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icipe: Insects are key in securing food security

Dr Saliou Niassy

By Joyce Chimbi I j.chimbi@gmail.com

There are at least 500 species of edible insect species among African communities, according to a survey conducted by the International Centre of Insect Physiology and Ecology (icipe).

The Central African region is home to approximately 256 edible insect species.

East Africa hosts about 100 species and an estimated eight species in North Africa.

An estimated 17 primary species are used for feed and food in Kenya.
Dr Saliou Niassy, a scientist at icipe says Africa is a biodiversity hotspot and part of that biodiversity are insects, which he says are the largest group in the animal kingdom. Scientists estimate that insects make up to 90 per cent of all species of animals on earth and more than half of all living things.

"Globally, there are an estimated 1.8 billion species of insects that are currently known. Insects are critical because every aspect of the food chain relies on insects. Insects are an essential part of the ecosystem services, these services are the benefits provided by nature for free that contribute to making human life both possible and worth living," he said.

Insects play an important role of pollination, supporting food production and security. Another function is the regulatory role, which includes waste decomposition and the support function, including nutrient cycling.

"At icipe, we are trying to harness biodiversity to understand how insects affect the lives of people and essentially to understand their usefulness, by exploring areas such as insects for animals and insects for food," said Dr Niassy. Globally, there are approximately 1,900 edible species, including butterflies, cockroaches, crickets, grasshoppers, ants, bees, dragonflies, beetles, domestic silk moth, centipedes and locusts.

According to UN's Food and Agriculture Organisation (FAO), an estimated 2.5 billion people eat insects as part of their regular meal, whole or in processed food

Turn to page 2

From to page 1

Globally, there are approximately 1,900 edible species, including butterflies, cockroaches, crickets, grasshoppers, ants, bees, dragonflies, beetles, domestic silk moth, centipedes and locusts. Source: icipe

products such as snacks and pasta. The global edible insect market was estimated at $112 million in 2019 and could reach $1.5 billion by 2026.

Dr Niassy said biodiversity helps humanity to grow.

He said agriculture is similarly central to human life but it comes with a lot of issues, including use of chemicals and farming practices such as slash and burn that transform the habitat of biodiversity.

"Therefore agriculture and biodiversity should go hand in hand and that is why the old way of practising agriculture is no longer acceptable. We are embracing agro agriculture and organic farming because we must preserve biodiversity as it is a central pillar of human life, and this is the message that journalists must take to their communities," Dr Niassy said.

He encouraged journalists to highlight the interconnectivity between biodiversity and agriculture, the former being nature driven and the latter driven by human activity.

"When you mention the word insect, the first thing that comes to many people's minds is that insects are harmful to people. They think of insects such bedbugs but that is not the complete picture, a majority of insects are very important as they play a key role in the food chain," he said.

According to icipe, edible insects contain high-quality protein, vitamins, fibre, calcium, iron, B vitamins, selenium, zinc, amino acids and are also an excellent source of healthy fats.

Insect oil produced, through an icipe research project, from two edible insects – the desert locust and the African bush-cricket – was found to be richer in omega-3 fatty acids, flavonoids and Vitamin E than the plant oil.

He spoke of statements that people make such as insects for life, that a butterfly in the Himalayas can cause an earthquake in California, that humanity has only 40 years to live if all insects disappeared. These, he said, speak to the central, critical role that insects play in human survival.

"As journalists, produce stories that educate communities about biodiversity, the more people understand their environment, the more they will understand why they need to protect their biodiversity because it is our lifeline," said Dr Niassy.

"If we take biodiversity for granted we will continue to destroy our environment."

Amos Rutherford, Team Lead, Research and Innovation at Legacy Seeds Ghana

It's a shame Africa begs for food with 60% of world's arable land, says expert

By Christine Ochogo | christawine@gmail.com

African countries must invest more in crop production in a bid to improve the continent's agribusiness share in the global market.

Amos Rutherford, Team Lead, Research and Innovation at Legacy Seeds Ghana, said it was high time farmers in Africa knew their value in the global market and increased production from the current two billion tonnes to the possible 60 billion tonnes annually.

Mr Rutherford said this is only attainable if farmers adopt modern and sustainable farming methods alongside enhancing value addition to their farm produce. He said this will give them a better bargaining power in the ever growing and competitive agribusiness market.

"Currently, since 2021, the global agribusiness market size is valued at $6.21 billion and is projected to grow to $154.6 billion by 2027, despite the economic challenges," he said in his presentation at the Fifth African Conference of Science Journalists.

Mr Rutherford said it is shameful that Africa as a continent has 60 per cent of the world's arable land, yet it is food insecure.

The seed expert gave a snapshot of the challenges farmers in Africa face in the course of food production, including lack of quality seeds, crop nutrition inputs, droughts, a land tenure system that does not allow commercial farming, pests and diseases, unstructured market systems and weak financial architecture.

According to UN's Food and Agriculture Organisation (FAO) 2009 report, agriculture in sub-Saharan Africa has been under-performing since independence and the continent must now rise up to be able to produce sustainable food and surplus for agribusiness.

Another report by the World Bank says African farmers and the leaders of their organisations are key players in mitigating these challenges affecting crop production.

"The narrative of getting relief food must end in Africa if we want to earn our dignity and respect as a continent globally," Mr Rutherford said.

He said sustainable crop production will ensure the continent has enough food to feed the ever growing population, create job opportunities for the teeming youth, enhance industrial revolution, and avert conflict and tribal wars.

MESHA Secretary Daniel Aghan regretted that Africa's full potential in agriculture remains untapped, hence the need to put in more efforts.

"It is time to stop complaining about issues and start taking action to improve on our shortcomings for a food secure continent," said Mr Aghan.

Amanda Ngabirano is the brain behind the Namirembe NMT project, she is a cycling enthusiast and lecturer of urban and regional planning at Makerere University, Uganda. Source Movin'On Lab

Why non-motorised transport sector shift is best bet for Africa

By Njeri Murigi | n.milliam@yahoo.comi

Africans have been urged to embrace use of non-motorised transport means or embrace use of transport modes that use renewable energy as a way of reducing emission from the sector.

Speaking during the Fifth African Conference of Science Journalists, organised by Media for Environment, Science, Health and Agriculture (MESHA) on Wednesday, Annika Berlin from UNEP Sustainable Mobility Unit said this is the only way Africa can decarbonise its transport sector.

