



Farmers slaughter a goat: An outbreak of Rift Valley Fever (RVF) has spread to 21 counties, Kenya. Coming into contact with blood from infected animals can transfer the disease to people. An *Aedes* mosquito which transmits the RVF virus (inset, left).

Maize and beans suitable for the short rains

Peter Kamau | Farmers in arid and semi-arid areas are about to harvest their maize, which they planted at the beginning of the long rains in March and April this year. Many are also planning on what to plant during the coming short rains. Maize and beans are the two most common crops grown during the two seasons. The enhanced rainfall is expected to provide an opportunity for farmers to



enjoy a bumper harvest if other agronomical factors remain favourable.

Use healthy seeds

As farmers prepare for the short rains, it is important to use healthy seeds and even try new ones to gauge their potential for future production. In this issue, we feature various seed varieties suitable for medium altitude areas that farmers can plant.

Medium altitude varieties

The following are some of the medium altitude varieties farmers can use:

Kenya Seed Company: H513, H515, H516, H517, H518, H519, H520, H521 and H522. **Western Seed Company:** WH507, WH505, WH403 and WH402. **FRESHCO:** KH500-33A and

KH500-13A.

Dryland varieties

Due to the unpredictability of the weather pattern, it is important for farmers to plant both the medium altitude and dryland varieties. The dryland varieties are available in the market and from the following suppliers:

KARI: Katumani composite (open pollinated*).

Kenya Seed Company: DH01, DH02, DH03 and DH04. **FRESHCO:** KDV1 and KDV-6 (open pollinated).

Bean varieties

Besides maize, farmers can also try new bean varieties that have been released recently with improved nutritional levels and adaptability to weather changes (See page 3).

Dear farmer,

The excessive rains currently pounding all parts of the country bring mixed blessings for farmers. Improved crop production, a slight reduction of the damage by the fall armyworm and other pests, which proliferate when temperatures are high, increasing infestation.

A good harvest poses challenges to farmers because it mostly creates a glut in the market leading to low prices. To avoid food wastage and poor sale of the crops, farmers can invest in methods that prolong storage of their cereal crops such as maize and beans and only sell when the prices are favourable. This is a strategy mostly used by farmers in many countries globally.

Farmers in Africa lose close to 40 per cent of their harvest due to wrong timing during the harvesting season and use of poor storage methods of cereal crops. Farmers can adopt emerging post-harvest technologies, invest in better storage facilities like simple stores, Purdue Improved Crop Storage (PICS) which can help to reduce such losses and sell when such cereals are out of supply.

Other technologies we have always promoted in TOF magazine that can help farmers store their maize, beans and other cereal crops for even up to 3 years include early harvesting of maize to stop weevil infestation when the crop is still in the field, the use of food-grade diatomite powder, use of ashes to control weevils and metal silos. If farmers employed these storage technologies, they would not only increase their income but also ensure their stored cereals are safe from contamination by mycotoxins.

As farmers harvest their crop this season it is advisable to sell a small portion to meet their immediate financial needs and store the rest for sale when the prices improve.

The increased rains have also led to the outbreak of Rift Valley Fever (RVF) in many parts of Northern Kenya, Rift Valley region and parts of Nyanza. The disease affects both people and animals. In this issue, we have featured important information on the disease so that farmers and pastoralists in the affected regions can take measures to protect themselves and their animals. We provide this information because we know the disease may escalate and cause huge losses to farmers and livestock keepers. (Page 2)

In this issue

New bean varieties 3



The perils of pesticides 4

Chickens diseases 7

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How to avoid infection by Rift Valley Fever

Livestock keepers in affected areas should vaccinate their livestock and take measures to stop transmission of the disease to humans.

Amina Day Ojijo | Rift Valley Fever (RVF) is a viral disease that affects humans and animals. It is transmitted by mosquitoes mostly during periods of enhanced rainfall especially in low lying areas of North-Eastern and North Western Kenya where it kills a large number of animals if not vaccinated against the disease on time. People easily get infected with the disease if they come into contact with blood or organs of infected animals during slaughter, butchering, assisting animals during births, when conducting veterinary procedures or while disposing 'of' carcasses of dead animals or calves. Mosquito bites can also transmit the disease to humans. The people at risk of such infections are herdsman, slaughterhouse workers, veterinarians and even farmers.

People can also get infected with RVF by consuming unboiled milk from infected animals. However, research shows there are no cases of mosquitoes transferring the diseases from one person to another.

Symptoms of Rift Valley Fever

The following are the symptoms of RVF in people:

- The incubation period (the period from when one is bitten by a mosquito to the time they start showing symptoms) of RVF is usually 2 to 6 days).
- People infected develop a mild disease accompanied by fever, flu like fever, muscle pain, joint pain and headache. Some patients develop neck stiffness, sensitivity to light, loss of appetite and

vomiting. The disease may present the same signs and symptoms as meningitis.

