

CEREAL THREAT:

East Africa's looming grain crisis

Food crisis. Food has always been a major factor of integration in East Africa. However, a new phenomenon is threatening not only the survival of families in the region, but also the brotherly exchanges of winks, sackfuls, and associated fortunes across the region's borders. The fall armyworm, that pesky little pest chomping through millions of acres of crop in Kenya, Uganda, Tanzania, and Rwanda, is to blame for future food crisis, yet we seem not to know what to do with it. Nation Media Group Special Correspondents report.

East Africa is staring at a biting cereal shortage in the wake of the devastating destruction caused on farmlands by the fall armyworm, experts have warned. The most affected is the maize crop, the staple in the region, meaning household budgets could be hit as food inflation rises in coming months.

Unfortunately, the administrations in Nairobi, Dar es Salaam, Kampala and Kigali are scarcely prepared for the coming crisis, and the gloom and dread that accompanied the invasion of the destructive pest in 2016 has waned within boardrooms. Yet, outside, in the subsistence farms of peasants, the destruction continues unabated.

But the danger has not gone anywhere, according to various food experts we talked to in the process of compiling this report. Most ominously, the fall armyworm is not going anywhere, meaning the fragile economies of the region must learn to live with the menace at the door.

In Kenya, the Ministry of Agriculture says more than 250,000 hectares of farmland have been affected in the food basket counties of Uasin Gishu, which has lost (8,000 ha) as well as Trans-Nzoia (10,000 ha), Bungoma (31,600 ha), Nandi (7,000 ha) and Nakuru (48,969 ha).

The total acreage of land invaded by the worm in Kenya accounts for 11 per cent of the total land on which maize is cultivated in the country. Between 2010 and 2015, maize was grown on an average 2.1 million hectares, according to the Economic Review of Agriculture, 2015.

In Tanzania, the worm is wreaking havoc in the coastal region as well as the uplands. In Chalinze alone, for instance, 3,000 hectares of maize crop have been affected, and Mr Mathew Mtigumwe, the Permanent Secretary in the Ministry of Agriculture, Livestock, and Fisheries, says Katavi, Mbeya and Songwe have also fallen to the pest. A true citizen of the world, the worm crossed over from neighbouring Zambia into Nkasi district of Rukwa region, and from there it spread its tentacles.

Despite the ministry, through the Efficient Maize for Africa (Wema) project, coming up with 11 new maize seeds which are drought-tolerant and good for low- and medium-altitude areas, the worm is spreading fast, and so Ms Constansia Msola, a farmer in Kabuku, Tanga region, laments that she might not have much to harvest this season.



Sh309.2b

Loss. Amount of money Africa is likely to lose to fall armyworm in the next one year.

"At the beginning of the year we incurred huge losses when we lost our crops to drought, and so we were overjoyed when the government came up with drought tolerant seeds," she says. "I was expecting to harvest at least 250 sacks from my 30-hectare plot, but due to the worm I only got 100 sacks."

Dr Nicholas Nyange, a consultant with the Open Forum on Agricultural Biotechnology in Africa (Ofab), says farmers are bearing the brunt of the invasion. He says researchers from Tanzania and across the region are collaborating to find a quick solution before it is too late.

The government, meanwhile, is burning the midnight oil. Mr Jackson Nkuba of Ministry of Agriculture, Livestock and Fisheries says the worm has affected huge swathes of land in the country, from Dar es Salaam to Tanga, Morogoro, Manyara and Arusha, among others.

"I cannot quantify the losses in tonnage or monetary terms, but harvests have reduced tremendously," he says.

Across the border in Rwanda, the Ministry of Agriculture and Animal Resources says that since February,

an estimated 15,600 hectares, which represents five per cent of the total maize crop in the season, have been attacked. The government, however, says that everything is now under control.

