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EDITORIAL

NOW IS THE TIME TO INCREASE COFFEE PRODUCTION

For the first time in decades, coffee farmers are celebrating good producer prices they have received from the sale of their coffee. Majority of smallholder growers were paid over Sh 100 per kilogram which is an improvement from the past earnings.

It will be recalled that Kenya was a leading quality coffee producer in the world. It was leading in foreign exchange earnings compared to other cash crops. But political interference in 1980s by the government forced farmers to abandon production for other crops. The country has never recovered since.

As years went by, two successful administrations tried to revive the sector with new regulations and policies. Unfortunately, the industry was invaded by cartels who colluded with buyers at coffee auctions to fix prices. This affected the small producers who sold this produce through their societies. This equally affected production to a large extent.

After the promulgation of the 2010 Constitution, counties in coffee growing areas each tried to market its produce with little success because there was no proper

structures and regulations to govern the initiative. These are the teething problems that affect the sector and sabotage the growth of the sector.

When the current administration came to office, President William Ruto ordered for coffee reforms whose results are now being enjoyed by farmers. This does not mean there are no problems. They are in plenty and need urgent solutions and fixing.

In seeking answers, the role of the government should remain regulatory rather than direct involvement in the chain of production, grading and management of the sector. This direct interference in the past ruined the sector and has never fully recovered to date.

The role of the government, through the ministry of cooperatives, should ensure that coffee societies, like other agri-based societies, are properly managed and adhere to laid down regulations to safeguard farmers' incomes and interests. And where possible it should assist marketing Kenyan coffee to other overseas countries as was the case before.

In the recent past, cooperative development minister Wycliffe

Oparanya proposed that coffee farmers should be paid directly instead of through their primary cooperative societies who mill their produce. This move was totally rejected by farmers who saw the move as intended to disenfranchise them and eventually kill their societies.

These manoeuvres will definitely undermine the goodwill between the government and farmers through their societies. Instead, the ministry of agriculture should also play its role to ensure farmers receive the best quality seedlings to boost coffee farming.

As a country, we should aim to revert and even improve our coffee quality in order to attract premium prices in the international markets. Hence, we should desist actions that hinder this progress now and in the future.

Indeed we should dream to revert to days when coffee consumers in international market sought our coffee to beat others because of quality and aroma. That should be our dream and aim.

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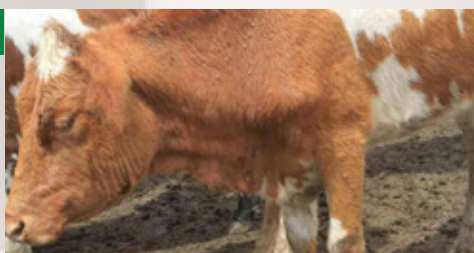


Pumping Irrigation Water

Irrigation and drainage have a major importance in the global food production.

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East Coast fever is protozoan disease of cattle by *Theileria parva* parasites and transmitted by *Rhipicephalus appendiculatus*.



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The fertilizer has nitrogen fixing bacteria and as a result, there is every distinct product designed for each legume.

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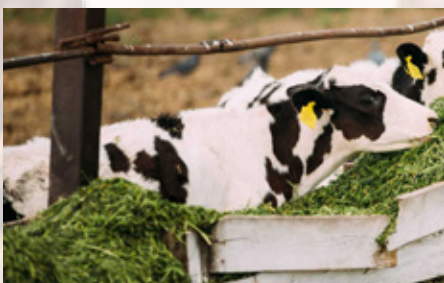


Feeding Dairy Cows

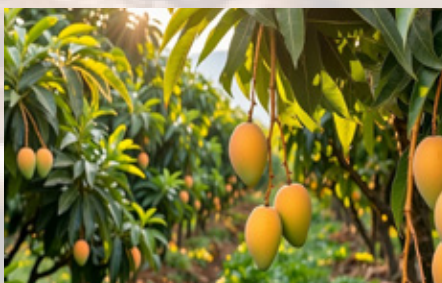
Essentially, dairy cows need well-balanced diets in order to produce quality and quantity milk and also, maintain good health.

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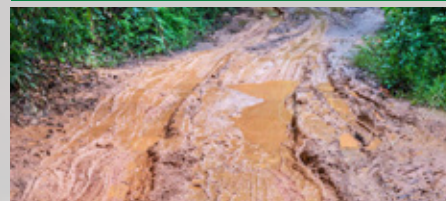
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Coffee Boom Good News

For Kenyan Farmers



Kenyan Coffee In Demand In World Market

Coffee farmers in Kenya, the smallholders and large estate owners, are smiling once again as their earnings are rising after many years of misery over poor payments.

Once the producers of the country's leading export crop alongside tea and horticultural products and the top foreign exchange earner, the coffee sub-sector has been on its knees for a number of years, as the global prices continued to decline, eroding the farmers' confidence in the crop.

The situation got so bad that some farmers, especially in the central Kenya highlands, which are the main coffee growing zone, began uprooting their bushes and planting other crops. In Kiambu

County, where many of the people working in Nairobi live, the construction sector has blossomed at coffee's expense as farms have given way to numerous blocks of residential apartments.

The agricultural gold of yesteryear became a pale shadow of what it was for so many years, including the smuggling of the crop from Uganda during a global market boom that was sparked by bad weather that devastated Brazil's harvest in the late 1970s.

This year, the Kenyan coffee farmers are once again enjoying a significant income boom from their main source of livelihood. The good fortune is driven by record-high global prices exceeding \$120 (nearly KSh15) per kilogramme, up from \$35 (about Ksh5) per kilo in 2024.

And the Kenyan farmers have responded to the good fortune by boosting production to nearly 52,000 tonnes. This impressive turnaround, driven partly by the transparent direct sales of the crop, has boosted returns, hugely improving livelihoods. Record high prices have been fuelled by the increasing global demand for the Arabica beans, with some grades fetching over KSh910 per kilogramme.

According to coffee industry experts, the implementation of the Direct Settlement System (DSS) and reforms in the Nairobi Coffee Exchange, have led to faster and higher payments made directly to the farmers. It is a godsend that should be exploited to once again promote the growing of this valuable crop.

This is, indeed, the best

motivation for the people who work so hard on their farms daily have seriously required pulling the crop out of the gloom that has overshadowed the vital coffee sub-sector in recent years.

The Kenyans' current good fortune, as also happened during the famous coffee boom of the late 1970s, has been boosted by a shortfall in the leading global producer Brazil due to erratic weather that has drastically cut the output.

Ironically, Brazil's misfortune now happens to be the source of Kenya's joy. The decline in the giant South American nation's production has boosted demand for Kenyan coffee, which has always been the high-quality gem desired in the international markets.

The new vibrancy in Kenya's coffee sub-sector is evident in Murang'a County, for instance, where the farmers' pay-outs have increased from roughly KSh80 to KSh110

per kilogramme.

In the gradually recovering coffee industry, the introduction of the digital tracking of sales and direct banking have increased the farmers' confidence and reduced the perennial influence of the exploitative brokers.