"Africans should avoid and reduce use of motorised modes of transport and shift to more environmental friendly modes. Apart from that, they should also embrace energy efficient modes of transport if they want to decarbonize this sector," she says.

According to Annika, Africa needs to heed to this call because its population is expected to rise from 1.3 billion to 2.5 billion by 2050. This increase is expected to cause 85 per cent rise in demand for new vehicles between 2020 and 2027. More vehicles on our roads mean more air pollution from the transport sector.

"Africa has very high transport emissions. Between 2000 to 2016, there was an 84 per cent increase in CO2 emissions from the transport sector across the continent. The percentage continues to increase as more conventional vehicles continue to be added on our roads," Annika said.

According to her, this intervention will help because others such as additional road space have not helped to solve the pressing problems of unacceptable levels of congestion, air quality deterioration and increasing greenhouse gas (GHG) emissions in cities.

She said a shift from the most energy consuming and polluting urban transport mode (cars) towards more environment friendly modes will help to limit global warming as well as reduce emission of GHG, especially CO2. The shift will also reduce congestion and ensure an efficient decarbonised transport system, thus ensuring accessibility.

"Government should redirect fossil fuel subsidies to clean technology. The increased spending on renewables will decrease air pollution and increase life expectancy. This will greatly help because in sub-Saharan Africa death rate from transport air pollution is high," Annika said.

Non-motorised modes that can be embraced include walking and cycling. Electric mobility can also support avoid and shift strategies.

Since motorised transport cannot be eliminated 100 per cent, Annika says introducing renewable energy sources into the transport sector must become a basic principle for motorised transport.

"We need to improve the overall performance of the vehicle fleet by utilising cleaner energy. We also need to make public transport more attractive either by improving the actual public transport vehicles and accompanying features or improving last mile connections to and from mass public transport," she said.

According to her, Africa fits all criteria for an electric vehicle revolution because it has the richest renewable energy resources globally, temperatures in the region are rarely below 0oC, people travel average distances of less than 80km daily, with an average speed of 60km/h, meaning electric vehicles solutions technically fit, and there is need to decrease petroleum dependency and boost energy security in the context of increasing transport demand.

In most African countries it is also cheaper per kilometer to operate an electric vehicle instead of an internal-combustion-engine vehicle, resulting in reduced total cost of ownership.

Africa, Annika said, also has young technique-affine populations that facilitate a fast shift to new technologies and provide a workforce to develop own vehicle production capacities.

Since very few Africans can afford new cars there is also need for designing and manufacturing of affordable electric vehicles. The reason is that currently availability of electric vehicles is limited to new vehicles, whereas most vehicles purchased are low-cost used internal combustion engine ones.

And how will the environment gain from the shift from internal combustion engine automobiles to vehicle electrification?

Annika said the major benefit of electric cars is that they have no tailpipe, meaning they do not emit CO2 when driving. This reduces air pollution considerably.

Electric vehicles are also efficient and suitable for stop and go operation. Energy is regenerated by electric braking, leading to lower consumption.
healthjournalist3@gmail.com

A lorry spews out exhaust fumes into the air in Nairobi. Source: Nairobi News

Expert: Africa needs to restrict vehicles age limit to tackle transport emissions

By Clifford Akumu | akumu.clifford@gmail.com

African governments have been urged to institute fuel emission standards and restrict vehicles age limit to tackle transport emission menace across the continent.

Annika Berlin, Programme Management Officer, Sustainable Mobility Unit, Economy Division at UNEP said, "Although transport emissions per capita are still low in Africa, they are currently growing rapidly than anywhere in the world."

She said to reduce transport emissions in Africa needs a myriad of approaches.

"I urge African states to adopt the ASI model, including; avoid and reduce the need for motorised travel, shift to more environment friendly modes of transport and fuel economy," said Ms Berlin.

She said failure to act puts the continent at risk of being a dumping ground for old, polluting, internal-combustion-engine vehicles as developed countries shift to electric vehicles.

Over 80 per cent of vehicles, for example, have been imported and they keep on polluting the continent. Between 2020 and 2027, Africa's new vehicle demand is expected to increase by 85 per cent.

Currently, approximately 55 per cent of the global population lives in urban areas. By 2050 this proportion is estimated to reach 68 per cent, according to the United Nations data.

The menace of outdoor air pollution in African cities is compounded by the increased imports of old vehicles, which are known to be heavy emitters of pollutants, said Ms Berlin.

Environmentalists too are rooting for restrictions on importation of over 15-year-old vehicles.

Kenya has since taken a first step in vehicle import restrictions. The government banned the importation of second-hand buses and trucks in a move that was seen as a boon for the local auto assembly industry.

The Kenya Bureau of Standards (Kebs) said it would not allow the importation of buses and trucks into the country beginning July 1 this year.

Evidence shows that the air pollution levels in Nairobi, as with other East African urban areas, are currently at unhealthy levels.

Ms Berlin said Kampala and Nairobi are some of the major cities in the larger Eastern African region where air pollution is rising rapidly, affecting the health and environment.

The 2021 World Air Quality Report finds that only three per cent of cities and no single country met the latest World Health Organisation's (WHO) PM2.5 annual air quality guideline.

Kampala's air quality index measured at Nsambya (a city suburb) by the air pollution monitor in September 2018 indicated that it was six times higher (162 g/m3) than WHO Air Quality Guidelines (25 g/m3).

In 2020, the average PM2.5 concentration in Nairobi was 14.7 μg/m3, which is about 1.5 times the WHO recommended annual PM2.5 threshold concentration. The most polluted month in 2020 was July, with an average of PM2.

Meanwhile, switching fully to electric mobility is still a tall order, said Ms Berlin.

To deploy electric vehicles, there is a need for conducive policy regulations and subsidies that will make it cheaper for the end user to easily afford the e-vehicles.

In European countries, for example, the governments have realised the importance of e-mobility and are heavily supporting subsidy and regulation initiatives.

Besides East Africa, other cities in China and India are also facing visibility degradation due to increased air pollution, while visibility is significantly improving in European cities.