"The country is currently armyworm-free, and it did very little effect on the normal food production situation. We are not required to take any special measures because we are in a state of normalcy, but everything is in place to act when need be," says Ange Tambineza, the Agriculture Communication and Information Programme Manager.

The ministry of agriculture says that overall production of major food crops for the second half of the year remains positive, although we could not confirm the assertion. Still, projected maize production stands at 781,000 tonnes on over 63,400 hectares. Another 1.3 million hectares are under beans, Irish potatoes, banana, rice, wheat, soybeans, and cassava, among other crops prioritised by Kigali's crop intensification programme.

Where the region is faltering, Rwanda is doing well, and increased

Disastrous. A farmer shows how the caterpillar destroys the maize crop. PHOTO BY DAN WANDERA.

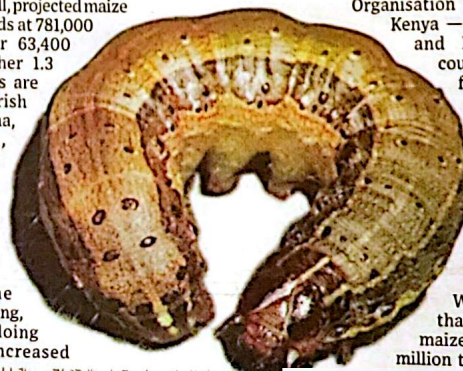
output under the intensification programme is credited with the fall of prices of several food items, resulting to lower inflation of 8.1 per cent in July this year, compared to 9.1 per cent in June, according to the Institute of Statistics.

Food and non-alcoholic beverages account for 27 per cent share of the items used to gauge the country's inflation, alongside utilities and transport, which represent 21 and 12 per cent, respectively. Beans, maize, potatoes, cassava and vegetables are some of the key staples whose prices eased.

Nonetheless, in view of a possible spillover of cereal shortage effects from the region, Rwanda banks on its strategic grain reserves, which until currently absorb bumper maize and beans yields for redistribution.

The United Nations Food and Agriculture Organisation (FAO) has already listed Kenya — alongside Uganda, Sudan and Ethiopia — as among countries that need external food assistance. More than five million people in East Africa face starvation, with the biggest threat being in Kenya (2.7 million) and Uganda (1.6 million).

The latest Regional Supply and Market Outlook East Africa, by USAid's Famine Early Warning Systems, shows that the region's supply of maize is expected to fall to 1.2 million tonnes, from an average of



2.7 million tonnes, with Uganda — the only regional country with a surplus — expected to record a drop to 1.03 million tonnes, from 1.18 million tonnes.

Across the region, the estimated costs of the infestation are astronomical. Mr Roger Day of Centre for Agricultural and Biosciences International (Cabi) says Africa will lose about \$309.2 billion worth of crop to the fall armyworm in the next one year.

Being the staple of the region, a shortage of maize will give rise to many other social and economic problems, but inflation in a region already suffering from drought and poor economic growth could be the straw that breaks the camel's back.

The prices of food in Kenya, Uganda, Tanzania, Rwanda, South Sudan and Somalia are largely regulated by rainfall patterns, security, economic stability, the efficiency of regional trade, agricultural policies, and now, the crop pests of the region.

Around the world, countries normally take a beating before they stabilise, but not in East Africa. For instance, Kenya's annual food price inflation has averaged 12.5 per cent for the past five years.

In July, two kilogrammes of maize were retailing at Sh150 in rural Homa Bay, compared to the Sh90 in two months earlier, in May.

Headline inflation has risen to the top of the Central Bank of Kenya's targeted range of five per cent, plus or minus 2.5 per cent, and experts warn that it might exceed 10 per cent towards the end of the year.

In Uganda, the International Monetary Fund says that annual headline inflation rose to 10 per cent in February, but food costs have risen by about 19 per cent. Tanzania's was at seven per cent while Rwanda reported a drop, from nine per cent in 2016 to eight per cent this year.