- The symptoms of RVF usually last from 4 to 7 days, after which the immune system fights the disease with antibodies and eventually the virus may disappear from the body. However, a few people can develop a more severe form of the disease such as eye infections, inflammation of the brain (a severe headache, loss of memory, hallucinations, confusion, disorientation or even uncontrolled bleeding, loss of balance, convulsions and nerve damage). Haemorrhaging fever involves liver damage, vomiting blood, blood in stool and urine, bleeding from nose or gums. Haemorrhage (bleeding) fever has a death rate of up to 50 per cent.

Rift Valley Fever

With the expected El Nino rains, farmers keeping livestock especially cattle, goat and sheep are advised to vaccinate their animals against RVF. In cattle, RVF is characterized by abortion in pregnant cows and liver complications in calves. Transmission of RVF is made by insects and mainly mosquitoes. People can also contract the disease when they get exposed to blood, body fluids or tissues of infected animals. RVF mainly occurs in Africa and is therefore regarded as an African disease. It is common in East, West and Southern Africa. The disease epidemic occurs in cycles of between five and twenty years especially when there is heavy build up of mosquitoes which come after abnormally heavy rains.

Additional reading: <https://www.infonet-biovision.org/AnimalHealth/flies-and-mosquito-borne-diseases>



Many animals in Northern Kenya face the threat of RVF

Symptoms of Rift Valley Fever (RVF) in animals

Incubation in calves may take 12-36 hours. In very severe infections in calves, death may occur in 2 days after the incubation without the animal showing any clinical signs.

- In severe cases, calves develop a high fever and may vomit. Some nasal discharge may also be seen followed by prostration and mortality (death rates) may reach up to 70%.
- In mature animals, abortion in pregnant dairy cows is common. There is high fever which might go up to 70 per cent. Erosion of the oral mucous membranes may be observed.
- People affected by RVF show a lack of appetite, nausea, severe headache, joint pains, dizziness and nose bleeding. People affected people usually recover and develop lifetime immunity although some may succumb to the disease.

infections.

- Grazing of animals in mosquito-infested areas should be avoided.
- Vaccination of animals with suitable vaccines should be done. Pregnant cows should be vaccinated with killed vaccines to avoid the risk of abortion while humans should be vaccinated with formalin-killed tissue culture vaccine.
- In Kenya, the State Department of Livestock in collaboration with other stake holders is currently preparing a national vaccination campaign to control infection in people and animals.
- The campaign involves the provision of free vaccines and personnel. The public has been sensitized through the local electronic print mass media. They are encouraged to cooperate during the campaign to save livestock and protect the people.

Preventive measures

- Prohibition of movement of suspected animals from affected areas can prevent transfer and incidence of new

Warning

Vaccination should only be done by qualified personnel to avoid human infection through handling of the vaccines or infected animals.

The Organic Farmer is an independent magazine produced monthly for the East African farming community. It promotes organic farming and supports discussions on all aspects of sustainable development. The articles in the *The Organic Farmer* do not necessarily reflect the views of ICIPE nor Biovision Foundation or Biovision Africa Trust (BvAT).

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Plant new improved bean varieties for food and income

Beans are an important protein source for farmers in rural areas who have limited source of proteins. New bean varieties developed by KALRO are more nutritious and productive compared to old varieties.



A bean field: Good management and choice of seed can increase bean production

Peter Kamau | Beans are very valuable to Kenyan farmers as they provide the much-needed proteins to their families, especially those in the rural areas where income is low and many people cannot afford to get animal proteins. Being a legume crop, beans fix nitrogen into the soil, in the process improving fertility levels. The practice of intercropping beans with maize is, therefore, an important process that helps improve soils while diversifying food sources for farmers. Intercropping has benefits because the crops gain from nitrogen fixation and essential elements like lysine, which is found less in maize and other cereal crops.

Farmers in Kenya get very low beans yields because they do not employ the right management practices. Farmers in

most parts of the country only managed to produce 1 to 2 bags per acre. But if grown well, farmers can get up to 11 bags per acre. To get good yields farmers have to grow varieties that are suitable for their areas and adopt good management practices. Different beans varieties can grow well under the following conditions:

Altitude: Both high and low altitude areas are suitable as long as there is adequate rain. They, however, tend to grow and mature faster in lower altitude zones.

Rainfall: Medium to high rainfall areas are suitable with an average of 750- 2000mm annually. Too much rain and long

spells of drought are not good for beans and reduce their yields.

Soils: Beans grow well in well-drained soil that is high in organic matter and with a pH of between 6 and 7. Growth is poor in water-logged soils.

Land preparation: Land preparation should be done early enough so that the field is free of weeds and ready for planting at the onset of the rains. The seedbed should contain fine soil.

