The Organic Farmer

The newspaper for sustainable agriculture in Kenya Nr. 5 August 2005

Harvest season: Happy boys carry home their bean produce. (Picture : Kamau)

The war against pest damage

Not all Kenyan farmers can take home a big harvest like the boys in the picture above. Many of them incur huge losses due to pests.

By The Organic Farmer

Every year, farmers in Kenya lose billions of shillings following the destruction of their crops by pests. Although many of them use chemical pesticides for control, they are now losing the war because most of the pests have developed resistance to the chemicals. Besides inorganic pesticides are causing great harm to human health and the environment some of which is difficult to reverse. Indeed, consumers are becoming more and more sensitive to chemicals applied during food production.

There are many methods a farmer can use to control pests without resorting to the use of synthetic pesticides. Intercropping for example is one (see page 5). Another one is Pyrethrum. In this issue (on page 8) we have featured various cost effective methods of making Pyrethrum extracts.

Preventive measures

It is a fact that many farmers already have some indigenous knowledge on how to control pests without the use of harmful pesticides. However they need to supplement these with additional information in order to promote effective pest management strategies in their farms. Know your pests and their natural enemies! The accurate identification of the species, life cycle, habitat requirements, time and location of occurrence form an important part of the knowledge of pests and natural enemies is indispensable for long-term pest management.

Crop rotation, timing of planting and harvesting periods, planting of trap crops and choice of crop varieties do play an important part in pest control.

BIOVISION

In this issue

Take farming as business

The Kenyan farmers face many problems. Of course, many difficulties they are confronted with are beyond their scope. But with commitment, encouragement and with cooperation, they could solve so many of these problems on their own. Before, many Kenyan farmers relied on the National Cereals and Produce Board and the cooperative movement to market their produce. But with the liberalisation of the agricultural sector they were caught flat-footed.

By The Organic Farmer

They now find it increasingly difficult to cope with the changing market demands. Most farmers will harvest their produce and keep it in their stores waiting for buyers. In most cases these buyers are middlemen out to make a quick profit and who often offer prices far below the prevailing market prices. Of course transport costs to markets may be high due to the bad state of the roads. But why are farmers not taking their own initiative? Why they are not coming together to share transport costs to exploit the available market opportunities?

In the last issue we heard the complaints of farmers in Nyeri who had big problems selling their cabbages. The reason why is very easy to explain: So many farmers are planting the same crops, and there are not enough customers to buy them. Who is to blame? The customers? The farmers? Our Farmers are rarely market driven. This has to change. A manufacturer of pumps for instance has to look for what the customers need, and he has to market his own products otherwise he will soon go bankrupt. There is no big difference with farmers. In order to remain competitive, what the farmers need to do is to take farming like any other business. Farmers should be able to balance between their subsistence and market needs. But most important of all, they should change their attitude and way of doing things in order to realise the full benefits of farming.

MY OPINION

By Francis Karuga

It is really heartening to see the rate at which people in the rural areas including farmers are embracing the mobile phone. Wherever you go nowadays farmers can communicate with their relatives and friends in towns and other far flung places. Indeed: The mobile phone is changing the way of life in rural Kenya.

But let us stop briefly and think a little: Why are our farmers not adopting new technologies when it comes to farming? It is really ironic that we can accept such new innovations as the mobile phone and at the same time continue using outdated farming practices that neither uplift our living standards nor improve our country's food security situation.

Francis Karuga is a farmer in Limuru.

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The Organic Farmer is an independent newspaper for the Kenyan farming community. It promotes organic farming and supports discussions on all aspects of sustainable development. *The Organic Farmer* is published monthly and distributed free to farmers.

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Comfrey is a healing plant

Comfrey is not only a health plant. It is also good for composting and for mulching in agriculture.

By Sandra Zumpano

Comfrey (botanical name: Symphytum officinale) has been used for hundreds of years in the external treatment of broken bones. We are much more interested here from the point of view of a farmer. In Kenya the plant is also well known under the name knitbone, knitback, or local: (*Mabaki*, in Kikuyu).

The plant is erect in habit and rough and hairy all over. The leafy stem, 2 to 3 feet high, is stout, angular and hollow, broadly winged at the top and covered with bristly hairs. One-sided clusters of drooping flowers, either creamy yellow or purple growing on short stalks.