Whichever way you look at it, the goose is already cooked for the region, where average food costs account for more than a quarter of its household budgets — Kenya (36), Rwanda (27), and Tanzania (39) — against 15 per cent in the developed world, according to a 2016 analysis of food inflation in Sub-Saharan Africa by the IMF.

The pest has the region's economists' attention, but not more than the scientists, who are unable to answer the million-dollar question of what to do to the nagging worm. The pest was discovered in the Americas in 1957, and the International Maize and Wheat Improvement Center — the international consortium of researchers known by its Spanish acronym CIMMYT — suggests that in Africa it first landed in Nigeria in January last year.

From there, it hopped to Central and West Africa, before taking a tropical vacation down Southern Africa. It was largely ignored by authorities, until April this year, when it chewed through 90,000 hectares of crop in Zambia, 17,000 hectares in Malawi, 130,000 hectares in Zimbabwe, and 50,000 hectares in Namibia.

In March, it made an unannounced landing in sleepy East Africa, found favourable weather, and settled down. The region's weather — warm-wet and sunny all year — makes it attractive to the pest, which is unable to regulate its body temperature and so cannot survive in wintry climates.

And so the worm burrowed in, happy to have found the right combination of factors for a peaceful life — abundant food, good weather, clueless farmers, and bungling governments.

Worm defies normal behavioural ecology

Mr David Mwangi, head of plant protection services at the Ministry of Agriculture in Kenya, has battled many a threat to crops in the region. There was the Large Grain Borer — they named it Osama — which devoured rmpg and the sacks they were stored in, as rmpg and the sacks they were stored in, as

LOCOMOTION

How pests move. For as long as man has been farming for food, the threat of pests has always been present, but a study of 1,300 invasive species from all over the world by ecologist Dean Paini of Australia's Commonwealth Scientific and Industrial Research Centre in Canberra showed that Sub-Saharan Africa is particularly vulnerable to attacks. Dr Paini implicated international trade routes and climate change for the ease with which the pests move from one point to another. When people starve in some parts of the world, food is quickly moved to alleviate the suffering, and that food often comes with some unwanted guests, in the form of pests. That could explain the armyworm's invasion of Africa, as in Nigeria, where it first landed, an economic crisis had caused inflation rates as high as 50 per cent, necessitating external food interventions.

2006 and 2007.

From these attacks, entomologists developed a template of fighting the pests by answering a few questions: Are there insects that can eat the pest? Can we deny it the food that it feeds on? What and when does it like to feed on? How does it reproduce? What chemicals kill it? What does it scoff at?

This is called behavioural ecology, the study of how insects adapt to the environments they get in, and here lies the second worry for scientists.

When Dr Muo Kasina, an entomologist and the director of National Sericulture Research Centre at Kenya Agricultural and Livestock Research Organisation (KALRO) examined the fall armyworm using the template, he hit a wall.

"I do not know!" he said of the pest's particular risk and future in the region. "It is new in East Africa! The scientists do not know anything about it. Even the mites and spiders that would have fed on it have not learnt how to eat it!"

RESPONSE

The rescue. When the fall armyworm crossed into East Africa earlier this year, first response by governments was to fight it using pesticides... and a bit of mother nature wizardry. Uganda set aside \$6.85 million for purchase of pesticides as it struggled to save its farmers more than \$200 million in potential maize crop losses, while Tanzania bought \$132,400 worth of chemicals.

They did not work. Desperate, some farmers started spraying double the requirement, interfering with pollinators, which are needed for other crops to mature well. Others under sprayed and sold the remaining free-issue chemicals to large-scale farmers.

— Seeing the havoc being wreaked, the Food

As he was examining the worm, scientists and crops experts from the region were planning a meeting in Nairobi to discuss the infestation. In April, they packed their bags and converged in Nairobi, where they sat attentively inside a conference room as the diabolical nature of the worm was projected on PowerPoint.