The Media for Environment, Science, Health and Agriculture

The Media for Environment, Science, Health and Agriculture (MESHA) was founded in November 2005 in Nairobi, Kenya and is an organisation that provides support to science journalists covering health, development, technology, agriculture and the environment. It does so by offering training workshops, consultancies and encouraging networking through meetings and conferences among journalists, scientists and other stakeholders in Kenya.

The association emphasises on rural journalism and communication.

The idea for the formation of this association sprang up from the fact that there were many organisations and communicators in the fields of agriculture, environment, health and development.

However, few organisations in the region bring journalists covering these issues together, for better reporting in the media.

MESHA believes that in a democratic society where science must be answerable to the public, there is need to find new and innovative ways of effective mass communication about the benefits of science, and other areas of concern to the general public.

MESHA aims to ensure continuity, sustainability and consistent coverage of science and development issues as they arise.

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Nyandarua Governor Francis Kimemia

Kenya: Nyandarua becomes First County to Launch Forest Landscape Restoration Strategy

By Sharon Atieno I sharonphoebeatieno@gmail.com

In Kenya, it is estimated that about one in five (21.6%) lands is degraded with about 12,000 hectares of forestland converted to other uses or lost through natural causes every year, according to 2019 statistics from the Ministry of Environment.

Similar to this trend across the country, Nyandarua County has not been spared. Though 22% of land in the county has been covered by forests, within two decades (2001 to 2020) , Nyandarua lost 535 ha of humid primary forest, making up 7.5% of its total tree cover loss in the same period.

Landscapes in the county including forests, wetlands, riparian zones, rangelands, and agricultural landscapes are threatened by severe degradation due to agricultural expansion, overexploitation and unsustainable use of land resources, overgrazing, climate change, urbanization, infrastructural developments, and population increase.

It is against this background that the County Government of Nyandarua has developed a ten year Forest and Landscape Restoration (FLR) Strategy 2021-2030, becoming the first county to do so in Kenya.

Through this strategy, the county is to put under restoration 2400 hectares of deforested and degraded landscapes through FLR approaches for improved multiple ecological functions, increased resilience, and socio economic benefits by 2030. This is expected to be achieved through a multi-stakeholder process that builds on successful restoration initiatives scattered across the country.

Speaking during the FLR launch in Ol Kalou, Nyandarua Governor Francis Kimemia said they will adopt a ten-ten approach, whereby they will grow 10 million trees in 10 years.

Chief Conservator of Forests Julius Kamau

So far, he said, they have been planting two million trees per year in the five years of his rule as governor.

He noted that the implementation of the strategy will be inclusive of all ages and groups with a focus on women and youth who are at the centre of the restoration efforts. Additionally, he urged other counties to follow suit and ensure the country's target of restoring 5.1 million hectares of degraded landscapes are restored.

Besides calling on other counties to develop a similar strategy, Julius Kamau, Chief Conservator of Forests said there is need to integrate these strategies into county development plans to ensure that they receive funding for implementation.

He acknowledged that Nyandarua county had made great strides in increasing its tree and forest cover, noting that from the 2021 forest resource assessment, the county's cover was standing at 27.5% and 26.2% respectively.

With World Wide Fund for Nature (WWF)-Kenya, a non-profit organization supporting the development of the strategy by mapping out all- key natural resources in the county, Joseph Kiplagat, WWF-Kenya, Head of Conservation said it will work together with the national and county governments in achieving national and global commitments around forest landscape restoration activities.

Noting that the organization was supporting a number of activities geared towards conservation of natural resources across the country, he highlighted the need to recognize forests as a crucial natural resource and their contribution to the national economy.

All the 47 counties in Kenya are expected to commit and adequately contribute to the attainment of the country's national target of restoring 5.1 million hectares by 2030 in accordance to the country's commitment to the African Forest Landscape Restoration Initiative (AFRI100).

These efforts initiated by Nyandarua County will also go a long way in contributing to Kenya's five-year Forest Landscape Restoration Plan, 2021-2025 (FOLAREP) that aims at restoring 2.55 million hectares by 2025.

> *"Nyandarua county had made great strides in increasing its tree and forest cover"*

Insect-based feeds are effective, the level of protein is significantly high and this can help reduce importation of feed proteins from outside, which makes the cost of feed high.

Poultry farmers told to seek available options to cut costs on feeds

By Agatha Ngotho | angotho@gmail.com

Poultry farmers have been told to seek alternative ways to supplement feeds for their animals.

Dr Subramanian Sevgan from the International Centre of Insect Physiology and Ecology (icipe) said the poultry sector has been adversely affected by the skyrocketing cost of feeds.

He said insects-based feeds (IBF) can be used as a valuable source of proteins for the industry.

Speaking during the virtual Fifth African Conference of Science Journalists organised by MESHA, Dr Sevgan said data from icipe showed a 25 per cent weight gain in broiler when fed with IBF and 62 per cent increase in egg production by layers.

"Pigs mature 1.2-2 months earlier and are 15 per cent heavier while tilapia and catfish have a growth rate of 23 and 37 per cent, respectively," he said.

Dr Sevgan said the nutrient and energy levels in insects is high, hence less feed intake, which cuts the cost of commercial feeds. Animal feeds account for 70-80 per cent of the cost of production in poultry farming.

He said insect-based feeds are effective, the level of protein is significantly high and this can help reduce importation of feed proteins from outside, which makes the cost of feed high. This is a natural source of protein, which will help increase productivity of poultry," he said.

The data further showed that over 96 and 95 per cent of livestock farmers in Kenya and Uganda, resepectively, are willing to use insect-based feeds in their animal husbandry, and over 85 and 92 per cent of feed producers, respectively, showed willingness to integrate insects into their feed products.

Doreen Ariwi, a poultry farmer and the proprietor of Bugs Life Protein Limited, has ventured into black soldier fly rearing to cut costs on poultry feeds.

She has 6,000 birds and in 2020 she was able to put up a greenhouse to produce the black soldier fly in large scale.

"Besides being able to produce enough BSF to feed my birds, I am able to sell the surplus to a company in Athi River that produces pet food at Sh96 per kilo.

"The birds prefer the insects to the commercial feeds. I feed the insects on birds above two months old, and this helps in improving their growth rate and increase the egg production," Ms Ariwi told journalists during a visit to her 20-acre farm in Mtalani, Machakos County.

She said she had been able to reduce the usage of commercial feeds, hence a drop in the cost of buying feeds.