Comfrey is a very hardy perennial. It grows in moist areas and has the ability to clean and extract nutrients from stagnant or foul water. It sends down long tap roots, enabling it to accumulate minerals in it's leaves. These minerals include potassium, calcium, magnesium, iron and phosphorus along with several vitamins. The leaves contain a lot of protein. When comfrey leaves are composted and returned to enrich the soil, all these elements are made available to your plants.

Comfrey grows in almost any soil or situation, but does best under the shade of trees. Propagation may be effected either by seed or by division of roots. The roots are very brittle and the least bit of root will start growing afresh. They should be planted about 2.5 feet apart each way and will need no further care except to keep them clear from weeds. Many farmers like to plant comfrey at the borders of their shamba.

Fertilizer with leaves

With its' high levels of potash, comfrey tea can be used as an excellent fertilizer for tomato, pepper, cucumber and potato plants. Pick a good sized handful of leaves. Place them in a container with enough water to cover the leaves. Cover and let this soak for 4 weeks in cool weather or 2 weeks in hot weather. The smell while it is "cooking" is strong. Then squeeze the leaves to extract as much juice as possible. Strain and use at a rate of 1/3 cup of comfrey juice to one gallon of water. Use as a foliar feed and soil drench around the plants. Put the solid wastes into the compost pile.

Fertilizer with flowers

When in full bloom, the stalks with flowers are cut, about 15-20 on each plant. They contain nitrogen and potash. That's what potatoes like very much so their furrows can be covered with this comfrey material. We can also put it between the other rows of vegetable or under tomatoes. After cutting the comfrey that way, it will look a bit worn out. But after about two weeks and the next rain it will get back the usual beauty.

Co-operatives can improve farmers' income

The running of a Sacco needs committed farmers, who can work together for their own benefit - and that of their community.

By Eric Lumosi Asiligwa

In the July-issue of *The Organic Farmer* we carried the story on the problems farmers are facing when trying to get loans. We have already mentioned the benefit of Saccos. In this edition we bring you more information on how co-operatives function. In the coming issue we will feature one model-Sacco.

Let us now look on the different types of Saccos before we come to the formation of Sacco's. There are three types of co-operative societies:

Producer
Individuals engaged in production form these co-operatives societies. It is possible for any group of businessmen engaged in production (e.g. manufacturers, any given industry, or factory owners) to form a co-operative society, In Kenya most producer co-operative societies are formed by farmers. These means that they are formed by people producing agricultural crops individually but join hands to sell their products collectively so as to get a good market price.

The farmers who engage in farming in a particular area form themselves into a co-operative society. This helps them not only get the best prices for their crops but also offer certain other services:

- They attain education on growing of a particular crop.
- The societies provide tools, fertilizers, seeds and insecticides to the members.
- The societies collect, store and sometimes process the produce before selling.
- They may to go to the extent of giving financial assistance to the members on loan or credit basis.

Some companies go through SACCOs to sell their products to the members on credit.

Members make all decisions on the running of a co-operative

Consumer
These societies are formed specifically with the aim of buying products jointly with a view to pay as low a price as possible. This trend is not common in the country because many producer co-operative societies already provide the service.

Savings & Credit
Employed persons or producer co-operative members who save a part of their monthly salary with their co-operative societies form these Saccos. Their money earns good interest and when they have saved a significant amount they are entitled to loans. The interest charged on the loan is usually very low as compared to ordinary banks or even some micro-finance organisations. Besides it has fewer formalities (see box).

Ownership
A Sacco is owned by members each of whom buys shares in the society according to ability. Membership is open and voluntary. This means that anyone can join a society as long as he or she is involved in the type of activity for which the society has been formed. No one can be forced to join a society.

Administration
The members run the affairs of the society. The members make the capital decisions that govern the society.. This is done in the Annual General Meetings (AGMs). A committee elected by members does the day-to-day running of the office. Each member has one vote, regardless of the number of shares held.

The committee officials are elected for a fixed period after which fresh elections are held. Non-performing officials may be voted out. In addition to elected officials some paid employees may also be hired to assist in the daily management of the society affairs.