There is also a new expansion of coffee farming beyond the traditional zones into areas such as Bomet County in the South Rift Valley, and in western Kenya. This has seen great enthusiasm that is increasing the adoption of the high-yielding and drought-resistant varieties that promise greater returns to the farmers and the country. As more new farmers start growing the crop, the overall production will definitely increase and boost coffee yields. The country is now vigorously working on solving the challenges to enable the expansion of its coffee sector, targeting a production increase from the current 50,000 to 150,000 metric tonnes by 2028-2029. The growth strategies

include extending coffee growing to some 35 of the 47 counties.

By distributing high-yielding seedlings and supporting farmers with modern agronomic practices, the country hopes to raise the average coffee yields from 2kg to 20kg per bush. The government's reforms, including direct payments and the establishment of a Coffee Cherry Advance Fund, are meant to boost income to more than KSh100 per kilogramme.

This new boom marks a major turnaround for the coffee sector, which has faced challenges due to low international prices, the exploitation by middlemen, and high production costs. The key goal is to increase coffee's contribution to the national economy to KSh1 trillion annually.



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Firm Turns Animal Waste Into Organic Fertilizer



Animal Waste Before Being Processed To Make Organic Fertilizer

An organic fertilizer making company is seeking correcting the acidic state of Kenyan soils bycomposting waste from livestock, vegetables and water hyacinth from Nairobi dam. Pastoralists, known to keep large herds of livestock, struggle to manage and dispose the waste. After a day of grazing, the livestock have to be taken to a designated area to spend the night. It is this area where the waste accumulates. With one pastoralist owning up to 3,000 goats and tens of cows, and with no farming land, managing waste even for a day becomes a nightmare.

Essentia Kanan, a company in Rongai, has sought to take the burden off the pastoralists by buying the waste which the company treat and packages for sale. Working with transporters who understand the rough terrain that leads to the pastoralists' homes, Essentia Kanan buys the waste from the transporters which is then delivered to a location in

Kiserian where the company does the treatment of the waste. The company also has an agreement with two major slaughterhouses in Kiserian who slaughter on average 200 cows and thousands of goats daily to get waste.

"We currently don't treat the animal blood because we don't have the requisite technology to do it but it is something we would definitely explore in future. But the waste on its own is too much. Even in situations where the slaughter houses channel the waste for biogas, much more is left unused. Sometimes they even pay people to dispose the waste which becomes an eyesore. We are however very strict on the waste delivered and must ascertain before we purchase that it is not mixed with anything," said Robert Kariuki one of the directors at the company.

Once the waste is gathered at a central location, composting begins. "This is the process of exposing the waste to extremely

high temperatures to sterilize it and remove any disease causing organism that may be harmful to a plant. This process is extremely important and is what separates safe good manure from the others," Kariuki explained.

Composting, Kariuki further explains, ensures that compounds in the manure are broken down into components that make it easy for plants to absorb nutrients. Composting takes on average five weeks. After the sterilization microbial agents are introduced into the manure by use of a liquid solution that further enhances safety and increases the potency of the manure. The organic fertilizer is then taken to the laboratory to test whether there are any more harmful and disease causing micro organisms.

A sample is also taken to the Kenya Bureau of Standards for quality check. This is followed by a process called fortification where nutrients that may be lacking are added.

Turn to page 32

Livestock Herders Turns To Fruit Growing



A Mango Plantation In An Irrigation Farm In Kajiado

Moses Ole Tanchu's one acre farm is a model for other pastoralist farmers in Soweto area, Kajiado County, as he reaps from bananas, mangoes and a variety of vegetables, grown through irrigation.

Tanchu was a pastoralist for as long as he could remember but when Ngurumani Irrigation Scheme in Kajiado County was established by the government, he changed his mind and decided to try farming as a career. He narrated that he used to keep a lot of livestock and would move from one place to the other in search for pasture and it would be extremely difficult, especially during drought periods.

"I countered huge losses as many

of my livestock died, but today I have reduced my livestock to only 15 cows and 50 sheep in order to concentrate on farming," said the 41 year old husband and father of five. He has planted pawpaws, mangoes, bananas, beans and vegetables and in a week, Tanchu makes approximately Sh16,000 from the sale of his produce.

"This is where I get money to educate my five children and I have no problem of school fees or money to raise my family. I prefer farming than pastoralism because the farm gives me all I need for my family."

Leasing farmers

There are also farmers like George Kimani, who lease farms in the area for horticultural farming in

seasons. They reap big and export or sell their produce in neighbouring markets such as Nairobi, Machakos, Makueni and also Kiambu. Mr Kimani hails from Lari in Kiambu county. He has leased one and half acres of land for five years now to grow tomatoes for export. He disclosed planting is done according to seasons and that he leases land per season for Sh16,000.

"We are about eight farmers in this area that plant tomatoes for export and we start by doing market survey to get good income," he revealed, adding that without market survey, their tomatoes will lack buyers. "When the market and season favourable, I pocket about Sh180,000. But

you must know that there can be bad season where I only get Sh80,000, way too low below my expectations,” he added.

He blamed such poor sales on poor roads. To bring a lorry to transport his tomatoes from Kiserian, Mr Kimani said he pays the lorry owner Sh25,000 due to poor roads, yet the same could go for Sh12,000 when roads are in good conditions.

Human-wildlife conflict is another challenge also because the area is near a wildlife corridor. “Sometimes wild animals invade our produce and destroy almost everything planted,” he decried.

Irrigation

The Ngurumani smallholder horticulture project was funded by the Japan International Cooperation Agency (JICA) and the government at a tune of Sh344 million. The irrigation project covers 2,500 acres and has benefited about 1,400 families some of whom used to farm using open canal and furrow irrigation methods.

They have now embraced sprinkle irrigation method as they look forward to starting drip irrigation. According to the Kajiado county government, there is also a capacity of expanding another 500 acres at a cost of Sh150 million for largescale maize farming courtesy of the project. It is anticipated this could produce 70 bags of maize per acre annually, translating to about 35,000 to 40,000 bags for the 500 acres.

“This can feed the whole of Kajiado County. We will also integrate it with warehouses and link farmers to the market,” a county official said. He said the Agriculture Finance Corporation (AFC) is as well helping farmers to get credit and expand horticulture farming, for the soils are fertile due to natural manure.

They do not require fertilisers, making the area good for crop production. The farmers advised farmers not to abandon livestock

rearing but have quality breeds that can enable them venture into dairy farming and reap big from both ventures.

Livestock farmers in the County have further been urged to embrace Artificial Insemination (AI) services for better and quality livestock breeds.



A Pawpaw Plantation In Soweto Area, Kajiado

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A Herd Of Cattle Waiting To Be Immunized Against ECF

Ticks Cause Rift Valley Fever Outbreaks.

East Coast fever, a tick-transmitted disease putting 25million cattle at risk across 11 counties of eastern, central and Southern Africa, kills some 1 million cattle a year and is responsible for nearly half of calf deaths in these countries. Methods to control this disease are inadequate, particularly for pastoralists, on whom the disease has the biggest impacts.

Background

East Coast fever is protozoan disease of cattle by *Theileriaparvapar* and transmitted by *Rhlephealusappenticlatustick*3. It causes high mortality in calves and adults in dairy production systems.

A study in one pastoral area in Tanzania showed that calf mortality was about 40-80 percent, which ECF accounting for 75 percent of these deaths. The impact of the disease is

particularly severe among pastoralists because, under the conditions of pastoral production systems there is scarce infrastructure to support conventional East Africa Coast fever control such as tick control or chemotherapy.

