

The Kyuso farmers experiences



Mr. Kavisi the Ministry of Agriculture staff giving technical advice in the field

Introduction

In developing countries, extension agents face the challenge of helping small-scale farmers achieve increases in food production in a cost effective manner while at the same time conserving the natural resource base. One of the major problems farmers complain about during a cropping season is control and management of pests and diseases. Conventionally, many farmers believe that the only solution is to spray chemical pesticides. However, these chemicals are expensive and are known to have effects on human, water resources, and the environment. Due to increasing awareness on the effects of chemical pesticides, there is a growing demand for affordable information on ecological pest management and non-chemical crop protection approaches and techniques that leave no scar on the environment.

The **Pesticides Action Network** (PAN) is an international agency that aims to eliminate the use of hazardous pesticides, reduce overall use, risk and dependence on pesticides, and increase support for community-based control over a sustainably produced food supply. PAN is committed, to place pesticide concerns in the broad political and economic context in ways that will advance the fight against rural poverty, enhance pro-poor development and ethical trade. PAN aims to help local communities use the initiatives to benefit their day-to-day lives.

PAN Germany is part of the international Pesticide Action Network. It is supporting non-chemical pest management on tropical crops that are commonly grown by small landholder farmers. A key project of PAN Germany is the 'Online Information Service for Non-chemical Pest Management in

the Tropics', OISAT Info (www.oisat.org) that was launched in July 2004 for public use and as practical info for farmers and technicians.

The OISAT pilot project in Kenya is an initiative of PAN Germany which is an overall co-ordinator. The project is part of PAN Germany's medium-term concept of extending and studying success factors to introduction of OISAT Info to agricultural training, extension services and networks. The lead implementation organization in Kenya is Participatory Ecological Land Use Management (PELUM-Kenya). The other four implementing organizations include the Arid Lands Information Network-Eastern Africa (ALIN-EA), in collaboration with the Ministry of Agriculture, Mwingi district, Sustainable Agriculture and Community Development Programme (SACDEP) Kenya in Muranga district, The Kenya Institute of Organic Farming (KIOF) in Maragua district and Sustainable Agriculture Community Research Extension Development (SACRED Africa) in Bungoma district. The pilot project started in July 2005 and is funded by PAN Germany and Bread for the World.

What is OISAT Info?

OISAT Info is a web-based practical guide for trainers, extension workers and farmers on how to minimize pest damage in a safer, affordable, effective and ecologically a sound way. Information provided via the website, www.oisat.org, provides tips on how to lower the cost of production based on recommended pests, diseases and weeds control methods. Its structure is based on the cropping season of the major crops indicating key pests for each growth stage and plant part.

The OISAT Info details preventive and curative methods of managing pests with the main goal of reducing synthetic pesticides. The information is presented in form of illustrations, photographs and clear advice together with a glossary of technical terms. Situation specific information can be downloaded and compiled into training materials, which can also be translated into local languages for an effective transfer of the information to farmers. The OISAT Info database has been developed in consultation with an international experts group.



Farmers have access to development info

OISAT milestones

2003

- PAN Germany, researches and consolidates information on crop pests' management in the tropics. This included development of OISAT Info structure, programming and information processing.

2004

- PAN Germany in collaboration with CABI, organizes an International workshop dubbed 'From web to field' held at Nairobi and drawing participants from Sri Lanka, India, Kenya, Uganda, Germany, and the United Kingdom,
- OISAT Info website www.oisat.org is launched on 1st July.

2005

- Pan Germany in collaboration with ICIPE and PELUM organizes a regional workshop held at ICIPE with participants drawn from Kenya, Uganda, Ethiopia and Tanzania.
- OISAT pilot project takes off in Kenya, implemented by PELUM as lead co-ordinating organization and ALIN-EA in partnership with Ministry of Agriculture, Mwingi, SACDEP Kenya, SACRED Africa and KIOF.