Seed quality: Farmers are advised to buy certified seed. Local farmers, however, prefer using seed from their own stock. This is acceptable (because beans are self-pollinated), but farmers should carefully select

seeds for planting. Ensure all wrinkled, damaged or diseased seeds are removed.

Seeds, when planted, are prone to fungal diseases and pest damage before they germinate. If possible, please renew your seed by buying new certified seed varieties from companies; such seed tends to give higher yields than on farm seeds. You can also renew your seeds every two or three years to get good yields.

To prevent diseases and soil-borne pests, all seeds must be treated with organic fungicides and pesticides which are available in the market.

Continued on page 6

KALRO bean varieties are nutritious and give more yields

The Kenya Agricultural and Livestock Research Organization (KALRO) has some good and high yielding new seed varieties that have been fortified to increase the level of iron and zinc through conventional (selective) breeding. Iron and zinc are important micronutrients that help to reduce blood disorders such as anaemia, impaired physical and mental development, delayed maturity and poor appetite. The vitamins and minerals help boost the body's ability to fight diseases.

Nyota variety

The Nyota bean variety is drought tolerant and can be planted in low potential areas where the average rainfall is 450-550mm. Angaza, Metamaeta



and Faida bean varieties can be planted in medium and high potential areas with an altitude of between 1200m to 1800m above sea level. The following are some of the characteristics of each of the varieties:

Angaza variety

Angaza variety has the following characteristics:



- It is a non-climber (this means that it has no tendrils) with an average height of 30cm to 40cm;
- It has light pink flowers and flowers in 40-42 days;
- It yields between 6 to 12 (90kg) bags per acre;
- It has green pods with thick pink flecks;
- The seeds are speckled medium-sized and kidney-

shaped. The seed has a white coat with brown spots. The pericarp (skin) is greenish and changes into sugar with age;

- The grain has a sweet taste and causes less gas build-up in the stomach;
- The variety is tolerant to bacterial blight, rust (*Uromyces* sp), Bean Common Mosaic Virus and angular leaf spot.

Metamaeta variety

- The variety is a semi-climber (it has tendrils) with an average height of 35cm-40cm;
- The variety has white flowers and flowers within 42-45 days;



- It matures between 80 and 84 days;

- The seeds are long and straight with white spots;
- The grain is sweet tasting with low gas production in the stomach;
- It is resistant to most bacterial and fungal diseases.



Faida variety

- The variety is a semi-climber (it has tendrils) with an average height of 35cm-40cm;
- The variety has white flowers and produces flowers in 45-46 days;
- Maturity period is 84-85 days
- The variety has large and kidney shaped beans;
- It produces from 7 to 13 (90kg) bags per acre;
- It is tolerant of most fungal and bacterial diseases.

Widespread use of pesticides poses danger to health

The increasing use of harmful chemicals for crop protection continues to cause serious health problems to people, animals and the environment. Farmers should adopt environmentally friendly biological solutions for their own safety and that of our ecosystems.

Nobert Okare | The increasing misuse of pesticides is causing critical damage to the humans, animals and the environment. The impact of pesticides consists of the effects of pesticides on non-target organisms such as beneficial insects and soil microorganisms. Pesticides are chemical preparations designed to kill fungal or insects and animal pests. More than 98% of insecticides and 95% of herbicides reach a destination other than their target species. This is because they are sprayed or spread across entire agricultural fields.

We can avoid pesticide use

The main difference between pesticides and other pollutants is that pesticides are deliberately put in the environment, applied to larger areas, designed to kill organisms and that pesticides are applied with high application rates and several times per year. This together with poor management skills of their usage, poor production and storage practices pose serious health problems to the environment. In as much as pesticides are used to improve productivity by reducing crop losses from weeds, diseases and insect pests that can markedly reduce the amount of harvestable produce, persistent use over time poses irreparable damages to our health and that of ecosystems.

How pesticides get into the environment

Run off water can carry pesticides into water sources and the general environments while wind can carry them to other fields, grazing areas and human settlements, potentially affecting other species. Pesticides can also be lost to the atmosphere through volatilization (evaporation) increasing greenhouse emissions. Pesticides that are taken up by pests or crop plants



A farmer sprays a tomato crop in Aror Elgeyo Marakwet County

can either get degraded (which are often less toxic than the original compound) or in some cases, accumulate in plant or animal tissues.

The major loss pathways of pesticides to the environment are volatilization (evaporation) into the atmosphere and aerial drift (carried by wind) runoff to surface water bodies in dissolved and particulate forms (residue effect), and leaching into the groundwater sources.

