

The Organic Farmer

The magazine for sustainable agriculture in Kenya



Nr. 45 February 2009



A farmer feeding a polythene digester with mixture of manure and water (slurry). Our photo does not show the roof that protects the digester from sunlight. (Photo TOF)

Biogas, an alternative to firewood

Biogas is clean and relatively simple to generate, but it is an under-exploited source of energy.

The Organic Farmer

70 percent of Kenya's total energy demand is met by wood fuel and charcoal. The pressure on our forests for firewood and charcoal has speeded up severe deforestation. This will lead to the destruction of so many water catchment areas and in the long term, cause the drying-out of agricultural

land, which would further diminish the country's already limited agricultural potential.

Cost effective-technology

One possible alternative to firewood especially for farmers is the installation of a biogas unit using the tubular Polythene (plastic) Biogas Digester. It is an efficient and a cost-effective technology.

The costs for a biogas digester made from polythene tube vary, but for a 2-cow unit, one can spend between Ksh 5,000 and Ksh 8,000. It lasts for about four to five years, if well maintained. Findings at KARI-Embu have shown that the Polythene Biogas Digester fed with dung from two dairy cows can supply 30 to 50% of the total energy needs of a typical rural household of about 5 to 8 people, with up to 60% saving on wood fuel, which is a substantial saving on costs. *Pages 4 & 5*

You can save on fertilizers

The declining soil fertility, changing weather patterns and soaring prices of agricultural inputs such as fertilizers pose a serious problem to resource-poor small-scale farmers. In several issues, *The Organic Farmer* has published tips on how to build soil fertility through the use of well-prepared compost, crop rotation and planting of nitrogen fixing legumes. *Page 3*

Dear farmers,

A big hurdle facing small-scale farmers in Kenya is lack of small-scale technology that would make their work easier. Simple machines could help them save on time that in turn could be invested in efforts for adding value to farm produce. A motorised machine for example would be an ideal tool for chopping the hard maize stalks or Napier grass to make feed for livestock!

Of course, we know about the plight of low income small-holders; when they make some money, a lot of it is spent on other pressing needs such as paying school fees, medical bills, and other incidental expenses. Consequently there is not much remaining that can be ploughed back into the farm after the payment of these bills.

Apart from the high costs of transport to remote areas, small-scale farmers in rural Kenya have to cope with many other problems:

- **Lack of power:** Rural electrification programme is crawling at a snail's pace. This is unfortunate, since most of the small machines that use electrical power are cheaper than those that run on fuel.
- **Lack of appropriate technology:** Compared to the technology used on big farms, development of small-scale technology is slow. Good looking designs is one short-fall, its applicability another.
- **Lack of information:** Extension officers know little about small-scale technology.
- **Lack of interest in new technology:** Very few farmers are unwilling to try out something new.

However, we know that small-scale farming is a challenging business. Farmers can hardly risk losses. But if they evaluated carefully and took appropriate measures, they could, in the long term, win. Let's take the example of biogas; it could replace firewood as the only source of fuel in rural households. In this issue, we feature a simple biogas unit which costs around Ksh 5,000 and which has been used by farmers for many years in many developing countries.

There is quite a number of cheap small-scale technology equipment which farmers (or farmers' groups) could use to make work easier, to save time and money, or to expand in value addition of their products. The biogas unit we are writing about in this magazine is only one of them, others are oil presses or solar dryers. Small-scale farming is a business, and farmers should use every chance to boost their income.

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“For me, going organic was the best decision”

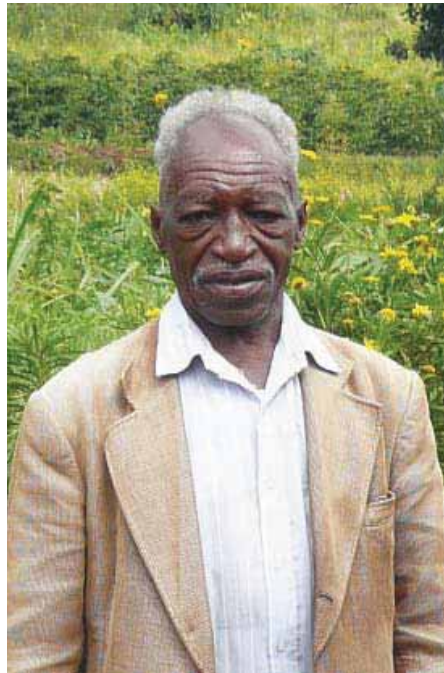
To change from conventional to organic farming is a challenge. Amos Guandaru Ng'ang'a has managed it.