"I have reduced the use of commercial feeds by 150 bags per month. Before I started supplementing my poultry feeds with the insects, I used 450 bags for 6,000 birds per month and now I'm using 300 bags to feed the same population of birds," she said.

Nicholas Mareve, 24, from Wangige in Kiambu County also rears the black soldier fly to sell as pig feed and as organic fertiliser to farmers in the area.

He said he received training on insect production from icipe and uses waste from nearby markets and slaughterhouses to produce the eggs for the black soldier fly farming process that takes about 10 days to achieve the final product.

"One man's waste is my gold. I source waste to help in production of the black soldier fly eggs from Wangige market and in Ndumboini pig slaughterhouse in Kikuyu, Kiambu County," he said.

Animal feeds account for 70-80 per cent of the cost of production in poultry farming.

Mr Mareve sell his products under the name Zihanga Limited, which was derived from the aspect of zero hunger to put an emphasis that his products promote zero hunger initiative.

He makes about 300 to 600 kilos of dried black soldier fly insects per week and sells a kilo at Sh110 to Sh140. Mr Mareve sells the organic compost to tomato, onion and strawberry farmers in the area.

Through the Insect Feed for Poultry and Fish in Kenya and Uganda project, farmers were assisted to tap into the opportunities of black soldier fly farming. The project provided training in the fly rearing and utilisation of insect protein as an alternative animal protein source.

The Kenya Bureau of Standards (KEBS) has developed and approved three new standards on codes of practice, insect products and products containing insects.

To help farmers address the high cost, icipe developed a project to demonstrate the technical feasibility and economic profitability of insects for feed in Kenya and Uganda.

Africa's seed breeding programmes 'neglecting high value crops'

By Clifford Akumu | akumu.clifford@gmail.com and
Sharon Atieno I sharonphoebeatieno@gmail.com

Africa still lags behind in seed breeding programmes for neglected or overlooked local food crops, an expert has warned.

Mainza Mugoya, Programme Coordinator at The African Seed Access Index (TASAI), said most of Africa's seed breeding programmes are dominated by production of staples, especially maize.

This, he said, is mainly driven by demand and supply as most African communities prefer maize to other crops.

Mr Mugoya said increased investment and breeding systems in staple maize across the region at the expense of the orphaned crops is also to blame for the neglect.

"In most African countries, maize dominate the crop breeding programmes. In the last three years we are recording higher trends in a number of varieties released for maize compared to other crops like millet, sorghum and beans across the continent," he told the Fifth African Conference of Science Journalists.

Maize is also one crop that happens to be lucrative for most seed companies in the continent mainly because of hybrid seeds compared to open pollinated crops. They make more money from maize than other crops.

Neglected or 'orphaned' crops are a class of crops that tend to receive less attention, but are poised to make a major impact on global food security.

Mainza Mugoya, Programme Coordinator at The African Seed Access Index (TASAI).

These crops are typically grown in Africa, Asia or South America and eaten as part of local diets. Because they get less research attention, the breeding technology for orphaned crops is lagging way behind modern technology.

Mr Mugoya said the uptake of improved seeds among smallholder farmers in the continent still remains low notwithstanding their impacts on yields, disease and pest resistance, climate change adaptation and improved nutrition and longer shelf life.

A 2019 report by Seeds Systems Group (SSG) had earlier shown that even if one-third of the farmers in just 15 of the continent's 54 countries are able to obtain improved seed, Africa's agricultural sector could generate an additional 25 million tonnes of food worth US$4 billion.

Across the continent, only about 30 per cent of farmers are using seeds that have gone through some form of breeding programme, he said.

Further, the high cost of variety release process poses a challenge in most African countries. In countries like Ghana the cost ranges between US$10,000 and $53,000, Uganda ($5,000 to $24,000), while in Nigeria it costs about $18,000 and $3,000 in Kenya.

Breeding technology for orphaned crops lags behind modern technology because they get less research attention.

Kenya, according to the study, is one of the few countries that has clearly defined cost structure for variety release, with the costs being standard and known by all variety owners both public and private.

Mr Mugoya said lack of structured varietal release was to blame for the high cost in most countries.

"Most countries in the African region lack structural varietal release. Because of this, the cost tends to remain high.

"In countries like Kenya, there is a robust private sector involved in the development and release of varieties and this drives the seed regulators to set standardised varietal release structures," said Mr Mugoya during his presentation titled Seed Industry Updates from Selected African Countries: Data from recent TASAI Studies

Another issue farmers are grappling with is counterfeit seeds. He said most countries have not put in place reporting mechanisms and stiffer penalties to curb the vice that is causing health risks and huge amount of losses for farmers.

He singled out innovations in Kenya and Uganda that are fighting proliferation of fake seeds. The two neighbouring countries have since adopted seed tracker and authentication systems for farmers to enable them ascertain seed authenticity.

"In Kenya, use of the tamper proof labels, and increased surveillance of counterfeit seed increased the efforts of the government in fighting counterfeit seed," said Mr Mugoya.

He said African countries were now diversifying their sources of basic seeds and not solely relying on national agricultural research institutions. These are not a reliable supply source because they are underfunded and under resourced.

Besides, the national seed trade associations, which are the link between the industry and the governments are performing well based on surveys conducted in different African countries, Mr Mugoya said, noting that the most active associations are from South Africa, Tanzania, Malawi, Kenya, Ghana and Uganda.

Looking at the case of Mozambique, Burkina Faso, Kenya, Burundi, Liberia and others, he said there were steady efforts to harmonise seed regulations with regional economic blocs like the Common Market for Eastern and Southern Africa (COMESA), the Economic Community of West African States (ECOWAS) and the Southern African Development Community (SADC). However, implementation in most countries is still lagging behind due to limited resources and mistrust.

Prof Nicholas Oguge addresses journalists. In Tanzania, more than 3.6 million hectares of forests and woodlands are now managed as village forest reserves.

How community engagement is saving Africa's biodiversity

Ruth Keah I rkeahkadide@gmail.com

Community involvement in solving biodiversity challenges has enabled awareness on ecosystem among African communities.

Speaking during the second day of the 5th African Conference of Science Journalists held virtually, Prof Nicholas Oguge said the awareness is close to 30 per cent of the biodiversity values integrated into the economic system.