Effects of pesticides on the soil

The use of pesticides often kills important microorganisms in the soil which maintains soil fertility and promotes plant growth. Avoiding chemical use in your farm results in higher soil quality because living organisms in the soil are protected. Increased organic matter and microorganisms help increase yields for farms. Organic farms have been found to get 20% - 40% higher yields than conventional farms.

The extensive use of pesticides in agricultural production can degrade and damage the habitat of thousands of many microorganisms in the soil, especially when these chemicals are overused or misused. Chemical use interferes with the transformation of the atmospheric nitrogen into nitrates which plants can use.

Effects of pesticides to pollinators

One in every three bites of food we eat depends on bees. Birds and honey bees are the main

plant pollinators. Pesticide accumulation damages most bird species. Some types of fungicides are only slightly toxic to birds but may kill earthworms, which can, in turn, reduce populations of birds that feed on them. Most of the herbicides may not directly cause much harm to birds and bees but may endanger their populations by reducing their habitat, consequently interfering with the growth and lower stability of yields of pollination-dependent crops.

Effects of pesticides to human health

Exposure to pesticides poses greater risks to human beings both directly and indirectly. Some of these risks could be acute or chronic depending on the period of exposure. How dangerous the exposure is will depend on how much of the pesticide entered your body, level of toxicity of the pesticide and how often the chemical is used. Some of the acute effects which are often written on the label include nausea, headache and skin irritations among others while some of the chronic effects include cancer, diabetes, gene mutations and reproduction deformities.

Children in spraying fields stand at greater risk of the effects of the pesticides including respiratory-related diseases e.g. asthma while acute poisoning could result in birth defects in unborn children.

Way forward?

Organic farming offers several solutions to the increasing

damage to the environmental health as far as pest management is concerned. Non-chemical control measures that may involve crop management practices such as crop rotation, intercropping and manipulation of planting and harvesting dates can help control pests and diseases.

Controlling pest populations and the use of biopesticides are some of these solutions. Biopesticides are safe to non-target animals. They leave no residues and their biodegradability is highly desirable. Biopesticides are also highly specific and only target a particular species. Their continued use results in high productivity and sustainability of farming systems.

For example, the use of the Push-Pull technology in controlling the fall armyworms and plant extracts in the control of *Tuta absoluta* pest in tomatoes have been remarkably appreciated for their workability and ease of use in controlling pests and diseases.

Construction of buffer zones around the spraying fields could also go a long way to mitigate the long-term effects of these pesticides. To this end, whenever pesticides are used, operative and well-maintained spraying equipment and the necessary precautions at all stages of pesticide handling are essential for reducing farmers' exposure and damage to the environment.

Additional reading: <https://www.infonet-biovision.org/PlantHealth/Biopesticides-Kenya>

Diversify your food sources by growing amaranth

Amaranth is a highly nutritious vegetable and grain that contains proteins, oil, calcium zinc and essential vitamins and fibre that young children, the sick and the elderly can be fed to improve their health.

Nobert Okare | Grain amaranth is an early maturing drought tolerant crop which is highly tolerant to pests and diseases. It has many uses as a vegetable, nutrient-rich grains and livestock feed. It is highly nutritious as it contains protein, oil, calcium, zinc, Vitamins B, C and E and dietary fibre. Grain amaranth has two times the amount of calcium found in milk.

Rich in protein

It is particularly rich in the amino acid lysine, which is low in cereals like maize and wheat. Cooked grain is up to 90% digestible and an excellent weaning diet, recommended for the elderly and people with compromised immunity or severely malnourished children.

Nutritive values of cereals are enriched when blended with amaranth. Grain amaranth has the potential to be a valuable source of nutrition in hot dry areas of Kenya. Under good management, grain amaranth will give reasonable yields of



Improved amaranth varieties provide nutritious vegetables and grains

about 500 kg per acre (About 5 (90 kg) bags per acre). The crop is therefore ideal for improving food security and nutritional status of the vulnerable groups.

Grows well with little rainfall

Amaranth is a warm climate plant and thrives well in temperatures of between 22-35 degrees Celsius, in a wide range of environmental conditions between 0-2400 meters above the sea level. It can be grown all year round under irrigation. The crop grows in deep well drained

soils with high organic matter content.

Land preparation

Grain amaranth seeds are small and therefore require a well-prepared seedbed. For virgin land, oxen ploughing followed by harrowing and levelling of the field is recommended. On cultivated land, harrowing and levelling should be done.

Planting and seed rate

Planting should be done at the onset of the rains. Make shallow furrows spaced at 75cm – 90cm apart.

Manure application: Apply well-decomposed Farm Yard Manure (FYM) at the rate of 3-4 tons per acre. Thoroughly mix the FYM with soil using a stick. Compost manure can also be used at a rate of 4-5 tons per acre.

Seed rate: A seed rate of about 1 kg per acre is recommended. Mix grain amaranth seeds with dry sands or soil at the ratio of 1: 10-15 (1 part seed to 10- 15 parts sand or soil) to enable drilling of the seed.