2006 and beyond

- Continued pilot implementation and experiences sharing among all stakeholders.
- Possibilities of scaling up the idea to other international networks, Agricultural extension programmes and training institutions etc.

OISAT implementation process

The Kyuso farming community

Kyuso division is in Mwingi district, Eastern Province of Kenya. Located a distance of about 60km from Mwingi town, Kyuso is a semi-arid region and generally hilly with many rock outcrops and plenty of indigenous shrubs and vegetation. The predominant Akamba community practice crop farming and livestock keeping. Some of the crops commonly grown include green grams, cowpeas, sorghum, maize, cotton and fruit trees that include mangoes, papaws and passion fruits.

Kyuso farmers were chosen for the pilot because of the strongly established Farmer Field Schools (FFS) network by the Ministry of Agriculture. In addition, the division lacks adequate extension staff, lacks an information referral point, farmers lack general information on production systems and are ill-equipped with crop protection info yet they are quite innovative and use Indigenous and Traditional Knowledge (ITK). The Ministry of Agriculture's acceptance to host the 'Kyuso Info Supermarket' as a one-stop shop for agricultural and development information cannot go unnoticed.

Pilot objectives

The OISAT pilot project, 'From Web to Field to Web' is aimed at providing information to farmers and extension staff on sustainable alternatives to chemical crop pest management in Kenya. ALIN-EA and the Ministry of Agriculture, Mwingi, teamed up as partners in implementation of the pilot within Kyuso division. Co-ordinated by Noah Lusaka, the Programme Manager ALIN-EA, the overall purpose of the pilot is to prepare the large-scale dissemination of OISAT Info among smallholder farmers, agricultural training and extension networks in developing countries.

Identification of farmers

As a starting point, seven farmers were identified to participate in the pilot project as focal farmers

for closer monitoring of OISAT Info use by the extension staff. The seven farmers were chosen using set-criteria that included, innovativeness, one growing diverse crops, literacy level, willingness to apply OISAT info and to train and share experiences with other community farmers enhancing diffusion of information widely. The participating farmers include five women and two men.

Establishment of Info Supermarket

The partners set up a Farmers Resource Centre, referred to as Kyuso Community Information Supermarket, that is equipped with various appropriate Information and Communication Technologies (ICTs). These include a computer, several CD-ROMS, a Worldspace Radio and an adapter card, printer and a mobile phone.

Farmers access information from OISAT CD-ROM and other CD-ROMS with various development technologies and experiences. The centre is powered by solar energy and communities are able to access Internet using the GPRS technology. A local farmer, Mr. Julius Matei works as a Farmers Resource Centre Assistant (FRCA) and helps download information for dissemination to farmers. The Ministry of Agriculture Crops Extension Officer, Mr. Antony Kavisi and the Farmer Field Schools (FFS) co-ordinator, Mr. D. Mwangi, offers technical support to seven Focal Farmers (FF) and other Community Farmers (CF) with interest in pest management using OISAT Info.

Effective from February 2006, ALIN-EA has attached to the centre a trained Community Information Volunteer (CIV)

Ms. Tabitha Mbinya, to help document local knowledge and disseminate development information widely via the Open Knowledge Network (OKN), an off-line information sharing system that involves collecting local knowledge and disseminating using various ICTs.

Sharing knowledge via farmer's forums

To ensure that focal farmers share their experiences and knowledge with community farmers, leaders, extension team, teachers' e.t.c., farmers' forums were organized at intervals. The first forum focused on the seven focal farmers to introduce the pilot project, expectations and OISAT info validation process. During this forum, farmers acknowledged that they lack appropriate info on pest control methods, hence, OISAT Info had come at the right time. In most cases, they use chemicals or ITK of which they are not sure about the mixture rates, preparation methods and residue effects.

The second and third forums focused on sharing OISAT Info as applied by the farmers and their experiences on what has worked or



Mr. Noah Lusaka demonstrating pests identification on laptop

failed and on which crops. These experiences are highlighted later under project results.

