

Dear reader,

THIS EDITION EMPHASIZES key choices we can make at the household level that make a huge difference in the quality of life we live by maintaining thriving organic kitchen gardens, diversifying the crops we grow to include nutrient-dense crops such as mushrooms, and integrating other ventures such as fish farming and poultry keeping.

This not only builds the family's resilience health-wise, but also economically.

To live healthy, we need to be aware of health risks that we can control and be intentional about preventing them. This edition also highlights diseases that are transferable from livestock to people and provides insights on how to stay safe from them. This being the rainy season, farmers can be

innovative in the way they trap water into their farms for continued use and protect their soils from erosion while protecting rivers from contamination and floods. Are you located in a slopy area that leaves your land infertile whenever it rains due to run-offs? This edition provides information on the most effective ways to harvest water and retain nutrients within your farm.

KITCHEN GARDENING

Tips for a thriving kitchen garden

The success of your kitchen garden depends on how well you manage the resources available. Start by ensuring the soil is well-fertilized using either animal or plant-based manures

By Samuel Monene

A KITCHEN GARDEN or home garden is a garden or area where vegetables, spices or herbs are grown primarily for domestic use. Establishing a kitchen garden provides a reliable, sustainable, and cost-effective way to produce fresh, organic food while promoting self-sufficiency.

A small plot of land and key materials such as manure and mulch are the basic components required to set up a kitchen garden. The success of your kitchen garden depends on how well you manage the resources available. Start by ensuring the soil is well-fertilized using either animal or plant-based manures. However, note that if applied directly to the soil over a period of time, chicken manure will make the soil highly acidic. To make the most of chicken



manure, put the manure in a sisal woven bag, or a sack and dip it in a tank full of water, let it sit in the water for two weeks. After two weeks, use the water as a liquid fertilizer by drenching at the base of the crops. Other types of manure including bokashi, and mixed compost manures can also be used.

Proper soil nutrition is crucial for healthy plant growth, providing essential nutrients for your vegetables. In addition, it's important to always cover the soil with mulch material, which helps retain moisture, regulate temperature, and prevent weed growth.

When planting, intercrop vegetables such as kales with herbs, for instance rosemary, has been proven to be highly effective in pest management. The vegetables grow healthy, without being attacked by pests. This means that there will not be any need to use pesticides. If the vegetables are attacked

by pests, farmers are advised to make their own plant extracts, such as boiling garlic with pepper, and sieving the liquid once it is cold, to spray on the crops. This ensures that the vegetables are safe for consumption. Avoidance of synthetic pesticides creates a conducive environment for multiplication of diverse beneficial insects, such as ladybirds, and soil micro-organisms, which further enhance growth of healthy vegetables.

Choose herbs and spices that will thrive together, benefiting from the principles of companion planting. This method involves pairing plants that have a symbiotic relationship, such as those that act as natural pest deterrents, ground cover, or nutrient fixers. For example, dhanias is known for its repellent effect on pests.

CONTINUED ON PAGE 2



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Value addition in chicken products

Advances in freezing, packaging, and transportation technologies will enable chicken processors to trade in high-quality, premium cuts locally and regionally. PAGE 06



CONTINUED ON PAGE 2

For instance, if planting onions, intercrop them with dhania, and any other green leafy vegetables. These will provide supplies for daily usage in the household, and a source of income.

Also, incorporate fruit trees such as paw paws, avocado trees, citrus fruit trees and apples. This ensures that you have access to a variety of fruits in different seasons, which helps to maintain the dietary needs of the family.

By selecting the right combinations, your plants will support each other, promoting a healthy, resilient garden ecosystem.

Advantages of kitchen gardening

- 1. Access to fresh, organic produce:** One of the greatest advantages of a kitchen garden is the availability of fresh, organic produce free from harmful pesticides, preservatives, or synthetic chemicals. Unlike store-bought vegetables, which may lose nutritional value during transport and storage, homegrown produce retains its natural vitamins and minerals.
- 2. Reduced food waste:** Harvesting only what is needed ensures food is consumed at its peak freshness, minimizing food waste and spoilage.
- 3. Cost savings:** Kitchen gardening significantly reduces household expenses. Families cut grocery bills by relying less on stores for essential vegetables, herbs, and spices. Additionally, the need for frequent market trips is eliminated, reducing transportation costs and the unpredictability of fluctuating market prices.
- 4. Long-term investment:** A well-maintained garden continuously produces food with minimal effort, providing long-term returns in terms of yield and financial savings.