"There is some progress in biodiversity awareness today. However, there is still some laxity, especially in areas of reduction of pollution, which currently is only at 18 per cent," he said.

Prof Oguge said Community-based natural resource management (CBNRM) had played a major role in creating awareness. He said most African countries had adopted the CBNRM, which also helped improve the livelihoods of the communities.

In Namibia, for example, he said communal land conservancies had proliferated and now cover more than 14 per cent of the country, which involves over 200,000 people and earn $2.5 million per annum.

In Zimbabwe, CAMPFIRE generated $20 million in revenues for local communities and district governments from 1989 to 2001, and resulted in over 40,000km2 of communal land being managed for wildlife production.

In Tanzania, more than 3.6 million hectares of forests and woodlands are now managed as village forest reserves, entirely under the control of locally elected village administrations.

In Ghana, 200,000 hectares of forest have been demarcated under the community resource management area policy of 2000.

In Cameroon, revisions to the forestry law enabled community associations and cooperatives to acquire the exclusive rights to manage and exploit up to 5,000 hectares of customary forests, while in southern Kenya, 11,000,000 hectares are under communities that capture up to 1,7000 tonnes of CO_2 annually, which is valued at $126 million.

Ecosystem: Involving communities in biodiversity management is beneficial to all players in the sector.

According to Prof Oguge, those initiatives afford various benefits to communities and the biodiversity. He gave an example of the Masai Mara area in Kenya, where there is now an economic, social, cultural and governance capacity change.

These sentiments were echoed by Dr James Kairo, chief scientist at Kenya Marine and Fisheries Research Institute, who added that media plays a pivotal role in shaping attitudes to the environment and could improve people's motivation to construct a sustainable future.

Dr Kairo, giving an example of a Mikoko Pamoja project, which the organisation is undertaking together with the community in Gazi area of Kwale County at the Kenyan Coast.

Mikoko Pamoja (Swahili for Mangroves together) is a community-led mangrove conservation and restoration project in Gazi Bay, Kenya.

It involves both the prevention of deforestation of the local mangrove forest, as well community-based reforestation. The project also supports community development projects such as provision of school books, constructions in schools and the provision of clean drinking water.

According to Dr Kairo, Mangroves provide a wide range of services and benefits to both the environment and the surrounding community. These include coastal protection, nursery habitat for fish, including many species fished by the surrounding communities, water purification, improving biodiversity and sequestering large amounts of carbon dioxide from the atmosphere.

He said by raising income from forest resources, including carbon credits and other income-generating activities such as beekeeping and Eco-tourism, the project safeguards these benefits for the local community and for future generations, hence reward the community that is safeguarding the ecosystem.

"The payment for ecosystem service we reward the ecosystem keepers, who are the community, is through the selling of carbon credit," he said.

The project earns the community millions annually and it has improved the livelihoods of the Gazi community and at the same time created employment opportunities.

Dr Kairo said of the success of Mikoko Pamoja: "The project is now being replicated in countries like Madagascar, Tanzania, Mozambique, Gambia and Senegal, and we are soon going to do a pilot project in Nigeria."

> *"The project earns the community millions annually and it has improved the livelihoods of the Gazi community and at the same time created employment opportunities."*

Embrace biotech to improve agriculture in Africa, AU tells farmers

By Aimable Twahirwa
twahaime@yahoo.fr

Integration of biotech into agricultural development has led to improved productivity and increased resistance of plants to pests and diseases, an African Union official has said.

Agricultural biotechnology in Africa has been practised most recently, as some countries seek to improve agriculturally important organisms by selection and breeding.

Dr Simplice Nouala, Head of Agriculture and Food Security Division at the African Union Commission said common crops, which are genetically modified in Africa, include maize, cassava, rice, potato, soybean and sorghum.

"Food biotechnology can also improve food security by increasing the nutritional value of food, but [African] countries are sovereign and may decide to or not to introduce GMOs in their countries," Dr Nouala said during a presentation at the Fifth African Conference of Science Journalists.

The expert also urged governments to strengthen and harmonise biotechnology policies and biosafety regulations to create an enabling environment for biotechnology development on the continent.

Dr Simplice Nouala, Head of Agriculture and Food Security Division at the African Union Commission.

Presenting findings on Continental Guidelines for the use of Biotechnology to Enhance Agricultural Productivity for Food Security and Nutrition in Africa, Dr Nouala said that Genetically Modified (GM) crops already exist in at least 12 African countries, with policy and legal frameworks in place at different stages.

Despite the existing framework, he said most countries in Africa still fall below the average in support towards policy framework to govern biotechnology.

"Harmonising biotechnology policies and biosafety regulations is still key to creating an enabling environment for its development and deployment," he said.

So far, the African Union Commission (AUC) has appointed African Agricultural Technology Foundation (AATF) to lead the continent's platform dubbed African Seed and Biotechnology Platform of the African Union (ASBP).

With the establishment of the African Continental Free Trade Area (AfCFTA) in 2018, experts hope to see an increase in trade related transboundary movement of agricultural commodities across the continent.

"GMOs, like drought-resistant crops, may become increasingly necessary in the current demand for food," Dr Nouala said.

For agricultural biotechnology to play a crucial role in bridging food and nutrition, researchers believe that the right combination of innovations, policies and actions could be an option.

Diversification in crop farming will help build resilience against pests, expert says

Joseph Ouma
joothoth@gmail.com) and

Many farmers in the East African region and beyond suffer the effects of pests like fall armyworm and the maize lethal necrosis.

African farmers have been urged to build resilience through diversification of crops as a reliable solution for the management of destructive pests.

This, as many farmers in the East African region and beyond suffer the effects of pests like fall army worms and the maize lethal necrosis, which compromised the attainment of higher yields, threatening food security.

Africa suffers extensive use of insecticides, where small-scale farmers are 96 per cent dependent on rain-fed agriculture, and where there is low adoption of new technologies, yet the same have proved successful across the world.

Dr Subramaian Sergan, the Principal Scientist with the International Centre of Insect Physiology and Ecology (ICIPE), now says they are building the capacity of small-scale farmers in Kenya and across the continent through the support of the European Union (EU) on how best to deal with the challenges.

Dr Sergan singled out the Push and Pull System, a new technology that has greatly controlled the strings weed in maize. This technology is also resilient against fall army worms, as it controls between 60 per cent and 70 per cent of the pest.