Empowering communities with knowledge

As part of capacity building for farmers and the extension team, the project organized a pest identification workshop where farmers and the extension team shared various experiences and practically went out in the field to identify some of the pests. Using a magnifying lens, some of the smallest pests were identified and discussions held on the best methods to control them.

In addition, an Information and Communications Technology (ICT) workshop was conducted for the farmers, extension staff and ALIN-EA members to be acquainted with the new technologies for accessing information. A total of 25 participants attended the workshop. During the workshop, participants were exposed to the operations of a computer, accessing info using CD-ROMS, and they also did an information mapping exercise to understand and learn local information access and communication systems within a remote set up. This exercise gave a benchmark for future assessment of ICTs as tools in the context of community access to information.



Farmers learn how to identify and control crop pests during FFS

As a way to integrate more documentation of local knowledge, ALIN-EA incorporated a training component on using the Open Knowledge Network (OKN) and installed the appropriate software and equipment. The OKN is a human network that collects, shares and disseminates local knowledge to a wider audience using flexible ICTs. 27 participants, who included farmers, ALIN-EA members,

extension staff and local leaders, attended the workshop. The members formed the Kyuso Focal Group and also elected a coordinating committee to oversee networking activities. The Community Information Volunteer, with assistance from members and local farmers will take lead in documenting and sharing of the OKN content.

Project results

The Info Supermarket gaining popularity

Since its establishment in August 2005, the Information Supermarket has been busy with farmers, teachers, students and extension staff visiting to access information on various development issues. The centre is most popular to farmers who seek agricultural information on how to improve their production systems. So far, more than 350 visitors have been recorded. The centre gets busier during rainy seasons.

Twelve farmers capacities to access OISAT Info has been increased. According to Mr. Matei, the farmers have been practicing how to use

the computer regularly, hence, they are improving with time and are able to access information from CD-ROMS.

“When I first saw the computer at the Kyuso Info Supermarket, I was amazed at what it was. At first I didn’t want to touch it! However, with encouragement from Mr Matei, I was able to learn how it operates. For a period of two months learning IT skills, I’m now able to write and key in my reports timely and send to my supervisor within the department of Adult Education at Mwingi. I can also access information from CD-ROMS, print and use it at my home. I’m now

encouraging and training other farmers to learn IT skills” these sentiments are expressed by Mrs. Agnes Mughu, who doubles as an adult class teacher and a Focal Farmer within the OISAT project.

The centre has grown beyond offering OISAT info only to other development, appropriate and practical technologies. The information is downloaded from different CD-ROMS that have been provided by ALIN-EA and AGROMISA. Among the many visitors to the centre are 60 students and 4 tutors from Kyuso polytechnic, who got information on controlling aphids, white flies and grasshoppers on kales and tomatoes. Other visitors include Kyuso fruit growers self help group and Kakongoo FFS who sent four representatives to the centre.

‘Mr. David Mutua, a science teacher at Kyuso



boys secondary school learnt about the resource centre and OISAT Info when he asked Mr. Kavisi, the MOA Extension Officer for materials that the school could use in this years Science Congress. He was referred to the Kyuso Info supermarket where he accessed information on haymaking, how to make the blackstone and how to make soap using local materials that was downloaded from the *Baobab* CD-ROM. The Science Club students, with guidance from Mr. Mutua, used the information to make some exhibits for the Science Congress. Due to the simple technologies and innovativeness of the information, the school scooped 1st position during the district secondary schools science congress.

Information Open Day a success

An Information Open Day was organized at the Kyuso Info Supermarket during the launch of the centre on 7th April 2006. The Open Day was meant to create more awareness about the information resources available and the new ICTs in use at the centre. The DOI, Mwingi district, Mr. Mohammed, who encouraged the farmers to utilize the available information resources to develop themselves crowned the occasion. In attendance were more than 150 farmers and representatives from other organizations including the District Agricultural Officer, the Mwingi District Drought Monitoring Officer and many other guests.