One of the presentations borrowed from a 1987 study by Seth Johnson of Louisiana State University in the US, who was among the first to look into the worm's destructive habits and risks to economies.

The fall armyworm is not easily noticeable to farmers at an early stage as it stages its attack from the heart of the maize crop. Unlike the African armyworm, the fall armyworm burrows itself in the stalk, like a borer, and attacks from within. By the time a farmer notices infestation, it is often too late.

Dr Seth Johnson's research also shows that the specie is also polyphagous, meaning it can feed on 80 species of crops such as millet, sorghum, cub grass, as well as pasture. Its affinity to these crops also explains why South Africa has contained its attacks faster than East and Central Africa, where crop varieties are more diverse.

Dr Raphael Wanjogu, a researcher, says that, unlike in South Africa, where planting and harvesting dates are uniform, East Africa's small scale farmers' crop seasons are different, heavily dependent on rainfall patterns.

"That means there is no one time that the pest will starve here because crops have been harvested from the fields," he says. "It has a constant supply of food here."

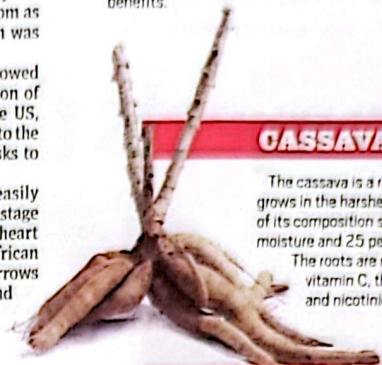
The worm also has a good dispersal ability to colonise new species and lands as it can fly up to 1,600 kilometres. At the larval stage it is a cannibal, feeding on other larvae, even from its own species. It lives for just 30 days while other insects live for between two and six months, and has shown particular resistance to pesticides.

It is also a very fertile insect, laying up to 2,000 eggs in batches of 100 to 200 on immature maize plants. The laying takes about three days, and after the eggs hatch into larvae, the worm is ushered into the most dangerous and destructive part of its life. It eats up the leaves, which is the food manufacturing part of the plant as it is where photosynthesis takes place, leaving the plant stunted and unproductive.

— Verah Okeyo contributed reporting from Nairobi, Rosemary Mironde from Dar es Salaam, and Johnson Kanamugire from Kigali.

A CHANGE OF MENU, PERHAPS?

The World Health Organisation recommends that people in the reproductive age (18 to 60) require a certain portion of nutrients that can be found in different types of food. In the absence of maize, the following foods can supplement nutritional needs of a grown up, as well as offer other health benefits.



CASSAVA

The cassava is a resilient crop that grows in the harshest weather. Analysis of its composition shows 60 per cent moisture and 25 per cent carbohydrate. The roots are rich in calcium, vitamin C, thiamine, riboflavin and nicotinic acid.



SORGHUM

Sorghum can provide vitamins like Niacin that boost immunity, as well as magnesium and iron, both of which ensure that the levels of calcium are regulated in the body.



MILLET

Millet is rich in magnesium, which helps reduce the effects of migraines and heart attacks. Niacin (Vitamin B3) to lower cholesterol, as well as a 15 per cent protein content.



SWEET POTATOE

These tubers are a source of immune-boosting vitamins such as A, the B complex, Niacin and C. They are also a good source of bone fortifiers such as potassium and phosphorus.



PUMPKIN

Pumpkins are high in protein, carbohydrates and potassium, which lowers the risk of high blood pressure. Their vitamin content prevents degenerative damage to the eyes.



These methods include the use of pheromones, which is a chemical produced by an insect to modify how members of its species relate to it.

How it works. Dr Wilson Ronno of FAO explained how this works: "The female pest produces chemicals to attract the males. We harvest that chemical and make synthetic forms of it, which we place in farms. The males are attracted to the trap and are killed en masse. When all the males are decimated, the pest will not reproduce, and so it dies off."