- An alternative control strategy through immunization has been available for chemotherapy.
- An alternative control strategy through immunization has been available for several decades.

The strategy, known as the infection- and treatment method, involves inoculating live *Theileriaparvapar* into an animal while simultaneously treating the animal with a long-acting antibiotic. This combination provokes in the immunized animal a mild reaction to the parasite infection and development of immunity to further infections.

This immunity lasts up to three years in the absence of further tick infestations; the immunity is life-long immunity if ticks

continue regularly to challenge the immunized animals.

Field trials demonstrated that the infection-and-treatment method effectively controls East Coast fever. But delivery of the technology is quite complex, requiring a/cold chain infrastructure. Moreover, because a proportion of any group of animals will suffer clinic East Coast fever after their immunization, the method required that trained personnel administer the vaccine and monitor any reactions in the immunized animal.

These factors made the technology expensive to deliver to resource-poor farmers in remote areas. Some professionals also perceived the method to be unsafe.

Experts concluded that this technology, although effective elsewhere, was unsuitable within pastoral production systems. Three new developments have changed this situation.

Three breakthroughs have overcome the technical and institute constraints named above and have given poor livestock keepers in pastoral regions of northern Tanzania access to this disease-control technology.

High quality vaccine stabilate

A major limitation of the earlier-generation infection-and-treatment method was the inconsistent behaviour of the vaccines in cattle. The proportion of animals that reacted to the parasite infection by developing disease ranged from 0-25 percent. This variability greatly complicated delivery of the vaccine. A few years ago, ILRI was contracted by the Food and Agriculture Organization of the United Nations (FAO) to produce a vaccine stabilate for an African regional Tiunizaton programme to control East Coast fever. The suitable batch ILRI produced underwent rigorous quality-control tests, including molecular characterization, resulting in a product that, for the first time, generates consistent results in cattle.

Technical innovations in the field

The main target of East Coast fever control campaigns until recently has been smallholder dairy producers because they keep genetically improved 'grade' cows, which are both expensive and highly susceptible to East Coast fever. In spite of this, however, the infection-and-treatment method for controlling East Coast fever was considered central to an FAO-initiated integrated tick and tick-borne disease project in northern Tanzania.

It was clear to that project's staff that East Coast fever has an ever more profound impact on pastoralists than it has on small-scale dairy producers. So the staff looked for ways to adapt the proven infection-and-treatment method for delivery to

Pastoral and agro-communities are thus the major beneficiaries of the three research developments that have given them access to the infection-and-treatment.

their pastoral communities at an affordable price.

Using ILRI's vaccine, the project staff dose of oxytetracycline reduced the rate of reactor animals, which cut costs and eliminated need for professional to monitor the vaccinated. At the same time, another FAO project showed that a reconstituted vaccine could be kept on ice for about 4 hours without affecting its efficacy, thus easing the requirements for a cold chain delivery of the vaccine.

Better epidemiological understanding

ILRI had, by this time, developed a number of molecular tools that could be used to monitor vaccine breakthroughs and breakdowns. The tool could also be used to study the genetic variation between different communities (isolates) of *Theileria parva* parasites. These developments helped allay concerns of veterinary authorities that use of the infection-and-treatment method might affect transmission of the disease, putting more cattle at risk. Immunization in pastoral communities with these three developments- developments of a higher-quality vaccine stabilate, better control of the ensuring disease through administration of higher doses of tetracycline and veterinary assurance that the technology poses no risk of greater disease transmission – the Tanzania project was able to set up systems for delivering the immunization to pastoral communities on a fully private basis. Because the risk of

generating reactor animals was reduced, project staffs were permitted to train and employ paravets to deliver the vaccine to the pastoral communities. To date thousands of cattle have been immunized in northern Tanzania (with cross-border migrants from Kenya). This outcome indicates that Tanzania pastoralists want to use this disease control method and are willing to pay for it.

There is reason for pastoral enthusiasm for the infection-and-treatment method of immunizing cattle against East Coast fever. For one thing, vaccination by this method is dramatically increasing the survival rate of their calves: calf mortality in two areas was observed to fall from 30-50 percent to less than 2 percent annually. In addition, with growing confidence that their cattle are safe from this killer disease, the pastoralists are starting to buy more expensive improved zebu breeds, such as Boran and Sahiwal, which are upgrading their herds genetically.

Another benefit is that cattle vaccinations against East Coast fever require as much as 50 percent less tick control. Reduced acaricide treatments not only reduces environmental pollution and probably extends the duration of the viability of the viability of existing acaricides as well (with extended use, parasites can develop resistance to acaricides).

Each of these outcomes is a serious benefit of pastoral livelihoods. Of the 25 million cattle raised in the region of eastern, central and southern Africa where East Coast fever is endemic, some 22 million are raised in pastoral and agro-pastoral systems.



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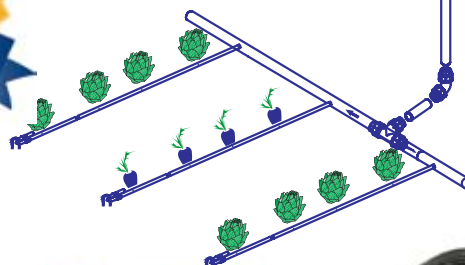
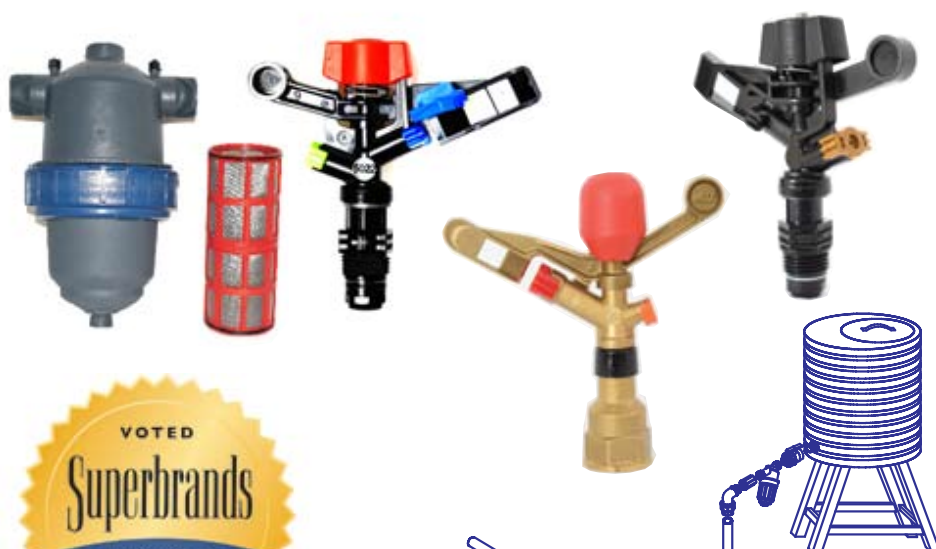


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For an irrigation system to succeed, it depends on the farmer. An effective irrigation system includes the delivery of water to agricultural land at the most appropriate time and in such quantities that will enable the farmer to produce a high quality yield.

Irrigation and drainage have a major importance in the global food production. There is over 275 million hectares of land under irrigation in the world today. There is also an increase in the irrigable land of about 1.5 per cent annually over the last few years.