The Focal Farmers had an opportunity to exhibit and demonstrate how they access OISAT Info and use it to make diverse formulations. The seven focal farmers were recognized by ALIN-EA and the Ministry of Agriculture by awarding them with certificates for their participation in the pilot project.

Farmers' voices and experiences

Most of the district experienced a severe and prolonged drought when the rains failed during the season ending November/December 2005. This led to crop failure, hence, not much of OISAT Info was applied despite farmers' enthusiasm. Despite the drought, the farmers undertook some field validation of OISAT Info and here are their experiences.

The experience of Maureen Mueni

Maureen's farm is situated at Kimangao village about 15kms from Kyuso town. She is a member of the FFS network where she has acquired a lot of farming skills that include seed selection, poultry, e.t.c.



LOOK! These apion beetles have no respect for my cowpeas

The farmer has set aside an OISAT plot measuring 75m by 75m and had planted maize and cowpeas among other crops. The cowpeas were attacked mildly by apion beetles in their flowering stage. Though she admitted to have made a mistake in the use of OISAT Info by mixing neem and chilli formulation instead of using each individually, they worked. The apion beetle reduced slowly after application of the solution.

Given that this was her first time to make the pest formulations, she found the methods to be somehow cumbersome as the availability of materials limits its use. Maureen got the neem leaves and the chilli from a neighbour. She reckons that the methods used are cheaper and easy to make since local resources are used in making the formulations.



Another pest controlled was the stalk borer in maize. She used sieved ash from a jiko and put it in the affected crops funnels. After a few days she noted that the pest had been eliminated. Next time she plans to mix the ash with chillies to improve the strength.

The case of Grace Ndeti using chillies and aloe

Grace planted 1kg of cowpeas in her farm. White flies, apion beetle and aphids attacked the crop. She tried neem formulation and only the white flies reduced. She then applied chillies on the apion beetles and they reduced but not all. While preparing the chillies, she had to soak in water hence this caused some irritations to her skin.

The papaya formulation also didn't work and instead attracted big flies. She decided to try some ITK she had heard from neighbors. This involved crushing 4 large sized bulbed (Should use spring onions) onions and soaking them in 2 litres of water for 4 days. Sieve the mixture, dilute with 8 litres of water and spray on the affected crops. The apion beetles disappeared completely and she harvested 21kgs!

On the control of termites, she used aloe that worked on trees but when she used on the granary posts, it was not effective. Ash and chili was also used effectively in 2-weeks old maize, which had been attacked by stalk

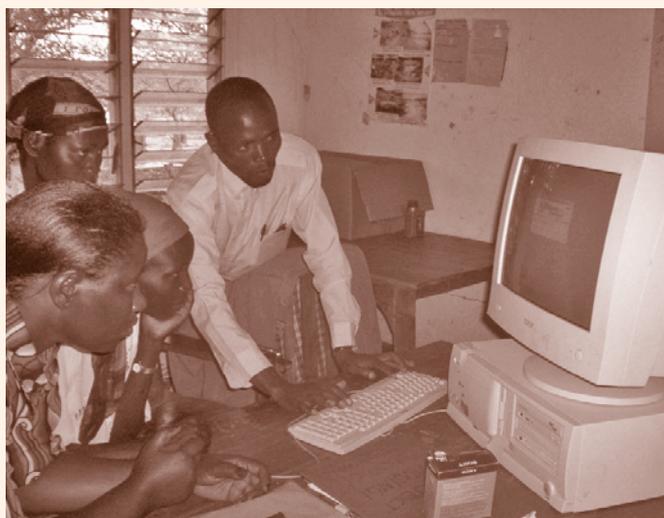
borers. Termites proved to be very destructive on mango trees, and she poured 10kg of ash in holes she had dug round the mango trees.