Anina Bondeni

It is a great challenge to try new production methods, especially in agriculture, where farmers are always concerned about losing their precious crops if they changed. Nevertheless, it is also worthwhile to try, since the benefits can be immense, sometimes improving soil fertility as well as your harvest - and maybe even income. Amos Guandaru Ng'ang'a is a great example of a man who took this challenge and benefitted a lot from it.

Farming with TOF in the pocket

Amos is a full-time small-scale farmer from Subukia valley. For the past sixty years he was used to farming the conventional way - with chemical fertilizers and pesticides. Then, four years ago and at the age of 66, a friend gave him an issue of *The Organic Farmer* magazine. After reading it carefully, he immediately decided to change to organic farming as he realized that it would be much healthier for him and his family. Moreover, he understood that he would save a lot of money if he used compost instead of chemical fertilizers.



Amos Guandaru Nganga changed to organic after reading *The Organic Farmer*

In one week, he had already put together enough material to make his first heap of compost, following every step as outlined in a TOF article “How to make compost”. Amos says: “I kept the article in my pocket while working on the compost heap!” When we visited Ng'ang'a and the members of his farmers' group some weeks ago, he showed us, with pride, his well-maintained compost. He had covered it carefully with a plastic sheeting to prevent sun-drying and keep it moist. He has also adopted several methods and tips he acquired from reading articles in TOF magazine. He is practising the push-pull method which is aimed at controlling stem-borer in his maize crop and providing fodder for his cows apart from fixing nitrogen in the soil. He is also rearing rabbits (see TOF No. 42 of November 2008 and No. 26 of July 2007) to provide his family with good and healthy meat.

“However, the change from conventional to organic farming comes with an increase in labour input”, Amos says. “But it was the right decision. I noticed an immense increase in harvest, in addition, I save money by using compost instead of the expensive chemical fertilizers”, he says.

Marketing problems

The only disadvantage is that Amos Ng'ang'a has to sell his products to the local buyers for the same price as conventionally-grown fruits and vegetables. “Mine are more nutritious, tasty and healthy”, he says. “I should be selling them at a higher price. But

people in the villages do not care about the nutritional value of their food; they just want something to eat”, he adds.

In order to be able to sell his produce as organic and get a better price for it, since they are of higher value, Ng'ang'a would have to follow the documented Standards of Organic Production and to have his land certified as organic by a recognized certification body. For a long time all certification of produce was carried out by international certifiers only. But in July 2005, a certification company for the local market was established to provide certification to local farmers at an affordable cost. This certifying body is called “EnCert”.

International statistics show that consumption of organic produce is increasing due to better consumer awareness. Organic certification could be a good investment. Both local and export markets of Kenyan organic products are yet to be tapped.

For many organic small-scale farmers however, certification is still too expensive. But costs can be greatly reduced if farmers came together and paid for certification as a group. Working in a group has other advantages: Since most of the buyers of organic food live in urban areas, the members of a group could save on transport costs (see our article about successful avocado-growers in Subukia valley in the March-2009 issue of TOF).

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TOF celebrates fourth birthday

In April 2004, we launched your magazine, *The Organic Farmer*. In view of the commemoration of this event in April, we shall publish a short series on farmers' groups in Subukia valley as an example of all the farmers' groups we are dealing with. How has TOF influenced their farming methods and their social life? And what is the experience of Charles Munyari, a TOF distributor since the inception of the magazine?

In the first article on this page we shall talk about Amos Guandaru Ng'ang'a, who has changed from conventional to organic farming.

New way to reduce fertilizer costs

With a variety of organic fertilizers, farmers can replace chemical fertilizers thus improving soil quality.

Peter Kamau

Whenever we visit farmers' groups, they often ask us one question: "Do you have examples of organic fertilizers? And if yes, which one can you recommend to a farmer? From where can we get them?" Since mid-December last year we got dozens of calls and SMS from farmers, asking us the same questions. From her point of view and experience, Su Kahumbu emphasizes the sole use of compost, as she writes in the 3rd column of this page. But what can a small-scale farmer with say, 5 acres of land do when they do not have enough compost? We also have to take into consideration the fact that the majority of those who work on the farms are women who cannot afford the extra labour needed for such tasks as compost preparation.

Of course, we know that well done compost is the cheapest and best fertilizer, I fully agree with Su. TOF has always emphasised on the benefits of building soil fertility through the use of well-prepared compost and other material such as legumes. However, it takes time to attain full soil fertility with compost to a level where good crop yields can be obtained, without additional fertilizers.

We therefore have done some research on where organic farmers can buy commercial organic inputs to use on their farms. Organic fertilizers enable farmers to increase the nutrient levels in their crops while at the same time building soil fertility through use of compost. To give our readers comprehensive information, we mention here some products from a number of companies which are allowed in organic farming and also their addresses. By the way, they are even cheaper than conventional (chemical) fertilizers, as the table below shows.