- 5. Self-reliance and food security:** Kitchen gardening fosters self-reliance and ensures a steady supply of fresh produce, despite supply chain disruptions, inflation, or food shortages. It also provides a safety net during economic crises, pandemics, or natural disasters.
- 6. Environmental sustainability:** Homegrown food reduces plastic packaging, transportation emissions, and reliance on large-scale industrial farming practices. It promotes chemical-free living, protecting consumers and the environment from harmful pesticides and fertilizers.
- 7. Community and social well-being:** A thriving kitchen garden enhances community bonds by allowing families to share surplus produce. It fosters a sense of community and encourages social interaction through local food networks.
- 8. Educational value:** Gardening teaches children and adults about food production, sustainability, and healthy diets, teaching farming skills and a sense of responsibility. This knowledge is passed down to future generations.
- 9. Cooking and value-addition opportunities:** Kitchen gardens offer the opportunity to enhance meals with fresh herbs and spices, improving flavor, aroma, and nutrition. Surplus crops can also be transformed into value-added products like dried spices, herbal teas, and infused oils, potentially creating small business opportunities.

Samuel Monene is an environmentalist experienced in kitchen garden management and farm yield optimization. Email: sammonene1@gmail.com

WATER HARVESTING

Water harvesting for agricultural use through terracing

Harvested water plays a crucial role in both agricultural production and domestic use. Most farming communities depend on rain-fed agriculture, which is sometimes characterized by acute dry weather periods

By Leah Munala

WATER IS AN important natural resource in sustaining life for plants and animals. However, its inequitable distribution has led to the exploitation of alternative sources. Harvested water plays a crucial role in both agricultural production and domestic use.

Most farming communities depend on rain-fed agriculture, which is sometimes characterized by acute dry weather periods. Water is scarce, and thus, there is a need for its conservation and sustainable use.

Water conservation can be done through the application of sustainable land management practices that include soil and water conservation, agroforestry, and conservation agriculture.

Water harvesting technologies play a significant role in counteracting unfavorable weather conditions and climate change by ensuring that the little water available is utilized well and stored for future use. The most common water harvesting techniques are collecting rainwater from the rooftops and surface run-off.

Water harvesting from rooftops - Rainwater is collected from the roof of the house or building as a catchment using a gutter. This requires a farmer to have a water tank or storage container or divert the water into an underground tank or a recharge well.

Collecting surface runoff - Surface runoff is the rainwater that moves or flows on the ground that is saturated or a hard area that doesn't allow the water to pass into the soil. Surface runoff can cause soil erosion and flooding, leading to water pollution and damaging water drinking sources. Controlling surface runoff using soil and water



Water conservation can be done through the application of sustainable land management practices



conservation structures is one of the water harvesting techniques a farmer can apply on the farm to improve productivity sustainably. Directing this water into storage structures such as farm ponds, soil bands, and retention ditches makes it available for plant use for a longer period. This technology also ensures that the soil is conserved thus improving the value of the land.

This can be done through establishing physical structures like terraces, agroforestry systems, conservation agriculture, and mulching, which control soil erosion, prevent moisture loss from the soil, and improve soil fertility, resulting in improved productivity.

Terracing in water harvesting

A terrace is a physical soil and water conservation structure used to reduce the speed of surface runoff and collect water so that it percolates into the soil, preventing soil erosion.

Types of terraces

- **Cut-off drains** - refers to terraces dug across a slope to capture surface runoff and divert the water into a dam, stream or river. They are usually graded, and a farmer requires technical support to set up the cut-off drains.
- **Retention ditch** - established on the farm to collect surface runoff water so that it seeps into the soil. They can be used as an alternative to cut-off drains where there

is no waterway to discharge the surface runoff. The retention ditches are usually separated using tied ridges and are not continuous. The first terrace is usually made at the start of the farm to capture the water from the compounds or roads.

- **Converse terrace (fanya juu)** – refers to the terrace where the excavated soil is heaped on the upper side to form an embankment. With time the converse terrace forms bench terraces that help in soil and water conservation.

After establishing the terraces, plant vegetation on the soil heap to strengthen the water harvesting structure. These include Napier grass, brachiaria, vetiver, and agroforestry trees.



Water harvesting technologies play a significant role in counteracting unfavorable weather conditions and climate change by ensuring that available water is utilized well and stored for future use. The most common water harvesting techniques are collecting rainwater from rooftops and surface run-off

Advantages of terracing in water harvesting:

- **Controls soil erosion**— surface runoff water carries topsoil; establishing terraces would capture soil sediments and nutrients, improving soil fertility within the farm and thus productivity.
- **Reduced pollution of water sources** - surface runoff carries fertilizer and other chemicals from the farm to water bodies reducing its quality for other domestic uses. Harvesting surface runoff will ensure these chemicals don't pollute the water bodies.
- **Reduced flooding** - water harvested on the farm reduces flood occurrence in the lowlands.
- **Reduced cost of production** - water harvested is used in watering crops thus reducing irrigation costs. The vegetative cover planted along the terraces serves as feed for livestock.

Disadvantages of terracing as a water harvesting technique

- Requires technical skills in laying out the water conservation structures.
- Unreliable rainfall –affects the quantity of water harvested, which might affect planned farming activities.