This was done around two months ago and is still to apply another round, as it seems to be working. Once she had tried on the OISAT plot and it worked, she extended the application to the whole farm. She plans to continue using the OISAT Info in future since it is economical.

Mr. Julius Mwonga's experiences using neem

This focal farmer, also doubles as the FRCA. He assisted a neighbour to apply OISAT Info after his cowpeas crops had been attacked by aphids and greatly by apion beetles.

Mr. Mwonga showed his neighbour how to prepare the formulation and also its application in the field. They pounded 2kg of neem leaves and soaked in 4 litres of water in a pot covered tightly with a piece of cloth. After 3 days, they diluted 1 liter of the solution to 9 litres of water and sprayed on a small piece of farm.



Mr. Matei doubles as a farmer and Farmer Resource Centre Assistant at Kyuso Info Supermarket

The aphids completely disappeared but a few apion beetles persisted. The crop, which was in the podding stage, was re-sprayed with the same formulation but 1 liter of the solution was diluted with 5 litres of water. After two days, the apion beetle completely disappeared and she applied on the whole farm. The farmer tried to control termites on his farm. He pounded branches of finger euphorbia and put in 10 litres of water, then covered the container for six hours.

The solution was then sieved and poured at the base of the trees (just like watering), and since then, he has not applied again as it was effective. He then tried the solution on granary posts and it worked quite effectively. Julius has also come up with a way to control ticks and heal wounds on cattle. He uses the barks of Kitungati tree Comiphora family, which he boils in water and leaves it to cool. The barks are then sieved and the soapy solution, which is thick, is applied on cattle using a piece of cloth. The ticks disappear after a day but appear after 10 days. The barks must be from a tree that is not too old.

Mr. Maluki Muneeni - Controls termites innovatively

Mr. Maluki's farm is situated about four kms from Kyuso market. He used the sticky trap learnt during a previous workshop to check the occurrence of pests and identified apion beetle and aphids. He went ahead and prepared the neem formulation which he soaked for 3 days then diluted 2 litres of the same with 8 litres of water. The cowpeas, which were in the flowering stage, had a reduction in aphids after 4 days but the apion beetle persisted. This prompted him to apply the formulation after a week and the aphids were eradicated and a reduction in apion beetle noted.



Mr. Maluki displaying the sticky traps on his farm

The mango trees in his orchard were attacked by the powdery mildew. He got papaya leaves and soaked them in a jug and added 1 cup of water. He soaked overnight then sieved the solution, diluted it with 6 litres of water and sprayed. He has since re-sprayed 4 times and his efforts are bearing fruits as one eight-year mango tree which had not born any fruits now has big fruits.

The farmer has also used finger euphorbia in the control of termites. However, do you know that human urine controls termites? Well, Mr. Maluki used to urinate on trees as he worked on his farm (not a laughing matter) and noted that the trees he had continuously urinated on were resistant to termites. He now uses urine from his family to apply on the trees though there is a limitation in the quantity.

“Daktari” (herbalist), as he is fondly referred to by the locals, was approached by a neighboring farmer to help him control apion beetle in cowpeas. He mixed chillies, neem and tobacco. They were pounded and soaked in a tightly covered pot with water and kept in a shade away from sunlight for 2 days. On the third day, the mixture which had a very strong smell was sieved and sprayed on the crops though it can also be poured round the farm to discourage pests from invading it owing to its strong smell.

AGNES MUGHU uses neem for multi-purpose

Agnes is one of the OISAT focal farmers who doubles also as an adult educator and a farmer innovator. She is a role model and an influential person in her village that is about 8 km from Kyuso market. She practices mixed farming and has plenty of different fruit trees that include papaws, mangoes and many others. She has also planted trees and



Agnes Mughu

shrubs that include neem and aloe. Since she started applying OISAT Info on her farm, she confesses that her yields have increased tremendously and her experiences are highlighted below;

The bean pod borer attacked her beans in the maturation stage and she used the neem formulation and sprayed on the pests and it was effective.