In cases where there is a lot of water in the ground which leads to losses on the farm, some part of this land is provided with a drainage system where it becomes possible to increase production of crops such as wheat, rice and other crops, according to research conducted by world renowned scholars.

Factors Affecting Irrigation and Drainage

It is estimated that the world population is around 7.5 billion people in 2019 and is expected to rise steadily over the coming years. This is from a United Nations report which indicates that the continents with the biggest growth are Africa and Asia. This population explosion leads to a decrease in per capita water availability. Prudent management of this resource is required to ensure that global food production is sustained. There has also been an increased competition for fresh water. The demographic distributions are changing rapidly where urban populations are on the rise and their need for industrial and domestic water must be met. This forces the amount of water that goes into agricultural activities to be cut down. This means that more protective policies are needed to prevent the

fresh water resources and soils from pollution. Equally, there is a declining per capita arable land.

When conducting farming, the cost of irrigation is a direct expense that a farmer incurs. Therefore, it means the most efficient ways is to ensure that when water is pumped from a source, it reaches the intended plants on time, a system which should be established and adhered to.

Some societies especially in the developing world can choose to use the community based irrigation plans. Strategies such as the traditional border and furrow techniques are not expensive to implementation. However, they are also not efficient as there is huge wastage. With the scientific and technological advancements that are going on in the world, the most efficient irrigation systems will have to border on the awareness of fresh water scarcity.

Community based irrigation structures are advised to embrace advanced techniques such as the drip irrigation method of farming where the water is availed only to the root system of the plants and thereby, water that is normally lost to the non-productive environment is preserved for longer use and production risk effects are thoroughly mitigated. Farm based renewable water systems like mulching can be employed to reduce these costs even further, according to studies conducted by scholars.



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Farmers who have integrated mito into their systems consistently observe its transformative impact on soil health. As a legume, it forms a symbiotic relationship with nitrogen-fixing bacteria, enabling it to capture atmospheric nitrogen and enrich the soil.

Under favourable soil conditions, crotolaria can contribute between 50 - 100 kg of nitrogen per hectare, remarkably improving on soil fertility.

When incorporated as green manure, crotolaria decomposes rapidly, improving soil structure, increasing organic matter and enhancing moisture retention. These benefits are particularly valuable in degraded or low-fertility soils. Subsequent crops often exhibit improved vigour and yields, making mito an effective tool for restoring productivity in intensive farming systems where land is continuously cultivated.

For maximum benefit, agronomic practice recommends incorporating the crop at the flowering stage. At this point, biomass accumulation and nutrient content particularly

nitrogen are at their peak, while stems remain tender enough for rapid decomposition. Delayed incorporation results in woody material that breaks down slowly, limiting immediate nutrient availability. Timely incorporation also helps prevent seed formation, reducing the risk of volunteer plants in subsequent crops.

One of the less widely recognized benefits of mito is its ability to suppress plant-parasitic nematodes, especially root-knot nematodes (*Meloidogyne spp.*), which severely affect crops such as tomatoes, carrots and beans. Crotolaria produces bioactive compounds that disrupt nematode life cycles and reduce their populations in the soil. When used as a cover crop or green manure, it can significantly lower nematode pressure. Farmers commonly report healthier root

systems, fewer galls, and improved crop performance in following seasons offering a sustainable and cost-effective alternative to chemical nematicides.

A natural soil booster

Beyond soil health, mito also has practical applications in small livestock systems. Young, tender leaves can be used as a supplementary feed for rabbits, providing moderate protein levels and helping diversify diets where commercial feeds are expensive or scarce however, When properly managed, it becomes a low-cost, locally available addition to rabbit feeding strategies.

However, moderation is essential. Best practice involves feeding small quantities, mixing with other forages and using only young leaves.

Mito also holds promise as a traditional leafy vegetable. The young leaves are consumed after cooking, typically boiling to reduce bitterness and are a rich

source of essential nutrients, including vitamins A and C as well as minerals such as iron and calcium. In many rural households, it represents an accessible means of improving dietary diversity while also offering potential for income generation in local markets.

A plant worth rediscovering

The case for Crotalaria is compelling. It is a low-cost, multifunctional crop capable of improving soil fertility, reducing pest pressure, supporting livestock feeding and enhancing human nutrition. The call to action is clear: farmers should consider giving mito a place in their farming systems by sourcing quality seed from trusted suppliers and integrating it into upcoming planting seasons whether as a cover crop, green manure, vegetable or supplementary feed. Sometimes, the most powerful agricultural solutions are not new or expensive they are simply overlooked.

Farmer experience :
From Trial to Transformation.

“I started planting crotalaria to improve my soil,” says a smallholder farmer from Mwea in Kirinyaga County. “But I quickly realized it does much more. After incorporating it at flowering stage, my maize became greener and stronger without using much fertilizer. In my tomato field, I noticed fewer nematode galls.”

He adds:

“Even my rabbits are benefiting now. I mix a small portion of the young leaves into their feed and the response has been remarkable. At home, we also enjoy the leaves as a vegetable. It's truly a transformative plant.”

Thomas Karuki.
Simlaw Seed Co. Ltd



Crotalaria legume crop is used as supplementary livestock feed and a leafy vegetable

Organic Fertilizers Doubles Legumes Yields

Through Nitrogen Fixing Bacteria



High Yield Legume Crop After Applying Biofix Organic Fertilizer

S Smallholder farmers involved in legumes are counting a doubling of yields thanks to an organic fertilizer that increases fertilizer through its nitrogen fixing bacteria. The fertilizer dubbed 'Biofix legume inoculants' was developed by University of Nairobi in 1978 but was never commercialized until 2008.

MEA, one of the leading farm input manufacturing company partnered with the University to commercialize the product after realizing its' importance in nitrogen fixing. According to Wafullah Teresah a Biofix manager at MEA, the company launched the product targeting leguminous crop farmers in a bid to improve their soil fertility and crop yields. "We are aiming at providing affordable solutions to smallholder farmers in order to improve their

production and food security in the country," added Wafullah. Since its' introduction in the Kenyan market, the organic fertilizer is gaining prominence among farmers with over 60,000 using it. The fertilizer's capability of doubling yields of legumes like snow peas, beans, soya among others is a factor that Wafullah mostly attributes to its' wide spread adoption. Additionally, she notes that due to depletion of nitrogen in most soils in the country, the product is being sought after by the farmers to help fix their soils and it's an ideal for most farmers who carry out crop rotation.

Dick Morgan a veteran farmer in Chavakali, Vihiga County who stumbled on Biofix while training with N2 Africa on nitrogen fixation has never stopped using the fertilizer. "I used to get about

200-300kgs of beans per acre before I discovered Biofix, but my yield increased fourfold to over 1200kgs of beans on the same size of land when I started using this nitrogen fixing fertilizer." Biofix eliminates the use of top dressing fertilizers cutting the cost of farming by about 50 percent and depending on the type of crop that is inoculated in the fertilizer, its capable residing about 46 to 200kgs of nitrogen per hectare. This makes it ideal for crop rotation as one can plant maize after harvesting of the legumes, explained Wafullah.