Leah munala is a trained agronomist and expert in soil protection and rehabilitation. Email: leahmunala@gmail.com



AGROFORESTRY

Policies Governing Planting of Trees in Kenya

In Kenya, there are various initiatives and policies that have been formulated to promote agroforestry and protect natural resources such as water sources and public forests

By Esther Mwanthi

TREE PLANTING IS a practice that is encouraged due to its myriad benefits. In Kenya, there are various initiatives and policies that have been formulated to promote agroforestry and protect natural resources such as water sources and public forests. These are:

National tree growing and restoration campaign

This campaign was launched on 21st December 2022. It targets the planting of at least 15 billion trees by the year 2032. In addition, the initiative provides that each individual living in Kenya (young and old) should plant at least 30 trees each year. So, for a population of 50 million in Kenya, the expected trees to be planted per year is (30x50m) and that translates to 15 billion for a period of 10 years.

Forest policy 2005

Among the key elements in the Forest Policy 2005, is the involvement of adjacent forest communities and other stakeholders in forest management and conservation. This policy is being implemented through the new forest legislation under the community participation section.

The communities adjacent to forests are required to come together in formation of an association called Community Forest Association. They should then come to an agreement with Kenya Forest Service on how to participate in the management and conservation of the public forest, that is within the community.

The law provides that a community of people living within a radius of 5km of any public forest is the one allowed to form a Community Forest Association and hence participate in the management and conservation of that forest.

The forest associations that have already been formed since the initiation of the policy have demonstrated reliability in supporting the management and conservation of our public forests.

The community as well benefits from the forests through provisions stipulated in the Forest Management Agreement that

the community association develops with the Kenya Forest Service. In the agreement each party has its level of commitment that if not followed can be sued by the other party.

Kenya's policy on 10% tree cover

This policy aims for a minimum of 10% tree cover in every farmland and is enshrined in the 2010 constitution. The percentage has been raised to 30% tree cover in every farmland by 2032 with a focus on restoring degraded lands and mitigating climate change impacts. So every farmer in Kenya should ensure there is a tree cover in the farm of about 30% of the land area of the farm.

The Agricultural policy 2021

This policy provides a strong emphasis on maintaining a minimum of 10% tree cover on all agricultural land holding to support sustainable agricultural practices.

This provides incorporation of Agroforestry trees in farmlands whether in an alley system or random planting. Farmers are advised to seek advice from agroforestry officers for guidance on the most suitable trees to plant on the farm.

NEMA guidelines on planting of Eucalyptus trees

Eucalyptus trees do well in Agro-ecological areas such as lowlands and the mountainous highlands. The trees are known for their many uses ranging from firewood, building materials, transmission poles and timber among others. However the National Environment Management Authority (NEMA) regulates the planting of Eucalyptus trees because of their adverse effects on the environment.

NEMA, which is the body tasked with the responsibility of taking care of the environment, banned the planting of trees along riparian areas or shorelines to a distance of at least thirty metres from the highest ever recorded flood level.

In effect of that directive, any Eucalyptus trees under thirty metres from the riverbanks were ordered to be removed in order to preserve water sources. The authority also banned the planting of Eucalyptus trees at a distance below six metres from the road reserves and common boundaries.

This means that no Eucalyptus trees should be planted in common boundaries unless one plants the trees six metres away from the common boundary and on his/her side.

So any farmer going against this guideline is breaking the law and can be charged in a court of law.

*Esther Mwanthi is an agroforestry officer, at the Kenya Forests Service.
Email: Esthermwanthi@gmail.com*



Benefits of biogas for smallholder farmers

This organic matter can come from different sources, e.g. animal manure, agricultural residues and food waste from kitchens and markets.

By Dr Jesse Kagai

BIOGAS IS A product of a process where micro-organisms decompose organic matter in the absence of oxygen. This organic matter can come from different sources, e.g. animal manure, agricultural residues and by-products and food waste from kitchens and markets. The end products of this process are methane gas used for cooking and bioslurry used as fertilizer.

There is a huge potential for biogas production in Kenya because only a small fraction of the smallholder farmers have embraced this technology. The country's large livestock population produces enough animal manure to be used as feedstock for biogas production. While this is so, many Kenyan households continue to rely on firewood for cooking, which leads to deforestation. However, the technology is gaining recognition, especially among smallholder dairy farmers, who are keen to reduce their operational costs.

The technology used to produce biogas is quite cheap and simple. It is easy to set up and needs little investment, especially when used on a small scale. The system has a quick return on investment, as it offsets the cost of energy used for cooking and the materials used for biogas generation (manure) are free.

Biogas as a renewable energy source

The current energy supply is dependent on non-renewable resources, and reserves are being depleted faster than new ones are being formed. Examples of these energy sources are firewood and charcoal. Unlike these sources, biogas is renewable and contributes to the preservation of natural resources by reducing the cutting of trees for firewood and charcoal burning. Cooking on biogas is fast and smokeless, leading to time-saving and improved family health, especially among women and children. It saves women and children from the daunting task of collecting firewood, leaving more time for other important tasks. The reduced indoor air pollution helps improve global health by reducing respiratory diseases caused by smoke from firewood and charcoal use.