Fertilizing at the right time

To understand the approach of these organic fertilizers, it is important that a farmer knows how a seed develops and what it requires at each stage of growth. Farmers assume that the



newly planted crops are able to utilise all the fertilizer that is applied at planting time. Indeed, what happens if the rains increase? Much of the fertilizer is either washed away or driven further into the ground through leaching. This happens at a time when the young maize or bean roots are not yet fully developed and not able to reach the fertilizer. The plant is starved of essential nutrients while all the fertilizer is lost. A yellow colouration on plants at this stage is a clear sign of deficiency.

To correct this situation, farmers make up for the nutrient deficiency with intensive top-dressing. But again, this may not solve the problem. When applied in dry conditions, the fertilizer granules cannot dissolve into the soil and therefore cannot be taken up by plants. In dry conditions, the soil forms a crust (hardens). This hardening makes it difficult for plant roots to reach the fertilizers.

Three stages

In the following paragraphs we provide you with an insight on the stages the plant undergoes in its growth cycle and gives you the methods of treatment required at each of the plant's

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Compost is never enough

Su Kahumbu

Understanding the life cycle of plants helps tremendously in the decisions we make when it comes to feeding them. Organic production entails feeding the soil, where a very nutritious soil will produce healthy, problem free plants. Organic production strives to create a sustainable cycle within a farm setting with little need for external inputs, but natural composting, constant mulching, abundance of biodegraders, very little soil disturbance.

Plant health affected

Conventional farming unfortunately does a lot of the opposite. Land is ploughed up disrupting the soil structures and balance, compost is substituted with artificial fertilizers, mulching is negligible. As the soil structure changes fertility drops, as does water retention capacity and microbial life densities. The soil begins to reduce in volume too as organic matter is not replaced but removed with each successive harvest. Naturally this creates a cycle that ultimately impacts on plant health, where then pests and disease take a foothold.

You can never have enough compost. Well matured compost also has a good shelf life and if kept under optimum conditions i.e well covered and in damp condition, can last from one season to the next. As organic producers, we create compost on a weekly basis, come rain or sunshine, 52 weeks of the year. If not, we stand to run out. When this happens we are stuck as compost takes a minimum of 30 days to mature. So what do we do meanwhile?

Bridge the gap

While the organic Standards strive for a closed nutrient cycle on any farming unit there are allowances for periods where some inputs are lacking (see article on this page). The purchase of organic nutrients in the form of organic fertilizers and foliar feeds is allowed, but expected to be used as a stop gap measure until systems are built up or restored on the farm. If we were to rely on commercial organic foliar feeds and use organic fertilizers, we would be doing the same thing to our soils as in conventional farming. We would not be adding the soil building materials that are the cornerstone of organic production.

A comparison of costs between conventional and organic treatment in maize:

Conventional farmers' method			Organic farmers' method		
Fertilizer	Cost per ha	Cost per acre	Fertilizer	Cost per ha	Cost per acre
150 kg DAP	12,500	4,500	Vitazyme 3lt	4,950	1,980
150 kg CAN	6,900	2,700	Twin N (1vl)	3,300	1,300
Total	18,900	7,500	Total	7,950	3,280

A simple method of producing biogas

Small-scale farmers with two cows can produce enough biogas to cook for a family of up to 8 people.

The Organic Farmer *

Biogas is a relatively cheap source of renewable energy to meet our requirements for cooking or even lighting. It is a combustible gas that is produced when organic matter such as farm yard manure is digested inside airtight containers called digesters. However, dung from cattle, sheep, goats, pigs and poultry is the most ideal since it is easily available in most rural households in the country.

The black plastic tube

There are many ways of producing biogas. A relatively easy and cost effective biogas unit is a Polythene Biogas Digester. This is a black (or white), 10 m long polythene tube (1000 mm gauge) like the one now being used by farmers to store silage. This is why this type of biogas unit is also called tubular digester. The digester is quite simple to instal because the material used is affordable and readily available in most big hardware shops. It is built within a short time. However, the design of the tunnel and the handling of the plastic tube need extra care.

The 10 metre digester is the most ideal as it produces adequate gas that can meet up to 50% of the daily energy needs for cooking for a family of 5 to 8 people. It is particularly suitable for farmers who have a zero-grazing unit with at least two cows because the collection of cow dung is easier. The digester can be directly connected to the animal shed in order to collect adequate manure, urine and water and to reduce the handling. However, farmers with free grazing systems can also adopt the digester since the daily amount of dung required to maintain gas production is low and dung can be collected from the grazing areas.