Drill the seed mixture evenly and thinly in the already prepared furrows at the depth of 5 cm. Cover the seed lightly with soil using a stick.

Thinning and weeding

Thin the crop three weeks after germination to attain a spacing of 30 cm (12inches) between plants in a row.

Keep the field free of weeds. Water harvesting structures such as ridges can be constructed at weeding to aid in moisture conservation.

Benefits of amaranth in the diet

Gluten-free: Amaranth is not really a grain and it does not have the sometimes troublesome proteins you find in wheat, rye and barley. Amaranth flour can be used to thicken soups and even sauces. It can also be used with other gluten-free flours and gums in baking.

Cholesterol: The oils and phytochemicals in amaranth help lower cholesterol levels, including LDL and triglycerides.

Inflammation: The anti-inflammatory properties of peptides and oils in amaranth can ease pain and reduce inflammation. This is especially important for chronic conditions where inflammation affects your health, such as diabetes, heart disease and stroke.

Protein: Amaranth is a rich source of protein which is also highly bio-available. The protein in amaranth is more digestible than other seeds, grains and has been compared to the digestibility of milk protein.

Lysine: Vegetables and grains are often lacking in essential amino acid. Amaranth has a good amount of lysine which helps the body absorb calcium, build muscle and produce energy.

Fibre: Amaranth is a high-fibre food. This makes it filling and means it aids digestive health, cholesterol, blood pressure and slows the absorption of sugars to let the body keep up with energy reduction.

Minerals: Amaranth is also a good source of many essential vitamins too, including A, C, E, K, and B5, folate, niacin and riboflavin. These act as antioxidants raise energy levels, control hormones and so much more.

Vitamins: Amaranth is also a good source of many essential vitamins too, including A, C, E, K, and B5, folate, niacin and riboflavin. These act as antioxidants, raise energy levels, control hormones and do much more.

Immune system: Amaranth may boost immune function according to some studies, attributed to the presence of important vitamins, minerals and antioxidants. Amaranth flour can be used in the preparation of several foods including cookies, *chapati*, cakes, porridge and *ugali* among others.

Additional reading: <https://www.infonet-biovision.org/PlantHealth/Crops/Amaranth>

How to make amaranth porridge

Uji (porridge) is a semi-solid food prepared from the flour of one or more types of cereals (maize, sorghum and millet among others) depending on availability and preference. It is a common meal in many households. It is a popular weaning diet, food for the aged and nursing mothers.

Grain amaranth is rich in high-quality proteins, minerals such as calcium, phosphorus and magnesium and vitamins. Once cooked, amaranth is up to 90% digestible, making it an excellent diet for invalids, the aged and babies.

Ingredients

- 1 standard cup (250 g) pure amaranth flour.
- 5 cups water;
- 6 level teaspoonful (30 g) sugar;
- 1 standard cup (250 ml) milk;
- Fruit juice (lemon, orange,

tamarind) optional;

- Juice from two lemons (optional).

Method

1. Boil water to a tepid temperature;
2. Draw 2 cups and use it to mix with one cup of flour;
3. Leave the other water to continue boiling;
4. Add the flour/ tepid to boiling water and stir throughout to ensure that no lumps are formed;
5. Continue stirring until the flour binds and starts boiling;
6. Let the porridge boil for 15 minutes;
7. Add sugar and milk and stir
8. Let simmer for 5 minutes;
9. Remove from heat.

You can improve amaranth flavour with fruit juice or extract and serve as may be desired.

Use of mobile phone service to educate farmers

Mwinyi Bwika | "Local farmers are not the problem to be solved, but part of the solution." This is one of the profound statements posted by Jamila Abass, Kenya's Country Manager for Wefarm, during the Tropical Forest Alliance Convention 2020 in Accra, Ghana. For quite a while, agricultural practitioners have engaged in agricultural productivity discussions with minds fixed on developing systems for the small-scale farmers. Little do they consider harnessing the wealthy indigenous information gained by these farmers overtime.

A typical indigenous farmer will inherit a farm and practice what they have seen their predecessors do. Ideally, these farmers begin their farming ventures from a known point and in the course of time continue sharing information with their neighbours to

improve production. However, the location may be a limit to exploring and adopting new farming techniques. In the view of the need to connect farmers to other farmers, Wefarm comes in as a valid bridge for this course.

Accessible to all farmers with phones

Wefarm is a farmer-to-farmer network that allows farmers in different locations to share critical farming information in order to improve their farming skills and consequently agricultural productivity. Using this model, Wefarm uses indigenous information obtained from other farmers as according to the needs of the farmer.

The organization uses a simple communication tool-the SMS, which is accessible to

all farmers with any kind of phone that supports the feature. Without the need for the internet connection on phone, the application enables farmers to connect to valuable farming information to improve on productivity.