In addition to cooking, biogas can also be used for lighting and heating water for domestic use. It can also be used to run small farm machines like chaff cutters and power generators. This helps smallholder farmers save on the fuel used for these machines, especially the chaff cutter that is used daily for animal feed processing. This is of economic importance to the smallholder farmer as it provides an additional income. One cubic meter of biogas is reported to be equal to 1 liter of kerosene, 2kWh of electricity and 4 kg of firewood.

Bio-slurry as an excellent fertilizer

One of the end products of a biogas plant is called bio-slurry. It is a valuable soil fertilizer rich in nitrogen, phosphorous, potassium,

and micronutrients important for soil health and plant growth. Compared to normal manure, bio-slurry is of superior quality due to its improved fertilizer efficiency, which is readily available to the crops. Most of the organically bound nutrients, particularly nitrogen, are mineralized making them easily utilized by plants.

Bio-slurry is also safer to use compared to untreated manure because the process of biogas production acts as sanitization against active pathogens that may be present in the animal dung. This prevents disease transmission. It also kills, inactivates or slows the growth rate of weed seeds that are normally present in manure. Weed seeds may end up in manure products through feeding as well as bedding materials. Some seeds, including those from weeds, survive the intestinal passage and may compete with crops when applied in raw manure.

Bio-slurry in fishponds

In recent years, small-scale fish farmers have incorporated bio-slurry in their fish ponds to increase their biological productivity. Studies have shown that 50 kgs of bio-slurry produces 1 kg of fish by increasing phyto and zooplankton biomass used as fish feed. This reduces commercial pelleted fish feed by up to 50%.

Organic waste reduction

Biogas can be produced from animal dung and organic waste materials from household kitchens and markets. Organic wastes, such as food leftovers, rotten fruits, and vegetables, can be used to produce cooking gas while helping manage the waste by reducing its volumes and disposal costs. The end product, which is a digested substrate, can be used as organic fertilizer.

Environmental advantages of biogas

Gas generated through bio-digestion is non-polluting, with no combustion taking place during its production, meaning no greenhouse gases are emitted to the environment.

Biogas production can help mitigate climate change by capturing methane from animal waste and utilizing it as an energy source. Methane is a known potent greenhouse gas responsible for global warming.

Biogas also helps reduce carbon dioxide, produced by the use of firewood and burning charcoal. Using biogas for cooking helps to reduce tree cutting, thus reducing deforestation.

Important points to note.

- A biogas plant requires a constant inflow of manure where you add fresh dung every day.
- Do not add manure that is too old.
- Do not add too much water.
- Do not add water with soap or disinfectants.
- Antibiotics are very harmful to biogas, so do not add dung with medicine residues or dung contaminated with milk from a cow treated for mastitis.
- Do not let oxygen into your biogas plant; always close gas valves and repair leakages.

Dr Jesse Kagai, is a scientist on animal health working at International Livestock Research Institute (ILRI). Email: J.Kagai@cgiar.org

VALUE ADDITION

Advantages of Value Addition in Chicken Products

Value addition begins by transforming whole chicken carcasses into various formats, including cut-ups, deboning, and portioning. These carcasses can be sold whole or divided into parts, such as wings, legs, and breasts, with options for skinning

By Dr Ann Wachira

CONSUMPTION OF CHICKEN products is higher in urban areas due to increasing urbanisation, higher incomes, and the convenience and accessibility of chicken products, particularly eggs. Despite the rise in production, processing and value addition remain low, leading to moderate profitability for farmers, with only about 10% of chicken and less than 6% of eggs being processed. Most dressed chicken (70%) are sold whole, while 30% are cut into parts. Key barriers to value addition include low consumer preference for frozen foods, inadequate cold chain infrastructure, disorganised marketing, and strict sanitary regulations. Moreover, selling live birds and eggs exposes producers to price volatility.

Kenya's current processing and marketing of chicken products ranges from basic live bird markets and on-site slaughter to highly advanced, ISO-certified facilities that provide ready-to-eat products to international markets. Barriers to marketing chicken meat products include inadequate knowledge of the benefits of cold storage for consumers, which includes an extended shelf life and enhanced product quality. Enhancing value addition and cold storage can improve chicken product trade, storage, distribution, and consumption. Advances in freezing, packaging, and transportation technologies will enable chicken processors to trade in high-quality, premium cuts locally and regionally, especially during periods of domestic surplus.

Value addition begins by transforming whole chicken carcasses into various formats, including cut-ups, deboning, and portioning. These carcasses can be sold whole or divided into parts, such as wings, legs, and breasts, with options for skinning. Some processing plants, such as butcheries, cut up carcasses by hand for retail outlets, while medium to high-volume processors have automated the handling to over 2,500 carcasses per hour.

