance women's labor force participation, considering these generally held beliefs.

In our recent study, we find that women's increased labor force participation in fact improves the dietary diversity of the household, with no reduction in the number of home-produced food items or the monetary value of home-produced food and non-food items. Notably, our results also rule out any adverse effects on the health of women due to their higher participation in the labor market.

Our study used a unique panel dataset of 832 rural households from 18 villages in the semi-arid tropics of India, spanning the states of Andhra Pradesh, Gujarat, Karnataka, Maharashtra and Madhya Pradesh. Data was collected from the same households across three seasons: (i) Kharif (July-October), (ii) Rabi (November-March) and (iii) Summer (April-June) during 2009-2014, which allowed us to account for seasonality in consumption patterns. The data was drawn from a farm household panel dataset provided by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT).

In our analysis, we have used a household fixed effects model that controls for the observed household characteristics and annual village trends. We substantiated our results with multiple Oster bounds to show that our estimates are not likely to suffer from omitted variable bias.

Impact on dietary diversity and home production

We find evidence showing that as the number of workdays of women

increased, the number of food items being consumed by the household also increased. We also find that the observed positive effect of women's increased workdays on dietary diversity was over and above what can be explained by the increased income of women. This indicates that the increased dietary diversity is not due to the increased income enabling the purchase of a more diversified food basket alone, but is associated with other potential effects that improve dietary diversity, such as exposure to new information on alternative dietary practices and awareness of new eating patterns and preparation techniques as well as economic empowerment.

Previous studies have raised concerns about the potential reduction in dietary diversity due to fewer food items being produced by the household if women's time availability for this decreases. However, we did not find this relation to be true from our dataset.

On the contrary, in our study, a higher number of women's workdays also improved the home-produced dietary diversity, over and above what would have been possible due to increased income. This could potentially be explained by the increased exposure to information, as mentioned above.

Also, women's increased time burden could be hypothesized to reduce the production of food and non-food items by the household, both for self-consumption and sale on the market. But we did not find any negative impact of a higher number of women's workdays on the (inflation-adjusted) value of the goods produced by a household.

Differential effects by nature of engagement

Our analysis underscores the importance of the nature of engagement in the labor market as it determines the underlying mechanisms through which women's labor market participation operates.

Employment of women in paid work (i.e., engagement in wage activities in the farm or non-farm sector) that is not influenced by men (unlike when they labor on the family farms) enables women's agency and increases their independence in intra-household decision-making processes. This includes decisions on various domains such as credit, investment, sale of farm produce, household maintenance and children's education. This allows women to direct more resources toward nutritional food items.

Labor force participation may also provide women an increased exposure to different dietary practices and eating patterns that they incorporate to improve the diversity of their food basket.
Unpaid work (engagement in the family farm or livestock) by women does not offer exposure and independence from the influence of men. Hence, we see no improvement in the empowerment of women. But it does add to the variety of food consumed by the household as women spending more workdays in unpaid employment directly increases the number of food groups they produce for consumption by their households.

Policy insights

Engagement of rural women in the labor market not only generates income that relaxes the budget constraints of the household, but the ensuing financial independence empowers women by increasing their say in household decision-making processes. As empowered women have better control over the food choices they make for themselves and the household, they direct a greater share of resources toward the consumption of a more diverse food basket. This improves the nutritional intake and health outcomes of the household, without any pernicious effects of an increased time burden on women.

The findings from the study accentuate the potential to harness synergies between nutrition-enhancing and women's employment-generation schemes to address the malnutrition challenges faced by developing countries. It highlights the need to design appropriate interventions to increase women's participation in the rural labor force.

(Originally published in CGIAR Gender Impact Platform)

How to make corn on the grill: Step-by-step guide to a tasty version of grilled corn.

When it's fresh corn season and grill season (in many parts of the country, it's always grill season), what's the best way to bring these two barbecue staples together? Grilled corn, of course.

There's nothing like pairing slightly charred, salty, buttery corn with grilled meats. When you've already fired up the grill, it's the perfect time to add a side dish of grilled corn to your barbecue feast.

So many people are intimidated by grilling corn, but it's much easier than you think.

How to grill corn on the cob?

For a great/ grilled corn experience, grab the freshest corn you can find and follow these simple steps:

1. Husk the corn and remove all the silks.
2. Create a two-zone fire in your grill: For a gas grill, heat one side of the grill to high and the other side to medium-low, and for a charcoal grill, put 75% of your bricks on one side and 25% on the other.
3. Rub each cob with about 1 teaspoon vegetable oil and season with salt.
4. Place cobs over the hot side of the grill and cook until some kernels begin to char, about 7 to 12 minutes depending on the size of the cobs. Turn cobs occasionally to char all sides.
5. Adjust position as necessary until corn is tender. If your corn is getting color too quickly or more than you'd like, move cobs to the cooler side of the grill. (But don't be afraid of a little char. As most chefs say: Char equals flavor.)
6. Serve with butter, salt and pepper. Or, slather with a mixture of mayo, sour cream, and chili powder, then roll in Cotija cheese and spritz with a squeeze of lime for a Mexican street-corn flavor.

ETG

ETG's range of fertilizer blends

Planting Blends

Top dressing Blends

ELGON KENYA LIMITED

THABITI Super FERTILIZER

ELGON KENYA
TRANSFORMING FARMS & LIVES THROUGH TECHNOLOGY

East Gate Road Off Mombasa Road
P.O BOX 46826 - 00100 Nairobi, Kenya
Tel: +254 733 699992 , +254 722 203089
info@elgonkenya.com www.elgonkenya.com

Elgon Kenya limited
@elgonkenyaltd