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Livestock & aquaculture

Q&A Interview: PS's insights on fisheries

Leather in Ethiopia attracts investment

South Korean village model transforms farming

PROFILE: ILRI Director General Dr Jimmy Smith



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In this special report, *Rootooba* focuses on livestock and aquaculture, both important assets in Africa contributing significantly to nutrition and economic growth, with livestock fulfilling multiple roles, ranging from draught power, to providing manure, milk and meat. Pastoralism is a vital part of the continent's economy. Aquaculture, introduced 50 years ago, faces many challenges but has the potential to increase fish production to benefit value chain actors through improved food security and income

Cover photo: Susan MacMillan, ILRI



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Editor's Note

2021 and hopes of post-COVID-19 recovery

We welcome the new year 2021 with cautious optimism after an extremely difficult 2020 dominated by the devastating COVID-19 pandemic and a trail of destruction on lives and economies.

The agricultural sector, the mainstay of the economies of many African countries and sustainer of the livelihoods of the majority of the continent's 1.3 billion population, was hard hit by the virus.

Movement restrictions as part of the control measures coincided with the planting periods for most staple crops, exacerbating food security challenges.

To achieve adequate food supplies, governments must develop better packages to confront the challenge of reducing hunger post-COVID-19.

This edition dwells on the livestock and aquaculture sectors, a profile of the International Livestock Research Institute (ILRI) Director-General Dr Jimmy Smith and a powerful response on Africa's aquaculture sector by Kenya's Principal Secretary in the State Department of Fisheries, Aquaculture and the Blue Economy, Prof Japheth Ntiba.

We report on the issues at the heart of the animal-human health interface and the emergence of new infectious zoonotic diseases such as COVID-19 transmitted from animals to humans.

Alberto Leny

We also review the evolution of African indigenous, cattle, donkeys and snail farming, the sugar sub-sector and our food security watch features the high-level 'Resetting the Food System from Farm to Fork' meeting ahead of the 2021 UN Food Security Summit.

With over 65% of households mainly poor, vulnerable smallholder farmers, African countries must rethink strategies and policies for sustainable economic growth.

Rootooba attended the recent African Union (AU) virtual session of the 16th Comprehensive African Agricultural Development Programme (CAADP) themed 'Malabo Commitments Five Years on: Translating Lessons Learnt into Accelerated Action towards 2025.

The commitments require governments to allocate at least 10% of public expenditures to the agricultural sector and 6% annual growth in agricultural GDP. Less than 20% of African countries have achieved these commitments, a situation worsened by the pandemic.

COVID-19 has left a negative impact on agricultural productivity and the value chain, disrupting farming communities and trade.

Calling for resilient policies and action, the forum expressed concern that African agricultural institutions are deeply fragile and cannot respond effectively to the fall armyworm, locusts and COVID-19 shocks.

Welcome to the new year!

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Farm animals feel pleasure and sadness, excitement and resentment, depression, fear and pain. They are far more aware and intelligent than we ever imagined. They are individuals in their own right.

-Jane Goodall

”



The Giant African Snails are natural to the tropical region and they can serve as an alternative to meat protein.

Snails emerge as a prime source of fertilizer, food

By Murimi Gitari

Contrary to many people's aversion to their unsightly slimy nature, researchers have established that snails have many properties that can benefit humans and livestock.

A group of researchers at Jomo Kenyatta University of Agriculture and Technology (JKUAT) led by Dr Paul Kinoti are conducting a study that shows snails have phosphorous embedded calcium carbonate and protein that can be utilized to generate fortified animal feed and organic fertilizer.

The principal researcher of bio snail farming in JKUAT's department

of horticulture and food security, Kinoti says starting this venture only requires a little capital but offers high returns compared to other conventional farming systems.

"There is so much value in snails cutting across sectors such as food security, cosmetics, pharmaceuticals, animal feeds and fertilizer making," he says.

After conducting research on snails, the group of researchers started a snail farming project at the institution with the aim of introducing it and its value added products as a viable alternative source of income and food.

Consumption of snails is considered to be highly beneficial for human health due to the Omega 3 fatty acids they contain and are assumed to inhibit the atherosclerosis and thrombosis diseases.

The fertilizer made using the snail shells is used to grow crops and plants in a more progressive way than conventional methods.

"Our aim is to develop organic fertilizer that will improve soil structure, enhance season-long supply of nutrients, and an increased water-holding capacity resulting into better crop performance," Kinoti explains the findings from their

study in the project, which is entirely owned by JKUAT.

"The use of snails as fertilizer and soil amendment will aid in the remediation of barren and acidic soils, making it valuable and a useful option in the control of the invasive snails", he adds.

According to Kinoti, this method has proven to offer better results and benefits compared to conventional products. The nutrient content contained in the bio snail organic fertilizer is quickly absorbed by plants.

"The use of bio snail organic fertilizer from field observations has shown that the fertilizer restores and improves soil fertility as the soil regains its lost fertility, becoming looser with enhanced development of worms and other beneficial microorganisms found in the soil," he adds.

The fertilizer is fortified compost made by mixing snail shells and ordinary vegetable compost where the two components are subjected to a special fermentation process. The fermentation stabilizes the nitrogen content, transforms added organic nutrients and results in an optimized compost base material with low salt and nutrient content.

"The bio snail shells fortified compost is ideal for the horticulture sector, especially growers directly involved in the cultivation of fruit tree crops, vegetables, flowers, ornamental plants, herbs, spices, medicinal plants and can also be used in growing the rice crop," notes Kinoti.

The fertilizer is a liquid fertilizer applied to plants through roots, leaves, stems and branches. Plants absorb essential elements through the stomata and the epidermis.

During the start of cultivation, the bio snail shells fortified compost significantly enhances the crop security of sensitive plants as a result of its distinctive features like being biologically active in

suppression of root diseases. It also increases shelf life of potted plants and has a slow release of nutrients, especially potassium, nitrogen and magnesium elements.

The fertilizer will be commercially available in large quantities for use at the beginning of 2021 and depending on how the snail product performs, potential private engagement in commercialization would be undertaken.

The product is expected to retail at Sh150 per litre, which guarantees better returns to farmers and Kinoti is confident the compost is a high-performance product that will satisfy a farmer's all round quality requirements.

In their sustainability plan to ensure they have enough snails and raw materials for making the product, the researchers have embarked on training and recruiting 10,000 to 15,000 potential snail farmers clustered in groups and spread across the country.

"We will supply the farmers with breeding stock and provide them with technical support to farm snails and in that way, adequate and sustainable snail production for use in the fertilizer making process among other value added products will be guaranteed," he adds.

Most recent research has also shown that snail meat has low fat and cholesterol levels, which makes it useful in the management of heart-related diseases. It is also gradually finding its use in skin care products and the pharmaceutical industry.

"Snail meat provides an excellent source of protein that is considered much higher than that of conventional food animals. Due to the high protein content, they are utilized as an alternative source of protein for livestock feed fortification to substitute use of fish

and soya ingredients," he says.

"Many people shy away from snails with a stereotype that they are not even good to touch but we want to encourage farmers to embrace this farming as it has many benefits. It is cost-effective and offers high returns with no regrets," Kinoti says.

Snail farming is not capital- and management- intensive compared to poultry and other conventional livestock farming. The feeds are readily available and can be produced easily using locally-available materials.

The researchers contend that the economic benefits resulting from the use of snail value added products such as increased crop production due to the use of bio snail organic fertilizer, and the high nutrition with healthy benefits is likely to minimize the stigma associated with snails.

Kinoti says that when farmers learn of these benefits, the mindset change on the negative perception and stereotyping will result to acceptability of snails as useful creatures.



Most recent research has also shown that snail meat has low fat and cholesterol levels





Kenya's Principal Secretary Fisheries, Aquaculture and Blue Economy, Prof Japheth Ntiba

Food, jobs and growth, fisheries sustain Africa

Fisheries play significant economic, social and nutritional roles in Africa, contributing to food and nutrition security, providing jobs, in particular for populations near water bodies. Fisheries and aquaculture directly contribute \$24 billion to the African economy, (1.5% of the total African GDP), employs over 12 million people (while fishing jobs are almost entirely taken by men, 59% of the processing work is done by women). In this Q&A interview, Rotooba speaks with Kenya's Principal Secretary, State Department for Fisheries, Aquaculture and the Blue Economy Prof Japheth Micheni Ntiba on why this sector remains significant to the continent. Kenya in November 2018 co-hosted with Canada and Japan the first-ever international Sustainable Blue Economy Conference.

QUESTION: What is aquaculture and why is it important for African livelihoods?

ANSWER: Aquaculture is the farming of aquatic organisms such as fish, crustaceans, artemia mollusks and plants such as seaweeds, seagrass, algae and mangroves in a controlled or semi-controlled environment. Aquaculture is important for African livelihoods as it provides a cheap source of animal protein (food) packed with rich nutrients and omega-3 fatty acids, which are good for brain development and cardiovascular functions besides providing raw material for manufacturing industries. It also creates employment and source of income especially for the rural poor.

Why have there been stereotypes about fish consumption amongst some African communities, including Kenya? What is being done to reverse this trend?

The stereotype about fish consumption revolves around the fish smell and high regards of other

domestic animals such as chicken, goats and cows that are associated with wealth and prestige. In Kenya, for the longest time, fish was viewed as a reserve of traditional fish-eating communities around the Lake Victoria region and with a small minority around the Indian Ocean.

There are also some social-cultural beliefs that prohibit some communities from consuming catfish due to lack of scales on the body. Furthermore, there are a number of communities in East Africa that imagine that fish were actually “short snakes”. The Government of Kenya has and is putting deliberate efforts to promote fish consumption through fish fare events dubbed Eat More Fish Campaigns that showcase practical demonstrations for fish preparation, value addition, cooking and eating for purposes of increasing the national per capita fish consumption amongst our people since, as we said earlier, fish are amongst the most nutritious food on earth.

How much is Kenya producing vis-a-vis its demand? Is there a deficit?

If so, by how much and how is the deficit being met?

The annual national fish production in Kenya in the year 2019 was 146,543 metric tons valued at Sh24.546 billion. Inland capture fisheries produced 102,331 metric tons, which contributed 69.8% of Kenya's total fish production. Marine artisanal fish production was 25,670 metric tonnes equivalent of 17.5% of the national production while aquaculture production amounted to 18,542 metric tons contributing 12.6% of the total production. Notably, inland fisheries recorded a decline, while marine artisanal fisheries stagnated and aquaculture recorded a 3% increase.

Yes, currently there exists an annual supply deficit of 350,000 metric tons of fish if every Kenyan were to consume 10kg/person/year of fish, which is the African continent per capita fish consumption. While the current per capita fish consumption in Kenya is about 5kg/person/year, in some countries such as Portugal, the per capita fish consumption is very high at about 57kg/person/year. To bridge the fish deficit in Kenya, the

Africa has extensive and extremely valuable fish resources, which are exploited by the marine, inland and aquaculture sub-sectors. Photo: Mirko Tobia Schaffer





The CGIAR Research Program on Fish in Agri-Food Systems-led youth study is adopting the post COVID-19 concept of “building back better” aquaculture, fisheries and fish value chains in a youth inclusive manner.

government has enacted the Fisheries Management and Development Act, 2016 that is geared towards ensuring sustainable exploitation and production of the fisheries and aquaculture resources in the country. Some of the deficit in fish supply in the local market has been met by traders importing fish from neighbouring countries and from abroad.

How does overfishing affect the blue economy in Africa?

Overfishing leads to depletion of fisheries stocks and in some cases a total collapse of these important natural resource altogether, with subsequent loss of an important food base, source of income, jobs and livelihoods for riparian and coastal communities.

What plans are there to ensure a sustained fish production in Africa?

The African countries are adopting different mechanisms to exploit oceans, seas and lakes sustainably while at the same time promoting development of aquaculture. These include developing Blue Economy Master Plans and Strategic Plans, Marine Spatial Plans (MSP), fishery specific management plans, promotion of co-management of fisheries resources between the government and the fishers, development of monitoring, control and surveillance (MCS) protocols for the protection and management of capture (natural) fisheries and promoting aquaculture development.

What has impeded growth in aquaculture and the blue economy since independence in many African nations, Kenya included?

Low levels of funding in the blue economy sector by African governments led to leaving, particularly fisheries, to the whims of hunting, gathering, piracy, and overfishing by local communities in shallow waters and by foreign distant

water nations fishing in the offshore deep waters. Similarly, there has been a general lack of training and concerted effort on blue economy literacy in our education curriculum from primary school level.

There seems to be little attention to scopes such as crustaceans and molluscs and a concentration in efforts to improve finfish production. Why is this so?

This situation has been due to firstly, market preferences. Secondly, as a result of social-cultural backgrounds and related issues about shellfishes such as crustaceans and molluscs and, last but not least, a limited capacity and technology development for production as well as farming for bottom living shellfish species.

Kenya is looking to increasing its share of GDP annually by investing in the fisheries sector. How does the government of Kenya propose to do this?

It is true that Kenya is very keen to implement some key development initiatives aimed at growing her fisheries sector including:

- (a) The development of a national deep-sea fishing fleet to tap into the deep-sea fisheries resources in its Exclusive Economic Zone (EEZ) in the Indian Ocean. Fisheries in our EEZ has largely remained unexploited by ourselves because of lack of capacity and concerted planning. For many years, therefore, they were left to be exploited by foreign nations who had enormous fishing capacity and power and hence mostly robbing these important natural resources from us through illegal, unreported and unregulated (IUU) fishing.
- (b) The gazettelement and development of the Liwatoni fish port for enforcement and implementation of port state measures to deter IUU, get reliable fisheries catch data and

statistics and retain 30% of fish caught by fishing vessels owned by distant water fishing nations to assist the development of the fishing industry in Kenya and contribute to the national food and nutrition security.

- (c) Enforcing sustainable fisheries management measures to prevent overfishing of natural fish populations in lakes Victoria, Turkana, Naivasha, rivers and in the Indian Ocean.
- (d) Co-funded the Aquaculture Business Development Programme (ABDP) with the International Fund for Agricultural Development (IFAD) whose aim is to commercialize aquaculture, increase food and nutrition security, and enhance better livelihoods of rural communities involved in aquaculture in the target communities.
- (e) Supported the Aquaculture Technology and Innovations Transfer Programme to promote uptake of climate-smart aquaculture technologies and ensure fish production in the face of climate change.
- (f) Enforced the East Africa Guidelines on fish cage culture in Lake Victoria to promote sustainable exploitation of the resource.
- (g) Supported the national stocking and restocking of community dams to enhance aquaculture production base among other interventions.
- (h) Kenya is also establishing a state-of-the-art Mariculture Centre in Kwale County at the coast to mainstream fish and plants farming in our part of the Indian Ocean.

How is the national government and especially your docket planning to incorporate and work with county governments to ensure that the blue economy succeeds?



Kenya's State Department of Fisheries, Aquaculture and the Blue Economy issues pond liners and predator control nets through the Aquaculture Business Development Programme.

Fishing is controlled at a national level. However, fisheries and aquaculture production are a devolved function, which means that the success of the fisheries sector depends on responsible undertakings of the various devolved governments. The national government is responsible for coordination of how these activities are undertaken. The State Department for Fisheries, Aquaculture and the Blue Economy is principally responsible for provision of policy guidelines, for the management and development of the fishery by controlling entry and access to fishing, development of aquaculture, setting quality and safety standards for fish as food for humans, regulating the quality of fish feed, and coordinating with the Ministry of Environment the protection of the aquatic environment. However, in undertaking these tasks the national government works very closely with the 47 county governments to formulate and enact these policies. The national government also designs and funds projects for implementation at the county level as well as supporting the counties to build their capacity to implement fisheries programmes and activities through training of technical officers,

fishers and fish farmers.

Where do you see the role of the youth in the blue economy?

The youth are involved in all nodes along the blue economy framework. The government has embarked on a deliberate effort to train youth in deep-sea fishing and marine safety and provision of fishing boats for coastal communities. In aquaculture, the government is keen to support aquaculture support enterprises that specifically target the youth. The MasterCard is working closely with the State Department to develop a programme for the youth to be adequately engaged in growing the blue economy in Kenya.

Which technologies, best practices, and development models can advance sustainable blue economy investments in the continent?

Fisheries and Aquaculture Technologies, Innovations, Management and Practices (TIMPs) that are climate-smart, resilient and profitable will advance sustainability of Blue Economy Investments. Examples of the TIMPs include the Aquaponics, Recirculatory Aquaculture Systems (RAS), raised ponds for flood mitigations, harvesting of rainwater and use of greenhouses.

Aquaculture is the only viable alternative source of fish especially at this time when the natural stocks of fish are declining. What are some of the initiatives being advanced to maintain natural stocks?

To maintain natural fish stock to stay healthy from year to year, various fisheries management strategies are employed. These include closed seasons and closed areas to protect young immature fish and breeding fish from being caught. Controlling the fishing capacity and effort by maintaining the optimum number of fishing boats and fishing nets based on the known stock size of fish available for fishing that year or season scientifically determined through well-coordinated fish stock assessment by the Kenya Marine and Fisheries Research Institute, forging fisheries co-management principles between government and the beach management units (BMUs), developing fisheries management plans and stocking and restocking of the water bodies to replenish the overfished fish stocks. And many more management measures aimed at ensuring that the whole aquatic environment is protected from pollution so it stays healthy. Healthy lakes, rivers and oceans are critical for sustainable fisheries on Earth as espoused in the FAO Code of Conduct for Responsible Fisheries (CCRF).

In your opinion, is fish farming profitable in Africa?

Absolutely. Fish farming is very profitable if undertaken in an efficient, effective, responsible and a sustainable manner. Let us remember this, that fish farming is the fastest growing subsector in the wide agricultural sector globally now at a rate of almost 20% per annum.

What opportunities are there for private sector engagement in fisheries and blue economy?

There are opportunities in offshore gas and oil exploration, tourism, mining, transport, fishing, fish farming on land (aquaculture) or in the ocean (mariculture), water transport, various water sports including the celebrated and globally loved sport fishing, wind and tidal energy, bioprospecting and all manner of trade and businesses associated with water economies.

Is the policy environment adequate to accommodate any recommendations for improving the aquaculture sector in Kenya and Africa?

Yes, the Fisheries Management and Development Act provides a clear policy direction and regulations, standards, guidelines and standard operating procedures (SOPs) have been developed to operationalize the Act.

Could you please speak on expansion in global consumption of fish?

Kenya is making deliberate efforts to promote fish consumption alongside dietary diversity with the development of fish post-harvest technologies to reduce post-harvest losses, and value addition to enhance consumer preference. We target to achieve over 10kg/person/year per capita fish consumption by 2030. On the global arena, Kenya will be contributing to the global fish consumption having received certification to export to EU markets after implementation of the Residue Monitoring Plans for farmed fish. As regards our natural, capture fisheries, Kenya developed a sanitary and phytosanitary certification system to allow our fish to enter the European Union and other overseas markets in Category 1 of fish quality standards. We have also established international accredited laboratories (in Kisumu, Mombasa and Nairobi) that are currently being operationalized to not only serve Kenya, but also offer referral services in the region.

What would you advice smallholder farmers interested in venturing into fish farming in Africa?

Small-scale fish farmers should strive, as much as it were, to get information about fish farming from the competent authority (CA) in fish and fisheries matters in Kenya, and this is the Kenya Fisheries Service and fisheries officers in the county governments. They should also focus on commercial fish farming for good profit margins.

Any last comments you may have to our readers?

My last comment is this: "Let us all remember that fish is good, nutritious food for mankind that also creates business for wealth and jobs. Let us embrace fish farming since it is the only sure means we have to produce future additional fish for our tables and kitchens as well as for trade and more businesses. Natural fish stocks are going to remain stagnant and probably decline as climate change and environmental degradation clouds our earth in unpredictable ways.



KOPIA Centre Director Dr Kim Keejong explains South Korea's agricultural system lessons inspiring Kenyan farming communities.

South Korean village model helps reform African agriculture

By Verenardo Meeme

The Korea Programme for International Cooperation in International Agriculture (KOPIA) Kenya Centre was launched on 23 August 2009 under an MoU between the Rural Development Administration (RDA) of South Korea and the Kenya Agricultural and Livestock Research Organization (KALRO). Since then, KOPIA and KALRO have conducted joint agricultural research and development projects countrywide. In an exclusive interview, KOPIA Kenya Director Dr Kim Keejong narrates to Rotooba how South Korea's agricultural transformation journey can help inspire Kenyan farming communities to emulate the remarkable success attained in his country.

One of Africa's leading development economists, currently High Representative of the African Union Commission Chairperson for AU-EU Relations Post-2020, Prof Carlos Lopes, says a pillar and, indeed driving force of the continent's structural transformation is agriculture.

Writing in the Journal of African Transformation, Volume 1 No. 1 of 2015 when he was Executive Secretary of the United Nations Economic Commission for Africa, Lopes notes that countries across the globe that have increased productivity benefited from economic growth sustained by agricultural transformation.

Lopes could have been referring to

examples from, among other countries, the Republic of South Korea, whose experience in agricultural development and structural transformation were achieved with the rapid growth of the country's economy in the late 1960s and 1970s.

From the insights gained, South Korea is willing to share this experience in

agricultural development with developing countries in Africa beyond basic programmes to achieve food security and help people escape from prolonged hunger and poverty in a short time.

Lopes notes that African countries have an opportunity to change their lives through increased agricultural activity and enhanced agribusiness that connects smallholders to national, regional and global value chains such as that provided by the South Korean model.

“It is important to renew the building blocks for a deeper discussion of the connection between agriculture and industrialization,” he adds.

To achieve food security and rapid agricultural transformation, South Korea recognized the need for the development of infrastructure, agricultural technology and institutional establishment.

South Korea has prioritized agricultural technology transfer to developing countries in Africa to support country-led agricultural development programmes.

The technology development

cooperation is focused on improving the national agricultural research and extension system, including capacity building of human resources to develop and disseminate agricultural technology.

South Korea is working in Africa through its key ministries and the Korea International Cooperation Agency together with technology development agencies, and research and educational institutions.

At the partner country level it is implementing two programmes: the Korea Project on International Agriculture (KOPIA) and the multilateral cooperation initiatives composed of the Asia Food and Agriculture Cooperative Initiative (AFACI) and the Korea-Africa Food and Agriculture Cooperation Initiative (KAFACI).

It is a vital learning experience for Kenya’s agricultural transformation effort at a time farming has been battered by production challenges such as low crop productivity, market access, low quality produce, pests and diseases.

The Kenya KOPIA agricultural model

village was the first centre to be established on the continent and has since inspired other African countries including Algeria, Ethiopia, Ghana, Senegal, Uganda and Zimbabwe to join the knowledge exchange model transforming agricultural practice in Africa.

Sustainable Development Goal 2, which aims at ending all forms of hunger and malnutrition by 2030 and Korea’s farming journey have been boosted by research and education after the Second World War.

The Korea government pushed for the development of high agricultural production techniques for cultivating high yielding varieties in the 1970s, enabling the country to achieve self-sufficiency in rice production, while improving the country’s GDP.