The cut-up parts include breasts, back, legs, thighs, drumsticks, and wings. Deboning separates meat from bones, primarily breast and thigh meat, for retail. Deboned meat, especially breast fillets, ensures specific weight and dimensions for food safety, crucial for consistent cooking



Value addition in the chicken industry creates jobs across various sectors, from farming to processing and marketing. It enhances food safety, reduces losses, and ensures quality standards, which boosts consumer confidence



efficiency and internal temperatures in fast food outlets. Further processing involves adding ingredients or heat treatment to create various value-added products. The industry has developed hundreds of processed items, including marinated, chopped, breaded, and fried varieties, including the famous "mayai pasua". Other value-added products include nuggets, wings, drumsticks, and thighs, available cooked, pre-cooked or ready-to-cook at various retail outlets.

Value-addition processors typically partner with farmers through contracts to supply live chicken, ensuring financial security by guaranteeing payments and protecting them from market price fluctuations. This reduces investment costs, as processors often supply inputs (chicks, feed, medication) and technical support, leaving farmers responsible mainly for housing and labour. In such an arrangement, the risk of losses is minimized since integrators offer disease management services and insurance and ensure a stable market for the chicken products.

Chicken value addition is profitable with large, consistent volumes of live birds or eggs, ensuring efficiency and meeting market demand. High volumes optimize equipment and labour usage, achieving economies of scale and enhancing by-product utilization, like converting feathers and bones into animal feed and fertilizers. This underscores the need for organized chicken production to add profitable value. Retail market prices for value-added products are higher, e.g. a kilogram of deboned chicken breast meat or fillet is Kes. 1,200, while a live broiler chicken is less than Kes. 450.

Value addition in the chicken industry creates jobs across various sectors, from farming to processing and marketing. It enhances food safety, reduces losses, and ensures quality standards, which boosts consumer confidence. This allows Kenyan chicken producers to access premium markets do-



mestically and internationally. By extending the shelf life of chicken products, processing helps minimize post-harvest losses, enabling farmers to sell at better prices and fostering economic growth.

Final remark

The Kenyan chicken industry is one of the fastest-growing livestock sectors. Despite immense growth, value addition has not kept pace, depriving farmers of much-needed revenue amid rising input costs. Marketing chicken products faces numerous challenges, including an unstable market, increased input taxation, high transportation costs, a lack of cold chain facilities, and non-compliance with food safety regulations. However, there is much promise for the industry as urban growth and rising incomes increase the demand for value-added chicken products, which are preferred for convenience and health benefits. These products not only save time in the kitchen but also enhance the overall cooking experience!

As E-commerce reshapes the retail food industry, it offers exciting growth opportunities in the chicken industry. Upholding rigorous quality assurance standards in value addition is not just important but essential for future success.

Dr Ann Wachira is a scientist and animal health specialist at KALRO Naivasha. Email: Ann.Wachira@kalro.org

HEALTHY LIVING

Be mindful of what you eat

Healthy and affordable food choices are within our reach

By **Pauline Mundia**

NON-COMMUNICABLE DISEASES (NCDs) are emerging as a critical health challenge in Kenya, contributing to a noticeable increase in both illness and mortality rates. In 2019, NCDs caused 119,958 deaths, which represents the highest figure recorded since 2011, when the number of deaths attributed to these diseases was 87,865. The primary NCDs affecting the Kenyan population include:

- Cardiovascular diseases
- Cancers
- Chronic respiratory diseases
- Diabetes.

The increasing trend of NCDs in Kenya is influenced by various factors, including unhealthy diet, inactivity, tobacco use, and stress. Addressing this growing burden requires comprehensive strategies focusing on prevention, early detection, and management of NCDs, promoting healthier lifestyles and improving access to healthcare services.

Good nutrition is one of the most effective strategies to mitigate NCDs. In Kenya, households can create balanced, nutritious meals using locally available foods, ensuring affordability and accessibility. By incorporating diverse food groups and following smart meal-planning strategies, families can enjoy a healthy diet that supports overall well-being. Let us examine the essential food groups and their importance in health and then see how to incorporate them into our diets to reduce the risk of non-communicable diseases. Essential food groups and their benefits:

1. **Carbohydrates (energy providers).** When whole grains and fibre-rich options are included in the diet, these foods provide the energy needed for daily activities, support brain function, and aid digestion.
Sources: maize (grain, ugali, porridge), sweet potatoes, arrowroots, cassava, millet, sorghum, and bananas.
2. **Proteins (body-building foods).** They help in muscle repair, enzyme production, and boosting immunity. Combining plant-based proteins, such as beans and maize (githeri), enhances their nutritional value.
Animal Sources: Eggs, fish, chicken, beef, goat meat, milk, and fermented dairy products (mala, yogurt).
Plant Sources: Beans, lentils, green grams, cowpeas, peanuts, and soybeans.
3. **Vitamins and Minerals (protective foods).** These foods strengthen the immune system, improve digestion, and support skin, vision, and bone health. Eating a variety ensures the intake of essential micronutrients.
Sources include:
Vegetables: Kale, spinach, cowpea leaves, amaranth (terere), pumpkin leaves, black nightshade (managu), and cabbage.
Fruits: Mangoes, pawpaws, oranges, avocados, pineapples, guavas, and bananas.
Herbs and spices: ginger, garlic, cinnamon, cardamom, sage, rosemary, basil, thyme.
4. **Healthy Fats (energy and cell function).** They support brain function, hormone production, and heart health while reducing inflammation.
Sources include: Avocados, groundnuts, simsim (sesame seeds), coconut, and oils from sunflower, canola, and olive.
5. **Fibre and Hydration (digestion and detoxification).** Fibre aids digestion, prevents constipation, and helps regulate blood sugar levels. Drinking enough water, herbal teas, and fresh fruit juices enhances hydration and detoxification.