Famous in many countries

The Polythene Biogas Digester was developed in Colombia; the technology is widely used in Vietnam and Colombia as well as in other countries of Asia and Latin America. Biogas is clean and does not produce smoke; therefore it reduces respiratory dis-

*Sources: Erastus Kiruir (KARI-Embu), William Ayako (KARI Naivasha). More information you can get from the Kenyan based company JuaNguvu Ltd. in Mombasa which is specialized in the building of biogas units and solar energy systems; the company offers training courses for building biogas units. Contacts: <http://juanguvu.com>, e-mail: info@juanguvu.com

"I no longer buy firewood"

An ideal biogas digester should be put up next to the zero grazing shed and in close proximity to the house and kitchen to facilitate easy flow of gas. This well done digester should also be covered against sunlight. (Photo TOF)



David Muriithi is a small-scale farmer with 1 ¼ acres of land in Kagumo village in the outskirts of Kagumo town. Due to the high population, the area suffers an acute shortage of firewood. For many years, Muriithi was forced to buy firewood for his family at the local market, where 1 cubic metre cost him between Ksh 800-1200 depending on availability.

In the year 2005, Muriithi attended a farmers' field day near Kagumo town where officials from KARI showed farmers how to produce biogas for cooking using a plastic digester. Seeing how simple it was to produce biogas, he immediately bought the necessary components and with assistance from KARI, he set up his own digester next to his zero-grazing shed with

eases experienced in households which use firewood or charcoal.

After a false start in promoting this energy source in Kenya in the mid-1990s, it was successfully re-introduced

two cows. Within a short time he was already producing his own biogas which met all his family's cooking needs. The by-product is very high quality manure which he applies on crops on his farm that include tea, maize, potatoes, beans and peas.

Farmers learnt from Muriithi

"Except for some little charcoal to warm the house I no longer buy firewood because my wife now uses biogas to cook all the meals for my family of four. I save a lot of money that I would have used to buy firewood. Besides biogas is safe and clean as it does not produce smoke and we now live healthier", he says. Many other farmers in the area have learnt from Muriithi and have already set-up their own biogas units.

by KARI-Embu in 2005. According to Erastus Kiruiro from KARI-Embu there are around 300 tubular digesters in use, mostly in Central Kenya but also around Nairobi.

"Biogas is a low-cost energy source"

TOF asked Erastus Kiruiro *a few questions regarding the biogas unit:

What are the reasons for increased adoption of this biogas technology by farmers?

We use a better approach: The farmer-based technology transfer that incorporates a component of capacity building and scaling-up based on farmer-to-farmer networks.

Do the farmers share their knowledge?

Yes, they do. This is possible because of the low technical requirements on the installation and management.

Are many small-scale farmers apprehensive of the costs?

The costs are relatively low. Farmers pay about Ksh 5,000 for a Polythene Biogas Digester, but they can save

money for firewood, charcoal and kerosene. In a nutshell, it is a low-cost domestic energy-source.

We understand that one of the disadvantages of this biogas models is the short lifespan of the digester tube. Is this true?

This is no doubt a critical point. We have seen that the digester material (the plastic tube) has a lifespan up to four, even five years. But this needs a good management. When farmers discover the benefits, they really do everything to protect their biogas units.

*Erastus Kiruiro works at KARI-Embu and is co-author of the KARI-brochure "Biogas production". KARI Technical Note Series No. 24, January 2003

Erastus Kiruiro contact: 0722 30 38 81

Any farmer can afford a biogas unit

Making a plastic digester is easy. But any farmer intending to set up a unit should seek advice from technical personnel. They should explain to them the minor details to ensure the system works efficiently. The plastic digester should be handled with care.

The Organic Farmer

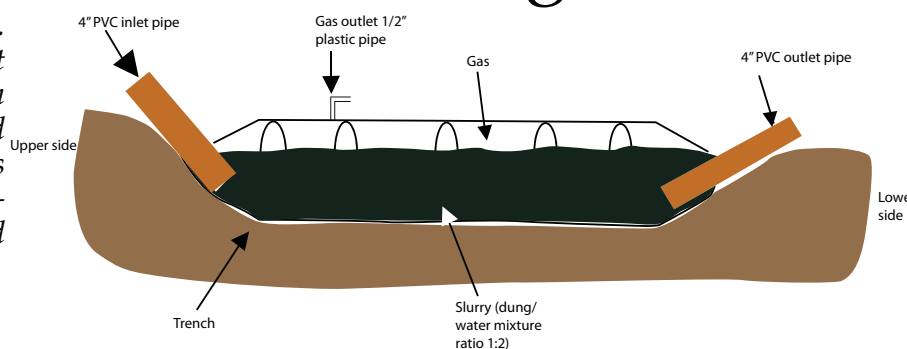
1. Prepare a horizontal trench on the ground in a good part of the farm preferably near the zero-grazing unit. The trench will enable the polythene tube to hold the digester in place. The trench should be trough-shaped with a top width of 65 cm, a bottom width of 50 cm, a depth of 65 cm. The length of the digester is variable depending on the number of animals but a digester measuring 8 to 10 m long is recommended for a 2-cow or 8-pig unit. The trench should have firm sides to avoid soil from collapsing, and a gentle slope on the floor (about 5 percent) to ensure outflow of exhausted slurry.