The fertilizer has nitrogen fixing bacteria and as a result, there is every distinct product designed for each legume. We have designed different Biofix for different crops because each crop has different type of nitrogen fixing bacteria however;

this is a fact that does not deter the effectiveness of the product explains Wafullah. The product is manufactured through artificially culturing nitrogen-fixing bacteria in a set of controlled conditions.

The mixing of the solution should be done under a shade because the bacteria reacts to heat and they may dry up or die hence making one not able to get the desired results. One mixes water and the right amount of sugar depending on the amount of seeds to be planted and stir well until all the sugar dissolves. The solution is then poured into the seeds and mixed thoroughly until all the seeds are wet enough and using the right type of Biofix for the legume seeds, add the inoculants onto the wet seeds.

Using both hands, mix the legume

seeds with the inoculants until all the seeds are uniformly covered with the solution. One should keep the mixture covered and plant as soon as possible in moist soil. The planting should be done in a moist soil due to the fact that the bacteria are living micro-organisms and will need water or moist soil in order to survive. Wafullah advised that to acquire the best results, one should conduct irrigation in the area they intend to plant the legume seeds and in case one cannot access irrigation then it's vital that planting is done on rainy seasons preferably after it has rained.

The product's target of the smallholder farmers is reflected in its smaller packaging quantities. Biofix is packaged in quantities ranging from 10 grams to about 150 grams. The smaller pack of 10 grams retails

at about Sh40 and is enough for 1kg of seeds while the larger package of 150 grams retails at about Sh450. Biofix can work well with soils that have other micro nutrients like potassium, phosphorus and zinc among others. As a result, Wafullah advises that farmers ought to conduct soil analysis to determine what micronutrients are missing in them. "In case a farmer has found out that micro nutrients are missing in his soils, then it's advisable for him to purchase a legume pack that has both the Biofix and another fertilizer that has the micronutrients," explained Wafullah. The smallest legume pack that is enough for about 1kg seeds retails at about Sh200.



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Cassava Farming Contributes To Food Security In Africa



Cassava Plantation

Throughout Africa populations are growing fast and pressure on land is steadily increasing. To maintain productivity, farmers constantly adapting their management of natural resource. Farming systems are thus changing from “slash and burn systems” systems without external inputs and ultimately into more “intensive” systems using agricultural inputs.

Cassava has become one of the crops which research institutes like KALRO are giving emphasis on. Cassavabase is a database of phenotypic and genotypic data generated by cassava Breeding (NEXTGEN Cassava) project. The database makes available breeding data immediately available, thereby providing cassava researchers and breeders a key reference data source.

The cassava plant (*Manihot esculentaa*) feeds more than 500 million people mainly in Africa.

Besides phenotypic and genotypic data, Cassava base contains cassava geographical maps, genome and sequences and other datasets produced within the NEXTGEN Cassava project.

Why is this important and how does it contribute to food security? Cassava is one of the root crops that challenge droughts. It does well in arid and semi-arid areas. It is a lifeline and a ‘foodwall’ against famines and starvation. A cassava root can put up with any cracking surfaces, survive a drought and pass on a sheathed steathed stick for babies to chew and survive to tell the horrors of famine. The pen data on Cassava helps researchers and breeders improve on local varieties of the important root crop. It takes averagely ten years to come up with a new variety of Cassava. That time is significantly cut down with immediately available breeding data on Cassava.

In Kenya, we currently have six

improved Cassava varieties by the Kenya Agricultural and Livestock Research Organisation KALRO Mtwapa has Siri, Nzalauka, Shibe, Karembo, Tajirika and Karibuni. Siri Matures within 8 to 12 months. Root yield is 23 tonnes per acre. It is short with no branches. It has smooth roots with many constrictions. Nzalauka Matures with 6 to 8 months. Root yield is 21 tonnes per acre. The texture of the root is rough. It has straight stems and suitable for intercropping. Shibe Natures within 8 – 12 months. Root yield is 28 tonnes per acre. The roots are smooth with yellow cortex and stems are straight with no branches.

Karembo Matures within 8 months. Roots yield is 25 tonnes per acre. It is short with cylindrical. The roots are smooth and long with white cream cortex. Stems are straight. Karibuni Matures within 8 to 12 months. Root yield is 21 tonnes per acre. The roots are either conical or

cylindrical in shape and with rough skin. The stems are short with branching height.

These varieties are adapted to the coastal lowland agro-ecological zones but also do equally well in all parts of Kenya. Most of the farmers in the coastal region grow local cassava varieties which are low yielding and susceptible to diseases. The major diseases in the region are cassava brown streak virus and cassava mosaic virus. The Cassava breeding database may help in improving on these characteristics within a shorter period and see the productivity of the important root crop go up.

Opportunities for agricultural entrepreneurs

Value addition on cassava is simply an unexploited goldmine. Cassava flour can make Cakes, Biscuits, doughnuts, chapatti – a local favorite, gruel or Uji or even Ugali – a Kenyan staple that can easily start a fight if not provided on the dinner table. What's more, cassava crisps have earned their place on supermarket shelves recently.

Cassava – Maize systems in East Africa. A principal crop in Africa's farming systems is cassava, with a total production that has quadrupled in the last five decades to about 118 million t/year. Cassava is a major crop in East Africa, where it is often produced together with maize by smallholder farmers. Such cassava-maize based systems are found around Lake Victoria and in Burundi, Rwanda and Eastern DR Congo.

Apart from being dominated by cassava and maize (on average one third of cropped land is planted with cassava and one-quarter with maize) these systems have a high self-sufficiency in food. Sixty percent of all households sell cassava and maize; each crop generates an average of US\$90



A Cassava Plant

per year.

Due to its widely varying levels of land pressure, this region allows an interesting study of natural resource management and opportunities to improve both the productivity and the sustainability of cassava-based farming systems. Cassava is widely grown in East Africa today, but this is a recent development. Only three decades ago cassava production was limited to the odd corner in farms as enforcement of its production during colonial times had given the crop very bad images.

Does cassava improve soil fertility?

Jacinta Ouma. A farmer in Teso district, Western Kenya, explains; "Cassava drops its leaves on the soil while it grows. This improves the soil, so if I plant maize after cassava it grows better," Jacinta is not alone in this belief. A similar practice, known as jachere manioc or cassava fallow, exists in West Africa.

Almost 90 percent of farmers interviewed in Uganda and Kenya had the same opinion. Farm

surveys in Uganda and Kenya showed that farmers plant cassava on all soil types to maintain soil fertility. If land pressure increases and soil consequently become more acidic (pH 5.8) and deficient in phosphorus (P) (available P 4-5mg/kg), farmers increasingly plant cassava in the poorest fields in their farm. In Siaya district, Western Kenya, with nearly 400 people/km², farmers planted nearly twice as much cassava on fertile.

Six varieties of cassava swing to the tune of coastal breeze which is referred to as proud as a peacock.

Cassava Ideal For

- Siri may look tiny but heavy duty down under.
- Tajirika is popular in the local markets.
- Karembo is the most beautiful in the cassava that are among the improved varieties of cassava that are combating food insecurity in Kenya.

AI Improves Cattle Breed

For Better Milk Production



An Improved Cattle Breed As A Result Of AI

Artificial Insemination is a sure way to improve cattle breeds, other than milk, the main objective of a dairy farmer should be to have calf per cow every day. Failure to this means losses arising from decreased milk, less calf crop due to longer calving intervals, culling of infertile cows and lack of herd replacement.