“Kenya is on the same trajectory as it has embraced research and education in agriculture. That is why we are sharing our experiences so that we can learn from each other,” says KOPIA Kenya Centre Director Dr Kim Keejong.

Before the onset of the agricultural

Dr Kim says local farmers have increased poultry production from the South Korean experience.





KOPIA and KALRO work on projects demonstrating sustainable agricultural technologies.

village model project, the centre carries out a baseline survey of a chosen area to check the viability of the project in the region.

KOPIA customizes the technical needs of each country as the agricultural landscape differs on aspects such as climate. Through a collaborative work agreement with the Kenya Agricultural and Livestock Research Organization (KALRO), the KOPIA project has published maize production, chicken farming, rice cultivation, tomato production, cabbage cultivation and potato production manuals.

These handbooks are being used by farmers, schools, universities and other agricultural institutions at the rural model village level.

"Poultry farmers have increased their income from \$15.2 before the project to \$126.7 after three years. The farmers have adopted the model

village idea so well. Farmers have gone ahead to register groups with the help of researchers from KALRO and county governments," Kim says.

The project's main objective is to disseminate the localized technologies and practices to local farmers through demonstrations, and build better research capacity through exchange programmes for scientists and experts.

KOPIA's first project focused on poultry production – through the development of new feed formulation for smallholder poultry farmers and support for maize production through the development of new Maize Lethal Necrosis (MLN)-resistant varieties, and a handbook for standard cultivation methods for sweet potatoes and rice.

The second project focused on the development of a model village for increased income for small-scale

farmers through poultry and potato farming while the third project focuses on model villages, agricultural technologies, and interaction with skilled agricultural professionals.

Successful outputs from this initiative are beginning to take effect. KALRO Muguga researchers have come up with pocket-friendly poultry feeds and farmers from Embu and Tharaka Nithi are now mixing their own feed rations using KOPIA-KALRO technology.

Grace Njeri, a poultry farmer in Kerugoya, keeps indigenous chicken, which laid 20-30 eggs per year, but with the improved KALRO Kienyeji, she is now getting 200-250 eggs per chicken every year.

The Kenya government and the World Bank have adopted the model village system and chosen KALRO-KOPIA projects to train farmers from other parts of the country to implement the National Agricultural and Rural

Inclusive Growth Project (NARIGP) with county governments.

The KOPIA project also sends Kenyan farmers and researchers for agricultural training in Korea every year to gain first-hand knowledge of Korean agricultural technologies. On return, they transfer the acquired knowledge to other farmers. KOPIA also invites Korean experts in various agricultural fields to train the farmers.

Initially, communities used to store seed potatoes and potatoes for consumption in a manner that allowed potatoes to develop sprout and produce toxins, which were harmful for human consumption.

KOPIA has helped communities develop improved potato stores for a longer shelf life and better conditions for the seed. Motorbikes were purchased to help extension and communication services among community members.

The project also supports neighbouring primary schools by educating students on farming techniques. “We don’t expect all students to become farmers, but when we share techniques on farming, they form groups of 50 students and acquire knowledge on food sources.

“In Korea, some students living in big cities know what a potato is, but do not know where it comes from.

However, with exposure to village models, they are able to learn about various sources of food,” Kim says.

To ensure sustainability, KOPIA has a follow-up programme of at least two years after the end of every project where farmers follow all steps taught during the project period. The researchers have linked farmers with markets where they sell their produce.

As the Korean KOPIA village farm model gradually takes root, Kenya could witness progression towards a similar trajectory as that of Korea, a move that will spur economic growth, triggered by agricultural transformation.

High-yielding potatoes in rural farms have been one of the success stories of the KOPIA model.





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Innovations in Technology, Institutional and Extension Approaches towards Sustainable Agriculture and enhanced Food and Nutrition Security in Africa (InnovAfrica)

The main goal of InnovAfrica is to improve Food and Nutrition Security by integrating Sustainable Agriculture Intensification systems (SAIs)

InnovAfrica is a multi disciplinary and multi actor project implemented in 6 African case countries (Ethiopia, Kenya, Malawi, Rwanda, Tanzania and South Africa)



Main Outputs and Outcomes

Brachiaria - reintroduction of has reached nearly 20,000 farmers

Crop diversification through maize/millet-legume has provided multiple benefits to 40,000 farmers in Malawi, Ethiopia, South Africa and Tanzania

Village Knowledge Centre in Kenya case has enabled farmer networking and significantly increased farmer to farmer exchange of knowledge and adaptation

Stakeholder interaction through MAPs has strengthened science-stakeholder-policy linkage

Value Chain mapping has identified in key food actors, gaps and barriers and helped in linking the value chain actors, especially the markets

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Co-coordinator: Cathrine Ziyomo, BecA-ILRI Hub, C.Ziyomo@cgiar.org



This project has received funding from the European Union's H2020 Research and Innovation program under Grant Agreement No. 727201

SU movement transformed agriculture in South Korea

By Verenardo Meeme

South Korea's community-driven development movement Saemaul Undong (SU) was instrumental in driving agricultural reforms in the country pursued during the 1970s.

The movement, based on diligence, self-help, and cooperation, aimed at overcoming endemic rural poverty with food security given priority.

According to the Asian Development Bank, the SU movement was anchored on the Six-Year Rural Development Plan (1966-1971) that included a series of projects designed to increase rural household incomes.

SU movement's achievements included rehabilitation of village infrastructure, improvement in the overall rural living environment, and a significant increase in household income in three stages - basic infrastructure, development and dissemination.

Thanks to the upgrading of the agricultural production infrastructure

and introduction of high-yielding Indica and Japonica hybrid rice varieties, by the end of the 1970s, the Republic of Korea had overcome its chronic shortfall in the domestic supply of food.

Enhanced participation by women in the planning, execution, monitoring, and evaluation of community-driven development projects greatly helped in the country's agricultural transformation.

The Korean rural village movement concept is now being implemented in Kenya through the KOPIA agricultural model village as it seeks to learn from South Korea's remarkable journey of agricultural transformation.

The African Development Bank (AfDB) is encouraging African countries to adopt lessons from the structural transformation of Korea's agriculture pursued with the rapid growth in the economy and industrialization in the late 1960s, and also through the interaction between the agricultural and manufacturing sectors.

The AfDB's recommendation is contained in its African Economic Brief, Volume 7,

Issue 8 of 2016 titled 'Korean Experiences in Agricultural Development and Policy Proposals for Structural Transformation of African Agriculture and Rural Space (STAARS)'.

"The acceleration of urbanization due to economic growth led to an increase in the demand for agricultural products, and the farmers awakened witnessing the development of manufacturing and other industrial sectors, and the relevant advanced technologies were spread to the agriculture sector.

"Investment in social overhead capital such as roads, in the process of economic development, led to easier transportation of agricultural products, and the supply of farming materials such as fertilizers, thanks to the development of industry, contributed to the enhancement of agricultural productivity," states AfDB.

Korea's agricultural and rural development went through a three-staged development process (Table 1 below). From the 1960s to the 1970s, in the early stage of development during the pursuit of sustainable growth, the government directed policy

Rice paddy field in Gyeongju, South Korea, which overcome chronic hunger by upgrading infrastructure and introducing high-yielding Indica and Japonica rice varieties.

concentrating on food production and self-sufficiency in staple grains to address food shortages and poverty.

From the 1980s to mid-1990s, in the latter stage of development, the government focused on the enhancement of agricultural productivity, increasing agricultural household incomes and the improvement of the agricultural structure. After 2000, Korea's agriculture entered the 'global era' and faced the new environment of market opening and trade liberalization in agricultural products.

Korea's agriculture experienced a rural exodus due to rapid economic development in the 1970s, but managed to respond to the reduction in the rural workforce by increasing capital investment.

Without major changes in land input, the government increased the input of intermediary goods along with input of capital.

From 1970 to 2012, total agricultural output increased annually with the slow relative increase rate of output. As a result, Korea's actual labour productivity per household in agriculture was Korean Republic won (KRW) 2,465 per hour in 1970 and KRW 13,972 per hour in 2012, showing an increase index with 5.67 times in Table 2.

In comparison to some countries in Africa, recently, Tanzania's and Uganda's agricultural productivity has remained at a very low level due to lack of inputs, technological extension, and so on.

The agricultural productivity of sub-Saharan Africa in constant 2005 US dollars had increased from an average of USD 474 to 705. However, in the case of Uganda and Tanzania, it was stagnant at a low level that ranged from USD 275 to 355 in Tanzania and from USD 220 to 217 in Uganda as shown in Table 3 (World Bank, 2015).

Over the same period, agricultural productivity in Korea increased from USD 11,116 to 26,415.

Table 1. Agricultural development of Korea by period

	Earlier Development (1960s-1970s)	Later Development (1980s-1990s)	Globalization Era (2000s)
Economic policy	Poverty reduction Self-reliance economy	Economic growth Industrial development	Economic maturation Knowledge-based society
Goal of agricultural development	Agricultural production Self-sufficiency in staple food-grains	Enhancing agricultural productivity Creating farmers' income	Strengthening agricultural competitiveness Enhancing quality of rural life
Strategy of agricultural development	Seed improvement, Technology development and extension Food production	Fostering commercial farms Increasing off-farm income	Promoting sustainable agriculture Integrated rural development

Source: KSP team based on the literature.

Table 2. Trend of agricultural productivity in Korea

	1970	1980	1994	1995	2000	2010	2012
Labor productivity per household (KRW/hour)	2,465	3,506	10,540	9,593	11,017	15,480	13,972
(index)	(100)	(142)	(427)	(389)	(446)	(628)	(567)

Source: NH Economic Research Institute 2013.

Table 3. Recent agricultural productivity (constant 2005 US dollars)

	2000 (A)	2013 (B)	B/A (%)
World	1,066	1,377	129.2
Sub-Saharan Africa	474	705	148.3
Tanzania	275	355	129.1
Uganda	220	217	98.6
Korea	11,116	26,415	237.6

Source: World Bank, World Development Indicators

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The study of fish in the sea may be the most necessary of all our oceanographic researches because we shall increasingly be made to turn to the sea as a vast food producer by the increase in the population of the world.— **T.F. Gaskell**

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ILRI's One Health method to study zoonotic diseases

By Alberto Leny

As 2020 ended, the COVID-19 pandemic had directly infected over 70 million people, with over 1,700,000 deaths globally.

Experts contend that unidentified cases, unrecorded deaths, and a still poorly understood and characterised “tail” of chronic (ongoing) health effects resulting from COVID-19 mean that the direct burden of the disease is far higher than the figures suggest.

The destruction caused by the infectious disease known scientifically as severe acute

respiratory syndrome (SARS-Cov-2) has left profound damages to societies, economies, and environment in every corner of the world.

Now as the global community seeks to build back better after COVID-19, scientists say it is crucial to understand the transmission of zoonoses, the threats they pose to human health, and how to minimise the risk of further devastating outbreaks.

In their joint scientific report, Preventing the Next Pandemic: Zoonotic diseases and how to break

the chain of transmission launched last July, the UN Environment Programme (UNEP) and the International Livestock Research Institute (ILRI) identified seven trends driving the increasing emergence of zoonotic diseases - those which jump between animal and human populations.

UNEP and ILRI through the report offered ten practical steps that governments can take to prevent future zoonotic outbreaks.

The report highlights key anthropogenic drivers for the emergence of zoonoses, from



Livestock market in Wajir, Kenya. People can acquire zoonoses through direct or indirect contact with animals or from livestock products. Photo: Riccardo Gangale, ILRI

agricultural intensification and increased demand for animal protein to the conversion of land and climate change.

Zoonosis is an infectious disease that has jumped from a non-human animal to humans. Zoonotic pathogens may be bacterial, viral or parasitic, or may involve unconventional agents and can spread to humans through direct contact or through food, water or the environment.

Past zoonoses have included bird flu, SARS, MERS-CoV and Ebola.

The UNEP-ILRI report also outlined

some of the key policy options that can be taken to reduce the risk of the emerging zoonoses and future pandemics.

The options include regulating and monitoring traditional food markets, incentivizing the legal wildlife trade and animal husbandry to adopt zoonotic control measures, and further promoting the One Health approach.

First, a historical background of the emergence of this disease that has caused so much misery and untold damage on humanity across the globe.

The virus is believed to have emerged in a wet market in Central China, but it is not the first to pass from animals to humans.

People can acquire zoonoses from direct or indirect contact with animals and from livestock products. In some cases, when a disease jumps from animals to humans it becomes adapted to humans as it spreads as a human-only disease.

Experts say HIV was originally a zoonotic disease which mutated to become a human-to-human disease. In other cases, such as rabies, animals remain the source of infection.

Scientists have also observed that zoonoses are more common than most

people realize, stating that on average a new zoonosis emerges every four months, although few in recent history have been as globally threatening as COVID-19.

The emergence of COVID-19 underlines the importance of taking a One Health approach based on the premise that animal and human health and the ecosystems they share are inextricably linked and must be addressed together. Animal health systems remain poorly resourced to contribute effectively to One Health interventions.

"Until we start thinking of human and animal health as linked, another coronavirus is inevitable," ILRI Director-General Jimmy Smith warned in an op-ed published in the Independent on February 26, around the time the World Health Organization (WHO) declared COVID-19 a pandemic.

"There is a better way, he continued. "Instead of seeing zoonotic disease outbreaks as discrete, unpredictable events – the microbial equivalents of hurricanes or earthquakes – governments and health authorities should start thinking about them more systematically."

He says zoonotics do not emerge from nowhere, but are predictable consequences of the ever-intensifying interactions between humans, animals and the natural world, many of them the result of positive global developments such as growing wealth, urbanization and mobility in the developing world.

However, those developments have not always translated into better policymaking. That is why Smith argues that we should adopt what scientists call a 'One Health' approach, based on the simple premise that human health and the ecosystems they share are inextricably linked.

The idea originated in the 1960s and received renewed attention in the 2000s, with the emergence of SARS and a highly pathogenic variety of bird flu.

The problem, the experts point out,

is that the broad scientific consensus around the concept has not led to a corresponding institutional response – at least not on the scale that is necessary. Medical and veterinary authorities too often still operate in separate domains.

"Our health systems still divide the world into neat categories: doctors take care of humans, veterinarians of animals, environmentalists of ecosystems," wrote Smith.

He proposed various remedies such as more surveillance and monitoring of animal diseases, better vaccination and food safety programmes, and more work on the broad array of issues that arise out of the interactions between people and animals, such as antimicrobial resistance, foodborne diseases and poor animal health.

"It's odd that when it comes to zoonotic diseases, humans seem to be serving the sentinel species - the canary alerting us to the dangers in the mine," he cautioned.

Scientists note that animal health systems remain poorly resourced to contribute effectively to One Health interventions. For the system to work, the ILRI-UNEP report states that we need to understand that society and people are at the centre.

"Our choices about human, animal and ecosystems health drive the present system." COVID-19 has wrought severe health and economic consequences worldwide, with severe repercussions.

It has placed extraordinary stress on food and nutrition security, agriculture, gender equality and global food systems. Traditional markets that sell fresh meat, fish and other goods that can spoil, as well as consuming of wild animal or bushmeat, have come under increased scrutiny.

However, a global policy overreaction such as an outright ban on wet markets could jeopardize livelihoods and food security and, perversely, lead to greater long-term health risks.

A new report by the Lancet Countdown

2020 initiative, states that the COVID-19 pandemic and climate change represent converging challenges to which no continent, country or community is immune.

"Aligning the global COVID-19 recovery with our response to climate change offers the chance to protect health, promote a sustainable economy and preserve our planet," state the experts.

Their key message is that no country – whether rich or poor – is immune from the health impacts of climate change. Failure to tackle these converging issues in tandem would move the world's 1.5C target out of reach, damaging the health of the world's 7.8 billion citizens in the short- and long-term.

"Right now, people around the world face increasing extremes of heat, food and water insecurity, and changing patterns of infectious diseases.

"Unless urgent action is taken, the health impacts of climate change will bring further disruption, threaten lives and livelihoods and compromise the hospitals and clinics we depend on."

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*It's odd that
when it comes to
zoonotic diseases,
humans seem to
be serving the
sentinel species*

- Jimmy Smith

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Antibiotics misuse haunting livestock farmers in Africa

By John Njeru

Antibiotics have been used in the treatment of a wide range of infections in animals and humans. Before antibiotics, a small wound infection, diarrhoea, chest infection, skin infection, sexually transmitted disease often ended in a life-threatening condition.

The antibiotic revolution was kicked off in 1928 when Alexander Fleming

found a weird-looking mold growing in a dish he had left by an open window. This discovery led to the discovery of the 'magical drug', an antibiotic called penicillin. Since then researchers have discovered numerous antibiotics, many of which are a modification/improvement of the parent.

While several antibiotics continue to save lives the age of the 'magical drug' is fast approaching the end.

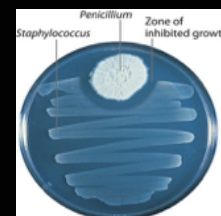


Figure 1 showing killing of microbe (Staphylococcus) by Fungus Penicillium (due to the antibiotic penicillin there- in) as discovered by Alexander Fleming

Source: MUIB made up in Britain

How antibiotic misuse/overuse is a problem for human and animal health

Data from several African studies show that between 2000 and 2017, most of the world's antibiotics were readily available over the counter without prescription. As a consequence, a 65% rise in antibiotic use was reported in 2019.

One study found that 90% of households in Kibera, Kenya had used antibiotics in the previous year, compared to about 17% for a typical American family.

Some of the factors driving antibiotic access and misuse include use without proper diagnosis of infection, inappropriate prescription practices by health and non-health personnel, unregulated supply chains for medical drugs, self-medication, sharing of antibiotics among family members, and use of substandard/counterfeit or drugs with questionable pharmacological quality.

Dispensing of incomplete dosage based upon the patient's ability to pay and storing the antibiotics for use during future infections when signs and symptoms begin to subside after an initial favorable therapeutic response are also common.

These lead to the patients taking suboptimal dosage of the drug thus exerting selective pressure on microorganisms, which in turn develop antibiotic resistance to the drug used.

Rearing animals for food takes time and hard work to maintain their health and well-being. Just as in humans, farm animals sometimes get sick and require drugs to treat infections.

Misuse and overuse of antibiotics is similarly rampant among livestock farmers in Africa in the treatment of the ever-widening spectra of livestock tropical infectious diseases.

Previous studies have frequently reported empirical use of antibiotics in treatment of viral and parasitic diseases among livestock farmers in Africa. Under such circumstances, the antibiotics have minimal efficacy if any, in treatment of such diseases.

Moreover, there is growing evidence of immense prophylactic use of antibiotics in order to prevent future infections in food

animals. For instance, when one animal gets an infection, prophylactic antibiotics are given to the entire herd.

Other farmers use antibiotics as growth promoters in food animal breeding. In many developing countries, prophylactic use of antibiotics in farming is banned, but this practice is still common in Africa.

Microbes such as *Staphylococcus*, *Enterobacteriaceae*, *Pseudomonas*, *streptococcus* and *Clostridium* among others have been widely reported to develop resistance to commonly used/misused/overused antibiotics.

Bacteria are able to mutate promptly to acquire genes horizontally and to 'mobilize' the necessary mechanisms for their survival if subjected to an unconducive environment such as a 'harmful antibiotic environment'.

Unfortunately, when a drug resistant bug emerges, the resistant bacteria can then be transferred across the animal-human-environment interface, mainly through the consumption of food or through direct contact with food-producing animals or through environmental spread (e.g. sewage and runoff water from agricultural sites).

The World Health Organization (WHO) recently predicted that worldwide death rates from drug-resistant bugs will rise

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A growing evidence from African studies shows that CRB are likely to be distributed across the continent.

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from the current 700,000 per year to 10 million by 2050.

With no measure, these deaths will surpass those attributed to cancer, heart disease and diabetes to become a major cause of death in humans.

Advice on which antibiotics to use for common infections and which to preserve for the most serious conditions is regularly updated taking into account the resistance trends.

Delving further into the present Carbapenem antibiotics are broad-spectrum antibiotics with antibacterial



Misuse and overuse of antibiotic is rampant among livestock farmers in Africa in the treatment of the ever-widening spectra of livestock tropical infectious diseases.
Photo: Germán Miranda/IPS

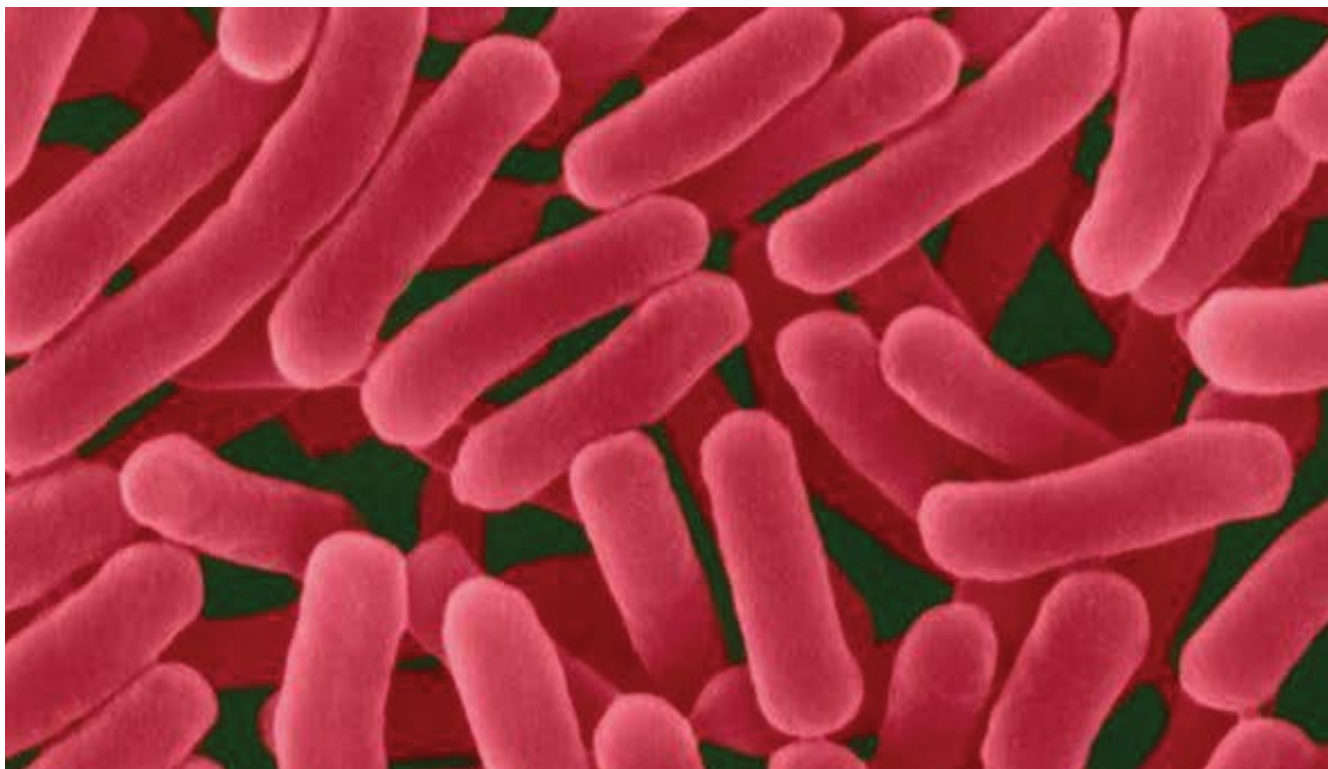


Figure showing a *Salmonella typhi* (A microbe that causes Typhoid fever). The Microbe is resistant to seven out of eight commonly used antibiotic for the treatment of the disease

activity against a wide variety of bacterial agents known to infect humans and animals.