The fall army worm is a destructive moth that causes devastating damage to almost 100 plant species; including sorghum, rice, wheat and sugarcane, alongside a variety of horticultural crops, thereby threatening food and nutritional security, trade, household incomes and overall economies.

Dr Sergan said fall army worms spread fast to the extent that in their adult stage they can move over 100km in a single night. The pest is also capable of laying hundreds of eggs, with the emerging larvae burrowing into crops, destroying and eventually killing the plants.

The ICIPE research findings established that until 2016, the fall army worm was constrained to its native region of origin, the Western Hemisphere (from the USA to Argentina). However, in January 2016, the pest was reported in Nigeria, and it has since spread at an alarming rate across Africa.

Its presence has also been confirmed in more than 25 African countries, while a further nine either strongly suspect, or are awaiting confirmation of invasion. "This is why the farmers should be encouraged to adopt inter-cropping between maize and legumes for example, ensuring that the pest doesn't land on the crops. This controls up to 30 per cent of the fall army worm," explained the researcher.

He was addressing the 5th Science Conference for journalists organised by Media for Environment, Science, Health and Agriculture (MESHA), with more than 300 participants, including researchers.

Dr Sergan said compared to traditional methods, the diversification system had proven more successful, having 214,000 farmers in Africa involved and a further one million beneficiaries spread out across the continent.

Of interest, he said, is the classical biological control, through which up to 30 per cent of eggs of the fall army worm were killed, leaving only 70 per cent that survived the attack.

The scientist pointed out fungus and viral deceases that also posed major challenges, calling for quick interventions. He revealed that interval pathogenic fungus had so far been tested in various counties in Kenya and in Uganda.

Dr Sergan called for swift adoption of the new technologies for sustainable control of the fall army worm, while avoiding mono-cropping, with close and consistent surveillance on the movement of the pests.

The problem of the African smallholder farmers is the failure to commercialise their agriculture because of the limitation of the land tenure system in their countries.

How Africa can increase its share of global seed market

By BOZO JENJE | bozojenje@yahoo.com

The agribusiness share for African countries is unexploited despite the huge global market.

According to Ghana based Legacy Crop Improvement Center CEO Amos Rutherford Azuni, the market share of the world market is at $96.21 billion and has the potential to grow to $150 billion.

Speaking on the third day of the fifth African Conference of Science Journalists, Mr Azuni said the smallholder farmers in Africa need to change from the narrative of food reliance to gain dignity and respect.

"Africa must increase the global share of the current $2 billion markets by increasing production, feeding itself, and exporting," he said.

He said the problem of the African smallholder farmers was the failure to commercialise their agriculture because of the limitation of the land tenure system in their countries.

"Land keeps decreasing because families own the land. When father or mother pass on, the land is divided among the children," Mr Azuni said.

He critiqued the smallholder farmers for their over-dependence on rain to grow crops at a time climate change is an issue. "When the rains come, the distribution is uneven to an extent that the neighbouring countries can produce better harvest, like in Malawi and Zambia," he said.

Mr Azuni said the delayed rains made it difficult to plant the crops in time, making it difficult to feed the populations due to poor harvests.

To promote Africa's ability to feed itself, the expert said, there is need to adopt irrigation, but which is not fully implemented in favour of the smallholder farmer. "Farmers in Africa lack the support of private and public sector to produce the extra food for the market," he said.

He said the irrigation system and mechanisation practiced at the river upstream and dams was not reasonable for smallholder farmers. "There is a belief that irrigation is for large-scale mechanisation. This limits investment for the small-scale holders," he said.

With the poor marketing system, African agriculture is not favoured by organisations that buy grains in the world. "The World Food Programme doesn't buy from Africa. They buy grains from the United States of America and other countries," he said.

He said to counter the problem of post-harvest losses caused by logistics challenges, Africa should do value addition to its production system. "This will end the culture of perpetual begging for food, and the small farmers will grow," he said.

On mining concession on land for agriculture, Mr Azuni said it is a colonial legacy that recognises minerals more as an income for a nation. "But the culture of food production will generate a lot of income and leave our people out of poverty," he added.

Mr Azuni said many farmers were still in a foreign land and the losses on land were visible in Ghana.

Regarding the challenges of smallholder farmers, Mr Azuni said lack of quality seeds, crop protection inputs, plant nutrition inputs, the land tenure system, agricultural drought, pests and diseases, and middlemen are a contribution to low food crop production.

Mr Azuni said to attain sustainable crop production and feed the burgeoning population, the aversion to conflict and tribal wars, creation of jobs and opportunities for teeming youth, industrial revolution, dignity and respect were key.

At the same time, the principal scientist at the International Centre of Insect Physiology and Ecology (ICIPE) Dr Subramanian Sevgan said the African smallholder production system was linked to daily livelihoods.

The head of Environmental Health theme and a specialist in Agricultural Entomology advised that farmers focus to increase income and opportunity.

He warned that about 36 per cent of the food in the granaries went to the feed sector and that it was crucial to find alternative ways to create the feeds.

Seed work: About 36 per cent of the food in the granaries goes to the feed sector and it is crucial to find alternative ways to create the feeds.

According to Dr Sevgan, the food market is competitive between humans and animals, and innovations need to be introduced in the feed sector.

In reshaping the marketing system, he said trials on insect feeds had been done on broilers, pigs and the result indicated a gain in weight. "The soldier flies have been successful among entrepreneurs in Kenya and has won the Food Planet Award for ICIPE," he disclosed.

"The $1 million Curt Bergfors Foundation Food Planet prize was in recognition of the pioneering research and development on insects for food, feed, and other uses," he said.

Finally, he said the small-scale farmers in Africa can incorporate circular farming to manage the organic waste into organic fertiliser.

> *"Food market is competitive between humans and animals, and innovations need to be introduced in the feed sector"*

Embrace agri-technology to be food secure, farmers told

Ruth Keah I rkeahkadide@gmail.com

Lack of infrastructure for crop production and logistic issues are among the challenges blamed for food insecurity in Africa.

Speaking virtually on the third day of the Fifth African Conference for Science Journalists, Mr Amos Rutherfold, a farmer from Legacy Seeds in Ghana, said there was need for African countries to rethink ways of financing the sector to enable farmers to produce adequate food.