If this failure is not due to infertility by cows then it can be reduced or eliminated by correctly detecting heat and timely serving the cow.

Progressive dairy farmers use artificial insemination (AI) to breed their cows and heat detection is a critical element for the operation to be successfully carried out.

A cow standing to be mounted is the crucial sign to look out for. Cows generally show sign of heat by receptive to bulls or AI. The estrus cycle takes place every 21

days but can range from 12 – 30 days. Heat sign lasts for two to three days and is manifested by restless behaviour and physiological changes around the vulva. To time insemination accurately, it is important to know when ovulation takes place. Normally a cow ovulates 24 to 30 hours after she first stands to be mounted.

She will remain on standing heat from about 12 to 15 hours. For the average cow, ovulation occurs 10 – 16 hours after it goes out of heat. It is important to inseminate a cow at least 8 – 10 hours before ovulation as it takes time for the sperm to reach the oviducts and undergo the essential process of activation which takes six to eight hours.

A rule of thumb for timing insemination is as follows:

- A cow seen on heat before 6am should be inseminated the same day.

- A cow seen on heat after 6am should be inseminated early the next day.

Artificial Insemination plays an important role in development of the livestock and dairy sub-sector; this offers an important opportunity for investment the private sector. Using AI has the following advantages of allowing efficient control of venereal diseases. It is also economical and eliminates purchase of expensive bulls, maintenance costs and prevents possible losses of bulls. The other beauty is that semen from bull studs or imported semen is usually genetically superior and disease free.

It is also the most efficient technique of cattle improvement. One bull can procreate 500 to 8000 offspring per year while natural servicing provides a mere 30 to 40. There is also an adequate offspring for a reliable evaluation of the breeding value of a bull is

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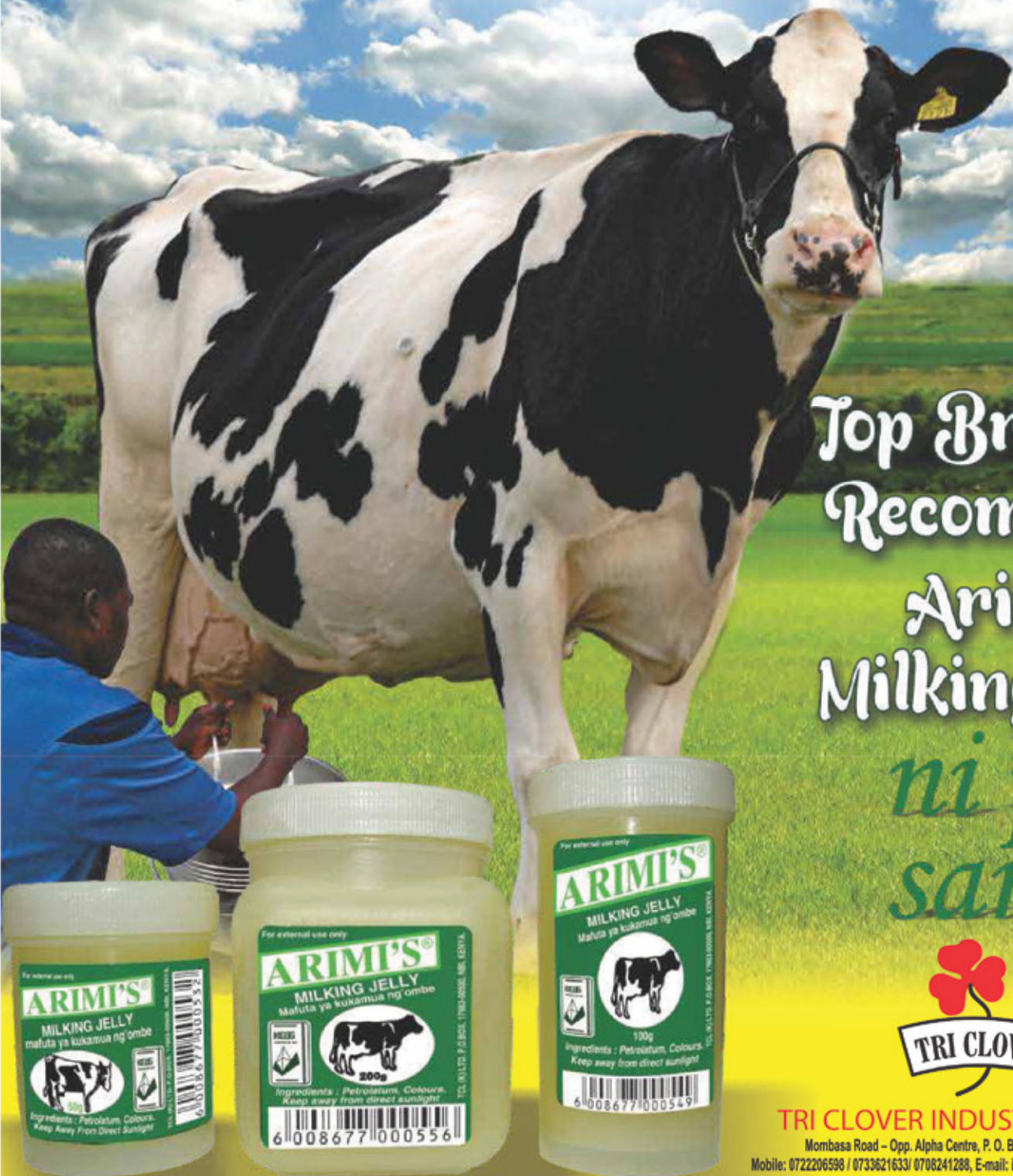
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available at a relatively young age. It necessitates accurate record holding and high level of management, resulting in a high degree of efficiency. Proven bulls are seldom sold and their frozen semen can be distributed worldwide.

The semen of outstanding bulls can be stored for years and thus used for subsequent breeding programs. There is need for AI to be qualified personnel since venereal diseases can be distributed quickly if incorrect or negligent handling of AI. When selecting a bull to be used for mating in a breeding program a breeder should rate a bull on the basis of milk production of the dam of the bull and its pedigree. The only accurate method of identifying superior bulls is by progeny testing. When purchasing a dairy bull the rating of its progeny is evaluated based on milk yield, butterfat and proteins for 305 days lactation period.

The production record for daughters of the bull being used is compared with production record of daughters of other bulls within the same herd and within the same year. The bull pedigree should also be considered

when selecting a bull. The bulls' parentage like dam should be known to calf down with ease and to be resistant to diseases such as mastitis. Only proven bulls should be used by a dairy farmer. Bulls should be handled with care from birth to maturity. A bull should be dehorned because they can be dangerous. The bull should be exercised regularly to keep it in shape. A young bull can only be used to serve from 18 months old.

Mating should be increased gradually to three times a week because more than this can exhaust and shorten the reproductive life of a bull. A bull should be kept in its own paddock and taken to female cows for mating only for a designed period of time. If bulls are allowed to roam with female cows those on heat are served without the farmer's knowledge. That aside, record keeping becomes virtually impossible.

Inbreeding is bound to take place if proper management is not done. The bull is likely to serve young heifers that are not fully developed. The disadvantage of using bulls is that sterility can go undetected.