They are more stable against inactivation by many-lactamases and are relatively well tolerated with comparatively fewer adverse effects. Alternatives to treatment with carbapenems for multi-drug resistant (MDR) infections are most often less effective and/or more toxic. Carbapenems are thus among the reserved last resort class of antibiotics.

Presently, carbapenems are reservedly used in the treatment of MDR infections in many developed countries. However, high prevalence of resistance to carbapenem is frequently being reported in those countries, while emerging evidence of global spread of carbapenem resistant bacteria (CRB) is apparent.

In particular, the findings from previous studies demonstrate a rapid and geographically extended dissemination of CRB, causing serious outbreaks and dramatically limiting treatment options.

Similarly, a growing evidence from African studies shows that CRB are likely to be distributed across the continent. Recently, gram negative CRB have been reported in Chad, Egypt, Kenya, Nigeria, Tanzania, Tunisia and Uganda. However, up to the time of writing this article, the cases have mainly been detected at low to moderate levels in African countries.

It is unclear if the reported CRB - caused infections were as result of an outbreak or a sporadic occurrence. Nevertheless, these data clearly shows that carbapenem resistance (CR) is fast emerging and spreading in Africa despite its limited access.

Several studies from developed countries have already characterized the prevalence and distribution and genetic variants of each genetic determinant of carbapenem resistance in humans and to some extent in livestock.

Worryingly, these variants and their molecular epidemiology are yet to be comprehensively documented in Africa.

For these reasons, the emergence and rapid spread through all continents of carbapenem resistance mainly among Gram-negative bacteria constitutes a global public-health challenge of major importance.

There is need to generate quality data in the continent about the molecular epidemiology of CRB and its burden on the health care system, document drivers of CRB development and spread and the prevalence in livestock and their products along the value chains.

Such knowledge will be key in formulating targeted policies on the rational use of carbapenems and strategies to control the emergence and spread of CRB.

This will be important because carbapenems are expected to become cheaper and readily available after their respective patents expire.

John Njeru is a scientist at the Kenya Medical Research Institute (KEMRI)

Climate-smart Brachiaria grass boosts productivity

By Donald Njarui, Elias Gichangi and Sita Ghimire

Livestock production currently accounts on average about 35% of agricultural gross domestic product (GDP) in Sub-Saharan Africa (SSA).

Livestock is strategically important to the continent's food and nutritional security, income generation, employment and livelihood of millions of people including stallholder farmers. Livestock productivity in SSA is among the lowest in the world due to several challenges related to nutrition, health, and genetics. The most important constraint is a low quality and seasonal scarcity of feeds, which become severe during the dry season.

Many initiatives to exploit improved genetics and better veterinary services for increasing livestock productivity in SSA have been less effective because of seasonal scarcity and poor-quality feed resources.

Overgrazing and poor pasture management have led to decline in palatable forage plant species, increased shrub land and degraded habitat.

Lack of suitable forage options that are better adapted and resilient to abiotic (edaphic and climate) and biotic (pests and diseases) stress factors also contribute to low productivity.

The escalating impact of climate change has exacerbated the feed situation leading to reduced yield,

changes in composition of vegetation and overall herbage quality.

In the regions where commercial dairy farming is predominant, farmers have limited options of productive and climate resilient forages.

For example, in Kenya, over 90% of dairy farmers depends on Napier grass for their cattle but during the dry season, crop residues form the major component of the feed.

Due to overreliance on Napier grass for a long period, it has become susceptible to pest and diseases, which cause yield reduction of up to 90%.

On the other hand, crop residues are generally of low quality with crude protein of less than 4 percent, which is not even adequate

Brachiaria grass growing in Kenya





Cows grazing on Bracharia Grass

to meet the animal maintenance requirements.

Improved forages

Improved forages constitute promising innovative technology that offers a pathway to minimize feed scarcity and boost livestock productivity. Bracharia grass is a new forage option with a high potential to improve livestock productivity in SSA.

It is commercialized in Australia, Asia and South America where it has greatly transformed the beef and dairy industries. Although Bracharia grass originates from Africa, its contribution to livestock productivity has been negligible.

Benefits of Bracharia grass

Bracharia grass is high yielding with annual yield potential of 30 tonnes dry matter/hectare under good management. Cultivars with perennial growth habit have a productive life of up to 20 years.

Bracharia is well adapted to drought and low fertility acid soils. It contains more crude protein than Napier grass, is highly palatable and gives higher livestock productivity.

Research conducted by Kenya Agricultural and Livestock Research Organization (KALRO) with smallholder farmers showed that Bracharia grass increased milk production by up to 40%.

This demonstrates its important roles in food and nutritional security, generation of income and improved livelihoods.

This study also revealed that due to its deep and abundant root systems it has ability to fix large amount of organic carbon in soil and thus contribute to reduction of greenhouse gas (GHG) emission and provide other environmental benefits.

Moreover, because it easy to digest, animals produce less amount of GHG, making it superior to most of other native grasses.

Bracharia is less hairy and stemmy than Napier grass and making it attractive for cut-and-carry feeding system.

However, it is suitable for grazing directly by livestock or can be harvested and conserved as either hay or silage for dry season feeding. It highly persistent thus recovery and regrowth after each grazing/cutting is vigorous.

Up-scaling Bracharia grass

To achieve sustainable food and nutrition security in Africa, the European Union-funded project 'Innovations in Technology, Institutional and Extension Approaches towards Sustainable Agriculture and Enhanced Food, and Nutrition Security in Africa

(InnovAfrica)' has been testing and integrating Bracharia technology among smallholder farmers in SSA.

Using innovative institutional approaches and extension and advisory services, the InnovAfrica project involves six African countries, with Kenya, Rwanda and Tanzania participating in the up-scaling of Bracharia grass – dairy value chain component.

The project is promoting four Bracharia grass cultivars, Basilisk, MG-4, Piata and Xaraes. These cultivars have broad agro-ecological adaptation, from sea level to 2300 metres above sea level and can be cultivated in areas which receive an average minimum annual rainfall of 700 mm and dry spell of no longer than four months.

In Kenya and Tanzania, InnovAfrica has adopted innovative extension advisory services, the Village Knowledge Centre (VKC) to upscale the Bracharia grass among livestock farmers.

The VKC uses information and communication technology (ICT) digital based platforms, which make use of smart phone and social media for efficient and effective information and knowledge exchange.

The social media platforms, WhatsApp and SMS have been created for networking among farmers, extension agents and researchers and for capacity building. Through the VKC, there has been increased access of information and knowledge on Bracharia grass management, conservation and on livestock feeding and improved access of seeds to farmers.

Within three years of project implementation, Bracharia grass technology has benefitted over 20,000 smallholder livestock farmers in Kenya, Tanzania, and Rwanda.

Donald Njarui and Elias Gichangi are researchers at -Kenya Agricultural & Livestock Research Organization (KALRO)

Ghimire Sita is a researcher at - International Livestock Research Institute (ILRI)



John Njoroge with one of his prized cows

Milking fruitful lessons from unique dairy farm

Rotooba Managing Editor Alberto Leny and Photographer Kinoti Manyara tour prize-winning farmer John Njoroge's Sprout Dairy Farm in Kiminini near Kitale in Kenya, a model success story and prime learning hub of urban farming for many agricultural institutions, researchers and farmers. Njoroge's farm produces over 1,000 litres of milk a day, supplied to a leading Kenyan dairy firm.



Farm manager Nelson Wafula during one of the milking sessions.

From a humble background as a petrol station pump attendant, John Njoroge has grown from modest dairy farming beginnings to transform his Sprout Dairy Farm into a top cream model centre of excellence in Kenya.

No one would have imagined when he started in 2012 with one cow and one calf bought from a successful dairy farmer in Kiminini on the outskirts of Kitale, that just six years later he would become a celebrated dairy farmer rearing prime breeds.

Njoroge shot into celebrity status in December 2018 when Kenya's President Uhuru Kenyatta bought a champion bull from his Sprout Dairy Farm for Sh1.15 million during the inaugural Narok County Livestock Show and Auction.

So impressed was the President, himself a livestock breeder, with the quality of Njoroge's bull that he was keen to find out how he had managed to achieve such a remarkable feat. "The President was so impressed with the bull that weighed 1.5 tons," Njoroge recalls beaming with pride, "he said he had never seen such a big bull!"

Njoroge's success had already caught the attention of the local farming fraternity, including the Trans Nzoia County department of agriculture and national

government officials.

On the day Njoroge granted us an interview, he had just hosted a powerful delegation of agriculture officials on a tour of his one-acre farm that is today an established centre of learning for farmers across the region and neighbouring countries.

The farm manager, Nelson Wafula, gave us a brief introduction as we marveled at how they have achieved such a high level of output within a farm occupying a one-acre space where Njoroge also lives.

Njoroge attaches a personal identity to each of his cows, whose names include notable figures Uhuru, Raila, Ruto, Chebukati, Chiloba and Kura.

When we visited, Sprout Dairy Farm had 100 Ayrshire and Friesian cows and 58 Doper sheep. Wafula reveals the secret of the success of the farm – the feeding programme for the cows. This elaborate process begins from the shamba where acres of maize are planted and harvested when green before maturing and delivered to Sprout Dairies where it is transformed into silage.

At no one time should the cows lack feed, the manager says, adding that they have to make sure they have

enough stocks.

Next he took us to the food supplements store and if you thought that human beings need a balanced diet, sample what goes into the cows' menu: carbohydrates, maize germ, wheat bran, maize protein supplement, soya seeds, canola, cotton seed cake, fish meal, mineral supplements, Diamond V, dairy premix, natizyne, DCB, Twiga Max, Maziwa and Mepron Yeast.

All these must be in the formation of the animal feed that includes a toxin binder to neutralize the aflatoxin in the dairy meal when it overstates due to the fluctuation of cold and humidity.

Each cow consumes 18kg of feed daily, calves 2kg and bulls, which spend a lot of time resting, 9kg. The feed also contains maize from the cob together with the seed grinded with a grain crusher. The sheep consume 14kg in the morning and another 14kg in the evening.

The maize silage includes the stem, leaves, and the sugar from the young maize cob. There are three types of storage – underground silage, own surface dupes silage and drum silage.

After being compressed for one week and soil placed on top and properly covered with polythene, it can even stay for ten years without going bad.

The maize silage and hay is fed to the lactating cows, while the dry cows are fed on silage, hay and meal concentrate. The calving cows on silage, hay and low calcium/phosphorous dairy meal. Calves below

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Four lactators at Sprout Dairies (Gathoni, Queen, Riziki and Solai) are high yielders, producing 50-55 litres a day.

LL



Four lactators including this one are high yielders, producing 50-55 litres a day.

three months (one to three months) feed on milk, silage and calf meal (high proteins, carbohydrates and reduced mineral levels).

The sheep are separated in partitions for feeding, with lactators, expectant sheep and dry sheep staying with the calves. Three males stay in each partitioning. They are fed on hay, sheep meal, maize germ, wheat bran, maize meal and protein supplement, seed cake, soya seeds, sunflower seed cake, mineral supplements, beef salt (copper amount in the minerals is not high).

Sprout Dairy is a truly mixed farm with geese, turkey, chicken, and guinea fowl serving an important duty of raking the cows' beddings after feeding to aerate them.

Cowsheds are sprayed once a month with a knapsack or car wash ordinary crush.

The cows' dropping (dung) has a ready market after every 24 hours and the farm produces 10 tons every day.

There is a clean supply of water harvested in gutters and pipes fed into an underground tank and treated with rock alarm and chlorine. During the dry season, water is drawn from the river pumped into the underground tank and treated before watering the livestock.

All the cows' details and history are

meticulously recorded in a register, milking records for lactators from birth to dry cows and in-calf heifers' record of breeding and treatment.

A veterinary doctor is on standby 24/7 to treat the animals. The most common ailment is a cold/sneeze. Steaming cows six to nine months pregnant are confined to a maternity ward. Calving down cows going into pregnancy have their udders hanging or attached to prevent mastitis. Raila was eight months pregnant when we visited.

The semen for breeding is imported from USA and Germany. Four lactators (Gathoni, Queen, Riziki and Solai) are high yielders, producing 50-55 litres a day. Another 16 average 40 litres and ten produce 35 litres for a total of 1,060 litres a day output.

Machine milking is done three times – 4am, noon and 5.30pm and the milking parlour is limited to four cows per pen. There is a mastitis detection strip for every milking. If there is clotting in a drop of milk, mastitis is suspected and treated with a disinfection mastrite. The milk is then weighed and recorded for each cow before being transferred to cans, draughts and coolers, ready for dispatch.

Njoroge recalls how he started with one cow and one calf. After six months he bought four more, bringing this to six, his initial herd. .

His business acumen and instinct for quality breeding saw Njoroge breed his herd to 30 cows.

Today Sprout Dairies has become one of the most successful urban dairy farms in Kenya, a center of excellence, a model learning hub for national and county government agricultural institutions, researchers and farmers.

"We receive many researchers and students keen to learn about modern dairy farming methods," said Njoroge shortly after meeting some farmers from Uganda who wanted to buy cows from his farm.

Njoroge assures potential dairy farmers of a good return on investments. "Apart from my passion for dairy farming, it is a good investment and I encourage Kenyans to take it seriously as an agribusiness venture. It is also an important avenue for job creation."

He tells prospective dairy farmers to start small and build up slowly, reminding them that the number one requirement is animal feed, followed by housing and cleanliness.

Double trouble for beast of burden killed for food

By Marion Wagaki

The drastic decline in the population of donkeys in Kenya has raised an outcry among local and international animal rights activists, prompting government intervention. From a population of 1.8 million donkeys in 2010, this has dropped to below 1.2 million, mainly due to the ill-fated 2012 government decision to allow their slaughter for meat and hides.

According to official figures, 301,977

donkeys were slaughtered between 2016 and 2018 by the four licensed slaughterhouses in the country. The figure could be higher because of unreported cases.

The rapid decline in the population of donkeys left lobbyists and farmers baying for the shutting down of the slaughterhouses in a bid to protect the prized domesticated animals.

Prompted by the raging protests, Agriculture, Livestock, Fisheries and Cooperatives Cabinet Secretary Peter

Munya in February 2020 banned abattoirs from slaughtering donkeys.

The CS said the 2012 decision that legalised trade in donkey meat and hide to meet growing demand in China had been a mistake as it had caused their population to fall.

There is a huge demand for donkey skin in China where the skins are boiled to produce gelatine, an essential ingredient in Chinese 'ejiao' products - popular health foods and traditional medicine. The ejiao

The drastic decline in the population of donkeys in Kenya is mainly due to the ill-fated 2012 government decision to allow their slaughter for meat and hides.



products can sell for up to \$400.

UK-based charity The Donkey Sanctuary estimates that 1.8 million skins are traded every year, but the demand is as high as 10 million. According to government data, China's donkey population dropped from 11 million in 1990 to three million today.

Botswana, Burkina Faso, Mali, Niger, Senegal, Tanzania and Uganda have also joined Kenya in banning donkey products to China.

The mass slaughtering of donkeys had also spawned a black market in Kenya, with skin-smuggling networks hiring gangs to steal donkeys. The value of an adult donkey more than quadrupled.

Women and men from farming communities had protested outside Munya's offices demanding action to protect the donkey population. Some carried a placard that read: "When donkeys are stolen or killed, women are turned into donkeys."

Other than their increased decline due to the ravishing appetite of consumers back home, abattoir owners, mainly originating from China, piled on the woes bedeviling the beast of burden.

Donkeys play a key role in Kenya's agricultural economy and about 75% are working animals used in transport and farming, fetching water, firewood, carrying farm produce and other goods.

Despite the vital role they play in the rural and pastoral economy, nearly 40% of the working donkey population is suffering under disturbing conditions, suffering from work-related injuries, malnutrition and lameness.

With the decline in numbers aggravated during the slaughter

spree, donkey farmers expressed fears that their herds would be wiped out if the trend continues.

The farmers, through the Alliance for Donkey Welfare Organizations in Kenya (ADWOK) have urged the government to maintain the ban on the slaughter of donkeys, calling for increased vigilance on the activities of the slaughterhouses.

Farming Systems Kenya Executive Director Dr Raphael Kinoti says the increase in global demand for donkey skin had led to the establishment and licensing of four export slaughter houses in the country between 2016 and 2018.

"The licensed slaughterhouses in four counties include Goldox Kenya Ltd in Baringo County, Star Brilliant Donkey Abattoir in Nakuru County, Silzha Ltd in Turkana County and Fuhai Machakos Trading Co. Ltd in Kithyoko, Machakos County," explained Kinoti.

Kinoti says research conducted by Kenya Agricultural and Livestock Research Organization (KALRO) in 2019 showed that donkey keepers and users whose livelihoods depended on the donkey earn an average of Sh11,390 per month from providing transportation services.

"The 2019 census shows that the country has a population of 1.8 million donkeys and within the three years, it lost a third of that population from both licensed and bush slaughter of the animals," notes Kinoti.

Speaking in Nairobi during a forum on the update on the ban of donkey slaughter, Kinoti said that in a day, 1,200 donkeys could be slaughtered and in a very short time their population would be decimated.

He said the problem of donkey theft begun when community members

were willing to sell their animals due to the attractive prices they fetched from brokers to the slaughterhouses.

CS Munya revoked the licences of the four main donkey slaughterhouses, giving them a one-month notice to shift to handling other animals like sheep, goats and cattle.

According to Kiambu Donkeys Owners Association Chair, Leonard Kagwi, the government in 1999 gazetted the donkey as a food animal with the aim of curbing bush slaughter and improving food security. He says increased demand for donkey skin from global markets threatens the existence of the animal.

"The annual rate of 5.1 percent of donkeys slaughtered is five times higher than the annual population growth rate that stands at 1.4 percent. This is a devastating state of affairs for the donkey farmers mainly because it is reducing the country's donkey population," says Kagwi.

Lucy Erika a donkey farmer from Turkana says donkeys play a crucial role in the hard terrain as it acts as an ambulance to take the sick and elderly to hospital, and helps in carrying their belongings as they migrate in search of pasture and water.

"The slaughter of donkeys has brought insecurity in our communities and rendered us vulnerable because when one wants to steal your donkeys, they most likely will hurt you or kill you so that they can take away the animals," said Erika.

There are more than 40 million donkeys in the world, mostly in developing countries, where they are used principally as draught or pack animals. Working donkeys are often associated with those living at or below subsistence levels. Small numbers of donkeys are kept for breeding or as pets in developed countries.

Ethiopia's thriving leather industry needs a new boot

By Wandera Ojanji

Ethiopia's leather industry has experienced remarkable transformation over the last two decades to become an important and strategic sector in the country's social, economic and industrial growth.

This tremendous growth of the Ethiopian labour industry has largely been attributed to the abundance of raw materials, favourable government policies and incentives to foreign direct investments (FDIs).

With about 57.83 million cattle, 28.04 million sheep and 28.61 million head of goats, Ethiopia has the largest

cattle population in Africa and the second largest total population of livestock in Africa (after Nigeria), ranking eighth globally.

Livestock keepers help the country produce about eight million cowhides, 12 million sheepskins and eight million goatskins annually. Ethiopian hides and skins, especially those from highland sheepskins have a worldwide reputation for quality, thickness, flexibility, strength, compact structure, and a clean inner surface.

To discourage export of hides and skins and boost exports of value-

added products, the Ethiopian government in 2008 imposed 150% taxation on semi-processed leather exports. Before 2008, tanneries exported large quantities of wet blue and semi-processed skins.

This development strategy created a path for the transformation of the local leather industry, which mostly consists of transforming leather into shoes, leather garments, stitched upholstery, backpacks, handbags, luggage, travel goods, purses and gloves.

To attract FDIs, the Ethiopian government went further and

Workers arrange shoes made at a factory established through foreign direct investment policies adopted by the Ethiopian government.





Friendship Tannery PLC in Mojo, Ethiopia produces finished leather for shoes, bags, gloves and sofa.

provided a four or five-year tax holiday for companies who invest in the country to export finished leather products or a duty-free import of machinery for these companies.

These incentives have made a great impact on the country's leather sector, attracting more than 75 domestic and foreign leather and leather product factories to invest in Ethiopia.

There are 36 tanneries, all of them owned by the private sector, which process about 20 million skins and two million hides every year. Finished leather products such as shoes now form the bulk of leather exports. Leather exports, which stood at \$23 million in 2013, reached \$133 million in 2018.

The leather sector has attracted all kinds of players, from small-scale artisans manufacturing low-price leather goods such as wallets, shoes, and bags to medium and high-scale highly branded leather manufacturers such as Zaaf, Meron Addis Ababa, Sabegn and Kuncho leather producing branded wears and professional accessories.

One of the largest shoe exporters in China – Huajian – set up a factory in Ethiopia in 2011, as part of a plan to invest US\$2 billion over 10 years in developing manufacturing clusters focused on shoemaking for export.

The company produces shoes for brands such as Guess and Calvin Klein and hopes to see its exports from Ethiopia reach US\$4 billion within 10 years.

The Japanese manufacturer Hiroki Co. Ltd set up a \$400,000 manufacturing operation in Ethiopia, where it produces shoes and other luxury accessories made from leather.

The Ethiopian shoe industry has grown exponentially both in production and export, producing 24 million pairs for the local and export market from leather and non-leather materials. However, only 3.54 million pairs are exported to the international market, 95% of them from leather, with 91% of the export done through FDI.

The largest markets for high quality leather goods remain Europe and the

United States. The USA alone has bought more than two million Ethiopian leather shoes in the last few years.

The policy change has since attracted four glove factories, one local and three FDIs. Exports have grown from zero in 2012 to \$6 million in 2018, and it is still growing.

However, despite the strong raw materials base and government incentives, experts believe the sector is yet to be fully tapped and is actually underperforming. Only 50% of hides and skins potential is being utilized currently.

Indeed, the sector failed to realise the government targets during the First Growth and Transformation Plan (GTPI 2010/11-2014/15) and the Second Growth and Transformation Plan (GTPII 2015/2016 – 2019/2020).

But why is the Ethiopian leather sector underperforming?

The main problem lies in the collection and processing of its rich supply of hides and skins. This resource is not valued as a raw material for the leather industry and is perceived more as a by-product of meat or simply as waste, mainly due to structural problems occurring throughout the value chain of leather products.

Nearly 80% of raw hides and skins transacted in the formal market are derived from the rural areas, and only 20% are collected from abattoirs and slaughterhouses in large cities and towns. In the rural areas, even the meat itself is not the main purpose of animal husbandry, because the farmer needs his animal(s) as productive assets - as draught power and milk provision - more than the income he could earn if he sold them into the market.