Her cowpeas and pigeon peas were infested by aphids, leaf miners and thrips. The neem formulation was sprayed with success. The pigeon peas during maturation stage were attacked by stinkbugs. To control

this, she prepared the custard apple leaf extract then sprayed on the plants and was quite effective.

In maize, white grub attacked the sown seeds as well as roots and neem was used in their control. The corn stalk borer also attacked the leaves and she used wood ash and pepper, which was effective. She also noted that there were locusts and corn weevils, which she eradicated by spraying neem formulation. Agnes has an alternative method of controlling aphids. She applies ghee on leaves attacked by the pests, which in turn attract ants that feed on the aphids.

Challenges

A project of this magnitude cannot run smoothly without challenges. These include:

Prolonged droughts. Mwingi district is among those areas that have experienced severe prolonged drought as a result of insufficient rains during the last two seasons. Due to reliance on rain-fed crop production, the farmers were frustrated since they could not apply OISAT Info for a complete season.

Poor Safaricom network at the Information Supermarket. As part of using appropriate ICT technologies, the centre has GPRS equipment for accessing direct Internet using the Safaricom network. However, at the Supermarket the network keeps fluctuating, hence, has minimized direct access of OISAT Info from the Internet. However, plans are underway to avail a laptop for this purpose.

Unavailability of pest control materials. Some farmers have lacked access to local raw materials for making appropriate formulations for pests' control. For example, some farmers do not have aloe and neem trees within their farms, hence, they have to borrow from neighbours. To overcome this, farmers are being encouraged to plant trees and shrubs with medicinal properties on their own farms.

Poor infrastructure. In Kyuso, the rural communications infrastructure is very poor. This reduces access to the Info supermarket by the farmers who are farther away from the supermarket.

Short pilot time frame. The time frame for the pilot project was quite short given that the project started in the middle of a season. This necessitated extension of the pilot phase.

Emerging pests. Some pests were identified by farmers and there is lack of knowledge of controlling them. A good example is a pest called in local language 'Ngetani' that is destructive to mangoes and other crops like cassava, e.t.c. Ngetani, a beetle, cuts the stem of the plants completely just like a saw!

Making formulations take time. Some farmers are impatient and don't wait for the formulations to mature as per the recommendations. They want a quick preparation and immediate results hence they apply prematurely leading to the formulations being ineffective.

Impact and lessons learnt

- Management of crop pests by farmers need to be planned for right from the planting time especially through use of preventive measures. Farmers need to understand the common pests and the crop stage when they attack and apply curative means immediately.
- OISAT Info is practical, easy to use and cheap. The info can be applied by farmers to effectively control pests that attack their crops in the field. This in turn reduces use of hazardous pesticides, hence, producing healthy food.
- Use of appropriate ICTs can avail critical information to communities who need it to improve their livelihoods. The Kyuso Info Supermarket is highly acknowledged by local communities who through the centre to acquire info on various development issues.
- The Community Info Supermarket is serving a wider community in provision of appropriate information. This includes farmers, extension staff, teachers, local leaders, students e.t.c... whose information needs are quite varied.
- The use of a language that is culturally appropriate was critical in successful implementation of the

project. Use of a locally trained farmer in IT skills was advantageous in that communities are able to get translated information from one of their own.

- Choosing farmers who play other roles in society enables info flow and diffusion speedily in villages through farmer-to-farmer extension.



Wow! What a harvest? Thanks to OISAT Info for management of pests.