The bull could service cows yet no calf crop at the end of the year. If the bull was not selected properly the progeny would be of poor quality. To avoid inbreeding bulls have to be changed every two years and this can be very expensive.

Heavy bulls should not be allowed to service young heifers to avoid injury. Bull infected with the reproductive diseases can spread the diseases quickly. Bulls are still used by majority of dairy farmers in Kenya because the bull will never miss a cow on heat. Dairy farmers should use AI as it is advantageous and cheaper so long as the farmer can master the technique, detect cattle in time, keep proper records and manage his herd well.

In Kenya the policy of Central Artificial Insemination station (CAIS) is to use cows bred from imported semen as bull mothers and take advantage from the genetic potential of imported semen for the selection of bulls for its own semen production. The Government still maintains a few AI schemes in parts of the Rift Valley, Nyanza and Western regions.



Dairy Cows Grazing In An Open Field

Dairy Farmers Face Challenges In Milk Sector



A Milk Cooler Assists Farmers To Preserve Milk Before Processing

G Gone are the days when dairy farming in Kenya was considered white gold. While dairy farming is a lucrative venture in many places all over the world, the situation in Kenya has been different. The sector has been clouded by many challenges, despite the growing demand for milk and milk products in many Kenyan households. So, if you are thinking of venturing into this line of business, here are some of the challenges you are likely to face:

Increased controversy concerning the role of government and milk boards

There has been increasing controversy and mystery pertaining to the role of the government and relevant milk boards, especially pertaining regulation of the milk industry in the country. This has been

amplified by regulations which tighten the dairy sector. New proposal, Moreover, the glaring lack of government support in boosting the dairy industry in the country has raised a lot of questions on the role of government in the dairy industry. While the government is mandated to create favourable business and market conditions for success of the dairy industry in the country, the trend is opposite.

Poor Infrastructure for transportation and delivery of milk

That dairy farmers continue facing challenges of transporting milk products to the necessary processing and cooling plants on time, leading to incredible losses. Moreover, in the wake of the recent heavy rains throughout the country, transportation has

become more difficult, due to poor road conditions. Many dairy farmers still struggle to deliver their products to milk processors and cooling plants in time, leading to wastage and this becomes demotivating for many farmers. Moreover, there are limited milk cooling facilities within the country which have made it difficult for farmers, especially those in rural areas, to deliver their products to the market. Farmers in remote areas have had it even more difficult, more so as some roads still lack access to feeder roads which makes them even more impassable.

Costly feeds and supplements for dairy cows

In addition to naturally growing grass, many dairy farmers (especially commercial ones), soon realize the need of store

bought feeds and supplements for their cows, to enhance milk production and profitability. However, many of these feeds and supplements are very expensive. Moreover, citing the challenges of delayed and under payment of farmers, many of them are forced to use their own finances to purchase the necessary supplements. In addition, due to unpredictable weather patterns in many parts of the country, has made relying on fodder alone quite expensive, thus the need for store bought feeds. In this regard, many farmers are forced to purchase poor quality feeds largely available in the market, which creates more cycles of disease due to poor nutrition and malnutrition deficiencies which lead to poor milk production.

Supplements are a necessity, as without them, the milk production is reduced significantly. For optimum milk production, a dairy cow needs a variety of nutrients and supplements in addition to the regular fodder. Farmers who lack the money to purchase the right feeds end up with low returns which is very discouraging.

Poor storage facilities for dairy products

Many farmers collectively agree that lack of proper storage facilities is one of the biggest challenges facing many milk farmers in the country. For instance, in the year 2010, thousands of litres of milk were poured on the ground due to lack of proper storage facilities.

With many more such instances, a lot of milk production has gone



Poor Road Network Hamper Milk Delivery

to waste over time, leading to huge losses. Limited cooling plants, for instance, as an issue highlighted above, has also contributed to the problem, leading to many farmers lacking proper facilities for storing their milk products.

Lack of proper farmer education

Many dairy farmers in Kenya are still clueless on best farming practices for optimum returns and milk production. In addition, many dairy farmers still operate small enterprises and do not have the proper management skills for turning their businesses into successful and profitable ventures.

Many farmers also lack knowledge on soliciting for markets for their products, and negotiating for the best offering for their products. This has left many dairy farmers at the mercy of unscrupulous dealers and middle men who have continuously taken advantage of poor and naïve farmers.

What needs to be done?

Comprehensive farmer education, more so targeting remote and uneducated farmers, needs to be done to enlighten farmers on best farming practices.

The government should step in to create subsidies for supplements and feeds, as this would boost higher purchase of the same. It should also focus on creating the right infrastructure, such as good roads for instance, to enable faster transportation and delivery of milk products.

Farmers too, should show initiative, by working together to solicit and negotiate for the best price offerings for their products. By doing this, farmers will have better dairy farming businesses, which will translate into higher outputs and profitability.

Dairy Cows Need Balanced Diet High Milk Yields



Fodder Ready To Be Fed To Dairy Cows Which Contains Nutrients For High Milk Yield

Essentially, dairy cows need well-balanced diets in order to produce quality and quantity milk and also, maintain good health. In absence of this, no dairy cow can remain productive, producing higher quantities and quality of milk, without proper feeding management.

As you work to enhance profitability of your dairy farm, you should focus on fodder quality for better performance. Forage is a component in feeds of dairy cattle as it contains nutrients for greater absorption. As various studies show, quality and storage form of fodder can greatly affect milk production in cattle. As you determine the best types of feeds for your cow, it is important to identify some few good facts about milk: Firstly, it is important to note that milk consist of water, protein, lactose and fat. For a well

fed and managed cow, particularly for good breeds such as Friesian cow, can produce milk of 4% corrected milk on a daily basis. As a farmer, it is important to know that during a cow's lactation period, this is the time for the peak milk production. It is during this period that you can obtain very quantity of milk from your cow.

Proper Feeding for your Cow

For a dairy cow, one of the two most essential components of milk production is protein and energy needs, not to forget mineral and water components. A cow's energy is primarily derived from cellulose, which is available from roughages like hay, as well as other types of fodder. In addition, you can supplement your cows' energy needs by giving them other feeds such as cereal grains like oats, barley, maize as well as a wider variety of store-bought feeds.

Locally available grasses are also good sources of energy and protein needs for your cow, in spite of having lower protein and energy content. Typically, your cow would have to consume significant amounts of grass to avail the same energy and protein that other feeds provide. In addition, you can also derive energy and protein for your cow from legumes, such as the most popularly known Lucerne as well as Desmodium. For instance, as many experts recommend, feeding your 100 kg cow with 4 kg of Lucerne hay on a daily basis will provide the right energy and protein needs for your cow. In addition, you may also purchase supplements from stores to avail the required protein requirements for your cow.

Protein Feeds

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least 17 percent of protein for their daily feed. It is important to note that there are two types of protein; dietary protein as well as bacterial protein. The latter is derived from the cow's rumen, where it manufactures the protein (often in amino acid form) by combining carbohydrates with ammonia.

On the other hand, dietary protein, available from most store-bought feeds, is directly digested in the cow's small intestine, where it is also used to make milk protein. In so doing, by increasing microbial protein in your feed, you can stimulate quality and quantity milk production from your cow.