"We need to look at our financial structure. How are we going to fund agriculture in the continent in order to know how we are going to produce enough food to feed our African population," he said.

According to Rutherfold, if farmers are going to get enough funds, they can solve those challenges, which include poor quality seeds, inadequate crop protection inputs and plant nutrition inputs, agricultural drought, land tenure system issues, pests and diseases, unstructured market system and weak financial architecture.

He said over the years, governments had tried to impose methodologies that small-scale farmers should use, but which are normally not convenient for farmers to use for production.

He said there was need for sustainable crop production in Africa. "We are the youngest population in the continent; so we must be able to produce enough food to feed these people," he said.

Addressing journalists and communication experts attending the conference, Dr Kayode Sanni, who is the Rice Project Manager and Director of the Alliance for Hybrid Rice in Africa, (AHyRA), urged farmers to embrace the growing technology in farming to enhance food security.

Dr Kayode Sanni said many western countries had adopted new agri-technologies in producing different farm produce, while Africa is still lagging behind, hence the food insecurity.

Dr Kayole gave an example of shortage of rice, a staple food in many African countries. He said there was still a big gap between production and consumption of rice in Africa.

"Currently, in Africa, we are at the level of 26 million metric tonnes of consumption, and we barely produce half of that. This has left us with a deficit of nearly 13 million metric tonnes," he said.

> *"Many western countries had adopted new agri-technologies in producing different farm produce, while Africa is still lagging behind, hence the food insecurity"*

According to Dr Kayole, Africa spends over $6 billion in rice importation only. He acknowledged that it is a challenge for African countries, but on the other hand an opportunity to use agri-technology and fill the gap. "At the end of the day it will improve the livelihoods of the farmers, improve business and increase income, which goes to farmers' households," he said.

According to Dr Kayole, of the more than 50 countries in Africa, only three - Tanzania, Madagascar and Mali - are rice self-sufficient. Countries that are still behind are Angola, which is still at 7 per cent of production. Kenya is at 10 per cent.

He urged farmers to take advantage of the shortage and adopt new agri-technologies and build capacity of private and public sectors to be able to meet what is needed in achieving food security. He also urged farmers to embrace the new technology to not only produce food, among them rice, for eating, but also for exportation.

"With the shortage here, what we mean is that there is a lot of opportunities if technologies are adopted in producing rice in Africa," he said.

With effects of climate change being experienced globally, Dr Kayole also urged farmers to plant resilient crops. This, he said, will also increase the chances of being food secure.

"We need to plant climate resilient varieties that can survive drought, disease outbreak or even flooding," he said.

Anthrax and brucellosis are acute and highly contagious bacterial zoonotic diseases in domestic and wildlife that are also passed to human beings.

Nearly 80 per cent diseases are shared between domestic animals and wildlife

By Musembi Nzengu | nzengumj@gmail.com and
Bozo Jenje | bozojenje@yahoo. com

An upward of 77 per cent of the known disease-causing pathogens are shared between multiple hosts, including livestock and wildlife, with disastrous results, a wildlife expert has said.

Dr. Benard Rono, a vet from the Kenya Wildlife Service (KWF), thus said multi-host pathogens could have significant consequences on both livestock and wildlife conservation. He added that the multi-hosted pathogens always posed a potential risk for disease emergence.

The wildlife veterinarian was speaking during the virtual Fifth African Conference of Science Journalists.

He said such pathogens could cause diseases that could lead to high mortality and production losses in livestock as well as infections that could cause a decline in wildlife populations, increased predation and reduced reproduction rate.

The vet was making a presentation tittled, Bovine diseases in livestock and wildlife. He said a myriad of viral, protozoan and bacterial diseases are multi-hosted in both domestic animals and wild game.

He said for certain pathogens, wildlife could be the reservoirs while conversely, domestic animals could act as maintenance hosts to the pathogens.

Dr Rono said understanding the disease transmission dynamics between livestock and wildlife was key for control. He, however, added that climate change, population growth and human development has had significant impact on the interface.

The veterinarian singled out anthrax and brucellosis as acute and highly contagious bacterial zoonotic diseases in domestic and wildlife that are also passed to human beings.

He said although vaccination for animal against anthrax faced serious logistical and technical challenges, there was no effective vaccination for human against brucellosis neither did there exist treatment for animals.

In the WILD: it is key to increase wildlife surveillance to understand what is going on in nature.

Other viral diseases hosted by both livestock and wildlife, Dr Rono said, are rinderpest that was globally eradicated in 2011 and the foot and mouth disease as well as the malignant catarrhal fever.

He said other diseases shared between livestock and wild game include bovine tuberculosis, tick borne diseases like the Crimean Congo hermorrhage fever and the bats associated viruses.

Generally, Dr Rono said the control of the pathogens shared between domestic animals and wildlife can happen through vaccination, management of diseases in the reservoir hosts and minimising contact with alternative host.

He said African countries should invest in wildlife surveillance to control wildlife-to-human diseases.

Dr Rono said many countries in Africa have made little investment to develop vaccines to save the lives of humans and wildlife.

The veterinarian said stakeholders, including the media, must work together to raise their voices for the continent to invest more in wildlife diseases.

In his presentation on wildlife diseases, Dr Rono said it was key to increase wildlife surveillance to understand what is going on in nature.

"From this side, most of the diseases are not properly understood since to invest in researching these diseases is costly," he said.

He urged governments to invest more in wildlife surveillance on the human or wildlife side.

Speaking on the latest wildlife disease under research, Dr Rono said brucellosis is infectious and affects people and wildlife.

He said it is through the consumption of raw milk and the most affected are the pastoralists.

"The disease can be transmitted through contact sharing of the fecal materials," he said.

The vet said brucellosis is listed as a priority public health disease that requires control.

"The disease lacks specific symptoms and has no vaccines. It needs investigation and requires more investment in the development of diagnostics and vaccines," he said.

In managing diseases, Dr Rono said the invisible hosts need to be identified and direct contact between wildlife and livestock checked.

Expert: Biotechnology in food and agriculture key to ending food insecurity in Africa

By Asha Bekidusa
abekidusa@gmail.com

Most countries in Africa fall below average in support towards policy framework to govern biotechnology because this knowledge has not been fully embraced.