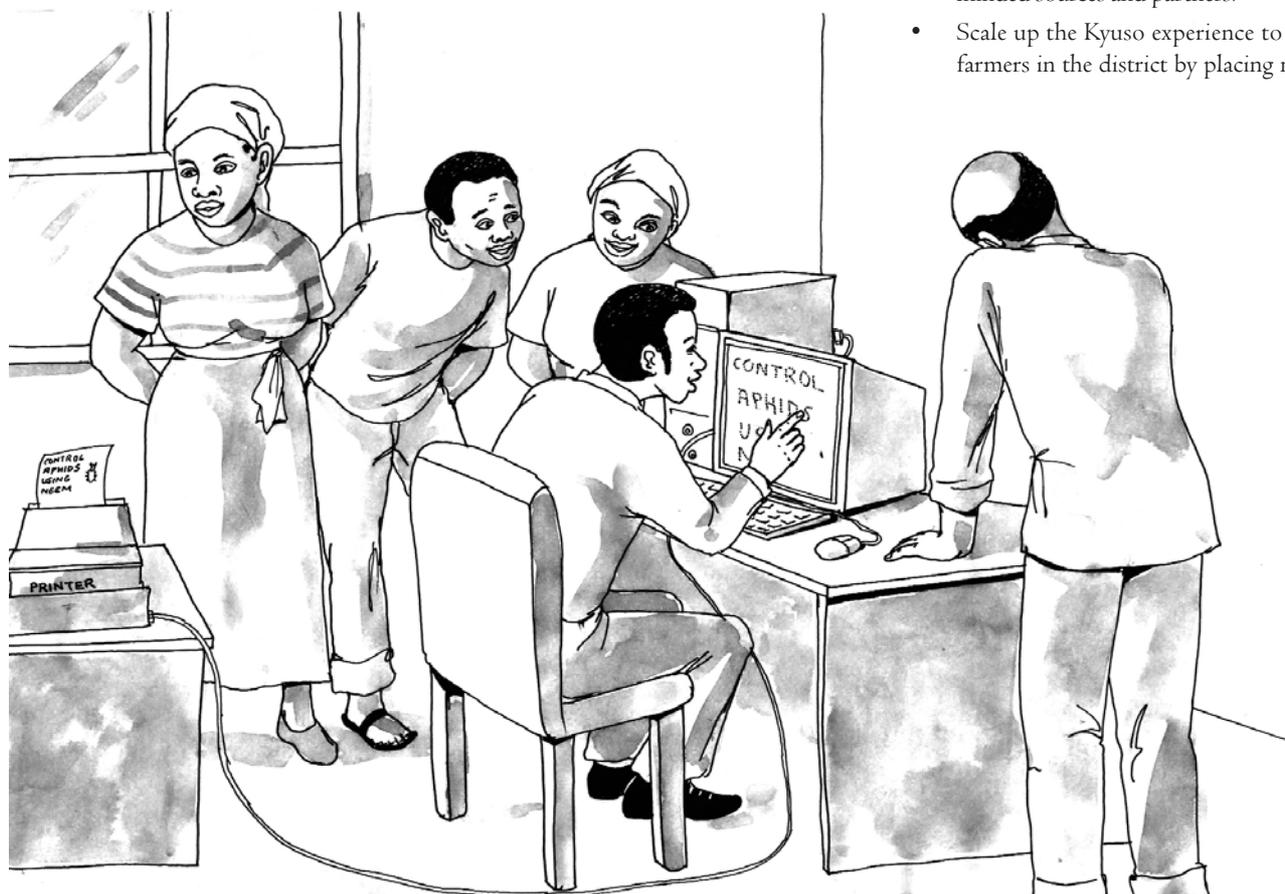
- Incorporation of OISAT info into schools offers an opportunity for young farmers to learn pest management at an early period and this knowledge can be transferred to their parents at home.
- Provision of appropriate repackaged info with good back up and support from extension team can help improve community livelihoods.
- At the network level, implementation of OISAT Info was yet another opportunity to research and disseminate info using appropriate technologies that enhance community development. The network continues to share experiences from the pilot to its regional membership. The implementing staffs capacities on pest management and use of ICTs to access updated development information has increased tremendously.
- The successful implementation of the pilot project was as a result of good team spirit and partnerships by implementing organizations, involvement of farmers right from the planning stage and the interest shown by the farming community to try new ideas. Indeed the project fitted well within the established Farmer Field Schools (FFS) networks.
- Farmers are more confident in use of OISAT Info and sharing openly other ITK technologies given the encouragement and awareness created from the pilot project. During the farmers' forums, farmers discuss other development issues beyond OISAT that affect them locally.
- There is need for more research on emerging pests like Ngetani to avail appropriate information on their control.