Information is free of charge

Additionally, this service is free of charge, that is, any information sent to and received from Wefarm by the farmer does not have any cost implications to the farmer. The farmer is, therefore, able to receive significantly valuable information that will help to improve their farming skills, leading to improved agricultural production.

Consider the case of Cleophas. He can easily sign up to Wefarm by sending JOIN to Wefarm shortcode, 22301 on both Airtel and Safaricom free of charge and ask questions. Since Wefarm uses machine learning technology, the questions from Cleophas will be sent to other passion fruit farmers in the network who have shown the ability to answer such questions. In three minutes to one hour, Cleophas will have received between three to six practical responses from other farmers that will help him improve his passion-fruit orchard.

Since its founding in 2015, Wefarm now connects more than 800,000 farmers across Kenya and Uganda. Soon, we intend to launch our operations in Tanzania. The network has proven to be of great significance in ensuring farmers in these countries are connected and share critical agricultural information.

Besides the fact that Wefarm is a free service, Wefarm acknowledges and appreciates information the users share. In this regard, Wefarm Champion Farmer programs have been instituted through time. The program aims at motivating, acknowledging and appreciating farmers who are vibrant in helping other farmers on the network to answer their questions.

The user is helping other farmers

Mr Cleophas from Nandi is one beneficiary of this program. Cleophas is a passion fruit farmer with vast agronomic knowledge. Since he joined Wefarm in March of 2017, Cleophas has responded to over 6000 questions from other farmers; shared highly informative tips with them and invited so many other farmers to join the network.

Cleophas has transacted with other farmers on the network, sold and bought agricultural produce. As a champion farmer, he has been featured on Wefarm radio talk shows on various radio stations where he has shared his amazing experience on Wefarm with other farmers.

In a nutshell, with the right people sharing appropriate information through a reliable channel, agricultural productivity will be a reality. Such is the case that Wefarm, a vibrant award-winning service that has embraced technology to empower small-scale farmers for increased agricultural productivity.



Join the home of Champion Farmers

Wefarm, the largest FREE farmer to farmer network provides small scale farmers with a free information service via SMS to help improve their yields.

Join Wefarm's network of over 900,000 farmers and receive free crop and livestock farming advise from other experienced farmers, via SMS.

You too can be a Champion Farmer by sending the SMS **JOIN TOF** to **22301** for **FREE**.



Poultry farmers can prevent diseases

How can I prevent diseases in my chickens to improve their productivity?

Dear Farmer

Prevention of disease is perhaps one of the most important measures a poultry farmer can take to ensure their chickens remain healthy, improve and maintain their productivity.

All birds are susceptible to diseases. But, domesticated birds such as chickens are very prone to diseases, which, in most instances, can wipe out an entire flock. This is one reason why every poultry farmer should remain vigilant to ensure that any signs of diseases are dealt with immediately.

Diseases cause deaths, interfere with the normal growth in chickens, reduce the productivity of eggs and meat, cause economic losses to farmers including a loss in local and even international trade.