Thus, large numbers of animals are held for five to seven years or more to meet these purposes and animals this old do not produce the best meat and their hides are usually so worn that they have limited value to the leather industry.

Availability of hides and skins for processing is therefore determined by the rate of meat consumption. Consequently, the supply of hides and skins is much

lower than its full potential, mainly due to a weak meat industry characterised by low off-take rates (7% for cattle, 33% for sheep and 37% for goat).

These low off-taker rates are attributed to two main factors: First, the high livestock death rate, which is double the African average. According to the Agricultural Growth Project - Livestock Market Development Value Chain analysis for Ethiopia, the death rate was 10% for cattle, 19% for sheep and 20% for goats.

Second, meat consumption in Ethiopia is one of the lowest in Africa due to the low per capita incomes, high domestic meat prices and the Orthodox Christians fasting period, which means that 43% of the population does not consume meat products for over 200 days in a year. This reduces aggregate demand by 20 to 35%.

The quality of this supply is further limited by structural problems related to the skins' complex marketing channels and to the non-transmission of price signals from the tannery level to the farmers.

Most of the rural slaughter of livestock is carried out under very poor conditions. Goats and sheep are slaughtered mainly on slabs in homesteads, while cattle are slaughtered in poorly equipped slaughter points, usually located near butchers' shops in trading centres, where the infrastructure is sometimes a slab of concrete under a tree, or poles used to hoist carcasses.

The tools are usually rudimentary and cause damage to the hides and skins. Peri-slaughter (ripping and flaying damage) and post-slaughter (abrasion, damage by pests and molds, and inappropriate curing methods) damages

the skins before entering tanneries. Peri-slaughter damage accounts for 20% of the defects in hides and skins.

Overcoming these difficulties requires substantial changes in current traditional husbandry practices, their sanitary conditions and the handling practices of the skins entering tanneries.

Ethiopian tanneries still have strong difficulties producing finished leather to meet quality standards allowing either tanneries or Ethiopian leather manufacturers to directly enter the highly competitive international market.

The main exporters of high-end leather are Argentina, France, Australia and the USA. These countries have undeniably a higher quality of finished leather and are closer to the consumption market, thus more anchored in the fashion segment.

Another factor making the Ethiopian leather industry underperform, though not of its own making, is the large volumes of imports of footwear from Asia and second-hand shoes from Europe and North America that are seriously affecting the local shoe manufacturing industry. The level of total import penetration of shoes is 73.3% for the whole of Africa.

This gap between resources and production shows the considerable potential of the Ethiopian leather industry. Reducing this gap is especially critical for the economic and industrial development of Ethiopia.

Not only does this sector have an excellent and renewable resource base, but it is also labour-intensive, with the potential to become a major source of employment all along its supply chain.

High quality shoes, boots, wallets, belts are among the ready leather products for the export market.





The Black Soldier Fly has been evaluated for its nutritive characteristics and safety to human health.

Black Soldier Fly leads insects' livestock feed

By Kanegeni NN, Muia JMK, Sambu S, Ndungu M and Ndirangu M

The livestock sub-sector contributes about 12% of Kenya's national gross domestic product (GDP), accounts for 30% of the total marketed agricultural products, and employs 50% of the agricultural labour force.

The fisheries and aquaculture industry contributes about 0.8% to the GDP, provides direct employment opportunities to over 500,000 people and supports over two million people indirectly.

The aquaculture systems recorded production of 24,096 metric tons in 2014 but have a far greater capacity of over 11 million tons per year.

In Africa, livestock production currently accounts for about 30% of the gross value of agricultural

production. However, production is struggling to keep up with the demands of expanding human populations, the rise in urbanization and the associated shifts in diet habits.

High costs of feed hinder the livestock sector from attaining potential output to meet rising demand.

Insects have been identified as potential alternatives to the conventionally used protein sources in livestock feed due to their rich nutrient content and the fact that they can be reared on decomposing organic matter.

Many insects including the Black Soldier Fly (BSF) have been evaluated for their nutritive characteristics as well as safety to human health. The BSF (*Hermetia illucens*) belongs to

the dipteran family *Stratiomyidae*. It is encountered in nature worldwide in the tropical and sub-tropical areas between the latitudes of 40 degrees south and 45 degrees north. The BSF is an effective biological tool in waste management. It is known to reduce organic waste by up to 80% depending on the waste type and source.

This organic matter biomass reduction process provides nutrient-rich organic manure that enhances soil fertility while improving soil structure and many other benefits. The fly was recruited in recent years to address nutritional challenges in livestock.

Initially, commercial feed formulation heavily depended on Silverfish as the main protein supplement. This is no



BSF rearing house. The house is a modified green house to raise temperature to optimal levels.

longer tenable because of overfishing, fluctuating weather patterns, water pollution and other environmental challenges.

Silverfish is also the cheapest protein source that addresses the dietary protein needs for man, leading to a sharp drop in the supply of fish to meet the two competing demands. The response is overfishing, high market prices, low protein supply to animals and competition for the fish with man, triggering malnutrition to both.

There is an urgent need to replace the conventional source of protein such as silverfish and soybean with insect-based ones, which are innovative, economically beneficial and environmentally sustainable

Rearing black soldier fly larvae for livestock feed

The BSF does not carry diseases, and actively feeding larvae secrete an info-chemical that keeps away other species of flies, thereby repelling potential insect pests and disease vectors.

The larvae are the most important and of interest to the livestock industry for their nutritive value. They are harvested just before pupation when they have attained maximum growth.

As a normal practice, about three-quarters of the larvae are harvested

and dried for use as livestock feed while the rest is left to continue the cycle to maturity.

The dried larvae can be fed directly to farm animals, particularly fish and poultry or mixed with energy source ingredients like maize and wheat products to make a complete ration.

Larvae emerging from a batch of eggs (about 600) laid by one fly can weigh up to 100 grammes when fully mature.

The larvae are reared on a diet commonly referred to as the substrate. The substrate is from various organic waste such as table scraps, composting feed like kitchen waste, hotel and municipal waste and animal manure. Pig dung has been shown to promote rapid larvae growth compared to that of other farm animals.

Once fermented, a handful of the

larvae are introduced to start the cycle. At this stage, the crude protein and fatty-acids are well developed. They are then harvested, cleaned by a sieve that allows the substrate to filter through, leaving the larvae mass that is then dried up to about 14% moisture level that is usually suitable for storage

Optimising Conditions for Larvae Growth

The larvae require warm climate. If too hot, the larvae will crawl away from the food in search of a cooler location. If too cold, the larvae will slow down their metabolism, eat less and develop slower. They also require a shaded environment. If their food source is exposed to light, they will move deeper into the layer of food to escape. This denies them the layer of feed at the surface and even distribution in the substrate. The food substrate has to be quite moist, with water content between 60% and 90% to aid ingestion, rich in crude protein and readily available carbohydrates.

Nutritive value of larvae

The dry weight of larvae contain up to 50% crude protein, up to 35% lipids and have an amino acid profile similar to that of fishmeal. Proteins are a very limiting, vital and most costly ingredient in feed compounding. In formulating a BSF larvae-based ration, a carbohydrate regime, vitamins and minerals are the only other ingredients required.

Kanegeni NN, Muia JMK, Sambu S, Ndungu M and Ndirangu M from KALRO-DRC, Ol Joro Orok and KALRO-DRI, Naivasha contributed to this article



Black Soldier Fly larvae are harvested and dried for use as livestock feed and some left to mature.



Backing Sahel pastoralists to secure a resilient future

By Special Correspondent

One morning in February, in Kaffrine Region, Senegal, Kaffia Diallo emerged from her tent. She is happy; her new grandson was born just two days earlier. “A beautiful baby,” she said, “although I wish he weighed a little more.”

Following tradition, they will wait

seven days before giving him a name. Surrounded by their herds of cows, sheep and goats, Kaffia helped her daughter with the birth in their tent in the middle of the brush, far from the closest medical centre.

This is nothing new for Kaffia. She comes from a family of livestock herders who seasonally move their

herds from one place to another, along with some 800,000 herders in Senegal and millions of others throughout the Sahel.

With 75% of the Sahel being too dry to allow livestock herders to be sedentary, they adapt, moving their herds according to the availability of water and pastureland.

"We have always been a family of herders and I began moving our herds when I was 15 years old," Kaffia explained. "But now that I am old, I stay in the village and take care of my grandchildren. This year was an exception because my daughter was pregnant."

Climate change is a reality here

Each year, at the first signs of drought in early November, as soon as rivers start to dry up and pastures become scarce, the family leaves the Podor region in the north, close to the border with Mauritania, and moves south.

They travel by cart in search of food for their own herd and the herds they care for on behalf of uncles, cousins and farmers in their village who also raise cattle.

"When our animals have eaten all of the available grasses, we move south, sometimes as far as the Gambian border," explained Kaffia, her eyes weary and her face weathered by years of relentless sun, wind and dust.

It is a months-long journey that pastoralist populations often take with several families. When the first rains return in June, they head back north. But as Kaffia explained, "This year, as the grasses became scarce earlier, we had to head out in October."

Here, climate change is not an opinion, it is a reality. The rainy seasons are growing shorter and the dry seasons are longer, sometimes lasting up to nine months. The drought in 2010 was particularly arduous. In Niger, it is estimated to have killed more than 4.8 million head of cattle, roughly 25% of the herd, representing a loss of more than \$700 million for the country's economy.

Even though the routes change depending on water points, pastures and the constraints of the growing insecurity in the region, herders generally use the same roads. This creates long-lasting links between

the resident farmers and herders.

"Each year we put up our camps close to the same villages where we sell our products, buy food and take water from the collective wells. If necessary, we go to the doctor or have our animals cared for," said Kaffia, who has "about" 250 goats and sheep and a dozen cows. In the Sahel, no herder says exactly how many heads they have for fear of bad luck.

The role of pastoral herders is generally underestimated. Eco-friendly before anyone else was—owing to their extensive methods of livestock raising and the mobility of their herds—they provide many essential services.

They help improve vast tracts of non-arable land and serve as an economic lung for the region. They also contribute to agricultural productivity by grazing their herds on fields after the harvest thereby fertilizing the soil,

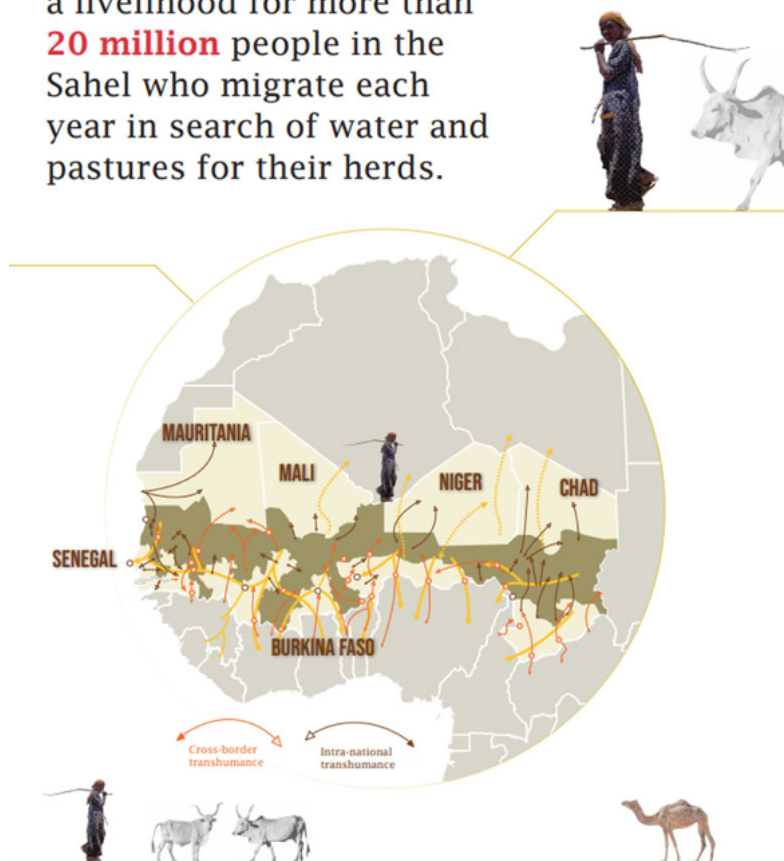
and to food security by selling their milk and animals on the road.

While this coexistence is generally harmonious and is part of a win-win ecological cycle, it can also be a source of tension. Water has become increasingly scarce and farmers are expanding their fields as the population grows, encroaching on pastoral regions and transhumance corridors.

"Migrant herders are arriving earlier and earlier, before the end of our harvests and sometimes the animals destroy our fields," said Hamadj Barry, mayor of a village near the Kaffia family encampment.

The situation has been complicated in recent years by long periods of drought, growing insecurity in some countries of the Sahel, and more and more restrictions on the movements of herds and herders

Livestock farming provides a livelihood for more than **20 million** people in the Sahel who migrate each year in search of water and pastures for their herds.





The herders leave with the animals, while the rest of the family follows by cart with all of the necessary supplies. Increasingly wives remain in the village with the youngest children so they can go to school. -Photo: Vincent Tremeau/World Bank

among the countries of West Africa. This has seriously disrupted traditional herd management methods, resulting in more frequent and potentially more serious conflicts.

PRAPS: A project benefitting millions of pastoral and agropastoralist families

Despite the challenges, the situation has been peaceful in Hamadj's village for some time now. Herders and villagers have learned to listen to one another and engage in discussion to find solutions.

"We welcome the herders and show them where they can set up their encampment," explains Hamadj, who is also the head of a dialogue committee that promotes social mediation. "We also make them aware of their rights and their obligations."

These committees complement other related actions taken by the Senegalese government since 2015 under the Regional Sahel Pastoralism Support Project (PRAPS). Deployed in six countries of the Sahel—Burkina Faso, Chad, Mali, Mauritania, Niger and Senegal—PRAPS aims to protect pastoral systems by improving resource management and animal health, facilitating access to markets, diversifying sources of income for pastoral households and managing conflicts.

It is supported by \$248 million in financing from the World Bank through the International Development Association (IDA), and coordinated by the Permanent Inter-State Committee for Drought Control in the Sahel (CILSS).

"The World Bank is trying to achieve two main goals in the Sahel: mobilize financial resources to protect a fragile

environment, and help the countries restore the living conditions of their population, particularly livestock herders, who are essential links in the socio-economic development and stability of the region."

In each of these countries, PRAPS has made it possible to establish rules for managing the areas primarily dedicated to pastoralism.

This includes essential infrastructure established around water points, such as reception zones for the pastoral herders, pasture for the livestock, vaccination stations, livestock markets, fodder storage warehouses, and shops managed by women.

A president oversees the system and various village committees responsible for managing this infrastructure.

"One of the things that has most changed our lives is the training provided by water and forestry officials for combating brushfires," explained Hamidj. "It is a transmission of knowledge that we will keep forever."

Greater resilience and better living conditions for pastoralists

"When PRAPS was set up in 2015, there



Koumpentoum, Senegal. Amadou Diallo speaks with herders and farmers during a consultation meeting to open a dialogue and seek compromises so that solutions can be found and conflicts reduced. - Photo: Vincent Tremeau/World Bank.



As they move, herders water their herds at collective water points. They own on average 200 to 500 head of livestock. Considering that a goat or sheep consumes 5 liters of water per day on average, a cow, 25 liters, and a camel, up to 30 liters, this can create tensions with sedentary populations on sharing water. - Photo: Vincent Tremeau/World Bank.

was a great deal of conflict,” said Maty Ba Diao, regional project coordinator for the CILSS. “This project has helped increase the resilience of pastoral families by enabling them to express their needs, providing them with essential services and infrastructure, and giving them the tools and knowledge they need to manage this grazing land themselves on a sustainable basis.”

Between 2015 and 2020, PRAPS helped establish and improve the management of more than 5 million hectares of pastureland, 181 water points, and 66 cattle markets, while delineating 1,414 km of transhumance corridors. It also supported the economic activity of 20,700 people, 88% of whom were women. “The World Bank is trying to achieve two main goals in the Sahel: mobilize financial resources to protect a fragile environment, and help the countries restore the living conditions of their population, particularly livestock herders, who are essential links in the socio-economic development and stability of the region”, said Ousmane Diagana, Vice President of the World Bank for Western and Central Africa.

“PRAPS is an example of successful cooperation. Everyone had to be mobilized, from village chiefs to high-

level ministers, to put in place a colossal logistical framework across countries.”

Sustaining achievements, overcoming COVID-19 hurdles

There is still work to be done, and the COVID-19 pandemic calls into question the hard-won balance. Border closures have meant herds of livestock have not been able to return to their homelands, creating significant animal health risks with their high concentration at the borders.

Overexploitation of pastures has also increased the risk of conflicts between farmers and herders at the start of the agricultural season. In addition, restrictions on mobility have led to sharp increases in livestock prices in towns, and the closure of weekly markets has made the livelihoods of pastoralists all the more precarious.

PRAPS partners have mobilized to set up monitoring initiatives, strengthen existing early warning systems, and provide targeted responses to support those in agro-pastoral sectors. The path is mapped out and the World Bank has committed to providing additional funding to PRAPS to strengthen achievements and sustainably increase the resilience of millions of pastoral families in the Sahel.



Ousmane Diagana

World Bank Vice President for the Western and Central Africa Region



“The World Bank is trying to achieve two main goals in the Sahel: mobilize financial resources to protect a fragile environment, and help the countries restore the living conditions of their population, particularly livestock herders,



Pig producers Farmer's Choice breed of quality

By Murimi Gitari

Demand for processed food products from livestock is steadily increasing worldwide as consumers seek the best quality of fresh and processed meats in their diet.

Farmer's Choice Ltd, which has been in existence for over 40 years, prides itself as the leading producer of these products. The firm places emphasis on quality control from the source to the table.

How has Farmer's Choice managed to guarantee their clients the quality of the products? The company's

Pig Procurement Manager George Monari outlines how the company works hand-in-hand with contracted farmers in the production of quality pigs for quality products.

Monari, whose duty is to ensure on a daily basis that the company gets enough pigs for slaughter and coordinates all activities across the pig department, says a team of extension officers reaches to educate the farmers on how to feed the pigs, come up with better housing, staking density (number of pigs per house) and management and control

of any disease outbreaks.

"While we have our own ranch where we rear pigs, we have contracted farmers who supply us with 70% of the pigs we process," says Monari.

The company looks for and signs contracts with farmers who can guarantee to supply at least 10 quality pigs every month. "Once we enter a contract with these farmers, we conduct monthly training on better pig farming practices that will not only benefit the farmers but also the company in the production of quality end products," explains Monari.

Pigs require a healthy and hygienic place to grow well and prevent livestock diseases spreading in farms, and to avoid contamination.



The training provides information and necessary materials to the farmers on pig production such as breeds and breeding, feeds and feeding, bio-security and hygiene practices.

Field officers also visit farmers to conduct anti-mortem assessments to check the health status of the pigs, their age, weight and hygiene and also to ensure the pigs have no defects like hernia.

All males must be castrated at the tender age of between 1-2 weeks. "The males have borne taint that usually affects the final products as the smell can be felt if the product was produced from an uncastrated male pig," he explains. All the animals must also come from a disease-free zone.

The farmers then pick a local purchase order (LPO) from the company if they pass the anti-mortem test and later get a no objection order.

The local veterinary office issues the farmers with a movement permit that allows them to load their pigs on trucks and deliver to the company. Farmer's Choice advises on the type of trucks to be used in transportation of the pigs, which must be well ventilated, spacious enough, and with a canopy.

Pigs are delivered between 6am and 6pm to comply with the Animal Movement Act. On arrival, they are offloaded and allowed to rest for a maximum of 8 hours to reduce stress

and get ready for another anti-mortem before they get to the slaughterhouse.

"During transportation, there is agitation, so we allow the pigs to rest for their bodies to adjust to normalcy. The agitation affects the body physiology of the pigs, releasing hormones to the body system that gives the pigs a defence mechanism. If slaughtered immediately they are offloaded, the quality of the meat or end products gets affected," notes Monari.

After offloading, vets conduct inspection to look for any suspect among the supplied animals. Inspection for post-mortem is also conducted to ascertain that the carcass is fit for human consumption. Any non-conforming pigs and rejected carcasses are not paid for and are incinerated within the company premises under security watch.

Farmers are paid within 24 hours of the pigs' slaughter, based on the cold dressed weight (CDW) and back fat criteria.

The quality and quantity of feeds determine the period the pigs will take to grow. A pig will consume a maximum of 395kg of feed or a minimum of 265kg, equivalent to 3kg per day for 5-6 months.

While there is a small proportion of non-contracted farmers who walk in with two to three pigs, which can be bought if they pass the required tests, contract farmers currently enjoy a bonus of Sh10 for every kilogramme supplied.

According to Monari, the Farmer's Choice Ranch in Limuru, Kiambu County, is the best pig farm in East and Central Africa. The breeds grow fast with an efficient feed conversion ratio and mature in 5-6 months with a guarantee of attaining 100kg.

Monari says consistent supply is not guaranteed due to expensive farm feeds that add to the cost of production. He adds that the Procurement Department strains to get quality animals for processing, a situation that makes them invest more in the training of farmers. Disease management and control is another problem, especially the African Swine Flu.

Like many other sectors, Farmer's Choice has also been affected by the Covid-19 pandemic, with the lockdown making movement of pigs expensive. Many farmers scaled down their operations, while others closed down their farms, reducing the supply of pigs necessary to meet the market demand of its products.

It is not all bleak though as the company looks to the future with optimism and hopes for a post COVID-19 recovery, anchored on teamwork and staff morale to deliver quality products, which he says is unmatched.



The Global Landscapes Forum discussed the 'The food, climate and biodiversity 'triple challenge' and One Health in the Greater Virunga Landscape' - one of the most biodiverse landscapes in the world, if not the most biodiverse.

Global experts seek new ways to curb pandemics

By Alberto Leny

Global Landscapes Forum (GLF), the world's largest biodiversity conference of the year 2020, brought together 5,000 participants from 148 countries for the GLF Biodiversity Digital Conference: 'One World—One Health'.

The online event cultivated a global dialogue on ways to 'build back better' from COVID-19 while tackling the climate and biodiversity crises.

The forum featured 261 speakers from

across the science, policy, corporate and civil society realms, including UN Convention on Biological Diversity Executive Secretary Elizabeth Mrema, who states nature is an important part of the solution and that conserving and restoring ecosystems can prevent further degradation.

Delivering the same message to the G7 Summit on December 16, Mrema said population health and the environment are inextricably

linked, and improving both human and planetary health relies upon all sectors uniting in transformational change.

"The G7 comes together at a crucial time for the health of people and the planet. COVID-19 is not only a health crisis; it is also an economic, social and environmental crisis. As such, it cannot be tackled in isolation.

"The fight against COVID-19, and the plans to build back better after we have passed the peak of the crisis,

require cooperation across all domains, a whole-of-government approach that also mobilises science and business – an approach that recognises the connection between human health and the health and resilience of nature.