Fibre Needs for your Cow

Even as you deliberate on the right feeds for your cow, always incorporate fibre as an essential to the diet. One of the ways that you can simply do this is by feeding your cow some yeast, which can increase fibre digestion in your cow. In the same vein, yeast optimizes the pH of the cow's rumen, thus raising the bacteria needed to digest fibre, resulting in greater milk production.

Energy Needs for your dairy Cow

Feeding your cow some grains or fat will increase energy intake and absorption by your cow. In cows, just like any other species, when the amount of glucose in the blood is too low, the cow converts the amino acids to make glucose, which will subsequently decrease the amount of amino acids in the blood

required to make protein.

Therefore, having high glucose levels in the blood is needed to stimulate higher outputs of higher quality and quantity milk. In addition, feeding fat also improves the fertility of your cow.

Forage Quality for Cows

Many animal experts recommend that you should have at least a quarter of your cow's diet consisting of dry diet feeds, mainly in the form of forage and forage substitutes. There are different types of feeds, all which have different characteristics affecting outcomes of the animals' nutrition processes.

As a farmer who is planning to

improve the quality and quantity of your cow's feed, you should acquire more knowledge on the best types of feed for your cow, determining the right rations of cow feed, as well as the best methods of meeting the right type of nutrients and minerals needed by your cow for adequate milk production.

Forage quality is simply a cow's ability to digest as well as use nutrients from the source of forage. Indeed, the greater the content and components in the forage source, the greater the quality of forage. Young herbs form the highest quality and most digestible forage for your cows, as they contain the least amounts of structural carbohydrates. As a farmer, adopting sound management and feeding practices for your cow, while combining forage, as well as ensuring your animal feed has optimal energy, protein and fibre needs will not only improve your farm operations, it will also ensure higher quality and quantity milk production.

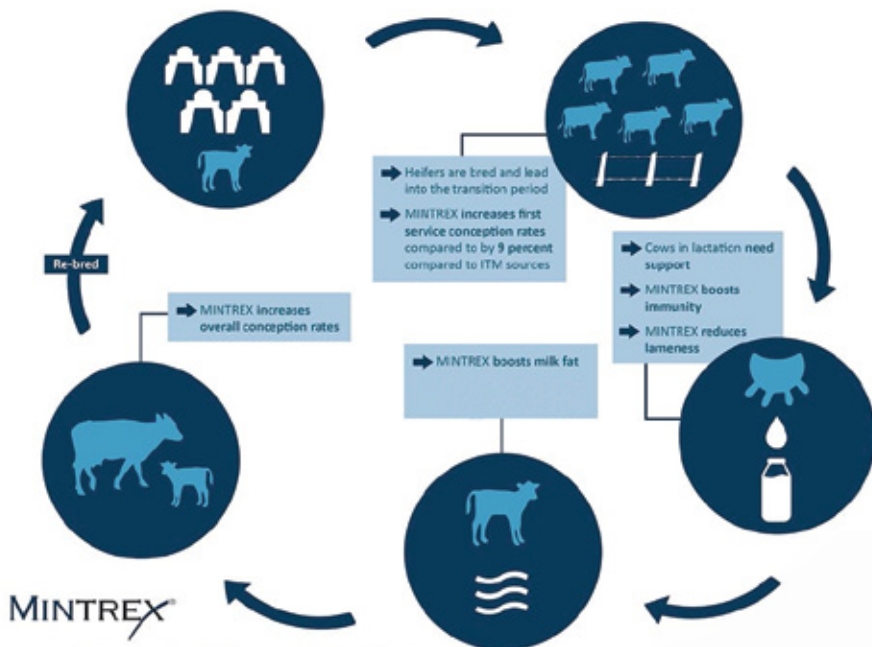


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"We need to understand whether the fertilizer has all key nutrients crucial for a plant growth and at what percentage. We test for nutrients like Nitrogen, Phosphorous, Pottasium and carbon matter. It is very important that we get all these right," said Kariuki.

Such meticulous attention to detail is now opening up new markets for the organic fertilizer market with farmers from as far as Kagio, Embu and Nyahururu expressing insatiable appetite for the fertilizer.

Already Essentia Kanan has developed and produced the organic fertilizer in large scale for Ngare Narok Meat Industries, a company in Rumuruti involved in livestock. It's from their abbatoirs that the organic fertilizer came from.

For the small holder farmers the company packages fertilizers in 50kg bags and 10kg bags. The customer base spans from greenhouse farmers into plantations like bananas and smallholder farmers. Certain farmers come with their own specification which the company responds to.

Say a farmer wants a fertilizer that is highly concentrated in

nitrogen "We assist them through fortification and other processes because we understand farmers' needs are different, Kariuki said. So why buy the packaged fertilizer while one could get it ready from their livestock.

According to Kariuki, this is where farmers go wrong. Any manure takes time to compost. So once it is placed on soils, the nutrients don't automatically get absorbed by the plants as the compounds first get broken down. It takes months and by the time the nutrients are being released they are of little or no use to the crop.

"Again with our composting and laboratory analysis, it means we understand what nutrients are lacking in that particular matter and we can fortify it to boost nutrient levels. With our composting it also means we ensure all harmful elements have been completely removed," he said.

Kariuki, whose background is Chemical Engineering and processing and additional experience in environmental management and legislation said poor farm management is costing farmers a fortune. With his fellow director John Kamau who has a wealth of experience in organic farming, the company has now

gone beyond selling the fertilizers to offering farm management consultancy and at times training farmers.

"It is very heartbreaking when you see farmers investing so much but a small mistake costing them their entire yields. This farm management information gap is what we are trying to close, because once the farmers get it right then everything else falls in place," Kariuki added.

Research has shown that years of farming with minimum replacement of nutrients in soil has led to what is christened tired soils which have had a toll on yields. This is further exacerbated by over use of chemical fertilizers and conventional pest control arsenals which leave heavy metals on soil.

According to Food and Agriculture Organization, over cultivation and nutrient mining has degraded farms' peak soil which is putting pressure on food production. Alliance for Agrarian Revolution in Africa (AGRA) posits that poor soils caused a 40 per cent dip in crop yields in 2013 in a sorry state of affairs being felt across Sub Saharan Africa with the depleted soils costing the region farmers over \$4billion yearly in lost productivity.

For example, according to AGRA, while farmers in most parts of the globe on average get five tonnes of yield from a produce like maize per hectare, farmers in Africa gets one tone. AGRA vouches for simple farming techniques like mixing organic matters like crop residue and manure among others to correct the situation.

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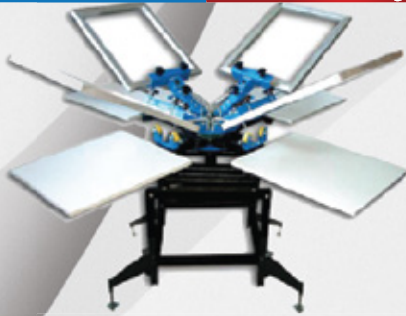
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- ✓ **Website Design**
- ✓ **Print and cut**
- ✓ **Digital Marketing**
- ✓ **Promotion Stand**
- ✓ **Vehicle Branding**
- ✓ **Stationary Branding**
- ✓ **Corporate Branding**
- ✓ **Garment Branding**
- ✓ **Promotion items Branding**
- ✓ **Product labeling**
- ✓ **Signages and Billboards**

& all your printing needs



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