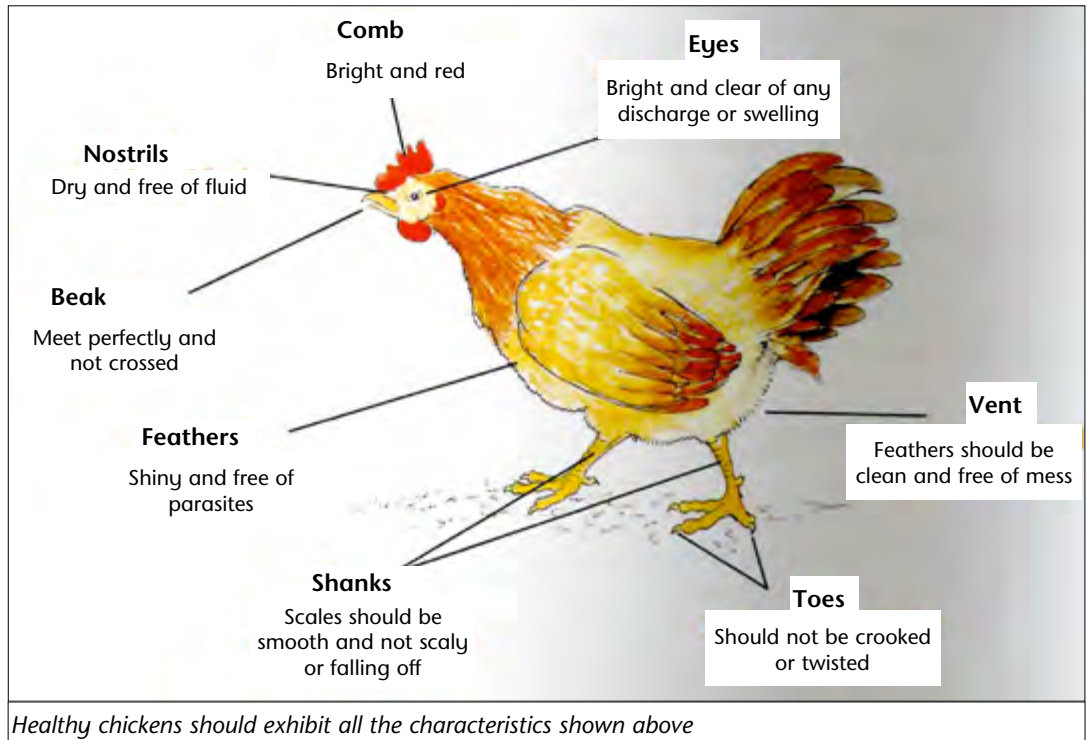
Causes of poultry diseases

Poultry diseases (including infectious ones) are caused by organisms that can be transmitted from one bird to another. Such organisms include viruses, bacteria, fungi and protozoans. Infections can also be caused by external parasites (fleas, lice and ticks) or internal parasites (roundworms, tapeworms, and flukes).

Prevention of diseases is always the best way to maintain chickens' health. The farmer should always ensure that all necessary preventive measures are taken to contain any disease outbreaks. The use of natural methods of disease control is encouraged to ensure that chicken products do not contain any chemical drug residues such as antibiotics, which can be transferred to consumers of chicken meat, causing drug resistance and other health complications.



A dead hen



Healthy chickens should exhibit all the characteristics shown above

Common poultry diseases

Before we explain the recommended disease control measures, let us look at the most common diseases that affect poultry. These include New Castle Disease (NCD), Avian Influenza (AI), Fowl Pox, Fowl cholera (pasteurellosis) and coccidiosis (protozoa). These diseases can cause between 30 per cent to 100 per cent mortality (death).

The other category of diseases that can cause death (10 per cent to 30 per cent) are Pullorum disease (Bacillary white diarrhoea), Gumboro (Infectious Bursal Disease or IBD) Infectious Coryza, chronic respiratory disease (mycoplasmosis) roundworms and tapeworms (internal parasites), mycotoxins (fungal poisoning).

The category of diseases that cause fewer deaths in chickens is Marek's disease, E.coli, scaly legs and nutrient deficiency diseases where chickens are not given the right or adequate feed.

How can farmers control chicken disease?

Chickens diseases are caused by a combination of factors such as poor management, feeding or even environmental conditions.

Farmers can control

diseases in their poultry flocks by observing a set of management practices which if well implemented reduce chances of disease outbreaks to a minimum. Most infectious diseases enter a bird's body, through the beak when they are eating, drinking water or while cleaning their feathers.

Wounds or bruises also offer an entry point for infections. Once inside a bird's body disease-causing pathogens multiply and spread throughout the body, causing damage to the bird's organs. Later, the pathogens leave the chickens body through their droppings or fluids from infected wounds, breath, feathers and scales. When other chickens come into contact with the contaminated droppings or fluids, then they also get infected.

Some disease-causing pathogens can survive outside the chickens for a period of time depending on the type of pathogen. Worm eggs and coccidian can survive for several months. While others are destroyed by sunlight, disinfectants or heat. Humans, other animals and birds that come into contact with poultry can also spread diseases.

Control measures (biosecurity measures)

Location: Do not put up poultry houses too near other poultry sheds (eg those of neighbours). The recommended distances between one poultry farm to the next should be 500 metres to 1 kilometre. Check the wind direc-

tion to ensure that airborne disease-causing bacteria or viruses do not pose a threat to your chickens. Use the common wind flowing direction when planning where to put up your poultry unit. This measure ensures your chickens are protected from airborne diseases.

All-in All-out measure: To prevent the build-up of diseases, ensure that birds of different ages do not share the same shed. Sell all your mature birds at once, disinfect the chicken shed and allow the shed to remain free of birds for even up to 3 months before bringing in a new flock- this prevents the build-up of disease-causing organisms.

Litter disposal: Remove all used litter (bird droppings and other waste such as trampled feed) dispose of it properly either by burning, composting and disinfecting it to destroy all disease-causing agents.

Site security: Reduce all chances of introduction of infection to chicken sheds by ensuring that all workers use disinfected clothing, (overalls, shoes and implements whenever they work in the chicken sheds.

In the next issue, we continue to show farmers how they can reduce disease outbreaks in their poultry units.