She calls for an integrated approach to health and the environment, along the lines of the One Health approach. This involves designing and implementing programmes, policies, legislation and research in which multiple sectors communicate and work together to achieve better public health outcomes.

“It is necessary not only as we work to recover from the crisis, and to build back better, but also as we work to create an ambitious post-2020 global biodiversity framework. If we work together to take care of nature, nature takes better care of us.

Biodiversity is the foundation of human health. It supports food security, dietary health and livelihoods. It plays an important role in the regulation and control of infectious diseases.

One of the keynote speakers at the GLF was EcoHealth Alliance President Peter Daszak that conducts research and outreach programmes on global health, conservation and international development

Daszak is a British zoologist and an expert on disease ecology, in particular on zoonosis – an infectious disease that has jumped from a non-human animal to humans. Zoonotic pathogens may be bacterial, viral or parasitic, or may involve unconventional agents and can spread to humans through food, water or the environment.

Reaching 35 million people on social media, GLF Biodiversity was the latest milestone in the GLF’s mission of sparking a movement of 1 billion people around sustainable landscapes. The outcome statement for the event identified four pathways towards a paradigm shift in conservation:

- Building back better: GLF Biodiversity rallied participants

to develop a globally coordinated response to the human and ecological health crises, integrating the One Health and landscape approaches.

- Placing people at the heart of conservation: The conference placed traditional knowledge and expertise at the centre of sustainable development, emphasizing the need to include indigenous peoples and local communities in decision-making processes.
- Meeting commitments: Speakers and participants advocated moving beyond pledges and integrating local and global action on biodiversity into international policy frameworks.
- Passing the baton: GLF Biodiversity mobilized a generation of future leaders, including young professionals and students, to take on the biodiversity crisis.

The COVID-19 pandemic is a direct result of human interference with the planet’s systems, speakers pointed out, emphasizing the urgent need to bridge gaps between scientists, policymakers and the public through a One Health approach.

“We need to tear down the barriers between the public health, animal health and eco-health communities,” said Dennis Carroll, Chair of the Leadership Board of the Global Virome Project. “Viruses don’t care about these artificial barriers.”

GLF Biodiversity aimed to break down these silos by facilitating an exchange of ideas and proposals between diverse stakeholders to inform global policy. With the release of 15 white papers, the conference made an informed, unequivocal call for more ambitious action, backed by a range of policy recommendations from organizations including CIFOR-ICRAF, Nia Tero, GIZ, IUCN and The Borneo Project to further inform the UN Decade on Ecosystem

Restoration and CBD post-2020 Global Biodiversity Framework.

Central to these proposals was the need to place communities and youth at the centre of conservation efforts. Indigenous peoples and local communities steward some of the planet’s most biodiverse and often fragile landscapes, and their traditional knowledge can provide valuable tools against biodiversity loss. Youth participants made up a third of attendees at GLF Biodiversity.

“The relationship between people and nature must be one of interdependence,” said Tonio Sadik, Director of Environment at the Assembly of First Nations of Canada. “Otherwise, we risk overlooking something that Indigenous peoples have known all along: that we are nature, and nature is us. Failing to see this simple truth is what has gotten us into this mess in the first place.”

“We have to think seriously about succession planning for biodiversity conservation and use,” added Mildred Crawford, from the Caribbean Network of Rural Women Producers. “Our youth plays a critical role in this area because when we retire, the baton needs to be passed on.”



*The COVID-19
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Innovation and extension to lift African agriculture

By Murimi Gitari

As Africa comes to terms with the shock of the devastating impact of the COVID-19 crisis, experts are counting on research and extension to help the continent recover and build back better its agricultural food systems.

The United Nations Food and Agriculture Organization (FAO) is contributing to international efforts to defeat hunger and improve local economies by helping its member countries modernize and improve agriculture, forestry, and fisheries practices.

The COVID-19 pandemic is jeopardizing human health and disrupting the food systems that are

the foundations of health. “Unless we take immediate action, we risk a global food emergency that could have long-term impacts on hundreds of millions of children and adults,” warns FAO Director-General Qu Dongyu.

“We need our agri-food systems to deliver food security and better nutrition for all, to be economically sustainable, to be inclusive and to have a positive impact on climate and environment,” Qu stressed during the World Trade Organization’s virtual Agriculture Symposium on 2 December 2020.

Qu reiterated the need to invest in research, development and infrastructure, harness the power

of digital technology to achieve transformative change, and strengthen international governance mechanisms.

He stressed the need to speed up the availability of digital data in rural areas, to remodel food systems from the field to the supermarket and to reduce food loss and waste.

Innovation in agriculture is the central driving force for achieving a world free from hunger and malnutrition, the organization believes. That is why FAO has placed innovation at the forefront in supporting small farmers in their role as food heroes of the food systems.

The world’s food systems are under

There is great opportunity with technology among the youth to increase Africa’s agricultural potential. Photo: Orange Hello-Future



threat and Africa's are most vulnerable. To prevent a global food emergency, FAO is calling for \$1.3 billion in initial investments to provide an agile and coordinated global response to ensure nutritious food for all during and after the pandemic.

Even before the COVID-19 pandemic, hunger continued to increase. In 2019, almost 690 million people – or nearly one in ten people in the world – went hungry. FAO's The State of Food Security and Nutrition in the World 2020 states the pandemic may have pushed an additional 130 million people in the world into chronic hunger by the end of 2020.

Measures to control virus outbreaks are disrupting global food supply chains. Border restrictions and lockdowns are slowing harvests, food loss and waste, destroying livelihoods and hindering food transport.

Simultaneously, according to the World Bank's estimates, the pandemic's economic impact could push about 100 million people into extreme poverty.

Soaring unemployment rates, income losses and rising food costs are jeopardising food access in developed and developing countries alike. Each percentage point drop in global GDP is expected to result in an additional 700,000 stunted children.

Smallholder farmers and their families, food workers in all sectors, and those living in commodity- and tourism-dependent economies are particularly vulnerable.

Equally urgent is the compounding threat of the pandemic on existing crises – such as conflict, natural disasters, climate change, pests and plagues – that are already stressing food systems and triggering food insecurity around the globe.

In 2018, FAO hosted the 'International Symposium on Agricultural Innovation for Family Farmers: Unlocking the potential of agricultural innovation to achieve the Sustainable Development Goals (SDGs)'.

The central role that family farmers play in agricultural innovation was clearly recognized during this symposium, a direct and firm response to member countries' encouragement for FAO to play a strong catalytic and supporting role to empower family farmers through innovation.

The symposium provided a roadmap for innovation actors and decision-makers, celebrating inspiring success stories of innovators, acting as catalyst for boosting partnerships and public and private investments to foster and scale up agricultural innovation.

Innovation is a complex process, where governments and other key stakeholders play critical roles. At FAO, the Research and Extension Unit of the Office of Innovation is leading efforts in agricultural research and extension towards the strengthening of Agricultural Innovation Systems (AIS).

These include all the individuals, organizations and enterprises that bring new products and processes into use to achieve food security, economic development and sustainable natural resource management.

For example, through the European Union-supported Capacity Development for Agricultural Innovation Systems (CDAIS) project, implemented by FAO and Agrinatura from 2015 to 2019, capacity development for agricultural innovation was supported in eight countries in Africa, Asia and Latin America by fostering participatory and multi-stakeholder processes including small farmers and small producers.

Since 2019 FAO is implementing a five-year EU-funded project called "Developing capacities in agricultural innovation systems: scaling up the Tropical Agriculture Platform Framework" focusing

on nine countries – Burkina Faso, Cambodia, Colombia, Eritrea, Lao People's Democratic Republic, Malawi, Pakistan, Rwanda and Senegal.

In Rwanda, the CDAIS project brought a new way of working, which succeeded in solving problems accessing water needed for food production.

FAO also participates in other innovative projects including "Small farms, small food businesses and sustainable food security" (SALSA), funded by the research and innovation programme Horizon 2020 of the European Union (EU).

The SALSA research project is pioneering a novel multi-method approach to assess the role of small farms and businesses in achieving sustainable food and nutrition Security in Europe and in selected African regions.

SALSA project results include key policy recommendations to help small farms add value to their produce and to facilitate cooperation as the most enabling and empowering form of governance.

Extension and advisory services (EAS) also play a crucial role at system level for boosting smallholders' innovation. EAS are demonstrating their indispensable role at the frontline of the COVID-19 response, especially in rural areas.



Innovation is a complex process, where key stakeholders play critical roles.





Chirping crickets to curb malnutrition in children

By Murimi Gitari

Biodiversity in the ecosystem continues to reveal the complex relationship between nature, health and nutrition as climate change, population growth and intensive farming increases pressure on land.

As pressure mounts, scientists are searching for alternative and sustainable ways of resolving these competing forces in the ecosystem amid the growing food security and nutrition problem.

One such effort is taking place at Jomo Kenyatta University of Agriculture and Technology where lecturer and director of research Dr

John Kinyuru is researching and rearing crickets for consumption.

In an interview with *Rootooba*, Kinyuru explained that he started cricket farming at the institution in 2006 by studying the chirping insects and harvesting them from the wild to find out more about their edible properties.

“We started this project by harvesting a male and a female cricket from the wild and kept them in one place after which they produced fertile eggs that we incubated and within a week they hatched.”

After analyzing nutrition and food products value of the insects,

Kinyuru is optimistic that cricket farming has a huge potential for the market with continued research and comparisons with the other existing technologies.

“Crickets are an adequate source of protein at one’s disposal as you can get them from the farm and eat, containing six percent of proteins, twice that of beef,” he adds.

Cricket farming is cost-effective with very little space needed for keeping them. They feed on organic food that is basically consumed by humans. Kitchen waste is the most ideal food for them or greens like kale, cabbage and fruit peels, and they require only

a small amount of water. One cricket consumes only 0.05 grams of food in a day.

They do not necessarily need a big infrastructure to rear. Kinyuru recommends starting with a standardized box or egg crates for shelter modified to mimic their natural habitat.

Cages are used as shelter for ideal conditions to ensure they multiply rapidly as required.

Egg trays when arranged and put together provide a dark environment for the insects to hide.

"To start cricket farming a farmer needs a specialized box or tray and a capital of only Sh3,000, but the most important thing is to get trained before venturing into this business," he explains.

JKUAT offers training at a cost of Sh5000 per farmer and they have managed to train over 2,000 farmers across the country, out of which less than 200 have ventured into cricket farming.

Stella Maina, the technical assistant at the farm who helps in training farmers and rearing the crickets, ensures that hygiene is highly observed where they are kept.

"The crickets are fed from day one of hatching and to boost their growth, we use broiler starter that is used in chicken feeding. After three weeks, we feed them with greens that are highly rich in proteins."

After one to one-and-a-half months, they become adults ready to start producing eggs and at this stage they are fed with more greens. "The more they feed on greens, the more they more eggs they produce. A single cricket can produce between 250 to 500 eggs at a go," says Stella.

"The first two crickets we harvested from the wild produced about 500 eggs, and after hatching, this is where the colony started," Kinyuru recalls.

Cotton wool is used to provide the

crickets with water. The cotton wool is dipped into water and placed on top of the egg crates for the crickets to suck. The cotton wool balls also act as a place where the females lay their eggs through the ovipositor. They require a wet or moisturized area to lay the eggs.

The laid eggs are collected and incubated for 7 to 12 days under room temperature. After hatching, the young crickets require heat that is necessary for their growth at a temperature ranging from 20-30° C.

When the young crickets mature, they are harvested while alive and placed in a drier to clear the gut. They are then dipped into hot water to clean the bodies and returned to the drier again to ensure they are completely dried.

The dried crickets are then grounded or crushed to make cricket powder.

The powder is used in many ways such as mixing with porridge or ugali flour and other meals to enrich them with the proteins they lack. Crickets are also used in making biscuits, flour, cookies and energy bars.

Dr Caroline Kipkoech, a post-doctoral researcher and an entomologist at JKUAT, says many children suffer from malnutrition due to lack of a balanced diet, as they feed mostly on carbohydrates.

Proteins lack in their diet, a key factor in boosting their growth and appetite, but with the introduction of cricket consumption, the malnutrition problem in children is getting solved. Cricket porridge makes a big difference within one month after the children are fed on it.

Kipkoech has been exploring the effects of cricket products on the nutritional status, cognitive function and gut health in children in her research.

"Children suffer from hidden hunger that is caused by lack of minerals and irons in the body as well as the lack of fat, especially omega fat containing essential fatty acids," she explains. She

adds that crickets are rich in omega 3, 6 and 9 that boosts immunity, growth and the mental health of children.

Regardless of their irritating chirping sound from the male crickets for Kinyuru, this is a sound for business and food venture.

He says that a kilo of pure cricket flour goes for Sh2,000, while a kilo of porridge flour is Sh300. For farmers who want to start rearing crickets, the institution also sells them at a cost of Sh1500 per kilo, with the eggs sold at Sh500 per plate which contains about 3,000 eggs.

"We cannot meet the demand from agro-processing industries and the millers who want these crickets that they mix with the products they make," he notes.

The life span of a cricket is three months after which they die a natural death. The dead crickets are mixed with animal feed and processed to boost growth and production of chicken, pigs and cows.

Dead crickets are not fit for human consumption as they are scientifically proven to contain micro-organisms that are dangerous to humans.

When asked if cricket farming will become like quail farming that became a stuck ship, Kinyuru articulates that they are not supporting cricket farming as a super food as was the case of quails. Their effort rather is as a good food highly rich in proteins for both human and animal consumption.

Cricket farming has some pitfalls just like any other farming, with the main challenge being predators like rodents. Viral and bacterial diseases are part of the challenges but are easily manageable.

"We are encouraging farmers to practice this kind of farming in large scale as animal feed processors need tonnes of crickets on a daily basis," Kinyuru says.

The farm has managed to keep over a million crickets after having started with only two crickets.

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For the poorest of the poor, livestock can, in some situations, be the first step along the pathway out of poverty. - **ILRI**

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Sugarcane farmers harvest the crop in a plantation. Farmers are awaiting the commencement of the leasing of government-owned mills.

Kenya sugar reforms bitter pill to swallow

By Alberto Leny

The revival of Kenya's ailing sugar industry is entangled in an intricate web of economic, political and social intrigues that have found their way to the corridors of justice.

So deeply rooted is the bitter taste of sugar in the mouths of farmers, that President Uhuru Kenyatta formed a task force to help revive the sub-sector. The task force

delivered a report with far-reaching recommendations in February 2020.

However nearly one year down the line, the envisaged reforms which have since been adopted by the Ministry of Agriculture, have run into headwinds and are yet to achieve the desired outcomes.

Among the thorny issues that continue to haunt the sector and hamper revival efforts are those

related to production, privatisation and zoning of sugarcane supply.

While the farmers have welcomed some of the recommendations such as the return of the sugar development levy, prompt payment of farmers and reduction of taxation and imports, they are divided on the zoning of cane producing regions.

They claimed the task force did not consider their input and called for

Sugarcane is a major industrial crop grown mostly in western Kenya, but the sector continues to suffer from low production and mismanagement.

the revival of the Kenya Sugar Board that used to fund cane development. Agriculture Cabinet Secretary Peter Munya has already implemented most of the task force's recommendations and tabled the sugar regulation policy in Parliament, a move that has raised a political storm, following opposition from some members of the Senate.

The Crops (Sugar) (General) Regulations, 2020 regulates the formation of the sugarcane farmers' apex body, sugarcane pricing committee, payment formula and contractual farming.

The Kenya National Alliance of Sugarcane Farmers Organisation (KNASFO), most of whose members come from the western Kenya sugarcane-growing zone, says the Senate and the Council of Governors (CoG) are plotting the annulment of the new policy.

Last October, over 6,000 farmers

from various associations across the country signed a petition supporting the Agriculture CS for gazetting the regulations, terming them a huge contribution to reforms in the sugar sector.

KNASFO Chairman Saulo Busolo, in a hard-hitting statement, termed the senators and the CoG leaders mainly from western Kenya calling for the annulment of the sugar regulation policy as "a threat to the reforms in the sugar sector."

"Farmers are angry at the politicians for failing to champion their interests at a time when Mr Munya has moved determinedly to gazette sugar regulations and the lease of government-owned sugar factories for the betterment of the sector," says Busolo.

He commends the CS's reform agenda, wondering why the political leaders are rejecting the gazetting of the sugar and tea regulations, alleging lack of compliance with the Constitution. "This is the political climate that dampens investment in the sugar sub-sector," he added.

Busolo urged the government to learn

from countries where the sugar industry is successful, citing Brazil as an example where the authorities play a minimum role in the sugar sub-sector.

Earlier another group of farmers had objected to the recommendations of the task force. Led by a former Kenya Sugar Board director Samwel Bonyo, they said they welcomed the re-introduction of the sugar development levy, but are opposed to the zoning of cane producing regions.

He said the government should revive the board that used to fund cane development and factory maintenance for the millers.

The board was disbanded in 2013 and the sugar sub-sector placed under the Agriculture and Food Authority (AFA), together with the Coffee Board of Kenya, Tea Board of Kenya, Coconut Development Authority, Cotton Development Authority, Sisal Board of Kenya, Pyrethrum Board of Kenya and Horticultural Crops Development Authority.

Bonyo said lumping the sugar sector with other crop agencies was suicidal, as the government had stopped funding factory maintenance and cane development.

Industry insiders maintain that the sugar sector would remain in trouble unless State-owned millers are given enough money to improve their cane crushing efficiency to avoid huge production losses.

They oppose the decision to zone cane growing regions, saying it would hurt farmers who wish to sell their cane to the highest bidders.

Of the three, only Muhoroni, which has been in receivership since 2000, is crushing sugar at far below capacity.

Miwani collapsed over 20 years ago and only exists in name, while Chemelil stopped milling cane over one year ago.

The State-owned millers are deeply indebted and struggling with low efficiency levels and lack of maintenance and money to pay workers and farmers. Meanwhile, the High Court has temporarily stopped the government's plan to lease out the cash-strapped state-owned sugar Chemelil, Muhoroni and Miwani companies.

The three are among the five financially stressed companies the government has earmarked for leasing to turn them around alongside Nzoia and Sony Sugar companies.

The petition came after the objecting senators called for the process to be halted until thorough public participation is undertaken to iron out fears surrounding the move.

The lawmakers claimed the privatisation was driven by a clique of 'tenderpreneurs' only interested in the multi-million assets owned by the firms and not in reviving them to benefit farmers.

In July, CS Munya announced a waiver of Sh62.5 billion (\$625 million) debts owed by the five sugar millers to set the stage for their revival before the

government leases out the debt-free sugar millers to private investors to turn them around.

However, the senators complained that the planned leasing was pushed without proper engagement of farmers, local communities and county assemblies from the sugar belt region as well as in Parliament.

CS Munya says leasing the ailing sugar factories would be good for the industry that over 10 million people depend on.

He said the government has waived Sh11 billion debts Nzoia owed the State in readiness for leasing since no investor was willing to invest in a company that has debts. "The government waived Sh11 billion to allow the private investors to come and lease the company and revamp it," he said.

Kakamega Governor Wycliffe Oparanya says the government's efforts to resolve the issue of stalled projects in western Kenya should not be politicised.

"The waiver of the Nzoia debt and Mumias' Sh20 billion is to help the factories have a face that can attract investors who can streamline the industry," he said. Oparanya, the CoG chair, said the privatisation process has stalled because of legal hurdles.

"We are committed to a transparent, honest, credible and accountable process," the CS said, adding that the government wants to attract and finally secure only serious investors worth partnering with in the revival of the sugar industry in Kenya.

He urged the Sugarcane Growers and Millers Association to register with AFA to gain formality and visibility.

The registration, he added, would also make it easier for farmers to advocate and lobby for their interests including membership in the Sugarcane Pricing Committee and make it easier to deliver services to farmers supported by national and county governments.

"The registration will also see them pursue their interests and have an organized platform to engage other value chain players as well as regulators," he said.

The registration is among the task force recommendations for regulations to stabilize

the sugar industry covering registration of growers, outgrowers' institutions, millers and their umbrella bodies.

Munya said the ministry has drafted and published two sets of regulations The Crops (Sugar) (General) Regulations, 2020 and The Crops (Sugar) (Imports, Exports and By-products) Regulations, 2020 which came into force on 27 May 2020 and 10 July 2020 respectively.

The regulations cover agreements on sugar and sugar cane products and address sugarcane development plans, the milling capacity of millers, the establishment and functions of the sugarcane-pricing committees and the implementation of sugarcane testing services and standards.

"I don't expect the process we have embarked on to be all smooth-sailing. It is never easy or painless to revive a sub-sector such as this, which has suffered a myriad of governance, financial and regulatory failures and setbacks," the CS said.

He explained that there were vested interests; those who benefit from a chronically weak sugar sub-sector and who won't be happy with the reforms now underway but noted that a prosperous sugar sector could withstand any short run pain that some stakeholders may experience.



*Total cane
harvested in
southern Africa
has grown 80%
over the past 20
years.*



Compelling cane lessons from the south of Africa

By Alberto Leny

As Kenya struggles to reform its troubled sugar sub-sector, it would be prudent to reflect on the history and growth of the sub-sector in the country and learn from the experiences of the success stories in other parts of Africa.

Industrial sugar was introduced in Kenya in 1902 and the first processing factory opened in 1922. In the 1960s, new government policy encouraged expansion of commercial sugar production with new factories opening in western Kenya.

By the mid-1970s, Kenya was a sugar exporter. But from the 1980s, the sugar sub-sector started to decline in both production and profitability, with the country becoming a net sugar importer by the 1980s.

Although the area under sugarcane has expanded over the years to cover 220,000 hectares, productivity is low, achieving only 55 tonnes per hectare. Meanwhile, production costs have been increasing, averaging US \$1007/tonnes in 2018. Over 80% percent of the sugar is grown rainfed by smallholder farmers mostly in western Kenya using low inputs, with consequent poor productivity.

The sugar sector has numerous challenges including agronomic, technological, economic, management and policy limitations, writes Bancy Mati and Michael Thomas of Jomo Kenyatta University of Agriculture and Technology (JKUAT) in a paper delivered in the journal *Agricultural Sciences*, in October 2019, <https://www.scirp.org/>

journal/as ISSN Online: 2156-8561 ISSN Print: 2156-8553.

The authors trace the main issues affecting the sugar industry in Kenya and find a sector in turmoil that requires significant reforms. Their paper explores prospects of the next sugar revolution emerging from the coast.

The coastal region has land available for rainfed and irrigated sugarcane, a warmer climate and possibilities to grow short-maturing cane varieties of higher sucrose concentrations.

However, other constraints are also inherent at the coast. These must be overcome for sugar to become a major cash crop in the region.

Here are the sweet stories of success from other African countries:

A report in *The EastAfrican* newspaper



describes the sugar industry in Southern Africa as a success story expanding against all odds, owing to favourable fluctuations in the market.

Mozambique, South Africa, Swaziland and Zambia a decade ago embarked on ambitious projects to increase sugar production for both domestic and external markets.

However, Mauritius has from 1997 reduced its sugar factories from 17 to eight, downsizing the labour force hoping to surmount internal and external market forces.