Regular Good nutrition is one of the most effective strategies to mitigate Non-communicable Diseases.



HUMAN HEALTH

Stay safe from zoonotic diseases

Zoonotic diseases are mainly spread through milk, manure, blood, fluids from either the nose or mouth and aborted fetuses

By Judith Chepchumba

ZOONOTIC DISEASES ARE diseases that can spread between animals and people. They are mainly spread through milk, manure, blood, fluids from either the nose or mouth and aborted fetuses.

In some instances, they can be spread through air or animal bites and scratches, drinking raw milk, or eating contaminated food. The most common zoonotic diseases are as follows:

1. Rabies

Rabies is spread by contact with the saliva of an infected animal, most commonly a bite from an infected dog.

Signs in animals

Aggressiveness, excessive salivation, biting imaginary objects, weakness and difficulty breathing.

Signs in people

Agitation, headache, discomfort, weakness and hallucinations.

Treatment

Once clinical signs have been displayed, death is the most common outcome. However, the disease can be prevented by vaccinating animals and seeking medical attention as soon as possible after being bitten by a dog.

2. Anthrax

Anthrax is spread by breathing in or eating anthrax spores from the soil, water or plants. It can also be spread by consuming meat or milk from an infected animal.

Signs in animals

Animals will often be found dead with blood oozing from all body openings, e.g. nose, mouth, anus or vulva, and the blood does not clot.

Signs in people

Blisters on the skin, vomiting, diarrhoea and coughing blood.

Prevention

Vaccination of livestock. Avoiding direct contact with dead animals with anthrax. Anthrax carcasses should be buried deeply (2 meters). People should not drink milk or eat meat from sick or dead animals.

Sources include:

Whole grains, vegetables, fruits, nuts, seeds, and legumes.

How can we incorporate these foods into nutritious meals that are affordable and easily accessible? Here is a simple meal plan to help you get the nutrition you need.

Breakfast		Lunch		Dinner	
Option 1	Option 2	Option 1	Option 2	Option 1	Option 2
Porridge made from millet/sorghum with groundnuts	Vegetable omelette with whole-grain bread and tea or coffee.	Githeri (boiled maize and beans) with sukuma wiki	Rice with lentils and avocado slices.	Fish with ugali and steamed managu	Chapati with green grams and kachumbari
Snack options	Roasted groundnuts, fruit salads, boiled eggs, or fresh sugarcane juice				

As we incorporate these foods into our diet, let us remember portion control is also important for health. Follow the Japanese rule of eating, which says “Eat until you are 80% full”. Feel free to try different options based on the foods in the categories described above.

Tips for eating healthy on a budget

- Use foods in season** - Fruits and vegetables are cheaper and more nutritious when in season. For example, mangoes and watermelons are more affordable during their peak season.
- Buy in bulk** - Purchasing grains, legumes, and cereals in bulk saves money and ensures a steady supply of nutritious ingredients.
- Good storage** - Drying vegetables like managu, fermenting milk (mala), and sun-drying fish or omena ensures availability during off-seasons.
- Grow your own** - Households can start small kitchen gardens with sukuma wiki, spinach, onions, tomatoes, herbs and spices to cut costs and enhance food security.
- Minimize food waste** - Use leftover food creatively. For example, over-ripe bananas can be used to make pancakes, and vegetable peels can be used in soups.

Conclusion

It is important to take a holistic approach to the health and prevention of NCDs.

Factors such as gut health, stress and sleep quality will affect how the body utilises the food you eat. Gut health refers to the good bacteria in the digestive system that supports digestion. Feed your gut bacteria with fermented foods. Stress raises the body’s metabolic needs and increases the use and excretion of many nutrients, making them unavailable to the body. Repair, rest and rejuvenation happen when we sleep, so it is important to prioritize sleep, ensuring you get 7 – 9 hours of sleep.

Call to Action

Take a step today towards a healthier diet by planning your next meal using at least three locally available food groups. As much as possible, ensure the food is organically grown to avoid the added danger of chemical pesticides in food. Visit your nearest market, choose fresh and seasonal produce, and try a new nutritious recipe this week. Small changes in your daily meals can greatly affect your health and well-being.

Additionally invest in growing your own vegetables, herbs and spices. This can be done in a kitchen garden, sack garden, and even in flowerpots. Be intentional about sleep, rest and dealing with stress.