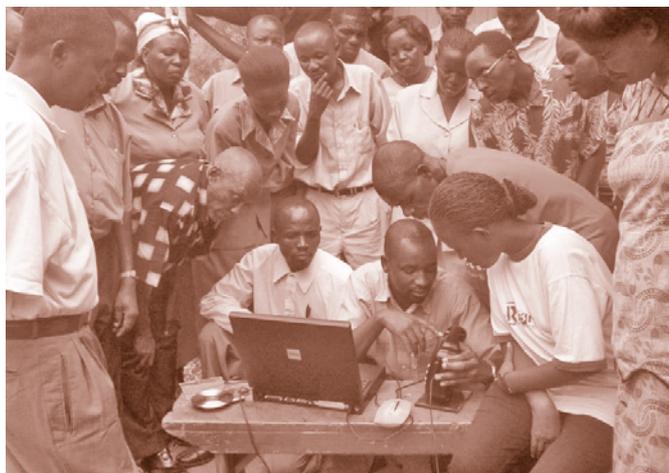


Ngetani beetle is deadly on fruit trees

What Next?

- The project has incorporated the OKN system to strengthen local info sharing among farmers and from other regions on diverse development issues. This will strengthen the OISAT initiatives and encourage local communities to contribute and share knowledge more quickly and freely. In addition, the Kyuso
- Info Supermarket will maintain a database of local knowledge and information that is easy to access by the communities.
- The project will focus on documentation of more innovative pest management practices by farmers and give feedback for inclusion in OISAT Info.
- As the project progresses, more farmers will be ICT compliant hence can access any info on markets, trading etc.
- A farmers' committee is in place and will involve more farmers in the management of the Info supermarket for sustainability and to acquire more appropriate information resources from other like-minded sources and partners.
- Scale up the Kyuso experience to more farmers in the district by placing notice





Farmers and extension staff learning the OKN using a worldwide radio

boards at strategic market places. The project staffs are willing to offer technical support to other districts with interest in setting up a similar Info Supermarket.

- Involve schools to form Young farmers clubs (YFC) to use the available Information from the Supermarket as learning tools and to understand farming in a more holistic way.

An example of repackaged OISAT info

Finger euphorbia

Common names: Milk bush, India tree spurge, Pencil tree

Scientific name: *Euphorbia tirucalli*

Family: Euphorbiaceae

Plant parts used: Branch

Formulation

Materials	Method of preparation	How to use	Target pests
Plant extract Mature branch Water 10-liter container Mortar and pestle Strainer	Pound branch finely to make into a paste. Leave the paste for sometime in water. Strain.	Spray on infested plants thoroughly. Spray early in the morning or late in the afternoon.	Citrus aphids Cutworm Termites
Plant sap extract 10 drops of plant sap 1 liter of water Pail	Cut a branch. Collect the oozing sap. Add the sap into the water.	Spray on infested areas.	Cutworm

Standard procedures for the preparation and application of the 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 sunlight and moisture. Make sure that they are free from molds before using them. Use utensils for the extract preparation that are not used 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 formulation 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.

Effect on humans

The plant causes low toxicity if eaten. It causes nausea, vomiting, and diarrhea. It also causes minor irritation to the skin (NCSU, 1997). Take extra care while handling the sap as redness, swelling, or blisters might occur on sensitive skins.

Effect on non-target organisms

In Tanzania, the plant is used as fish poison and as ant and mosquito repellent (Hines; Eckman, 1993).

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