The reduction of sugar mills in Mauritius is aimed at improving the throughput of the existing companies following the laying off of many workers.

The Action Plan for 2005-2015 hoped to address some of the problems plaguing the sugar industry.

For a while now, this Indian Ocean island has been recording losses in both production and income despite a 17% dependence on external revenue from sugar exports.

A number of major sugar growers in the country have now abandoned the crop altogether, sold their farms or stopped investing in sugar production.

This has badly hit the sugar industry, a pillar of the country's economy.

In Mozambique, the South African-based Tongaat-Hulett has invested more than \$47 million in expansion of the sugar industry.

According to the agricultural processing and land management group, more than 800,000 hectares of land for sugarcane planting will be developed in the next few years as part of the investment.

In Zambia, the Associated British Foods group, the major stakeholder in the Zambia Sugar Company, is also expanding.

Sugarcane will be grown on more than 27,000 hectares, with an anticipated yield of more than 3.2 million metric tonnes to feed the Nakambala refinery in Mazabuka, southern province. Nakambala mill will be the second largest in Africa, with refined sugar production of 440,000 tonnes annually.

Expansion is to be achieved through own efforts and those of affiliated outgrower and small-scale grower schemes.

In a paper published online, Alex Dubb, Ian Scoones and Philip Woodhouse review historic and contemporary development of sugar cane production across southern Africa.

They argue that the region's sugar industry provides a useful lens through which to understand current dynamics of corporate capital and agricultural production in Africa.

They identify three distinct elements of political-economic analysis:

First, the operation of logics of capital investment in different settings. Second, the nature of state policies and politics in different national contexts. And third, local processes of production, accumulation and livelihoods, including effects on labour and social differentiation.

The paper draws on the empirical cases from seven southern African countries. It highlights the rapid concentration of corporate control by three South African companies over the past decade, but also a diverse set of outcomes contingent on local context.

This is particularly evident in the nature of 'outgrower' sugar cane production found in all cases but constituted in different places by quite different social categories of wealth and scale of production.

They argue that common stereotypes of corporate investment as either 'win-win' or as a 'land grab' rarely apply.

Rather, the nature and outcomes of 'outgrower' systems needs to be understood as a manifestation of

context-specific political-economic relationships between corporate capital, national governments and a variety of local holders of capital, land and labour.

The Tongaat-Hulett group has service locations in Eswatini, Mozambique and Zimbabwe.

Eswatini is another test case for massive sugar production in the sub-region. Sugar growing is the country's mainstay, accounting for more than 53% of the total agricultural output.

More than 16,000 people are employed directly by the industry.

With an annual refined sugar production of about 300,000 tonnes a year, Eswatini continues to be one of the lowest cost producing countries in the world.

This predisposes it to investment that in turn facilitates its expansion programme. High production in the mountainous country allows it to sell both on the prescribed and the open markets.

Half of its production is sold in local and regional markets. Overall, the sugar industry in southern Africa has grown steadily since 2004 because of high demand and handsome returns from exports.

Other major producers of sugar are Malawi, Namibia and Angola.

The after-effects of COVID-19, the global recession and falling demand for sugar because of stockpiling on the world market is likely to affect production.

Countries in the sub-region are trying to intensify the local markets. Sugar exporters are being supported to shift their attention from overseas markets in Europe and America to regional markets.

Zambia is already exporting to Burundi, Democratic Republic of Congo (DRC) and Rwanda. The trend where crucial food items like sugar are exported wholly to overseas markets are harmful



Tongaat Hulett Sugar's Xinavane Sugar Mill, situated on the banks of the Incomati River, 136 km north west of Maputo in Mozambique during expansion

to food security and undermines the spirit of intra-trade.

Trade in sugar is distorted by restrictive barriers, hence southern Africa producers face a number of challenges before the sugar markets stabilise. And even then, they may not have the muscle to compete with countries like Brazil and Australia, which are slowly dominating the world market.

So why is sugar in southern Africa a good lens on these themes? Dubb, Scoones and Woodhouse cite a multiplicity of examples of large-scale commercial agricultural investments assessment within a wider political economy, linked to a particular and important commodity.

"This complements other more general work on 'land deals', which emphasises the diverse processes of land acquisition, financing and investment involved," they explain.

Sugar cane production covers more than half a million hectares spread across seven countries in southern Africa, and total cane harvested in the region has grown 80% over the past

20 years, with significant implications for land and water use in the region.

Unlike other recent corporate-led agricultural investments, sugar cane has a long history in the region, linked to long-term state support involving financing, infrastructure development and political backing.

Since its origins in Natal, outgrowers linked to core estates and mills have been central to the production system.

A close examination of such arrangements that have now expanded across the region allows for a critical interrogation of the 'win-win' narrative often promoted around this business model.

South Africa sugar production in million metric tons

2014-2015	2.19
2015-2016	1.68
2016-2017	1.61
2017-2018	2.06
2018-2019	2.26
2019-2020	2.3

The most important sugar producing regions in Africa are north and

southern regions. North African region is the oldest one in the sugar industry.

African sugar producing countries need to increase the share of the contribution to the GDP. Sugar industry in Africa is one of the key industries which contributes in providing jobs for the growing unemployment as well as instrumental in rural development.

This will reduce the high rates of migration from rural to urban areas and many associated problems.

Structural transformation. The Mauritian economy, which was initially centered on agriculture and in particular sugar cane farming, diversified significantly.

After the country first embarked on industrialization, a competitive service sector emerged with, in particular, the introduction of the free trade zone ("Export Processing Zone," FTZ) in 1980, inspired by the Taiwanese model, and tourism.

In 2009, sugar represented less than 3% of GDP, while textiles exceeded 5% and tourism 10%.

Kenana: Sudan tastes sweet story of success

By Rotooba Reporter

When the African Development Bank (AfDB) President Dr Akinwumi Adesina visited the Kenana Sugar Company in Sudan three years ago, he was impressed by one of the bank's premium investment partners on the continent.

He said the Kenana company provides an excellent example for the bank's policies of securing added value through agro-aligned processing of crops within Africa, and accelerating its High 5s vision for the continent's transformation.

Kenana is by far Africa's largest sugar-producing agro-industrial complex and the world's largest producer of white sugar. The company operates a cane farm of 105,000 acres of land and produces 400,000 metric tons of raw sugar annually, for domestic consumption and export.

The company employs 16,000 people, 4,000 seasonal workers, and generates an annual revenue of \$400 million.

The AfDB president visited the company's Research and Development Centre, and the sugar cane fields where he watched an automated combined harvesting operation. He also visited two pump stations, one financed by the bank.

He also visited the sugar factory, where he witnessed the automated offloading of tons of raw cane from large truck containers in a simultaneous operation that delivers newly harvested cane onto a conveyor belt running into the factory at the transport tower.

Kenana has diversified into ethanol

production and meat production to extract energy out of the company's byproducts, including molasses. Adesina described the massive, locally managed agro-industrial setup as a model exemplifying part of the High 5s: Feed Africa, Industrialize Africa and Light Up and Power Africa.

He commended both the size and the efficiency of the operation, emphasizing the company's resilience to have continued operations during the many years of US economic sanctions on Sudan.

AfDB financed Kenana's expansion phase in 1990 with a \$42 million Bank investment that helped the company to significantly scale up its capacity to become the world's largest producer of white sugar and Africa's biggest sugar factory, valued at over US \$3.5 billion today.

With plans to double output of sugar and triple biofuel production, Sudan's largest sugar producer is integral to efforts to diversify from oil.

The third largest producer of sugar in Africa after Egypt and South Africa, Sudan's yearly sugar output is currently around 850,000 tonnes.

It is a country known for its incredibly sweet tooth (putting three spoonfuls of sugar in tea or orange juice is common custom), hence its consumption of around 1.2 million tonnes of the sweetener a year.

Sudan had plans to become self-sufficient by 2014 aiming to boost production to two million tonnes and this year hopes to become a major global player competing with the likes of Brazil by producing 10 million tonnes.

Kenana was established by British

entrepreneur Roland Rowland in 1975 and has expanded over the years to produce other food products, animal feed, machinery and biofuels.

As the country looked to diversify following the loss of the majority of its oil resources when South Sudan seceded in 2011, agricultural products such as sugar and biofuels remain crucial to the country's economy.

"Kenana produces renewable sources of food and energy. Energy is coming from agriculture now. We are the biggest sugar producer in Sudan and one of the biggest in the world. By unlocking cane energy potentials, we are also going to compensate for the losses in revenue from oil in a big way. We are producing green fuel, which is even better than oil. Agriculture now is a very important sector for both food and energy," says Managing Director Mohamed El Mardi El Tegani.

"Kenana is a living example of how important agriculture is, as well as the role it can play in modernising the Sudanese economy and at the same time achieving all the objectives that Sudan is striving to achieve."

With major capital injection from its main shareholders (the Sudanese, Kuwaiti and Saudi Arabian governments), Kenana doubled its annual sugar production to one million tonnes and more than tripled its ethanol output to 200 million litres, 50% of which would be exported, turning the company into a major exporter of biofuels.

As part of its 'green diversification' efforts, Kenana plans to produce 200,000 tonnes of biofertiliser within two years.

A portrait of Dr. Jimmy Smith, a middle-aged Black man with short grey hair and glasses, wearing a dark blue suit, light blue shirt, and red tie. He is smiling slightly and looking towards the camera. The background is a blurred, warm-toned wall.

Jimmy Smith: A scientist for nature and humanity

In this edition of Rootooba, we profile Dr Jimmy Smith, the Director General of the International Livestock Research Institute (ILRI). Born in Guyana, where he was raised in a small mixed crop-and-livestock farm, Smith holds dual nationalities with Canada. A CGIAR scientist, he previously worked at ILRI between 1991 and 2001 as the institute's representative in West Africa, where he led the development of integrated research promoting smallholder livelihoods in animal agriculture. Between 2001 and 2006, he worked at the Canadian International Development Agency (CIDA) and later at the World Bank, where he led the Global Livestock Portfolio. At ILRI, Smith currently leads an institute of 650 staff made up of 40 nationalities. In this interview, he reflects on his career, how he came to focus on agriculture, the success he has had building organizations and livestock portfolios—and the one thing he most regrets. He notes that the COVID-19 pandemic's impacts on human health and the global economy have shown that inequalities of various kinds—social, racial and economic, among others—remain powerful forces that need to be addressed.



ILRI director general Jimmy Smith (left) confers with Kanayo Nwanze, president of the International Fund for Agricultural Development (IFAD) at the 6th Africa Agriculture Science Week (AASW6), in Accra, Ghana, 15–20 Jul 2013, organized by the Forum for Agricultural Research in Africa (FARA) (photo credit: ILRI/Paul Karaimu).

Born in Guyana to mixed race parents, who did agriculture for a living, including cattle, citrus farming, Jimmy Smith graduated with a bachelor's degree at the historically black college then called Tuskegee Institute, now Tuskegee University, in Alabama, USA.

This was one of the foremost institutes in animal agriculture and veterinary sciences that attracted students from the developing world. Jimmy then did his master's and PhD at the University of Illinois, graduating in 1986, in animal science.

After graduating, he was headhunted for a job in the Caribbean economic community's research arm called the Caribbean Agriculture Research and Development Institute, CARDI. Jimmy worked there, for several years, before joining

the predecessor of the International Livestock Research Institute (ILRI), the International Livestock Centre for Africa (ILCA), based in West Africa.

"A friend of mine was the deputy director of ILCA, and he invited me to interview for a position that he thought I was well suited for. So I came, at a time not with much interest in the job, because I liked my current job very much," he explains his first encounter with Africa.

In the end, he decided to take the ILCA job because it was challenging. "Having come to Africa for the first time, it became apparent to me that what we were doing in the Caribbean was child's play, in relation to what needed to be done here.

Struck by the poverty levels in Africa, compared to what he had experienced working in the English-speaking Caribbean countries, more of quality of life issues, Jimmy felt working on the continent was more meaningful

and accepted the job.

ILRI, which is co-hosted by Kenya and Ethiopia, has 14 offices across Asia and Africa, and works for better lives through livestock in developing countries. It employs some 700 staff and has an annual operating budget of about \$90 million. It is one of 15 CGIAR research centres worldwide, a global research partnership for a food-secure future.

One of the things that Jimmy cares very much about in ILRI is that of women and development, including their inclusivity at the research and managerial level of ILRI.

"On my first trip to Africa, on a really rural road in Nigeria, I saw a woman carrying a huge basket on her head, with either peppers or tomatoes. A baby was strapped on her back, and in one hand was a hoe or some agricultural implement, and under her other arm was a bundle of firewood.

"Having taken off from the field where she was, there was no way she could put

down any of those things until she got to the house. And since there were no houses close by, she had to have been walking a long way. I had never seen women do that kind of a thing, so that was my first exposure to rural Africa. The realization that as soon as you get a bit outside the city, there is so much poverty and hardship - That certainly motivated me to come," Jimmy recalls.

He then worked for a time for the Canadian International Development Agency (CIDA). "By this time my children were grown and I had the intention to work in academia, somewhere in Canada. As it happened, I was offered the job of directing the agriculture portfolio at CIDA.

CIDA had a very small agricultural portfolio at the time, just about \$60 million Canadian for the whole

world. He helped build a strong portfolio with a spending envelope of about half a billion a year. "Moving it from \$60 to \$500 million was a big jump, and it gave me a bird's eye view of the global institutions looking after agriculture, which included the Food and Agriculture Organization (FAO) and the World Food Programme (WFP), Jimmy recalls. He became fairly well known among international development people, as well as with the CGIAR.

A change of government in Canada encouraged him to look elsewhere for a position—even though he was a nonpartisan bureaucrat rather than a political figure—and ended up at the World Bank.

Smith went to the World Bank in 2005 and was essentially tasked with doing for livestock at the World Bank what he did for agriculture at CIDA. At the time he joined the bank, the livestock portfolio was very small. His remit was

to try to raise the portfolio. The World Bank was not unique at that time in having financial resources available for developing countries.

"What was unique about the World Bank is the expertise and knowledge it brings to their investments. So that comparative advantage is what we also offer here at ILRI—what distinguishes us from national programs, for example, is that ILRI brings global experience to national situations.

The World Bank encouraged him to apply for the director general position at ILRI. The bank was putting \$50 million a year in the CGIAR, but I think there was only one case where somebody from the bank went to lead a CGIAR institution. He applied for the position and arrived at ILRI in October 2011.

With the team, one of Smith's



accomplishments at ILRI has been raising the profile of livestock and increasing the institute's funding. How did he accomplish that? According to Jimmy, ILRI's growth is largely a function of success in convincing people of the importance of livestock.

"Globally, livestock represent 40% of the total value of agriculture, and in some countries, it can be as much as 80%, depending on the ecology. But it is a sector that has been largely neglected. I was well aware that there was this sort of policy bias against livestock: Agriculture to most people means crops, not animals.

"So as a management team, we decided to raise the profile of livestock by providing the evidence that it is of crucial importance to employment, gender, food and nutrition. Fortunately, we have been able to generate interest among donors, to the point where we've been able to more than double the budget in the last nine years."

"That said, livestock remains underfunded. It still does not get anything close to 40% of the total donor investments in agriculture; in fact, it may get perhaps a tenth of that. So there is still work to do. But we have done considerable work to raise the profile of livestock, and raise the profile of ILRI as an institution, and to drive home the claim that livestock is critical to development."

A lot remains to be done to continue to convince policymakers to help the sector contribute more and make the case that the sector is important. To do that, needs solid analysis and good data, explains the ILRI director-general. That means being prepared to make the case with financiers in government and other institutions to attract investments.

"We have to focus on research which can be transformative to the people we're trying to serve, not just for academics. We must do our research with the end in mind, not simply for

the sake of doing good science but for being impactful. Starting with the end in mind and delivering from there.

"For example, it does not do any good if we simply go to a farm and give the farmer a better cow to milk, if the farmer can't sell that milk. There has to be a market pull. If we are going to have an impact, we need to help connect people to markets. Once the farmer is connected to market, then he or she wants a higher producing cow. In livestock, there is the need for technology pull, not a technology push. Connect people to markets, and then they will want a better animal to produce more milk, and then they will buy more inputs.

Another focus for ILRI is on building strong partnerships with various businesses, NGOs, donors and national institutions. ILRI has a budget now nearing \$100 million a year, which he notes is very small in relation to the total demands out there.

"If we want to have a meaningful impact, we have to work in partnerships. Our core business is research for development, but to move beyond the laboratory we work mostly as a catalyst, facilitating and building partnerships."

ILRI builds these partnerships by creating a bigger awareness of the livestock sector, by trying to grow the livestock 'pie' bigger, even if its share of the pie stays the same.

"A bigger pie means we get more. We are also addressing the problems that livestock may cause, and trying to figure out how to ameliorate the negatives. For example, livestock is known to have a significant environmental footprint, through the enteric methane gas produced by cattle, sheep and goats. How can we develop the livestock sector, while ameliorating the negative impacts of livestock?"

That is why ILRI created the Mazingira (environment in Kiswahili) Centre, which has done some important work on the environmental impact of livestock in Africa trying to develop, with partners, approaches to curb these

negative impacts.

ILRI is trying to nuance the debate. In many parts of the world, people eat too much meat and animal products. Some journalists and activists in the rich world are now saying, "We should stop eating livestock products, because it's destroying the environment."

However, Jimmy explains that in most parts of the developing world, they eat too little meat. In Europe, the average meat consumption is about 75kg per year, while in North America it is over 100kg. That is a lot of meat. However, in many countries in Africa, the average is more like 10kg a year.

Nutritionists tell us that in the first 1000 days, especially, one must absolutely be nutritionally well fed, or you get irreversible stunting physically and mentally. One simply cannot meet those needs without nutrient-dense, animal-source foods.

What is Smith's view of the risk of emerging zoonotic diseases and the One Health approach?

"One Health is an area that I've been engaged in for a long time. It refers to an approach to global health that is based on the premise that animal and human health and the ecosystems they share are inextricably linked and must be addressed together.

"I first started paying serious attention to it during my work at the World Bank, because it was during that period that the world experienced an outbreak of avian influenza among humans. Then shortly after came the so-called swine flu. I wrote extensively before I left the Bank on this issue in a two-volume series called *People, Pathogen and our Planet*.

"Those experiences left a deep impression on Jimmy, and led him—and other scientists—to say that it wouldn't be a question of if we'd ever



Dr Smith's courtesy visit to Machakos Governor's office – Dr Alfred Mutua.

have a serious zoonotic pandemic, but when. Now here we are in the middle of one – the COVID-19 pandemic.

Zoonotic diseases are those that jump from animals to humans, often from wildlife into livestock and then into humans. Jimmy and his professional colleagues have been advocating for many years now that to detect or prevent a serious, potentially catastrophic pandemic, we need to take a One Health approach, to work at the interface of animal, human and environmental health.

"We have inaugurated the One Health Centre here at ILRI, which the government of Germany is generously supporting. But now that we're in the middle of the pandemic, and people understand how important this is, then I hope we'll get more investments in this One Health area, not just for ILRI, but this whole approach."

Smith and the scientists have been saying for 10 or 15 years that there is

a potentially serious problem out there, and got a respectful hearing but in retrospect, not nearly enough attention. Now that it has finally happened Jimmy feels very upset because they said all these things and he has the documents, his own publications that he worked on with many others to show for it.

We said, "Look, avian influenza is just a small warning. We were lucky with avian influenza, because while it was highly pathogenic it was not very easy to transmit. We were lucky it did not kill many people. We did a lot of modelling and writing about the disease. We mobilized governments and warned that the next disease could be more transmissible with similar pathogenicity.

"We demonstrated that global economies could contract from 1% to 3%, depending on the severity. We worked hard to convince governments to invest in One Health. But the truth about development is

that there are so many problems to address, that the money tends to go to the most immediate challenges, and once they pass, we forget about it.

Finally, what does he plan to do when he leaves ILRI? "The truth is that I haven't thought about it yet. I usually am loyal to the job I have. But there are lots of things I like to do. I have travelled around the world and there are many spots I would like to go back to.

"While I worked with the Canadian government, I became enamored with the beauty of Canada, and there are many places there that I have on my list to go to and spend time in. I will try to stay active, perhaps in academia, at a university in Canada. My daughter lives in Vancouver, British Columbia, and that's a beautiful place."

For now, Jimmy Smith is staying focused on the One Health approach and how best ILRI can best serve the livestock and agriculture sector, nature and humanity.



A fruit vendor in Nairobi Kenya. Food safety is a shared responsibility between food business operators, consumers and the government.

Aiming to flatten the curve on major foodborne illness

By Steven Jaffee and Delia Grace

Food safety has never featured prominently on Africa's development agenda. When it is an issue, typically the focus has been on high-value food items produced for export, while food safety in domestic markets has been largely neglected, both by governments and development partners. This must change.

Recent research has shown that the health and economic consequences of foodborne diseases in Africa are significant and growing, as urbanization and income growth prompt dietary changes that increasingly expose consumers to food safety hazards.

The coming decade is critical. A 'business as usual' approach to food

safety, involving a combination of post-outbreak firefighting and fragmented regulatory and ad hoc interventions, will do little to check the threats posed by unsafe food in many African countries.

The good news is that many of these problems can be controlled and their costs reduced. A combination of incremental and systematic measures, well within the capacity of most governments, can flatten the curve of foodborne illness.

Until recently, research on foodborne diseases was mostly limited to high-income countries. Research and public health interventions in poorer countries largely focused on the so-called big three—tuberculosis, HIV/AIDS and malaria—and on maternal

and child mortality.

Yet, recent epidemiological research from the World Health Organization shows the costs of neglecting foodborne diseases in developing countries. Worldwide, the global health burden of foodborne diseases is on par with the big three. The young, old, malnourished and poor are disproportionately impacted and children under five years of age are especially vulnerable.

Globally, Africa south of the Sahara and emerging Asia have the highest incidence of and death rates from foodborne diseases. Yet while the incidence rates of the two regions are comparable, Africa's estimated death rate is nearly four times higher.

The reasons for that difference

are not fully understood, but the prevalence of endemic ailments and poor diagnostic and treatment options probably account for much of it.

Drawing on data from the World Health Organization and other recent sources, we estimate that Africa experiences around 135 million cases of foodborne diseases and 180,000 foodborne disease-related deaths per year. Microbial pathogens—especially *Salmonella* spp., toxigenic *Escherichia coli*, norovirus and *Campylobacter* spp.—account for about 80% of Africa's foodborne disease burden.

The economic consequences of foodborne diseases in Africa are correspondingly severe. A recent World Bank study estimated the productivity losses alone attributed to unsafe food within Africa at \$20 billion in 2016 and the cost of treating these illnesses at an additional \$3.5 billion.

These costs are heaviest in larger, middle-income countries such as South Africa, Nigeria and Egypt, yet are also significant elsewhere. Overall, the relative economic burden of foodborne diseases is higher for African countries than for developing countries elsewhere.

Both the health and economic consequences of foodborne diseases in Africa are likely to grow as the continent develops. In low-income countries, food is typically produced close to the point of consumption and undergoes limited transformation. Starchy staples such as cassava, maize and rice predominate.

