

The Introduction of Mobile Plant Clinics to Uganda

First Results and Lessons Learned

2005 – 2010



WORK PAPER 1

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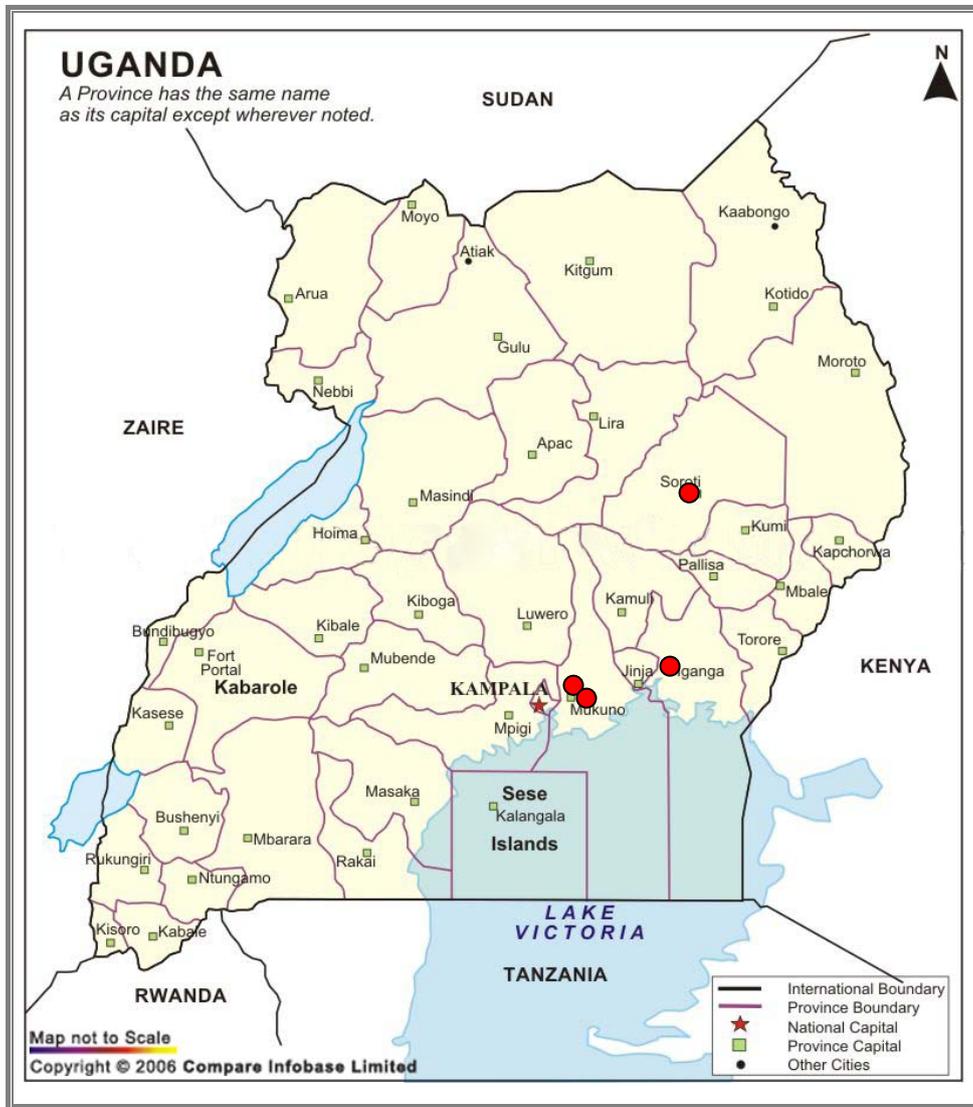
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ACRONYMS

AFAAS	African Forum for Agricultural Advisory Services
BBW	Banana bacterial wilt
CAO	Chief Administrative Officer
DFID	Department for International Development
DSIP	Development Strategy and Investment Plan
FAO	Food and Agricultural Organisation
CGIAR	Consultative Group on International Agricultural Research
GPC	Global Plant Clinic (CABI)
HORTEXA	Horticultural Exporters' Association
LG	Local Government
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
NAADS	Uganda National Agricultural Advisory Services
NARO	National Agricultural Research Organisation
NGO	Non-governmental organization
PAV	Poverty Alleviation Funds
PHSi	Plant Health Services Initiative
PKPi	Pest Knowledge Partnership Initiative
PMA	Plan for Modernisation of Agriculture
SAARI	Serere Agricultural and Animal Research Institute
SG2000	Sasakawa Global 2000
SOCADIDO	Soroti Catholic Diocese Integrated Development Organization
UNFFE	Uganda National Farmers Federation

PLANT HEALTH CLINICS IN UGANDA



Mukono: Nakifuma and Nkokonjeru markets; **Iganga:** Kawete market
Soroti: Katine and Ocapa markets (alternating)

Summary

Four mobile (or community-based) plant health clinics were started in Uganda on a pilot basis in 2005 as an attempt to ensure better plant health advisory services for small-scale farmers. This new way of delivering primary plant healthcare to farmers has attracted wider interest and the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) have recently included the plant clinics in their new 5-year Development Strategy and Investment Plan to strengthen disease control and surveillance.