2. The two sides of the digester are fitted with the 4" PVC pipes measuring about 1 m to serve as inlet and outlet for the slurry. The PVC should be tied to the digester using rubber straps made from old vehicle tubes. Biogas cannot escape through these pipes since the pipes remain immersed in the dung inside the digester.



3. A small hole (about one centimetre in diameter) is punctured through the wall of the digester about 1 metre from the inlet end. A small piece (about 30-cm long) of the normal PVC water pipe (1.2



cm or 1/2" diameter) is then inserted into the digester and an air-tight joint made using rubber straps. (You can cut this small piece from the PVC pipes which will eventually be used to deliver the gas from the digester tube to the jiko (kitchen).

4. The digester is then laid horizontally into the trench with the inlet, outlet and gas tube facing upwards.

5. The cow dung accumulated over time is mixed with water at a ratio of 1:2 and the mixture poured into the digester through the inlet pipe until the digester is about three quarters full; this usually occurs when the mixture starts flowing from the outlet pipe.

6. The external end of the 30 cm-long pipe is then fitted to other PVC water pipes using elbow joints. These pipes will eventually deliver gas from the digester to the kitchen.



7. It takes two or three days for the dung in the digester to start producing gas. Once the digester starts swelling, this is an indication that it is producing biogas. To ensure continuous gas production, the system should be fed with about 1 to 2 buckets (the normal 20-lit capacity) with the same mixture of cow dung and water (ratio of 1: 2) daily.



8. The digester should be covered with light materials such as grass straw and maize stalks to protect it from direct sun rays (ultra-violet radiation). A fence of fine wire-mesh or closely spaced wooden slats should be used to protect the digester from damage by children, pets and livestock. The plastic digester should be handled with care.

Photos courtesy of JuaNguvu of their demonstration plot in Mombasa. JuaNguvu PO Box 1779 - 80100 GPO Mombasa Tel: 0722 87 37 38 email: info@juanguvu.com

Important tips for biogas users

Careful handling: The plastic digester should be handled with care. It should be covered and protected. The inlet and outlet should be airtight as well as the gas outlet.

Regular feeding: A 5 m3 digester requires 19 kg of cow dung and 47-57 litres of water to produce enough gas for a day. Under-feeding reduces the amount of gas produced. If a green-looking slurry comes out of the digester, this is an indication that it is overloaded.

Cow dung: Cow dung is the ideal substrate for bio-digesters because it is not acidic. If livestock wastes and garbage have to be used, cow dung should be used as a starter substrate.

Effluent recycling: Recycling some of the digested slurry improves the performance of the bio-digester. This is important when the digester is still new because the used slurry contains

Continued on page 6

Budget for a biogas unit

10 m polythene tube (1000-mm gauge), black or white, 90 - 120 cm diameter, @ Ksh 250 per meter	2,500
* Two 4" diameter PVC pipes, 1 m long (like the ones used for pit latrine ventilation but preferably of a stronger gauge)	750
3 PVC water pipes (1/2" diameter) for the delivery of gas (from digester to kitchen) @ Ksh 250 per piece	750
5 PVC elbows @ Ksh 25	125
Rubber straps for tying the 4" PVC pipes and the 1/2 inch gas pipe into the digester @ Ksh 20	100
A burner or jiko (made by jua kali artisan) incl. valve	1,000
**Total costs (without labour)	5,225

* You can hardly get 1m-pieces of a 4" PVC inlet and outlet pipe; a full pipe costs between Ksh 600 - 1,200, depending on the quality. If three farmers come together, they can buy 1 pipe normally 6 m long (20 feet) and share the piece including transport costs.

** If the digester is protected with wire mesh then an additional Ksh 1,500 is required

Material (in Ksh; prices from Embu)



>>> from page 5: Biogas



more of the biogas producing bacteria.

Gas pressure: The amount of gas produced depends on the size of the biogas digester, its feeding regime, type of substrate and environmental conditions such as aerial temperature (the warmer, the better). The mean volume of a 2-cow biogas digester is about 5 m³. This will produce enough gas to cook for about 3 hours. Within this period, gas pressure drops and there is need to place an object weighing about 3-5 kg at the top the digester to increase the pressure and therefore flow of gas to the kitchen.