Answer by Elkanah Isabokeh

Additional reading: <https://www.infonet-biovision.org/Animal-Health/Chicken-new-animal-welfare-information>

TOF Radio answers your questions

TOFRadio is broadcast on KBC on Tuesday and Thursday at 7:30pm and Mbaitu FM on Friday at 8.30pm. Tune in and listen to farmer experiences and expert advice on agribusiness and eco-friendly farming methods. On this page, we respond to some of the issues raised by farmers in their correspondence to the radio program. Send your questions and comments via SMS 0715 422 460, email: admin@theorganicfarmer.org

Kakamega farmers conserve and exploit forest resources

Charles Kimani & Ian Luvayo | Kakamega forest is home to dozens of bird species and animals. It hosts more than 380 species of plants some of which are medicinal. The forest is Kenya's only remaining tropical rainforest and transverses Kisumu and Kakamega counties. For decades the local community has utilised the vast natural resources that include traditional medicine and firewood.

Reduced destruction of trees

The unsustainable practices have brought along wanton destruction of the forest. The *Prunus Africana* an indigenous tree referred to as *Mwiritsa* (Luhya) is one of the endangered plant species as the local community have for decades harnessed the tree bark for medicinal purposes.

Group processes traditional herbs

Donning a dress and a yellow headscarf, Maridah Khalawa, Muliru Farmers Conservation Group's Chairlady gets ready to have an interview with us at her groups head office at Isicheno village that borders the vast Kakamega forest. The group provides a valuable case study on how man and nature can co-exist. In its bid to stop the destruction of the forest the group is promoting the growing of medicinal trees alongside other crops, one of them is the *Mondia whitei* popularly referred to *Mukhobero* in the local language which is sold in different parts of the country.

Today, the group is reaping the benefits of value addition through processing of the medicinal plants. The group makes products such as ointments, balms, candles, honey and they plan to also make a mosquito repellent. These products are sold in local markets and chemists.

Farmers grow herbs and food crops

To supplement the earnings of the group members, the farmers



An intercrop of beans and *Ocimum kilimandscharicum*: Boniface Mujikha with a batch of the herb in the group's processing facility at Isicheno village, Kakamega County



Photo: TOF

have embraced intercropping practices leading to diversification of income sources. Maurice Abungana is one such a farmer who apart from growing *Ocimum kilimandscharicum*, he also grows vegetables after embracing organic farming. He confesses that organically grown vegetables have a high demand and prices are higher compared to vegetables grown using chemical fertilizers.

Farmers save their income

"*Ocimum kilimandscharicum* takes 3 months to mature and by that time, I will also have harvested my onions or my cowpeas. I later

sell them and get an extra income to cater for my household needs," attests one farmer.

The group that early this year started a Savings and Credit Cooperative Society (SACCO) credits its success to the commitment by members and the support (both technical and financial support) from different partners such as Biovision Foundation, The United Nations Development Programme (UNDP), ICIPE and other partners.

Pollinator gardens

As we wind up our interview with Mr Abungana, he leads us

to his pollinator garden. It turns out that what we thought was a beautiful flower garden is a key component in the crop production system. Pollinator gardens are gardens where flowers are planted to attract bees and other pollinators. Pollinators such as bees get attracted to the flowers due to nectar and facilitating pollination in the process. Pollination increases crop production. It is one of the many sustainable production practices that Muliru farmers group have embraced.

Additional Reading: <https://www.infonet-biovision.org/PlantHealth/MedicinalPlants/Ocimum-kilimandscharicum>

Plant new improved bean varieties for food and income

cont'd from page 3

Spacing: Where beans are planted alone, planting should be done in rows at 50cm by 10 cm (one seed per hill) if weeding is done using animal-drawn implements or tractors, then spacing can be done according to the implement to be used for weeding. For farmers who want to intercrop beans with maize, two rows of beans 15cm apart can be planted between maize rows.

Planting: Plant a bean seed per hole when using this spacing pattern. The other alternative is to plant a bean in a row and then 2 seeds per hole.

Seed rates: The amount of seed required for a given area will

vary from variety to variety and the size of the seed. The bigger the size of the seed, the higher the quantity of the seed required. Beans grown as pure stands take up more seed than when intercropped with maize.

Fertilizer application: The use of farmyard manure or well-made compost is highly recommended for bean growing especially in areas where soils are low in organic matter content. The manure should be applied at least a week before planting. Apply from 7- 10 tons of farmyard manure for every an acre of land.

Weeding: Weeding should be done continuously to ensure all the weeds are controlled.

Farmers are advised to weed the crop 2-3 weeks after emergence followed by second weeding 3 weeks later (before flowering) when beans are planted alone. Avoid cultivation at a flowering time when the field is wet as this can spread diseases.

Harvesting: This should be done immediately the pods turn brown and hard before they start shattering which causes bean losses.

Source: KALRO Information brochures 2017/18

Additional reading: <https://www.infonet-biovision.org/PlantHealth/Crops/Beans>