The present report is the first output of a newly started research project between University of Copenhagen, Makerere University and CABI. The purpose of this study was to gather results and lessons learned from the pilot period to inform future plant clinic interventions. The study covers issues of organisation and management, clinic operation and performance as well as clinic use and preliminary evidence of outcomes.

The plant clinic initiative was carried out in collaboration with MAAIF, Local Governments (LG) and NGOs in Mukono (Nakifuma and Nkokonjeru markets), Iganga (Kawete market) and Soroti (Katine and Ocapa markets). The Global Plant Clinic-CABI (GPC) provided training, technical backstopping and a small grant for operational costs. The first clinic trials were held in July 2005 and regular operation started in November 2006. All clinics ceased to operate in mid 2009 due to shortage of funds and plant clinic staff. Soroti re-initiated clinic operation early 2010.

Register data from 145 clinic events were collected from the period 2005-2010. The data were not complete since clinic registers from Iganga and Soroti were missing for a 14-month period. The clinics received 1,947 queries from 1123 clients from 408 villages. The overall average of women clients was 26%. Eighty-one clients visited the clinics more than once.

Sixty-two different crops were brought to the clinics, the three most important ones being banana, cassava and orange with 16, 11 and 10%, respectively. The crops included a wide range of roots and tubers, cereals, vegetables, pulses as well as a minor proportion of tree and oil crops, spices and ornamentals. In Iganga maize was the dominating crop, in Soroti it was orange and in Mukono banana was the most frequent crop.

A wealth of problems was identified at the clinics. *Banana bacterial wilt* was by far the highest scoring disease of all. *Cassava mosaic* and *cassava brown streak* represented the vast majority of cases in cassava. *Leaf miner*, *fruit fly* and *scab* were equally represented in orange, while the other main crops each had one predominant problem: *Striga* in maize, *Fusarium wilt* in tomato, *coffee wilt* in coffee, *rosette virus* in groundnut, *black rot* in cabbage and *stalk borer* in sorghum.

Although there needs to be more systematic follow up to track farmer responses to advice and the impact on crop management practices and productivity, there are indications that the clinics have helped solve many plant health problems. One new disease has been identified in orange from Soroti. The plant clinics have also stimulated a change in clinic staff's view on extension work. For the plant doctors it is a serious challenge, but also a source of personal and professional satisfaction, to meet farmers face to face trying to help solve concrete problems. All plant doctors highlighted the enhanced outreach and direct identification of demand as major advantages of the plant clinics compared to other extension methods.

The plant clinic registers constitute a new method for systematic collection of information about pests and diseases in the farmers' field. The register has shown to be a useful tool for targeting interventions on specific pests and diseases. It is a unique resource that has the potential to improve decision making as well as quality control of the plant clinics. However, the way the registers are currently managed does not allow the data to be used to its full potential. If the plant clinics are to

become a pillar of the national disease surveillance system, the data management has to be improved substantially.

The plant clinics have received little technical backstopping from expert institutions apart from the GPC. There is no functional referral system between the clinics and MAAIF's laboratories and attempts to establish links to NARO experts and labs have been unsuccessful. Although there is much diagnostic capacity in Uganda; existing labs are not designed to function as a public service for farmers and extension agencies. Systemic changes are needed to formalise links between plant clinics, research, laboratories and other key actors in plant health, e.g. input suppliers.

The 'loose' arrangements established at the beginning between the GPC, MAAIF and the districts were meant to enable the partners to experiment and be flexible in the implementation of the initiative. However, this flexible approach also had drawbacks since it was unclear how to proceed from experiment to full-time operations. The roles, responsibilities and procedures were vaguely defined and it took a long time for the partners to organise themselves around clinic implementation. There was not enough room for joint learning and reflection. There is a limit to how much 'things develop by themselves', especially in a country like Uganda where the institutional structures and incentive systems put many constraints on staff, leaving little room for creativity and flexibility. Experiments need to end and results used to improve future actions.

The parallel GPC/MAAIF reporting systems and general lack of information sharing were an obstacle for the establishment of an effective monitoring and reporting system. The external monitoring was ostensibly done for the GPC and not used for continuous learning and improvement of the clinic operations. The lack of a common space for regular follow up, coordination and sharing of results and experiences caused some frustrations among clinic staff and a feeling of being left alone. The only times clinic staff and coordinators from all partner organisations got together were during GPC visits. That was insufficient time to reflect on progress and plan new activities and approaches.