Temperature: Maximum gas production will occur at 35-40°C. Gas production declines as temperature drops and will cease at 10°C. ■

Worldwide use of biogas

Biogas is a well-established fuel for cooking and lighting in a number of countries. China has over 7.5 million household biogas digesters, 750 large- and medium-scale industrial biogas plants, and a network of rural 'biogas service centres' to provide the infrastructure necessary to support dissemination, financing and maintenance. India has also had a large programme, with about three million household-scale systems installed. Other countries in the South with active programmes include Nepal, Sri Lanka and several countries in Latin America.

Industrialised countries commonly use biogas digesters where animal dung, and increasingly fuel crops, are used as feedstock for large-scale biogas digesters. Brazil and the Philippines lead the world in crop-based digesters using sugar-cane residues as feedstock.

Interest and public support in biogas has been growing in most of the European countries. After a period of stagnation, caused by technical and economical difficulties, the environmental benefits and increasing price of fossil fuel have improved the competitiveness of biogas as an energy fuel. This has been seen in both small and large scale plants in Denmark, Germany and Switzerland, and as a transport fuel in Sweden. There have been interesting biogas projects in the UK, Ireland, and the Netherlands. ■

Sadness of a 'Happy New Year'

"Happy New Year!" I could not help feel the irony of this statement as friends kept on greeting me and SMS landed on my innocent mobile phone on New Year's Day.

Hey farmers! The year is indeed 'New' but is there anything jovial to make it 'happy'? Indeed as the year 2009 kicks off, over ten million Kenyans are oscillating between hunger and poverty amidst a background of political trickery and dishonesty.

Unfortunately, as I helplessly watch my once healthy maize crop of maize wither and eventually dry up, my small transistor radio emphasises to me that the food shortage that I am facing as a low income earner is indeed not really natural but man-made. Further still, as I watch my once upon a time well-fed and productive cows perish with hunger and dehydration due to lack of food and water respectively, my 14 inch television screen flashes with political statements, reactions and denials that our politicians have not actually been involved in any 'food laundering' cartels.

Amidst this political drama on food is a declaration that famine has been declared a national disaster. Unfortunately, the only disaster in the declaration of famine as a disaster could be that the allocations of relief food might go the same way the cheap maize flour for the poor went; never to reach the tables of the village and slum folks.

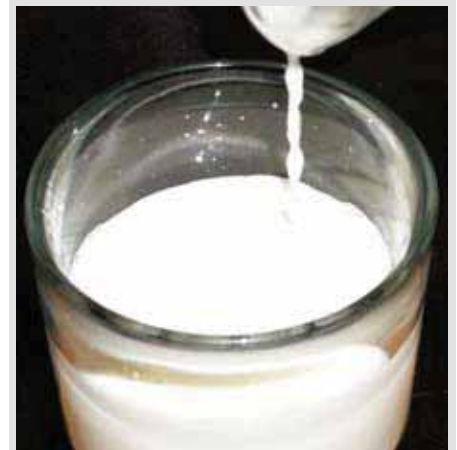
To me, it is surprising that an agricultural country like Kenya can declare famine within a few months of drought. This clearly shows poor planning on food security in the country. The government is not solely responsible for this mess.

As a farmer, I have recently learnt



Name firms with poor quality milk

In our January 2009 issue, we carried out a research on milk quality where we sampled milk from a number of local milk processing companies. As we did when we carried out a similar research on feed quality in April last year, we did not give out the names of companies that had poor quality or adulterated milk. The reason for this



is to avoid legal suits where the companies may sue us claiming they have made losses due to our article and then seek compensation for damages. A number of readers and milk consumers have called us requesting that we name the companies selling poor quality milk. We would like to inform our readers that doing so would invite a lot of court cases. The main purpose of this research was to highlight the extent of the problem and perhaps persuade government agencies charged with the responsibility of setting quality standards. They should ensure that consumers are protected from companies whose main objective is to make profits at the expense of consumers. (TOF)

that had I embraced organic farming earlier enough, then the quality of my sandy soil would be better if not best leading to a healthy crop that perhaps would have withstood drought up to the showers that we received in mid January. This way, I would actually have harvested some crop. It is only last harvesting season that I had a bumper harvest but I sold almost everything sooner than I had harvested it. Had I not sold my grain I would not be starving.

Dear colleagues, some of these food problems are of our own making, aren't they?

Paul Kariuki, Limuru

Rearing chickens can be profitable, if...