Formation
Setting up this type of system is a matter of competency, commitment and motivation. But how can a structure of this type be born, grow and reach maturity? People wishing to form a co-operative society get together and apply for registration of their society with the Ministry of Co-operative Development, giving details of what the society will be doing, for example in the area of operation. The Ministry controls and supervises the growth and activities of co-operatives in the country to ensure they are well managed.

"Saccos are sensitive to farmers needs"

There are many co-operatives in Kenya. In the Central province alone there are 998 registered Co-operatives with 820,423 members. According to the Central Provincial Cooperatives Officer, Geoffrey Karuku, it makes sense for farmers to join savings and credit co-operatives, or saccos. "Saccos are sensitive to farmers needs and would not easily move in to auction property, even when one fails to repay the loan in the specified period".

The Saccos are managed by fellow farmers who understand the plight of their colleagues. "They also know each other, so they do everything possible to avoid such auctions", Karuku said.

They also offer credit at low interest and give enough time to repay. One successful Sacco that lends money to farmers is the Neccofosa, which has its headquarters in Nanyuki town in Laikipia District. Neccofosa's General Manager, Faith Muchoki, said the 7,500 members guarantee one another to get loans, which are paid at an interest rate of 5 per cent. This is extremely low compared to commercial banks, whose interest rates is as high as 20 per cent. Small loans are repaid within a few months, while bigger ones of Sh100,000 are repaid in three years. To qualify for a loan one need only register with Sh 500 *(PM)*

BIOVISION

Group changes dumpsite into garden

A slum women group in Kitale helps improve food security and living conditions in their poor community.

By Peter Kamau, Kitale

The slum women group at work with their leader Lydia Asipitar (Photos P. Kamau)

Two decades ago, famine stricken Turkana families were driven out of their home district by drought and cattle raiding. They settled around a refuse dumpsite in Kipsongo area on the outskirts of Kitale town where they scavenged for food. Soon their temporary shelters built of polythene sheeting and cardboard boxes, grew into a sprawling slum where more than 3000 people have been living in squalid conditions. Lack of basic amenities such as water and toilets has led to frequent outbreaks of cholera, typhoid and malaria, which has left many villagers dead.

Appalled by the poor living conditions in the slum, women from the community decided to form the Akiriamriam Slum Women Group two years ago. The group has now converted the refuse dump into a three-acre organic farm where they grow maize, beans and vegetables to feed their families. They have also set up a revolving fund that is helping members start income generating activities to uplift their living standards.

"When we ran short of funds last year, we decided to use stored maize as seed and planted without fertilizer. We were surprised to see the maize was healthier than that of our neighbours who had used inorganic fertilizers. We have discovered very good soil which does not require anything to grow food", says a happy Lydia Asipitar, the group secretary.

The group now has 56 members. Last year they harvested 67 bags of maize. Each member got one bag of maize while the rest was sold and the money deposited in the groups account in a local bank. Asipitar says apart from working in the farm, each of the group members has a market garden where they grow tomatoes, sukumawiki or cabbages organically.

Anna Arukudi sorts beans for sale

Fear of eviction

Although none of the women knows what organic farming is all about, growing these crops without any inputs has greatly reduced their expenses in terms of inputs.

Their efforts have impressed many visitors to the slum. Already Asipitar says the Ministry of Agriculture is considering funding them through the "Njaa Marufuku Kenya" programme to enable them buy certified seed. The VI, a Swedish agro-forestry project, has pledged to provide vegetable seeds and has already started a tree nursery on the group farm.

The only worry for the group is that the Kitale municipal council owns the land on which the slum is built, raising fears of eviction. However they are determined to change living conditions of the slums dwellers at whatever cost. "We have changed the notion that women cannot initiate development. Our involvement in this activities will help improve the quality of life in the community," says 26 -year old Asipitar who has two children.

At 5 o'clock every morning each of the women leaves the village and forms a beeline to the town. Some go to the local municipal council market where they help the traders sort maize and beans. After sorting they are allowed to take away low grade grains, which they later sell to fellow villagers at a lower price. Other women work in the local slaughterhouse and are in return given portions of meat unsuitable for sale such as calf foetuses and entrails. Many group members also undertake cleaning chores in local hotels while others sell firewood to fellow villagers and neighbours.