Pauline Mundia is a professional health coach. Email: wanguimundia@gmail.com



3. Rift Valley Fever

It is mostly spread through mosquito bites or contact with infected animals. It occurs mainly in areas with flooding. Humans get infected by touching fluids or eating meat or milk from infected animals.

Signs in animals

Abortions, fever, vomiting, diarrhoea, running nose and weakness.

Signs in people

Mild illness is characterized by fever and weakness. It can sometimes lead to severe infection of the brain and eyes and abnormal bleeding, leading to death.

Treatment

Most animals and people recover on their own.

Prevention

Vaccination of livestock, insect control and avoiding contact with infected animals. Milk should be boiled and meat cooked well.

4. Brucellosis

Brucellosis is spread to humans from bacteria in raw milk or undercooked meat. It can also be transmitted through a skin wound coming with abortion fluid/fetus of infected animals. Animals get infected from the semen of an infected bull during natural mating.

Signs in animals

Abortions, poor fertility, low weight gain, poor milk production and swollen joints.

Signs in people

Weaknesses, fever, muscle and joint pain. Abortions in women and testicular pain in men.

Treatment

Once affected, animals become carriers for life hence, all infected animals should be culled by being slaughtered and buried. For humans, medicine is available.

Prevention

Use of artificial insemination for breeding. Boiling or pasteurizing milk before drinking and wearing protective clothing when handling abortions in animals.

5. Trypanosomiasis/Nagana/Sleeping sickness

This spreads through bites from parasite-infected tsetse flies.

Signs in animals

Anaemia, chronic weight loss, enlarged lymph nodes, recurrent fever, low fertility and weakness.

Signs in people

Headache, fever, swollen lymph nodes, joint pain, sleep disorders, seizures, coma and an open wound at the site of the fly bite.

Treatment

Treatment is only successful in the early stages of the disease.

Prevention

No vaccine is available, so insect control and treatment of animals in endemic areas are the only ways of prevention. Insecticides are often used on animals to control the flies.

4. Bovine Tuberculosis

Humans contract this disease by breathing in the aerosols of infected animals, eating contaminated meat, drinking raw milk or contact with infected blood in case of an open wound.

Signs in animals

Clinical signs develop with time characterized by extreme weight loss, persistent cough with blood, swollen lymph nodes, loss of appetite and eventually death.

Signs in people

Fever, sweating at night, weight loss, bloody coughing and diarrhoea.

Treatment

Infected animals should be slaughtered and buried since treatment is expensive and doesn't cure animals. Treatment for people is available.

Prevention

Drinking boiled or pasteurized milk and eating meat that has been inspected by veterinarians. No vaccine is available for TB.

*Judith Chepchumba is a trained veterinarian.
Email: chumbaajosephs@gmail.com*

NUTRITION

The nutritional and culinary benefits of chia seeds and mushrooms

CHIAM, a research project dedicated to developing sustainable and innovative solutions for the global food system, emphasizes the nutritional value of chia seeds and mushrooms

By **Tim Mwai**

NUTRITION AT THE household level can be enhanced by ensuring that meals contain a balanced diet. To achieve this, families need to integrate various sources of nutrients in meal preparation by adding nutrients-dense ingredients to their daily meals.

The Integrated CHIA and Oyster Mushroom System for Sustainable Food Value Chain in Africa (CHIAM), a research project dedicated to developing sustainable and innovative solutions for the global food system, emphasizes the nutritional value of chia seeds and mushrooms. This article provides a guide on how to grow and integrate these high-value foods into family meals to address the following common challenges:

- i. **Malnutrition:** a nutritional condition caused by a deficiency or excess of energy, proteins, or micronutrients, which can adversely affect the form and function of tissues and the body, sometimes leading to clinical outcomes.
- ii. **Undernutrition:** This consists of protein-energy malnutrition (PEM) and micro-nutrient deficiency (MND). Protein-energy malnutrition (PEM) is when a person doesn't get enough protein and calories from their food. This can lead to health problems like stunted growth, weakened immunity, and even death.



Chia seeds are a nutritional powerhouse, rich in omega-3 fatty acids, fiber, protein, and antioxidants. These nutrients play a role in supporting multiple body functions and systems



Understanding chia

Chia seeds are tiny black or white seeds from the plant *Salvia hispanica* L., which is native to Mexico and Guatemala. The Aztec and Mayan civilizations used the seeds in their diets, as well as for medicinal purposes, religious rituals, and cosmetics.

Growing chia

The Chia crop will likely thrive in moderately saline, well-drained soils with a PH of 6.5-9. However, some varieties of Chia can tolerate moderately acidic soils.

Chia is also drought resistant, which means that the crop can be easily grown in those counties, in Kenya, with lower rainfall and extended drought periods. It can also be grown organically, without the use of synthetic farm inputs that contaminate farm produce and degrade soils.

Key benefits of chia consumption

Chia seeds are generally considered safe to eat, with few to no adverse effects. However, to avoid possible digestive side effects, it is important to pre-soak them for a few hours.