Speaking during the Fifth African Conference of Science Journalists held virtually, Head of Agriculture and Food Security at African Union Commission, Simplice Noula, said agricultural biotechnology has been beneficial in developing crop varieties to improve productivity and increase the resistance of plants to pests and diseases.

"Such technology includes tissue culture and micropropagation, molecular breeding of market assisted selection, genomics, molecular diagnostics and genetic engineering," he said.

Dr Noula said genetically modified crops exist in Africa and in at least 12 countries, and policy and legal framework exist, governing the use of GMOs, which are at different stages.

Dr Noula, who is in charge of formulation and implementation of AU policies, strategies and programmes that promote sustainable agriculture in the continent, however said only South Africa has a strong policy environment for biotechnology followed by Ethiopia, Ghana, Kenya, Nigeria and Sudan.

He said most countries have very weak policies, including Algeria, Benin, Burundi, Chad, Central African Republic, Djibouti, Democratic Republic of Congo, Eritrea, Gambia, Equatorial Guinea, Gabon, Guinea, Guinea Bissau, Lesotho, Liberia, Niger, Togo, Sierra Leone, Somalia, South Sudan ad Swaziland.

Despite having continental guidelines for the use of biotech countries are sovereign and may decide to or not to introduce GMOs in their countries.

Despite having continental guidelines for the use of biotechnology to enhance agricultural productivity for food security and nutrition in Africa, he said countries are sovereign and may decide to or not to introduce GMOs in their countries.

The guidelines were developed on the basis of precautionary principle, which calls for transparency and public awareness. The guidelines focused on trade-related trans-boundary movements of GE products, functional biosafety regulatory system, confined field trials of genetically modified crops, and public awareness and participation in biotechnology.

The purpose of the guidelines is to build confidence and strengthen collaboration on information/data sharing, and commonly agreed or harmonised risk-assessment procedures.

This is in order to support African countries with no biosafety regulatory systems for import or transit of GE products and to provide guidance for handling trade-related trans-boundary movements of GE commodities and derived processed products in the context of the African Continental Free Trade Area (AfCFTA).

Planting time - farmers are currently busy putting seeds in their plots

There are 10 common crops that are genetically modified, including maize, cassava, rice, potato, soybean, banana, plantain, cotton, cowpea and sorghum. This has been done in 12 countries in Africa, with five countries having ongoing trials while the rest have commercial approval for GM crops.

In Kenya, among the GM crops are cotton, cassava, maize and sorghum. Farmers in Kenya started planting BT cotton after the Cabinet approved its commercial cultivation in an effort to revive the cotton industry, and boost textile and apparel manufacturing since 2020. BT cotton has been genetically improved to resist infestation by the African Bollworm, the single most destructive cotton pest in Kenya.

In yet another big win for its smallholder farmers, Kenya became the first country globally to approve national performance trials of genetically modified (GM) cassava. The improved crop, which was genetically modified to provide resistance to the destructive cassava brown streak disease (CBSD), was developed by the Kenya Agricultural & Livestock Research Organisation (KALRO). Cassava became Africa's fifth biotech crop approved for open cultivation after cotton, maize, soybean and cowpea.

Early last year, the Kenya National Biosafety Authority (NBA), which is the body mandated to oversee biotechnology food, approved the application for environmental release, following a comprehensive safety assessment that showed cassava varieties were unlikely to pose any risk to human and animal health or to the environment when consumed as food or feed or when cultivated in open fields.

Such biotechnological advances provide key approaches to tackling modern and future issues from food security to environmental change. With better disease control and increased tolerance to drought and flooding, biotechnology leads to a significant increase in crop production. This does not just match the ever-growing demand for food but also helps farmers to lower losses.

"There is no silver bullet to overcome food insecurity and challenges of agri-food systems in Africa and the only option is the right combination of innovations, policies and actions," said Dr Noula.

African countries urged not to rule out GMOs even as they observe food sovereignty

By Tebby Otieno | tebbyotieno62@gmail.com

There is no silver bullet to overcoming food insecurity and the challenges of Agri-food in Africa, experts have warned.

Speaking during the Fifth African Conference of Science Journalists held virtually on Thursday, Head of Agriculture and Food Security Division at the Department of Rural Economy and Agriculture at the African Union Dr Simplice Fonkou said the continent could consider the right combinations of innovations, policies and actions to govern the use of Genetically Modified Organisms (GMOs) as possible options to overcome food insecurity and the challenges of Agri-food.

"Essentially, GMOs exist, but we need to have the right combination in place if we are up to have the GMOs as a continent," said Dr Fonkou.

He challenged the continent to quit bashing the GMOs since the crops already exist, with at least 12 countries in the region having policy and legal frameworks governing its use, though at different stages. The 12 countries are South Africa, Zimbabwe, Egypt, Tunisia, Mali, Burkina Faso, Togo, Mauritius, Ethiopia, Ghana, Kenya, and Sudan.

He said there was reluctance when it comes to enabling a policy environment for biotechnology in the region, pointing out that only South Sudan had very strong policies on GMOs, followed by Ethiopia, Ghana, Kenya, Nigeria, and Sudan. Another 22 countries, among them Angola, Burundi, Chad, Congo, Djibouti and Equatorial Guinea have very weak policies on GMOs.

Cowpea farmers at work. At least 12 countries in the region have policy and legal frameworks governing biotech use, though at different stages.

Although the Common Market for Eastern and Southern Africa (COMESA) has a policy on biotechnology and biosafety at the regional level, Dr Fonkou said food sovereignty, which is the right of people to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their food and agriculture system, is a decision that should be made by individual countries.

He however challenged countries that are already implementing GMOs to provide the African Union with data to be able to tell their impact on food production in the region. According to him, no assessment has been done so far.

"If you go to a country and you look at the agricultural production, the country should be able to tell you what growing GMO means and what has been the production or the contribution of GMO," he said, challenging respective countries to release data for assessment of the impact of GMOs.

Agriculturalists describe most GMO crops as solutions to help farmers prevent crop and food loss while at the same time controlling weeds. Currently, maize, cassava, rice, potato, soybean, and sorghum are some of the commonly genetically modified crops In Africa.

Editorial Director: Aghan Daniel
Editors: Godfrey Ombogo
Linet Otieno
www.meshascience.org

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P. O. Box 57458 - 00200, Nairobi, Kenya.
email: sayansimagazine@gmail.com