With proper planning and careful investment, farmers can make good money from chicken rearing.

Su Kahumbu

I was once told that rearing less than 3,000 hens at a go was merely a hobby -an expensive hobby where the chickens would eat me out of house and home. Commercial chicken rearing is an investment of both time and money and therefore before you begin production you must be very clear as to whether you want to produce on a home-based scale, or a commercial scale.

You must also be clear on whether you would prefer to produce layers for eggs, or broilers for meat. Either way, you must do the right calculations in advance, which involves working out your costs to find out whether your business will be viable.

Example with 100 chickens

For 100 broilers the math will be as follows:

Input Costs

	No.	@	Total
Chicks*	100	72	7,200
Starter Mash**	2	2,520	5,040
Finisher Mash**	4	2,390	9,560
Electricity	1	1,500	1,500
Water	1	1,000	1,000
Labour	1	6,000	6,000
Medication	1		1,500
Total 1			31,800
Misc @ 10%			3,180
Total 2			34,980

*from Kenchic

** from Unga Feeds

The figures for power, water and labour have been approximated and will differ with regions. Feed is available in 70kg bags, therefore you will need approximately 6 bags of feed in total

Outputs and benefits

- Expected rate of mortality is 5%. Therefore one can expect 95 birds to survive to slaughter age and to reach an average dressed weight after slaughter of 1.3kg

- Cost per chicken would therefore be the input cost divided by the number of chickens. Thus $\text{Ksh } 34,980 \div 95 = \text{Ksh } 368$ plus $\text{Ksh } 20$ for slaughter. Thus cost per chicken: $\text{Ksh } 388$

- Cost per kg would therefore be cost per chicken divided by weight of chicken which should be about 1.3kg. Thus $\text{Ksh } 388 \div 1.3 = \text{Ksh } 298.5$.



Indegineous chickens are easier to keep, less affected by diseases and tasty.

- Now here follows the interesting part. You have your cost per kg. How do you decide your selling price? For starters, it would be advisable to find out what the market price for chicken is in the market that you want to sell.

- Subtract your cost of production per kg from the market price and you will end up with your profit. To find out the percentage profit, divide your profit over your cost per kg.

The calculation of profit is done as follows:

-If the market price is Ksh 325 per kg, your profit will be $\text{Ksh } 325$ (market price) minus $\text{Ksh } 298.5$ (production cost) = $\text{Ksh } 26.5$ per bird, or for the whole stock of chickens: $\text{Ksh } 26.5 \times 95 = \text{Ksh } 2,517.5$

-Your profit as a percentage is: $\text{Ksh } 2,517.5 : \text{Ksh } 34,980 + 1,900$ slaughter cost = **6.8 % ONLY!!**

More chickens, more profit

This computation of profit will give you an indication of whether your money is better invested in chickens or safer in the bank.

You will realise that as you increase the number of chickens in the formulas, your cost per kg actually goes down as you use less labour and electricity per bird and thus profits go up.

At 200 birds with the same labour and little increment in power and water your profit margin is already 18%

And finally, at 3,000 birds you make an average return of 34%

Looking for market

To make a healthy return on your money it would be wise to look at 200 plus birds. Or, to receive a higher income for fewer birds, which can be achieved if you make direct sales cutting out middle men and going

directly to customers.

Sadly many people start poultry production without doing the figures and end up running into financial difficulty mid way. This leads to cut backs in care for the birds, which leads to illness in the flock, increased risk and ultimate losses.

Remember the figures we are working with are not fixed. Some feeds are cheaper too, however it is imperative that the math is done and markets confirmed before production begins.

For home consumption of hybrid broilers we run into the costs of storage. Even if one were to rear 20 birds, where would one store them when slaughtered?

Breed Kienyeji chicken

This is where on small scale, we rely on the *Kienyeji* chicken. It breeds and cares for it's young, gives us eggs as well as meat and does not leave us bankrupt. It is more resistant to disease, depends on forage for most of its food, fends off dogs and cats and finally, it tastes better!!

How to feed chickens

Chicks need to start with Starter Mash for 3 weeks during which time they will consume approximately 900grams each. Thus total of 90 kg. Therefore you will remain with 50 kg Starter from the second sack of food.

During weeks 4-6 birds are to feed on Finisher Mash and will consume approximately 2.9 kg each thus 290 kg which will mean you will be short of 10 kg from the last bag of Finisher Mash.