From their earnings in these activities, each member has to contribute between Ksh.5 and Ksh.10 daily that is later deposited in the group's account. Every month the group is able to save Ksh.4000. So far they have saved Ksh.16,000. "From this money we are able to assist members who want to set up small businesses or pay school fees or medical bills in case of sickness. It has made a big difference because it has stopped many of us from begging in town," says Asipitar.

Force for change

The women group has become a strong force for social change in the poor community. On realising that the poor sanitary conditions in the slum were responsible for the repeated epidemics that killed people every year, they started an intensive education campaign through chief's barazas, funerals and related social gatherings. The slum dwellers were taught hygienic methods of human waste disposal. The Intermediate Technology Development Group, a local non-governmental organization, last year built sanitation blocks that included toilets and communal bathrooms for use by the community.

"If you came here two years ago, you could hardly walk in the village because every path was littered with human waste but we have changed all that. At first it was difficult to convince them to use toilets but they are now using them," says Asipitar.

Intercropping has many benefits for farmers

Although farmers know that intercropping increases land productivity and overall yield many do not practise it.

By Sandra Zumpano

In July, *The Organic Farmer* informed you about crop rotation. In this edition we will inform you in detail about intercropping or multiple cropping.

Intercropping (multiple cropping) means that two or more crops are grown at the same time in the same field. This results in a bigger plant diversity which helps the small-scale farmer not to be dependent on only one crop. As with crop rotation, weeds, pests and diseases are reduced. Intercropping can also be used in succession planting. Here, early maturing crops are combined with later varieties for perpetual yield all season long.

There are different possibilities to associate crops: Some plants provide natural way of protecting crops against insect pests. Taller plants offer support to winding plants. Low-growing plants provide shade to the roots of nearby plants.

Different types of intercropping

Mixed cropping: two or more crops are sown at the same time sharing the same space without row arrangement (see pictures)

Relay cropping: is the growing of two or more crops on the same field with the planting of the second crop after the first one has completed its development.

Cropping in rows: different crops are sown at the same time, on the same field, each arranged in their own row

Combined cultivation: annual crops mixed with trees

Research by ICIPE

Maize is the dominant cereal in most of Sub-Saharan Africa and stem borers are the most prevalent maize pests. Therefore ICIPE conducted field trials. The aim was to assess the level of damage and yield reductions caused by the stem borers in monocropped maize and maize intercropped with non-host plants such as cassava, cowpea and soy bean.

Intercropping is for the benefit of the farmers *Photo TOF*

Maize monocrops had 3-9 times more stems tunnelled and 1-3 times more cob damage than intercrops. Maize yield losses due to stem borer were 2-3 times higher in monocrops than in intercrops. That means that total land productivity is increased with intercropping.

Advantages of intercropping

Because of the diversity of the crops grown, insect pests are reduced since they are usually host specific.

- More beneficial insects are attracted, especially when you include flowering crops in your intercropping system.
- Plant diseases are reduced because the distance between plants of the same family is increased since crops of other families are planted in between.
- Different plants with a variety of root systems can reduce erosion and protect the top soil better.
- Minimized cost for the control of weeds because a mixture of various crops gives often a better coverage of the soil. There is less space for the development of weeds.
- Better use of available resources (land, labor, time, water, nutrients).
- Different food crops are provided for the farm family in one cropping season.

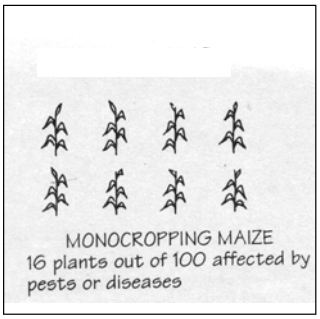
Examples for intercropping

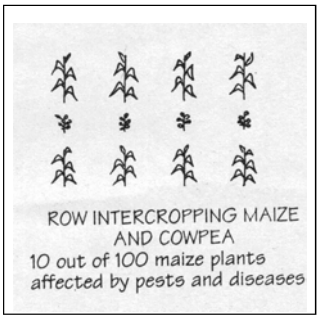
Leafy vegetables combined with root vegetables: like lettuces with carrots