Chia seeds are a nutritional powerhouse, rich in omega-3 fatty acids, fiber, protein, and antioxidants. These nutrients play a role in supporting multiple body functions and systems. In addition, the following benefits have been identified in Chia:



- **Health benefits:** They have been linked to improvement in risk factors for heart disease and improved blood sugar management (diabetes).
- **Improve overall nutritional quality:** Chia contains essential nutrients/minerals, including protein, fiber, and healthy fats, crucial for growth and development.
- **Enhance cognitive function:** Chia's high level of omega-3 has been proven to improve brain development and function, particularly in children.
- **Promote gut health:** Increase fiber intake, aiding digestion and supporting a healthy gut microbiome. Further, the insoluble



fibre in Chia seeds can act as a mild laxative, which may help reduce constipation.

- Bone development: Chia seeds are high in calcium, magnesium, and phosphorus. All these nutrients have been linked to improved bone mineral density.

Culinary benefits of chia

Chia seeds are easy to incorporate into the diet. They taste rather bland, which means they can be added to many food products, including porridge, juices, water, oatmeal, pudding, smoothies, and baked goods.

Also, due to their ability to absorb water and fat, Chia can be used to thicken sauces and act as an egg substitute. By leveraging the nutritional power of Chia seeds, we can help create a healthier future for future generations.

Tim Mwai is part of the team implementing The Integrated CHIA and Oyster Mushroom System for Sustainable Food Value Chain in Africa. Email: timmwai@gmail.com

NUTRITION

Why you should grow mushrooms

They are low in calories and sodium and have virtually no fat and no cholesterol. Mushrooms have been used as medicine for thousands of years.

By Tim Mwai

Although mushrooms are classified as vegetables, technically, they are fungi. They are low in calories and sodium and have virtually no fat and no cholesterol. Mushrooms have been used as medicine for thousands of years.

Growing Oyster mushrooms

Oyster mushrooms are a delicacy. They were introduced into the market in the 1930s. However, small-scale farmers started growing them in the 1980s. The mushrooms most commonly found in today's market are button mushrooms and oyster mushrooms. Although button mushrooms enjoy greater popularity, they pose significant challenges for cultivation.



The mushrooms most commonly found in today's market are button mushrooms and oyster mushrooms. Although button mushrooms enjoy greater popularity, they pose significant challenges for cultivation.



Through weekly Kiswahili and local languages radio programmes, TOF Radio helps to improve awareness and knowledge of sound agroecological practices, strengthen the link between researchers and farmers to enhance food security, reduce poverty and increase household incomes among farmers in Kenya.

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As a result, many small-scale farmers have begun to focus on oyster mushrooms instead.

Oyster mushrooms are easier to cultivate and can grow on a wide range of substrates, particularly agricultural waste. Some suitable substrates include sawdust, maize stalks, wheat straw, rice straw, maize cobs, sugarcane bagasse, banana leaves, cotton husks, and

CONTINUED FROM PAGE 11

chia stalks. Among these options, cotton husk has proven to be particularly effective for growing oyster mushrooms. When proper hygiene and climate control measures are maintained, oyster mushrooms can be harvested for up to a year.

Oyster mushrooms take a shorter time to grow and can be grown easily in grow bags and/or buckets in a grow house. This is in contrast to other types of mushrooms like Reishi, Shitake, and Lion's mane, which take up to one year to grow. As a result, experts advise farmers to grow oyster mushrooms.

Oyster mushrooms are also hardy compared to other types of mushrooms, as they can withstand higher temperatures, up to 25 degrees C.

Regarding consumption, oyster mushrooms have gained popularity because of their savoury taste and health benefits due to their high protein content. They are also rich in Zinc, Iron, Folate and Selenium, which is an antioxidant. For value addition oyster mushrooms can be ground into powder and used to fortify other foods and seasonings. They can also be dried to prolong the shelf life.

Health benefits of mushrooms

Studies show that eating 1 to 2 cups of mushrooms each week may reduce your risk of cancer by up to 45%. In addition, mushrooms contain Selenium, which helps the body make antioxidant enzymes to prevent cell damage, vitamin D, which assists with cell growth, boosts immune function, and reduces inflammation; and vitamin B6, which helps the body form red blood cells. Mushrooms also promote a healthy gut through stimulating the growth of healthy bacteria and are an excellent substitute for red meat.

Culinary value of mushrooms

Different types of mushrooms have different flavors and textures, which makes them good for cooking. For example, mushrooms and eggs, mushroom risotto, stir fries, burgers, pizzas, and soups. They can also be consumed fresh in salad.

Key contacts

For further information, kindly have a look at our website or make contact with Monica or Tim.

<https://www.faccepi.net/en/foscera/projects/chiam.htm>
 contacts: Project Coordinator – Dekut University Monica Mburu
 0714-915397

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To contact us on the "tusemezane" platform or ask a question, kindly call or sms +254 715422460. Mail to: feedback@biovisionafrica.org

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