In this case, feed birds a little longer, a day or two of the Starter Mash so that you do not have to buy another full bag of Finisher and remain with a left over of 60kg.

tips and bits

from farmers for farmers

A common culture of cheating

Once again there is a looming famine following the failure of the long and short rains in most parts of the country last year. But reports show that there is only a short drop in maize production. It is not the rains that are to blame for the current shortage of maize. Rather it is the corrupt system within the government institutions charged with the responsibility of safeguarding the country's strategic food reserves and its distribution that are to blame. Whenever the country is faced with food shortage, unscrupulous cartels with links to senior people in the government go into operation, manipulating food distribution and sale.

Trouble started after when the government through the National Cereals and Produce Board (NCPB) allowed millers to buy maize from the board in order to stabilise prices. However, NCPB colluded with the fake millers and sold more than 80,000 bags of maize which has now found its way into the neighbouring countries where a bag is fetching Ksh 6000. One way to avoid scandals of this nature is to stop the government from dealing with food distribution in the country. Any food held in the strategic reserves should only be distributed to needy as relief food through NGOs and churches. The NCPB has now proved that it cannot help farmers in any way. Recently farmers were promised they would get fertilizers at subsidised prices.



But when they visit their depots, they are told the fertilizer is either out of stock or it is not adequate. There is no price in guessing where the fertilizer is going considering that a bag is going for Ksh 4000 in the agrovet shops.

The government should then allow free movement of maize to all parts of the country and stop exports to neighbouring countries. The measure will help stabilise prices and reduce hoarding. This has worked before and there is no reason why it cannot work now.

Fake seeds in the market

As we approach the planting season, one of the major problems that farmers face is affordability and availability of seed. Seed producers who are contracted by seed companies to produce seed collude with traders and sell commercial maize or condemned seed to farmers claiming it is genuine seed. Since this seed is cheaper than certified seed, most farmers fall prey to these tricksters and buy the fake seeds. The result is a poor harvest. Already reports from maize growing districts of Trans-Nzoia and Uasin Gishu show that a number of seed producers have been arrested for packaging commercial maize seed in genuine seed bags for sale to farmers. Some seed growers offer basic seed maize (from which hybrid maize is propagated) as genuine seed, this maize is weak and cannot produce healthy maize. Farmers should ensure they buy their maize seed from licenced seed stockists only. They can demand to see the licence before buying the seed. TOF

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growth stages.

Germination stage: Once planted in moist soil, the seed breaks its dormancy and starts germinating. During this period (normally seven days), the plant gets all its nutrients from food stored within itself. Therefore it does not require any fertilizer for growth. – After the 7 days, the plant will require extra feeding and also some protection from diseases. To provide essential nutrients farmers can top-dress the seeds with 1.5g of Eco-T (Lachlan) per kilogram of seed. They can also add a diluted solution of Vitazyme (Lachlan) at the rate of 1 litre for every 50 kg of seed. Fulvic acid is also essential for the germinating seed (Lachlan, Hygrotech). The seeds should be thoroughly mixed and dried in sunlight before

planting.

Vegetative stage: From the eighth to the tenth day, the plant develops two leaves and also the first roots also called the fibrous roots. At this stage the plant will have finished all the food reserves within itself but the two leaves help it to make its own food using the sun rays in a process called photosynthesis. The plant roots also start taking nutrients from the soil to feed the plant. Unless these nutrients are provided (for instance in a well composted soil), growth will be stunted and the plant is prone to diseases and even pests. For this stage, farmers can use Vitazyme at the rate of ½ litre per acre or TwinN at the rate of ½ vial for every one acre of maize (Lachlan) alternatively they can use or Synergizer or Phosgard (Juanco). Application of these foliar feeds should be done in moist conditions for proper absorption by the plant.

Fruiting stage: At this stage that the plant is in need of extra feeding to produce the required size of grain, weight and other desired qualities. It should therefore be fed with all their fertilizer requirements nutrients that

will help to provide the needed nutrients. When maize is about to tassel, farmers can apply Vitazyme at the rate of ½ litre per acre (Lachlan) Synergizer (Juanco).

Do a trial

Farmers can also select a small portion of their land and try the two methods of fertilizer application. After getting the results, they can go into large scale production using the best method. Read the labels on the fertilizers and foliar feeds carefully to ensure you apply them in the correct way.

To get more detailed information, farmers can contact the companies selling the organic fertilizers and foliar feeds we have mentioned here. Their addresses are given below:

Lachlan Kenya Limited, P. O. Box 49470, Nairobi, 00100, Old Airport Rd. Tel. 020 207 3912, Cell 0722 209474.

Hygrotech (EA) Ltd P.O. Box 41446, 00100 Te. 020 205391 cell.0722 390207 (EA) P.O. Box 381, 00502 Karen, Nairobi Tel. 0722 827 987.

Juanco Centre, Ngong Rd, Ngong Hills, P.O.Box 381 Karen, 00502, Tel. 254 -45-41209, 40206.