Traditional processing techniques dominate and are often fairly effective at reducing risk. As they develop and urbanize, countries experience rapid shifts in diet and towards more intensified agriculture.

Such transitions typically lead to increased consumption of fresh produce and animal-sourced foods

and a lengthening of food supply chains. Yet much of this perishable food continues to be handled and distributed through informal channels, creating potentially multiple points for food hazards to develop.

In these transitioning food systems, the official regulatory apparatus is often overwhelmed by the breadth and depth of emerging challenges.

Until very recently, domestic food safety programs in Africa have been few and poorly funded. By contrast, literally hundreds of projects supported by trade partners or development agencies have sought to address international trade-related food safety problems.

These have been beneficial and have helped to push Africa's trade in safety-sensitive foods such as fish, fresh fruit and vegetables from \$3.8 billion in 2001 to \$16.1 billion in 2017. But overall, the available evidence suggests that the trade-related costs associated with unsafe food in African countries are small compared to the domestic public health costs and productivity losses.

In fact, we estimate the ratio between domestic and trade-related costs is likely to be on the order of 40 to 1, suggesting that the predominant attention of policymakers on the trade impacts of food safety has been deeply misguided.

African countries must implement better domestic food safety policies and support them with needed investment. But this, in itself, will not be enough to give them the upper hand against foodborne diseases. What they need is nothing less than a food safety paradigm shift.

The traditional regulatory model, imported from high-income countries, centres on enforcement through regular inspection of food facilities and product testing, with set legal and financial penalties.

This model is ill-suited to food systems

in Africa, where smallholder farmers, micro- and small enterprises and informal food channels predominate, surveillance and inspection mechanisms can be weak and court procedures challenging and slow. It introduces an antagonistic and often unproductive relationship between government and the private sector as regulator versus regulated.

A better approach is to think of food safety as a shared responsibility between food business operators, consumers and the government.

In this model, governments set forth a vision, convene stakeholders and offer a diverse set of policy instruments to involve, incentivize and leverage the actions of key value chain actors.

Instead of being the 'official food control' authority, governments should act as facilitators encouraging investments and behaviour change. Experimentation and flexibility will be critical.

There are no quick fixes to Africa's food safety challenges. They require a comprehensive approach that focuses on improving food safety awareness, practices and governance.

Foundational investments will be needed in people, infrastructure and institutions. Addressing these issues will require sustained attention from technical agencies and government ministries as well as donors.

It will require broader interventions to improve access to quality public health services, clean water and sanitation and improved agricultural productivity.

It will require, in short, a commitment commensurate to the scale of the problem. It is also likely, as in other parts of the world, that improvements will ultimately be driven by better-aware consumers demanding food safety and eliciting responses from public sector and food suppliers. Recognizing that is a good place to start.



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Farmforce Case Studies: Subati Herbs Kenya

Digital input traceability enables herb exporter to rapidly resolve customer concerns, ensuring food safety integrity and confidence

Exporting high-quality herbs across Europe, Subati operates from an expansive greenhouse complex in southern Kenya.

From its launch in 2016, Subati has rapidly grown their herbs operation, realizing in 2017 that in order to maintain the highest food safety standards, quality certifications and full traceability through production, a digital farm management system was required.

The Agribusiness Advisory Team at the International Finance Corporation (IFC), part of the World Bank Group, was already in discussions with Subati and was keen to support testing out agricultural technology solutions. IFC strives to enable the development of agribusinesses in emerging markets, facilitating competitive access to global markets.

Rapid Response to Chemical Residue Enquiries

Prior to deploying Farmforce in 2018, all records were manually kept on paper, requiring a room full of binders to keep track of the status of all greenhouse areas and what specific chemicals were applied to each crop.

While this system has been used in the horticulture industry for years, it

has limitations as production scales and companies need to precisely track and trace inputs applied when customers request or have concerns.

Since food safety is the highest priority, ensuring strict adherence to maximum residue levels (MRLs) of approved inputs (fertilizer, herbicides, pesticides) on all herbs exported to clients in Europe and around the world is 'business critical.'

Reducing MRL Risks, Properly Responding When They Occur

When customers receive herbs from



Safety-focused and compliant chemical storage and application system at Subati

Subati, they do standard testing to check for any chemical residue. If an issue is detected, Subati has only four hours to respond, explaining why the MRLs were exceeded, or why there may be residue of a chemical not expected for that crop. If the exporter fails to adequately respond during this 4-hour window, they risk having all their products immediately rejected by that customer, causing huge financial losses and tarnishing their reputation. **This can bankrupt any herb producer – and is a key reason that Subati decided it was critical to invest in Farmforce**

Digital Trouble Shooting and Issue Resolution

With the marjoram issue, the chemical residue found by the client was not a chemical that should have been applied, so where did it come from? The Subati team quickly confirmed through Farmforce that that chemical was not applied to the marjoram in question, but could see that it was applied in a different section of the greenhouse.

Since the chemical was applied via the irrigation system, they determined that must be the source of the contamination, locating a valve in the irrigation system where the chemical was getting 'stuck' and staying in the irrigation system even after the chemicals were flushed out.

Having a simple digital platform to have complete oversight of all chemical

applications – when, where, by whom – made this troubleshooting quick and efficient. John explains, “it would have taken at least four to five times longer (many hours), to go through all the physical paperwork, involving many more staff, distracting from normal operations.”

If they could not determine this within the four hours allowed by the client, the client could think one chemical residue issue would indicate much larger food safety issues at Subati, risking ruining their excellent reputation.

Quality Certifications to Access Markets

In order to sell in global markets, and contract with major supermarkets and wholesalers, Subati spent 1.5 years in extensive application, audit and quality control processes to receive certifications.

They proved their operations adhered to the highest levels of food safety, staff training and responsible input use with a robust traceability system. Certifications like Global GAP require yearly audits, and that is where having all the data on input applications, planting dates and staff safety training comes in handy. Prior to Farmforce, Subati would maintain 50+ binders of data sheets and would have to spend days sorting through them to fulfill the specific requests from the auditors – now all the data is digital and can be selected and printed for the auditor in minutes – saving valuable time for Subati staff and expense with the auditors.

For example, audit points for spot checking on pre-harvest intervals (PHI) check that crops are not harvested within a certain number of days based on what input was applied.

Farmforce has automatic features that pops up an alert if the mobile user tries to record a harvest



Greenhouse full of Basil, ready for harvest, packaging and export to the UK.

collection within a PHI, providing a safeguard against harvesting early, and then having herbs rejected by the customer when doing chemical residue tests. With the alert in place, Subati is confident of both food safety, and passing the audit.

Farmforce has automatic features that pops up an alert if the mobile user tries to record a harvest collection within a PHI, providing a safeguard against harvesting early, and then having herbs rejected by the customer when doing chemical residue tests.

With the alert in place, Subati is confident of both food safety, and passing the audit.

Customer Confidence in Reliable System

When meeting with new potential clients, having a robust digital traceability system in place is key, and is now expected of suppliers selling high quality herbs and other horticultural products.

Customers need that reliability factor - the ability to ask their herbs supplier about specifics in the production and receive a quick, professional response backed up by transparent data from Farmforce.



Greenhouse staff discussing and practicing on Farmforce during a training.

As Farmforce is used across Subati's operations, the team looks forward to further leveraging the digital data on the platform to better track their year-on-year production and performance. As they use the system across more seasons, they can compare their output in volumes, input efficiency, staff hours, and other key performance metrics to more robustly determine optimal production strategies. The Farmforce team will continue to support Subati through developing custom reports conducting team trainings to ensure that they continue to thrive and grow together.

"Using Farmforce isn't just about financial gain from operational efficiencies; we're in the business of food production and the level of integrity required is akin to mother and child. While we can calculate the cost of disruption and loss of business, if there is a food safety issue, the potential loss of reputation is too huge to put a number on it. Farmforce helps us maintain the highest levels of food safety and to proactively avoid mistakes that can destroy the business."

- Thomas Skaper, Subati COO

"You can't do farming without Farmforce; you can't be an effective exporter. It's business critical to have digitization to make it all work so you can address demands from international customers."

- Jacque Njonjo, Africa Lead at IFC Food Safety Advisory

"We use Farmforce's traceability features every day. When there was an issue with marjoram MRL from the customer, we quickly went into the raw data in Farmforce to trace the product - what chemicals were applied and when. With Farmforce, in less than 15 minutes, we can see the exact situation and then figure out the root problem. It used to take hours, but now customers have confidence with our quick response supported by digital data from Farmforce"

-John Kibiwott, Operations Manager

How do you measure the value of a seatbelt or an airbag? You have to be in a situation where the integrity of a system is tested - you don't appreciate its value until it's tested. When grocers have an issue, they go to suppliers – Farmforce gives the food safety data so customers get a print-out from a reputable system, a system established to ensure data integrity. You can't manipulate it. Farmforce gives our customers confidence in us, in our integrity."

- Thomas Skaper, Subati COO

Farmforce strives to build trust and transparency in the agricultural first mile. We deliver digital solutions to secure sustainable sourcing, improve farmer quality of life and protect the environment. Through a bush-proof web and mobile platform, refined over eight years, clients have visibility down to the field level while building a fully traceable supply chain. Farmforce is used in 32 countries across Africa, Asia and Latin America to manages over 520,000 farmers in 45 crop value chains and 15 languages. Find out how Farmforce could help you at www.farmforce.com or contact us at info@farmforce.com



Digital platform powers farms, boosts production

By Verenardo Meeme

Farmforce a unique digital platform that captures information from farms, is helping farmers keep track of safe use of chemicals and generate data that is transforming farming.

The platform is also drawing more partners to find interest in investing in the agricultural value chain.

Farmforce Head of Africa Operations Faith Kamenchu says the digital solution secures sustainable sourcing, better farmer quality of life and protection of the environment.

"Over 520,000 farmers are already using the platform. More than 40 crops such as vanilla, coffee, baby corn, avocados and fresh produce have been deployed through the platform. The digital tool operates in 14 languages active in 30 countries," Kamenchu tells Rotooba.

At a time farmers' access to extension services is proving to be a challenge, Kamenchu says one extension officer can capture information for 25 users in a day and within a week they can see about 500 farmers. Advice such as on proper use of chemicals, maximum residue levels (MRLs) training is much faster, as farmers can use the tool to check the right amount of dosage, types of pesticides to be sprayed to a particular crop, when, etc.

The platform has been developed according to the GLOBAL G.A.P checklist, with an elaborate interpretation of various processes required by GLOBAL G.A.P. Kamenchu says farmers can be audited independently and

information and evidence such as photo backups stored on the web.

Besides, the platform displays the compliance status. The system enables transparency with no room for collusion with unscrupulous business operators, since the platform uses GPS coordinates to monitor activities on the farm. If there is an issue, for instance misuse of pesticides, the source will be known.

Subati, a farming business, uses the Farmforce platform to operate its farming business across its operations. The team looks forward to further leveraging the digital data on the platform to better track their year-on-year production and performance.

As they use the system across more seasons, they can compare their output in volumes, input efficiency, staff hours, and other key performance metrics to more robustly determine optimal production strategies.

"Using Farmforce isn't just about financial gain from operational efficiencies; we're in the business of food production and the level of integrity required is akin to mother and child. While we can calculate the cost of disruption and loss of business, if there is a food safety issue, the potential loss of reputation is too huge to put a number to it. Farmforce helps us maintain the highest levels of food safety and to proactively avoid mistakes that can destroy the business," says Subati Chief Operating Officer Thomas Skaper.

"You can't do farming without Farmforce; you can't be an effective exporter. It's business-critical to have digitization to make it all work so you can address demands from international customers," observes Jacque Njonjo, Africa Lead at IFC Food Safety Advisory.

Kamenchu explains that the system has access rights. Not everyone will be given rights to access information, as each company data is secure and the platform does not show demos for clients without consent from clients using the platform.

Kamenchu adds that since data on the agricultural value chain is available when it is required, it is easier for farmers to link to the market, raising the number of interested partners such as bank institutions, input suppliers and aggregators who want to work with us because we have the data.

They can easily determine and predict the viability of the farming business, for instance, yield per acre, and can summarise information about various inputs and their performance in a given region through the Farmforce platform.

Over time, the data is changing the perception about bad agricultural practices, hence building trust among consumers. "The European market was suspicious and many farmers missed out exporting because of lack of paperwork, but this is changing," Kamenchu notes.

She says the future is bright. Integrating ICTs in farming systems will boost producers' ventures. With data, they are able to get subsidized inputs, access financing independently and build consumer confidence.



Africa's agribusiness CEOs 71 steps to post-COVID recovery

By Omulo Okoth

Agribusiness in Africa is going through unprecedented challenges during this period of COVID-19 but the sector has shown remarkable resilience that offers hope in the continent's post-pandemic economic recovery.

Resilience in Africa's agribusiness sector cannot be demonstrated at a better time. Implementation of the African Continental Free Trade Area (AfCFTA) has begun.

While the COVID-19 crisis has complicated the picture, there is optimism that the East African region is well-placed to implement the AfCFTA despite the scepticism expressed in some quarters.

AfCFTA is expected to pave the way for a rapid dismantling of impediments to cross-border trade.

East Africa has already made some progress in this area by, for example, installing 25 one-stop border posts, significantly reducing the time taken for goods to pass through customs.

AfCFTA's implementation has been preceded and augmented by the inaugural Africa Agribusiness Outlook survey that was conducted on agribusiness CEOs from early to mid-2020 to gain insights into their top priorities, how they are addressing challenges, and what they see as opportunities in these COVID-19 dominated times.

The Africa Agribusiness Outlook survey report, an initiative of the Alliance for a Green Revolution in Africa (AGRA) and KPMG financial and business advisory services, was launched on 17 November 2020.

The report highlights the major challenges faced by CEOs during this COVID-19 period but more importantly, showcases the resilience of the agribusiness sector in Africa. It identifies opportunities for businesses which governments and players in the agricultural ecosystem should pay heed to.

When the survey was launched in March 2020, most countries had implemented lockdown procedures. Governments faced (and still do) a delicate balancing act

– either prevent the explosion of a public health crisis and the implosion of our health systems, or preserve the economy.

It was not an easy choice, the report states, and yet we must continue. “In the midst of the pandemic we have been heartened by the responsiveness of the African business community to this inaugural Agribusiness Survey.”

CEOs, company founders and senior executives responded to the questions via Zoom or online links. Businesses are struggling but they are also determined to survive COVID-19 and emerge stronger. The survey sought to understand the priorities, opportunities and constraints for businesses operating with the agricultural ecosystem in Africa.

The 2020 Survey will form a baseline to track priorities of the private sector over the next few years to gain insights on what matters most to them. These topical insights will enable policymakers to respond to businesses in a more agile manner.

The 10-point agenda for action:

- Provide more flexible financing structures.
- Increase productivity for smallholder farms.
- Reduce the cost of money.
- Increase advocacy for infrastructure.
- Deliver catalytic finance.
- Increase government spending on agriculture.
- Create more public-private partnerships for infrastructure.
- Increase more public-private partnerships for agriculture.
- Increase massively, financing across value chains.
- Develop affordable technologies for Africa.

The scientific, evidence-based survey with direct one-on-one interviews posed 71 questions to which the respondents answered in order of priority on the 1-10 scale. The highest

score (number 1) was ranked 8.67, while the lowest (number 71) was ranked 4.32. Below is the full ranking of the comprehensive responses on the priorities for Africa's agribusiness sector post-COVID-19:

1. More flexible financing structures for agriculture and agribusiness sector that support business growth and provide flexibility to respond to market shocks and emerging innovation. Scored: 1 t
2. Increase productivity on small farms. Increased productivity is key to agricultural transformation on the continent.
3. Develop mechanisms for reducing the cost of money particularly for purchase of agribusiness assets (machinery, equipment, stores etc).
4. Increase advocacy for governments to invest in infrastructure such as roads and reach of electricity grid.
5. Increase catalytic financing (e.g. grants) for the entire agricultural value chain, not just technology.
6. Government needs to allocate more funding than it is currently doing on agriculture.
7. Increase public private partnerships critical for accelerating infrastructure development
8. Increase investment in the agricultural sector by the private sector.
9. A massive increase in the availability of finance throughout the agribusiness value chains is critical for the transformation of agriculture in Africa.
10. Increase access to agricultural technologies that have been adapted for Africa and that are affordable.
11. Deploy blended finance initiatives for agribusinesses

that will de-risk our investments in agribusiness.

12. Prioritize building of partnerships to support delivery of services to smallholder farmers.
13. Deploy early stage financing, venture type financing to support start-ups in the agribusiness sector.
14. Governments should resolve long border queues caused by COVID-19.
15. Increase technology investments in agriculture because this is a game-changer for the sector.
16. Prioritize guarantees by government to support lending to smallholder farmers.
17. Increase access to water and low cost irrigation technology.
18. Government should improve the policy, legal and regulatory environment for businesses working in the agricultural sector.
19. Develop inclusive supply chains involving smallholder farmers. This is critical to our sourcing and risk management strategy.
20. Prioritize public-private initiatives that fund and accelerate developments in the agribusiness space.
21. Support consolidation of smallholder farms to increase production.
22. Support innovation technologies for agriculture that are affordable and accessible to the African farmer and adapted to Africa.
23. Build more inclusive supply chains with greater participation of women and youth.
24. Mechanization is very important for transformation of smallholder farming in Africa.
25. Develop affordable and accessible technology-based solutions for delivering services to smallholder farmers. This is key to thriving in COVID-19 era.
26. Promote climate smart agriculture as a key driver for transformation and development of resilience.
27. Diversify incomes at the farmer level.

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| <p>28. Build more inclusive supply and distribution chains by involving women as suppliers, distributors, lead farmers and trainers.</p> <p>29. Prioritize promotion of regional trade and facilitation.</p> <p>30. Increase access to affordable irrigation technologies, adapted for Africa.</p> <p>31. Prioritize skills development and training/education of population.</p> <p>32. Equip future industry leaders including women leaders with the skills and experience to take on leadership and governance roles in the company and industry.</p> <p>33. Open markets for food and commodity trade to boost intra African trade.</p> <p>34. Complete high quality trade agreements to create market advantages for agribusinesses in your country.</p> <p>35. Increased investment in and a greater provision of improved seed varieties for all crops cultivated on the continent.</p> <p>36. Promote partnerships for R&D with industry, universities in country and research stations, to support innovation in agribusiness</p> <p>37. Leverage private sector in agricultural development i.e. planning, investment, consultations.</p> <p>38. Prioritize direct cost-sharing of business development services to agribusiness SMEs and smallholder farmer organizations.</p> <p>39. Promote career opportunities available in the agribusiness sector in a coordinated way to attract talented people, particularly youth, to enable the industry to grow.</p> <p>40. Develop multi-stakeholder platforms and partnerships for driving agricultural</p> | <p>transformation.</p> <p>41. Prioritize development and implementation of international food safety standards to facilitate international trade in food.</p> <p>42. Prioritize intra-African trade.</p> <p>43. Liberalize regional trade for seed markets to support access to improved seed and increase in productivity.</p> <p>44. Vocational training is key to agricultural transformation.</p> <p>45. Develop gender sensitive farmer extension programmes, including leadership programmes at the smallholder level.</p> <p>46. At firm level, we need to prioritize increasing our understanding and contribute to discussions and negotiations on the Africa Continental Free Trade Area (AfCFTA).</p> <p>47. Prioritize work on tax regimes for agricultural goods, (VAT, import/export duties, profit tax).</p> <p>48. Increased focus from government and other actors on agricultural education at high school and tertiary level</p> <p>49. Diversify the agricultural economy from traditional staple crops e.g. maize to new high-income food and horticultural crops.</p> <p>50. Increase investment as a firm in technology and innovation to support operational and financial performance.</p> <p>51. Prioritize standard setting and certification of agricultural goods.</p> <p>52. Develop inclusive supply chains involving smallholder farmer. This is part of our CSR strategy.</p> <p>53. Develop a continent-wide integrity mark system to facilitate intra-African trade, growth of African retailers and give assurance to consumers in Africa.</p> <p>54. Prioritize development and</p> | <p>enforcement of policies and regulations.</p> <p>55. Create multi-sector public private platforms to drive agenda, resources and learnings on agricultural transformation.</p> <p>56. Enact policies by government that reduce cost of digital transactions and reach of mobile money particularly for rural communities.</p> <p>57. Participate as the private sector in negotiations for the Africa Continental Free Trade Area (AfCFTA).</p> <p>58. Open access to national digital database of smallholder farmers.</p> <p>59. Greater leadership by the government in transforming the agricultural sector.</p> <p>60. Open markets for labour to boost intra-Africa trade and agricultural production.</p> <p>61. Increase government-subsidized farmer extension services.</p> <p>62. Prioritize ecommerce. Ecommerce is vital to thriving during and post-COVID.</p> <p>63. Achieve at least 50% women representation in senior leadership and board level.</p> <p>64. Liberalise food markets technology, as it is critical to the success of surviving negative impact of COVID-19.</p> <p>65. Leverage technology as it is critical to the success of surviving negative impact of COVID-19.</p> <p>66. Prioritize implementation of international food safety standards in response to COVID-19.</p> <p>67. Seek government and donor financial support to enable the firm to survive impact of COVID-19.</p> <p>68. Minimise disruptions in operations as a result of COVID-19.</p> <p>69. Government should consider introduction of GMO particularly for non-food crops such as cotton (e.g. Bt cotton).</p> <p>70. Put all new investments on hold for now until we understand the future post-COVID-19.</p> <p>71. Shut down or pivot the business as a result of COVID-19.no</p> |
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The resurgence of the locust swarms could aggravate food security in the Horn of Africa region, where almost 25 million people are already suffering from acute food insecurity. Photo: Haji Dirir/FAO

Millions at risk in new desert locust invasion

By Murimi Gitari

Kenya is one of the countries in the greater Horn of Africa region reeling from a fresh desert locust invasion following another foray which struck the region earlier this year, threatening food supplies for millions.

The UN Food and Agriculture Organization (FAO) said the invasion in early December could re-escalate as recent strong winds carried mature swarmlets from southern Somalia into eastern and northeastern Kenya.

Already eight counties in Kenya are threatened with starvation following the fresh invasion by small mature swarms of desert locusts swooping from neighbouring Somalia

devouring vegetation and grasslands.

Kenya's Agriculture Cabinet Secretary Peter Munya said the ministry would set up steering committees in counties to spearhead the fight against the second wave of the invading pests, which arrived in the country earlier than had been projected.

He said the government had set aside Sh3.2 billion (\$32 million) to combat the desert locusts, noting that their successful control depends on the effective coordination and cooperation between the national and county governments.

The ravenous pests invaded northern and eastern regions of Garissa, Isiolo,

Kitui, Mandera, Marsabit, Samburu, Taita Taveta, Tana River and Wajir counties, destroying crops and grass, threatening residents and livestock food security.

Disaster response teams in Samburu County used special drones equipped with mapping sensors to spray the destructive pests, with the technology proving effective in handling pests in inaccessible remote areas.

Swarms matured and started breeding due to the cool environment during the short rains season. The swarms in Taita Taveta headed towards north east Tanzania and landed in Kilimanjaro, Manyara and Tanga areas, reducing the threat on vegetation in the county.