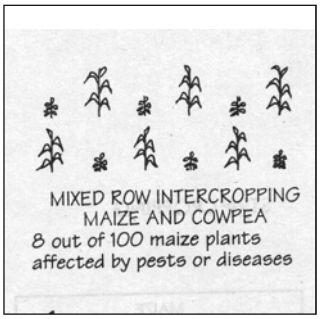
According to the plant families: legumes (for example beans, peas, groundnuts, soy beans or lentils) which are nitrogen fixers can be intercropped with cabbages, sukumawiki or spinach which are nitrogen users. Maize can be mixed with cowpea, groundnut, pumpkin, melon, cucumber, cassava or okra.

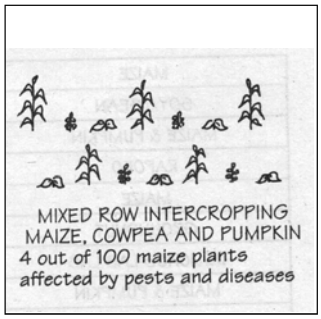
It is important for farmers to understand that plants of the same botanical family are subject to the same pests and should not be intercropped with each other and not grown close together (for example tobacco and potatoes)

References: Production without destruction, natural farming network, 1995, Zimbabwe; ICIPE Nairobi, Kenya.



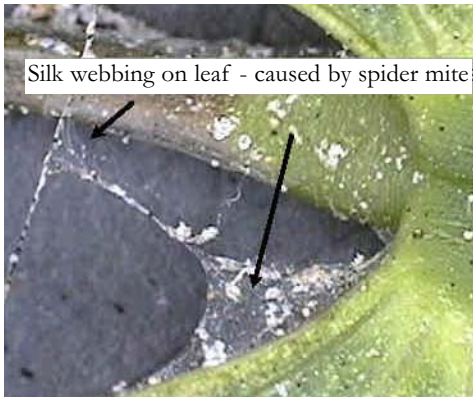






What can I do against Spidermites?

"It is very difficult to recognize the Spidermite in time", writes Isaac Maina Munyari from Subukia. "How can a farmer control this pests before it destroys the tomatoe plant"?



Silk webbing on leaf - caused by spider mite

A first step for us organic farmers in the protection of our crops from pests, is the ability to identify the pest at a very early stage (see also article on page 1). This can be done by regularly scouting our crops, and understanding the pest effect on the plants before we may even see the culprits. In the case of the Mashilingi effect, the pest in question, the spidermite at this stage, has done maximum damage. Let us work backwards from the problem.

Early inspection

Before this stage, on close inspection of the plant, one would have noticed fine silky spider webs normally where the leaf meets the stem. Infestation is already high when this is noticed. If one were to look closely at the silky strands, you would notice it is dotted with very tiny little reddish brown bug. With very bad infestation, whole plants may be covered in an orange looking web. Your plants at this stage may look very dull. Going further back, before this stage, when the infestation is much lower, on inspection of the plant leaves you would have noticed a white speckled effect on the upper side, on close inspection of the lower side, you will again see the tiny reddish brown mites but less numerous.

Dear farmers!

We are getting a lot of questions. Ronald Mokaya Nyabuya, P.O Box 995, Kitale for instance is asking for information about chicken diseases and medicine used. Or the chairman of the 3 km Self Help Group Machakos would like to have the prescription for making pesticides from chilli. We have only one problem: The Organic Farmer is a small newspaper with limited space. Su Kahumbu has already handed over the answers to us. We will publish them as well as the answers to your other questions in the next issue of *The Organic Farmer*. Thanks for your patience!

Hot spots

It is also very obvious at this stage that the mites are only in specific areas, we call these HOT SPOTS. It is cheaper and easier to control these pests from this level as later their web protects them from contact with bio-pesticides.

Conditions of the pests

Before we even get to the solution, now lets us learn a little more about the ideal conditions for these pests.

Spider mites are tiny (0.5mm) and we have 3 types in Kenya. They are oval in shape and at adult stage have 8 legs. Larval stage has 6 legs. They prefer to live within a temperature range of 16-37 ° C, however they flourish at relatively low humidities (24-26° C) where a new generation will develop every 10-13 days! Life span of a mite is 13-32 days, during which time the female may lay over 100 eggs!

With this information it would seem logical to identify and stop them at a very early stage.

Different pesticides

Our target area would be the HOT SPOTS. This will also ensure we have minimal collateral damage as well as being more cost effective. As the mites can develop resistance to pesticides it is advisable to use two different bio-pesticides alternatively. A pyrethrin-based bio-pesticide made from natural pyrethrum will kill the mites at adult stage on contact, however may not affect the eggs. To prevent the mites from developing resistance to the pyrethrin pesticide, alternate with spraying of a Neem based bio-pesticide. Although slower acting, it will ultimately affect the reproduction of the mites as well as act as a break against resistance. It is through constant vigilance, that we manage to keep the populations low enough not to affect the yield, as spider mites are very difficult to eliminate entirely. Keep checking and most importantly, practice good crop hygiene. If you have spider mite try not to spread it via handling, harvesting, forceful irrigation, etc.

Use of bio-pesticides

Even animals brushing against infected plants will spread these mites. A good idea would be to intergrow rows of crops that are not effected by mites, with those that are. Also keep good spacing between plants to minimise the spread.

These bio-pesticides are produced by BIOP at ICIPE and East African Botanicals as well as others. Ask the conventional fertilizer and pesticide distributors in your area to stock these products.

Make sure to scout all the crops these mites affect. Potato, tomato, egg plant , peppers, some wild plants and weeds, tobacco, black nightshade, gooseberry and bitter apple. Notice how most of these plants are in the same family. This family is called *Solanaceae*.

Remember, the Mashillingi effect is cosmetic. The nutritional value of the tomatoes is not affected and is by far healthier and superior in taste to tomatoes grown using poisonous artificial pesticides. We need to educate our consumers on this reality!

Su Kahumbu answers your questions

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Letters to the editor

Members are happy
As new chairman of Kugeria Organic Farming Group, and on behalf of the entire active group in Kipipiri, we are grateful to receive your wonderful letter all the way from Nairobi (ICIPE). Kugeria Organic Farmers are grateful and happy to receive your magazine "The Organic Farmer" while speaking every member had a minute or more to congratulate your mindful thought since we learnt how to fight hunger in and society in Kenya. So please should you send us more copies and information through the new address as given above, and for us to get information quickly, the new chairman name is Davis Njuguna Mwangi. As secretary of the group I have found it wise to be one of your partners and be assisting us to get loans rural areas to uplift the standard of living.

Chairman Kugeria Organic Group, P.O Box 1155, Naivasha.

Give us more
I do hereby acknowledge receipt of your wonderful magazine. I find your magazine quite interesting and the farmers with whom we are sharing, are always longing for the next issue. Allow me to make a few suggestions that might make the magazine interesting and more informative.

1) Ask all the farmers who are giving suggestion and contributions to give their full contacts example postal addresses, telephone and cell phone numbers, emails so that we can be communicating direct with them without necessarily coming through you.
2) Ask the manufactures of products to make their labels strikingly con spicuous, and appealing to cus tomers.
3) Include uses of your products in the livestock sector example EM.
4) Give possible uses of foliage in different species of animals, for exam ple can mulberry leaves be fed to goats, rabbits or cows?

S. M. Muthui, Thika Poultry Self Help Group, Thika.

Market place

Any farmer wishing to sell their organic products should get in touch with Su Kahumbu at:
Green Dreams Ltd,
PO Box 1403, Limuru,
Tel: 0722 70 4488

Farmers in Kinangop like Purple Vetch

Our newspaper, *The Organic Farmer*, is getting a lot of letters. Some farmers have sent questions, which we hand over to Su Kahumbu, others come with their own proposals and ideas. In this edition we publish a letter from South Kinangop. Some farmers there know about the plant Purple Vetch. Do you have any additional knowledge on it? If you do you can share it with fellow farmers. Please write to us!

Taking the soil as a living entity and also the fact that the good performances of all plants generally depends on the good physical and biological properties of the soil, it is good to know much has to be done to protect conserve and even improve its quality. One of the ways we can get good fertile and quality soil is through mulching.