FAO had warned that the risk remained

high in northern Kenya where the locusts laid eggs in sandy areas where the rains fell in November, and the hatching and band formation started in early December.

Farmers and pastoralists were alarmed at the impending invasion from Somalia and Ethiopia, worsening the situation as the authorities battle the challenges posed by the Covid-19 pandemic.

Swarm formation was expected to continue throughout December due to widespread hatching and band formation that occurred in the neighbouring countries where aerial and ground control operations continued.

While control operations have previously been strained due to inadequate pesticides and logistical challenges, officials fear the latest invasion could ignite resource-based conflicts and result to loss of lives.

A resurgence of the swarms could aggravate food security in the Horn of Africa region, where almost 25 million people are already suffering from severe acute food insecurity.

Desert locusts are considered the most destructive migratory pest in the world, devouring large areas of crops and grasses meant for people and livestock.

FAO is supporting in Somalia to scale up anti-locust measures, focusing on areas at high risk. "Survey and control operations, by ground and by air, have

been scaled-up and are ongoing," said FAO Representative in Somalia Etienne Peterschmitt.

"These resources include aircrafts, vehicles, equipment, biopesticides, insect growth regulators and staff that have been strategically been positioned in various parts of the country," he added.

In addition to the measures to reduce breeding and swarms, FAO and partners are also supporting farmers in the affected areas. Supplies have been delivered and pre-positioned to assist food-insecure households at risk of the locust invasion, including planting and replanting packages, supplementary feed and integrated cash assistance and livelihood support.

Response efforts are also underway in Eritrea, Sudan and southeastern Egypt, as teams continue ground and aerial control operations against groups of hoppers and adults.

The desert locust invasion in February 2020 in Kenya was the worst in 70 years, while Somalia and Ethiopia experienced their worst outbreaks in 25 years, putting crop production, food security and millions of lives at risk.

Swarms crossed into South Sudan, Uganda and Tanzania between March and July before they were eventually brought under control.

Traditionally, chemical pesticides have been the only effective method to control extreme locust infestations. And because they work the quickest, they remain a key tool in extreme cases like the large-scale

infestations affecting the greater Horn of Africa region.

But increasingly, nature-based biopesticides offer a reliable, less harmful alternative for controlling locust outbreaks before they reach crisis levels. They also offer a solution for treating outbreaks in fragile ecosystems.

"We've been using biopesticides to control desert locusts and it's a great tool to treat initial, small groups of hoppers before they form huge hopper bands," says Keith Cressman, a locust expert at FAO.

"We're looking at an insect that multiplies 20-fold with each new generation every three months, so it's critical that we shift our focus to interventions than can disrupt the breeding cycle. And using an effective ecological tool that farmers and governments can use in any environment makes sense in this time and age," he notes.

Prevention is becoming increasingly important with climate change, which is likely to bring more cyclones and severe rains that make for ideal breeding grounds for hoppers. The current locust crisis is a case in point. It started on the Arabian Peninsula after two cyclones in 2018, before swarms moved and multiplied rapidly throughout the region.

Going forward, biopesticides have an important role to play in strategies that monitor such risky weather events and start preventive treatment in the early stages of an outbreak. This would go a long way to avoiding the kinds of large-scale crises the Horn of Africa is experiencing today and safeguard the food security of millions of people.

Swarms of locusts matured and started breeding due to the cool environment during the short rains season. Photo: Sven Torfinn/FAO

Global Panel's co-chair retires after 7-year stint

By Rootooba Reporter

Former President of Ghana John A. Kufuor who has been Co-Chair of the Global Panel on Agriculture and Food Systems for Nutrition since its inception in 2013 has retired.

Through his leadership, the Panel has delivered 18 evidence-based policy and technical briefs covering various aspects of food systems, together with two Foresight reports.

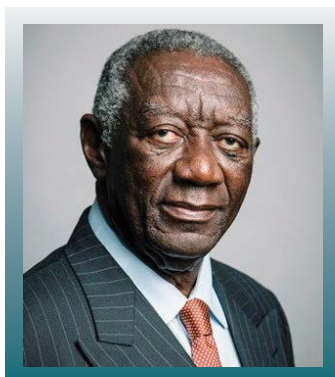
It has also convened several round table events with governments in Sub-Saharan Africa and South Asia to inform decision-makers on evidence-based policies to help deliver healthy diets for all.

As former President of Ghana, winner of the World Food Prize for Food and Agriculture in 2011, and former World Food Programme Global Ambassador against Hunger, Kufuor has gained global acclaim for his unique understanding of how food systems can support better nutrition and sustainable agriculture.

His wealth of knowledge, high status and positive influence have allowed the Global Panel to effect change at the very highest level.

He founded the African Leaders for Nutrition (ALN) initiative, alongside Global Panel member and President of the African Development Bank, Dr Akinwumi Adesina, and the late Dr Kofi Annan (1938-2018), former Secretary-General of the United Nations.

This high-level initiative is now driving political engagement to advance nutrition in Africa. It is led by an eminent group of ALN champions, comprising of current and former heads of state, finance ministers and leaders with the power



Retired Global Panel Co-Chair John Kufuor

to catalyse and sustain high-level political leadership and commitment to end malnutrition in Africa.

The former President was also instrumental in helping the Global Panel convene high-level inter-Ministerial meetings in Ghana, including with President Nana Akufo-Addo, where there was agreement to accelerate progress to tackle malnutrition in Ghana.

This culminated in signing a Consensus Statement in March 2019, which pointed the way forward for multi-sectoral action on food systems to promote healthy diets.

Through the John A. Kufuor Foundation, President Kufuor has also maintained his heartfelt support to fight all forms of malnutrition in his home country of Ghana.

Partnering with the United Nations World Food Programme, he drove forward a nationwide strategic review of Sustainable Development Goal 2 (SDG2) leading to President Akufo-Addo launching the Ghana Zero Hunger Strategic Review Report in 2017.

He has also supported the inauguration of the Ghana Academy

of Nutrition and Dietetics to ensure that nutrition advocacy is consolidated and more effective.

At the heart of all his achievements is President Kufuor's personal desire to see food systems transformed so that they provide safe, affordable and healthy diets for all whilst protecting and nurturing planetary resources. He has recently stated that, "food and nutrition are central to the stability of mankind".

And while he is stepping down from active duty as Co-Chair of the Global Panel, his unparalleled expertise will still be called upon from time to time and his legacy will continue to influence generations to come. A legacy that is encapsulated in the Global Panel's new report *Future Food Systems: For People, Our Planet and Prosperity*, a report he is proud to have been part of.

In typically understated fashion, at the launch of this report, President Kufuor said he would like to be "known as someone who did his bit to help make the world identify the things needed to transform food systems, for the better development of mankind and to sustain our planet".

The new report provides a series of evidence-based recommendations and practical steps for governments, civil society and the private sector.

As President Kufuor put it, "We have the evidence. We have the steps to begin food system transformation. We now need the commitment and courage from our leaders across the world to act now".

Fellow Co-Chair, Sir John Beddington said: "I speak on behalf of my fellow Panel members when I say we have been very privileged to have worked alongside John Kufuor during the last seven years. His knowledge and status have both enriched our work and given us unparalleled access to leaders across Africa, and beyond".



Around two-thirds of the African population are employed in the agricultural sector, including many small-scale farmers and women.

Africa charts new path to meet Malabo targets

By Alberto Leny

Seventeen years ago during their annual African Union (AU) Assembly, African Heads of State and Government adopted the Maputo Declaration on Agriculture and Food Security in Africa.

At that meeting in July 2003, the leaders endorsed several ambitious decisions regarding agriculture, the most prominent one being the “commitment to allocate at least 10% of national budgetary resources to agriculture and rural development policy implementation within five years” of the declaration.

The same meeting adopted the Comprehensive Africa Agriculture

Development Programme (CAADP), which has since then served as the framework for action for agricultural transformation across Africa.

The *Declaration on Agriculture and Food Security in Africa* adopted at that meeting became the point of reference for charting actions to implement the CAADP.

CAADP supports member states in increasing investment and productivity in the agricultural sector. The aim is to achieve agricultural growth rates of more than 6% as a means of promoting food security and economic development.

Nearly twenty years later, this

commitment is far from being realised and the 10% pledge remains largely unfulfilled. Ten years after the Maputo Declaration, the African leaders met in Equatorial Guinea’s capital city, Malabo, for the yearly AU pilgrimage.

The Malabo Declaration signed at the leaders’ AU Summit in 2014 represented a recommitment to the CAADP principles and goals adopted in 2003 in Maputo, Mozambique. But Malabo went further by identifying specific goals and targets to be achieved within ten years.

The targets include ending hunger, tripling intra-African trade in agricultural goods and services, enhancing resilience of livelihoods and production systems, and

ensuring that agriculture contributes significantly to poverty reduction.

The Declaration introduced a specific commitment on mutual accountability to actions and results, calling on AU member states to conduct a biennial agricultural review (BR) process involving tracking, monitoring and reporting on implementation progress.

Last month, the AU and its partners convened its annual Malabo Agricultural Policy Learning Event (MAPLE) that brings together technical experts and country-level policy practitioners to discuss important agricultural topics, share learning and generate actions that can drive the Malabo Agenda.

The December 8-9 MAPLE followed the 2020 (16th) CAADP partnership platform held virtually on November 24-25 due to COVID-19, at which some startling revelations were made regarding the Maputo and Malabo statements.

At this meeting, the CAADP biennial review (BR) revealed that out of the 49 member states, 36 had made positive

progress in 2017 and 2019 towards achieving the Malabo commitment targets by 2025.

However, only four (Ghana, Mali, Morocco and Rwanda) attained the minimum score required to be on-track. Opening the meeting, AU Commissioner for Rural Economy and Agriculture Ambassador Josefa Sacko still expressed optimism that together the member states could meet the Malabo goal of ending hunger by 2025.

It is important to place the alarming statistics revealed in the BR report into perspective, in view of the Malabo Declaration targets and their implications on Africa's much-needed food security and agricultural transformation.

In his presentation in a panel with Amb Sacko, Organization of African Caribbean and Pacific States Secretary-General Georges Rebelo Pinto Chikoti and EU Commissioner for Agriculture Janusz Wojciechowski, Burkina Faso Agriculture Minister Salifou Ouedraogo explained what is required for Africa's agricultural transformation and outlined key policy drivers for Africa's

agricultural transformation.

These include agricultural productivity, employment share, GDP share, labour productivity and expected growth rate or change.

International Fund for Agricultural Development (IFAD) East and Southern Africa Director Sara Mbago-Bhunu, noting the growth of philanthropy and the private sector in Africa's agricultural transformation, said the COVID-19 pandemic had hit the continent hard.

"For sustainable development in the COVID-19 era, labour, production on farms and SMEs, CAADP needs to refocus African agriculture with a resilient lens based on the food economy and the smallholder farmer," said Mbago-Bhunu.

She noted that 65% of the continent's adult population was engaged in agriculture as a source of livelihood and that 68% of the rural income was generated from farms. The demand shock in COVID-19 had caused a destruction in supply chains and minimum access to inputs.

"Countries need data to bridge the deficit gap caused by COVID-19, locusts, drought and floods. The current investment system is



AU Commissioner for Rural Economy and Agriculture Ambassador Josefa Sacko



IFAD East and Southern Africa Director Sara Mbago-Bhunu



COMESA Business Council's Sandra Uwera

untenable in terms of financial risks. Resilience requires building back better with new ways of doing things in smallholder farms," she advised.

That will require looking at the whole of the ecosystem, with landscape type approaches, bringing all actors including the smallholders on board and making medium and SMEs the backbone of the food systems.

The 16th CAADP session on accelerated action toward developing and financing Malabo compliant National Agricultural Plans (NAIPs) was moderated by the AU Commission Rural Economy and Agriculture Director Godfrey Bahigwa.

The panellists included SADC Department for Food Agriculture and Natural Resources Domingos Gove, ECOWAS Director of Agriculture Alain Sy Traore and the Principal Secretary in Kenya's State Department for Agricultural Research and Crop Development Hamadi Boga.

The CADDP's biennial review (BR) indicators are based on five groups - institutions, technologies and knowledge, human capital, infrastructure and markets and trade.

As part of the BR process, the meeting reflected on the need to embed data collection and analysis in national agricultural investment plans (NAIPs).

Around two-thirds of the African population are employed in the agricultural sector, including many small-scale farmers and women. However, its potential to enhance food security, reduce poverty, create jobs and empower women is not yet fully realised.

Many farmers, particularly women, lack the appropriate skills to improve productivity, processing and trade. Climate change is also adversely affecting agricultural productivity.

If the continent is to feed a predicted nine billion people by 2050, its agricultural sector must be modernised, strategies for adaptation to climate change developed and additional efforts made to utilise women's untapped potential.

MAPLE 2020 on December 8 and 9, a follow-up on using the 16th CAADP biennial review to inform policy debate, sought to address these challenges by fostering alignment, harmonization and coordination among multi-sectorial efforts and multi-institutional platforms.

Second, it called for the strengthening of national, regional and continental institutional capacities for knowledge and data generation and management to support evidence-based planning, implementation, monitoring and evaluation.

The meeting reviewed progress towards the 2025 targets set in the Malabo Declaration and adopted appropriate collective actions to accelerate agricultural growth and transformation.

MAPLE 2020 dug deeper into the biennial review report and its implications for national agricultural policy planning. Technical experts provided answers and offered support for countries to think about their results more deeply.

Representing the non-state actors, ActionAid International's Constance Okeke called for greater public engagement and investment in the BR for wide distribution and dissemination, noting that most countries are not on track with regard to data gathering.

She said agriculture has a key role to play in development and called for inclusion: "Listen to the farmers, make policies that are implementable, with practical solutions and investments."

COMESA Business Council's Sandra Uwera said the shock of COVID-19 calls for work on the ground to support actors access inputs and to feed trade, by empowering youth and women to expand markets beyond smallholdings.

"Data collection is key to the private

sector guide to industrial policy, health, food security, environmental concerns, productivity and rural development in Africa. Data will help build intra-regional trade," she said.

IFPRI Senior Research Fellow John Ulimwengu said data collection should focus on women and youth empowerment and highlight support for every segment of the value chain, noting that agricultural growth is critical for overall agricultural transformation:

"To achieve a higher BR score and improved quality of data, we must move from improved reporting to improved policy interventions. The same type of correlation with resilience to COVID-19. Build resilient food systems to withstand the type of shock caused by COVID-19."

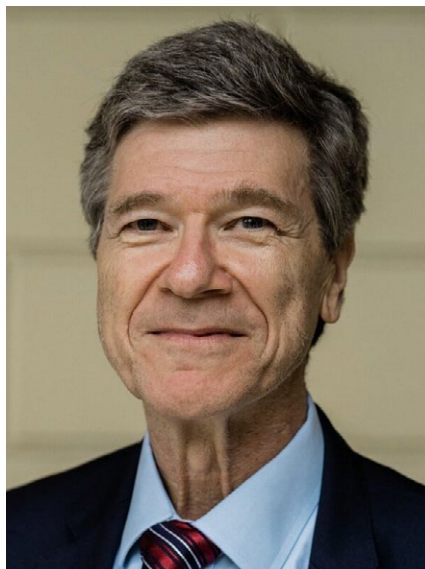
Noting that 80% of African farmers are smallholders, Ulimwengu said the interventions must be climate- and nutrition-smart, with increased investment in gender-based policies across the agriculture value chain.

Which calls for behaviour change within governments, development partners, non-state actors and the private sector.



The 16th CAADP session focused on accelerated action toward developing and financing Malabo compliant National Agricultural Plans (NAIPs)





Jeffrey Sachs, Director UN Sustainable Development Solutions Network



Guido Barilla, Chairman Barilla Group, the world's largest pasta company



Qu Dongyu, Director-General Food and Agriculture Organization

Resetting the global food system from farm to fork

Alberto Leny

The spread of COVID-19 has demonstrated the fragility of global food systems, but also offers opportunities to transform the way food is produced, distributed and consumed, an international forum of experts has revealed.

Meeting in an online event with the theme 'Resetting the Food System from Farm to Fork', the distinguished speakers explored how all humanity can play a role in re-aligning the global food system with human needs and within planetary boundaries.

The high-level forum convened to set the stage for the United Nations Food Systems Summit at the General Assembly in September 2021, pledged to end hunger, improve health, sustain livelihoods and protect the natural environment.

The experts, members of the Barilla Center for Food & Nutrition

Foundation Advisory Group, come from different disciplines - medical and public health professionals, and experts on climate change and finance, nutrition, international development and food policy, economics, environmental sciences and ecology.

In setting the stage for the 2021 World Food Conference, the forum deliberated on a number of topics including how to respond to a global crisis, how farmers can better feed the world and the EU strategy for better food systems.

Jeffrey Sachs explained why we need a new food system, saying that currently it is not working well. The COVID-19 pandemic has made the food sector worse, adding to the challenges of greenhouse gas emissions, chemicals and pollution affecting food production and distribution.

Because the challenges we face impact each of us, we need shared and systemic solutions and a global commitment to redesign the future since there is only One Health for humans, animals, plants and the environment, the forum declared.

Against the backdrop of the pandemic, that has wreaked havoc on lives, livelihoods and economies, the meeting looked at the future of food experiences post COVID-19, the new food economy and the future of food business.

Speakers discussed food and the intersection of technology, and explained why food is business as they committed to a shared vision of the future of food systems.

Guido Barilla, Chairman of the Barilla Group and Barilla Foundation, which hosted the event, recalled that the World Food Day was a particularly important event in 2020, the 75th anniversary of the foundation of the UN and the Food and Agriculture



The demand for food is growing all the time among the world population expected to reach 10 billion by 2050.

Organization (FAO). It was also the year the World Food Programme won the Nobel Peace Prize.

However, 2020 was also a special year due to the COVID-19 pandemic, which FAO says “threatens to reverse important milestones achieved in the areas of food security, nutrition and livelihoods.”

Most important, 2020 marks the start of the Decade of Action to achieve the United Nations’ 17 Sustainable Development Goals (SDGs).

Many steps have already been taken towards achieving the goals set, but the speed of the actions taken is not yet fast enough to achieve the final victory.

There are still many problems to solve, particularly with regard to food systems and the aim of definitively eliminating hunger in the world, guaranteeing safe and sufficient food for all.

The demand for food is growing all the time among the world population expected to reach 10 billion by 2050. “Unless we transform our food systems, undernourishment and malnutrition will have increased significantly by then,” FAO warns.

The figures clearly illustrate the problem we are facing: over 2 billion people currently have no regular access to healthy and sufficient food, and around

135 million are suffering from acute hunger in 55 countries. On the other hand, obesity rates have surged in all countries, whether developed or not, due to unhealthy diets and lifestyles.

The food supply chain from farm to fork includes actors that FAO defines as “food heroes” -labourers, pastoralists, fishing communities, mountain farmers, foresters, shepherds and farmers from indigenous communities. According to FAO data, there are 800 million family farmers managing 75% of agricultural land and producing about 80% of food globally.

They are also innovators by definition, often having to adapt their cultivation and production methods to changing external conditions and climate change, without stopping even in the face of a pandemic like COVID-19. “Many of us depend on them, but it is often small farmers who are most vulnerable during a crisis,” say FAO experts.

FAO is urging countries to support the disclosure and use of data, collaborate to make food systems more resilient to volatility and climate shocks, and prioritize innovation and digitalization to bridge the digital divide.

Private companies are advised to invest in sustainable and resilient food systems that offer decent jobs; food companies, including e-commerce companies to use or share new technologies to manage stocks, especially

highly perishable products.

While all stakeholders should be aware of their impact on natural resources and adopt a sustainable approach, individual citizens should always strive to make healthy food choices and reduce waste as much as possible, to help cultivate, nourish and preserve the planet.

In this time of panic and uncertainty, we can see the deep interconnectedness between human, animal, plant and environmental health. It is also clear that world’s food and agriculture systems need to be fixed - that was the case pre-pandemic - and the time to act to fix the food system is now.

It is time to truly revolutionize, recreate and reinvent our approach to food, nutrition and health. COVID-19 is providing unprecedented opportunities to create a resilient food system that is truly regenerative and restorative, healthier for people, and leaves no one behind, the experts said in a communique issued at the end of the forum.

They proposed 10 bold and interdisciplinary actions to finding ways to nourish both people and the planet today and in the future:

1. Create better standards and terminology.
2. Improve measurement.
3. Encourage businesses to focus on health and sustainability.
4. Digitize food and agriculture information
5. Identify the true cost of food.
6. Improve seed security, diversity, and soil regeneration.
7. Mobilize all actors.
8. Increase awareness and education.
9. Enable healthy and sustainable diets and empower eaters.
10. Build global resiliency.

Raising awareness on the systematic connection between good nutrition and the environment and humanity will help build responsible food behaviours to reduce the environmental, economic and social impact of food waste.



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United Nations World Food Programme (WFP) Executive Director David Beasley receives the Nobel Peace Prize awarded to the agency in October 2020 at the agency's headquarters on 10 December.

Photo WFP/Rein Skullerud

WFP chief's Nobel appeal to avert 'hunger pandemic'

By Rutooba Reporter

World Food Programme (WFP) Executive Director David Beasley has warned that "famine is at humanity's doorstep", threatening to destroy lives and undo so much we hold dear.

"Because of so many wars, climate change, the widespread use of hunger as a political and military weapon, and a global health pandemic that makes all of that exponentially worse — 270 million people are marching toward starvation," he said, speaking from the agency's headquarters in Rome.

He was officially accepting the Nobel Peace Prize awarded virtually to the UN agency in October.

"Failure to address their needs will cause a hunger pandemic which will dwarf the impact of COVID. And if that's not bad enough, out of that 270 million (more than the entire population of Western Europe), 30 million depend on us 100 per cent for their survival."

WFP was awarded the Nobel Peace Prize back in October 2020 for its work providing lifesaving food assistance to millions worldwide, often in dangerous locations. Last year, it supported nearly 100 million people.

Beasley underlined that food is "the pathway to peace." For the agency, it is also sacred, and their work is "an act of love",

he told the online ceremony, citing both the 1964 Nobel laureate, Dr Martin Luther King Jr, and The Bible.

"We stand at what may be the most ironic moment in modern history. On the one hand — after a century of massive strides in eliminating extreme poverty, today those 270 million of our neighbours are on the brink of starvation. That's more than the entire population of Western Europe", he said.

"On the other hand, there is \$400 trillion of wealth in our world today. Even at the height of the COVID pandemic, in just 90 days, an additional \$2.7 trillion of wealth was created. And we only need \$5 billion to save 30 million lives from famine."

Life-or-death choices

Beasley said many of his friends, as well as world leaders, often remark that he has the greatest job in the world, saving the lives of millions. However, he begged to differ:

"Well, here is what I tell them: 'I don't go to bed at night thinking about the children we saved, I go to bed weeping over the children we could not save."

And, when we don't have enough money, nor the access we need, we have to decide which children eat and which children do not eat, which children live, which children die. How would you like that job?," he said, adding "Please don't ask us to choose who lives and who dies."



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