Since that there are many places you cannot get enough mulching materials, it is good to know that there are other ways which can work the same as mulching. One of them is planting ground covers (vegetation cover).

Ikinyukia Self Help group from south Kinangop Nyandarua district have been carrying a project on this issue by growing " Purple vetch" a plant that was introduced by colonial settlers in the White Highlands including Kinangop area. The immediate modern settlers gave little or no attention to the magic plant and this almost led to its extinction.

Benefits
With advice from one of the old hands who worked in the white settlers farms, our members have searched the plant seeds and carried a thorough study on growing it. The plant grows sideways covering a circumference of about 2 meters from a double or single seed.

Some of the plants benefit's are:

- Underneath the plant, it is always wet thus moisture is conserved
- Very few or no weeds grow under neath the plant.
- It is a legume; therefore it fixes nitrogen in the soil.
- The plant can cover a large area where mulching might be expensive.
- It is a fodder crop for livestock and can be kept as 'hay' for dry seasons.
- Its flowers are very much liked by bees and produce a lot of high quality honey.
- You can plant it along with other crops like maize, fruits and even fodder crops like Napier grass.

Help to conserve the soil and the environment for a better future. We have plenty of the plant seeds and if needed contact:

Benson Maina Muturi, P.O BOX 125. South Kinangop.

How you can make Pyrethrum pesticide

Kenya is the world's leading producer of Pyrethrum. Farmers can make their own Pyrethrum-pesticides. It is helpful in many ways, but farmers should be careful while handling it, plant extract can cause irritation to sensitive skin. All parts of the plant can be used - flowers, leaves, and roots. It's mode of action is insecticidal, repellent, fungicidal and nematocidal. Pyrethrum has a quick knockdown effect on insects and can be applied a day before harvest because Pyrethrins are quickly destroyed by sunlight. The following table was obtained from the agricultural information-service Oisat (www.oisat.org).

Used Materials	**Methods of preparation**	**How to use**	**Target pests**
Pyrethrum extract 1 cup of fresh pyrethrum, daisy flower heads, 30 ml of rubbing alcohol (70% isoprophyl alcohol), Pail, Strainer	Soak flowers in alcohol overnight. Strain through a cheesecloth.	Add 3 liters of water to the filtrate. Stir well. Spray on infested plants	Aphids, Cabbage loopers, Codling moths, Mexican bean beetles, Spider mites, Stink bugs, Thrips, Tomato pinworms, Whiteflies
Pyrethrum water extract 1-1.5 kg of dried pyrethrum 3 kg of liquid soap 100 liters of water Drum	Finely shred dried pyrethrum. Add into the drum with water. Stir vigorously. Strain. Add soap. Mix well.	Spray on the target pests preferably in the evening.	Aphid, Bean fly, Cabbage white butterfly, Coffee bugs, Colorado beetle, Diamondback moth, Eggplant fruit and shoot borer, Flea beetle, Gall midge, Grasshopper,Green leafhopper Locust, Mites, Thrips
Powder extract 3 g of pyrethrum powder. 1 liter of water 1 tsp of soap, and a Pail	Add the pyrethrum powder and soap to water.Stir well.	Immediately apply on infested plants preferably in the evening.	Flea beetles

Procedures for the preparation of plant extracts

Farmers should remember the following guidelines when making plant extracts.

- Select plant parts that are free from diseases.
- When storing the plant parts for future usage, make sure that they are properly dried and are stored in an airy container (never use plastic container), away from direct sun light and moisture.
- Make sure that they are free from moulds before using them.
- Use utensils for the extract preparation that are not use for your food preparation and for drinking and cooking water containers.
- Clean properly all the utensils every time after using them.
- Do not have a direct contact with the crude extract while in the process of the preparation and during the application.
- Make sure that you place the plant extract out of reach of children and house pets while leaving it overnight.
- Harvest all the mature and ripe fruits before plant extract application.
- Always test the plant extract for mulation on a few infested plants first before going into large scale spraying.
- When adding soap as an emulsifier, use a potash-based one.
- Wear protective clothing while applying the extract.
- Wash your hands after handling the plant extract.

The Organic Farmer in September

Biological Control: The wasp that is saving the cabbage