The plant clinics were to a large extent seen as a 'GPC project' from within Uganda. This perception affected the commitment and ownership of people who ran and supported the clinics. The lack of clear leadership and orientation created the impression that the plant clinics were unconnected to other extension and advisory services, with the inevitable result that clinic operations depended on availability of funds from the GPC. The GPC funds were small and it was expected that the partners would co-finance the clinics or roll them into other programmes. But this has only happened to a limited extent, despite the existence of major national programmes to improve agricultural advisory services, notably NAADS, and regular advocacy by the GPC to encourage cost-sharing.

Institutionalisation is essential for the sustainability of the plant clinics. The clinics have not yet been integrated into the official work plans and procedures of the organizations. Even though the plant clinics fit well with the mandate of the NGOs and LGs it has shown difficult to integrate them into the organizational structures. The dominating 'project mentality' in many organisations is a severe constraint to institutional change. There is a major challenge ahead in matching funding, human resources and work modes within and between organisations.

The establishment and institutionalisation of plant clinics have faced many challenges. Nonetheless, the plant clinics have shown their value as a means to reach farmers who are deprived of access to advisory services. There is keen interest in reviving and expanding the initiative. The inclusion of plant clinics in the national disease control and surveillance strategy is a proof of government acceptance and commitment. The partners have gained vast experience since the initiative started in 2005. The lessons learned, positive and negative, provide an important base for designing a new phase where the essential components of a 'plant health system' will be in place.

1. Introduction

Four mobile (or community-based) plant health clinics were started in Uganda on a pilot basis in 2005-2006. This new way of delivering primary plant healthcare to farmers has attracted wider interest and several countries are now seeking ways to implement plant clinics on a wider scale to improve the delivery of plant health services to farmers. Moving from a pilot scheme to a larger intervention requires knowledge about how plant clinics operate, what the outcomes and limitations are, and what interventions are needed to ensure effective, well-connected and accountable services. Linking plant clinics to effective networks of diagnostic labs, research institutions and input suppliers under a 'plant health systems' framework is a new and largely unexplored challenge that needs to be addressed.

The main purpose of the present study is to gather results and lessons learned from the existing plant clinic initiative to inform future interventions. A second purpose is to validate the applied methods and analyses to establish a common framework for clinic assessment, which allows comparing plant clinic performance and outcomes.

The study is part of a 2-year Danida funded research project that started in January 2010. The project is an alliance between the University of Copenhagen, Makerere University and CABI. The project aims to provide evidence to inform policy-makers and implementers and help shape future interventions for the creation of well-functioning plant clinics and plant health networks.

2. Methods used

A 3-week field trip was conducted to Mukono, Iganga and Soroti in February-March 2010 to gather qualitative and quantitative data about clinic organisation, performance, use and outcomes according to the criteria listed in Table 1. The criteria used for quality assessment of the clinics are based on Danielsen and Kelley (2010).

The study mainly concentrated on the plant clinics themselves and their institutional and historical context, less so on client perceptions. Feedback from clients and outcome measurements will be assessed more systematically in the next phase of the research.

The data were collected through 1) Semi-structured interviews with plant clinic staff, their superiors, MAAIF officials and GPC staff, 2) Analysis of plant clinic registers, 3) Direct observation of plant clinics in operation, 4) Exit interviews with clients, 5) Review of monitoring and progress reports and other relevant documents.

We have attempted to verify the findings by consulting different sources of information; however, it has not been possible in all cases. There are some gaps in the clinic register data and we were not able to acquire as many progress and summary reports as intended. It was not possible to conduct interviews with the coordinators/directors of Caritas and SG2000, so some perspectives of the plant clinic initiative may be missing.

The results of the present plant clinic study were presented and discussed at a stakeholder workshop in April 2010 in Mukono. Based on the evidence from the field study and conclusions of the workshop (presented in a separate report), concrete plans for the establishment of new plant clinics will be made by existing and new actors, including a pathway for desired organizational and behavioural changes.

Table 1. Criteria used to assess plant clinic operations and results in three districts of Uganda.

Clinic organisation and management	Quality assessment of clinics
<ul style="list-style-type: none"> • Institutional arrangements • Staff (#, training, rotation) • Costs and financing • Register management and reporting • Monitoring • Communication, coordination 	<ul style="list-style-type: none"> • Venue, access • Materials and publicity • Timeliness, regularity • Attitude and communication • Technical quality and feasibility of advice • Technical backstopping, networking
Clinic use	Clinic outcomes
<ul style="list-style-type: none"> • # clinic events • # users • Coverage • Crops and problems • Gender • Repeat visits 	<ul style="list-style-type: none"> • Plant health • Vigilance • Changes in attitudes • New demand and synergies • Changes in Government strategy

3. The plant clinic start-up in Uganda

The mobile plant clinics in Uganda were born out of the ‘Pest Knowledge Partnership initiative’ or PKPi, a collaboration between the Global Plant Clinic (GPC-CABI) and Department of Crop Protection of MAAIF (Ministry of Agriculture, Animal Industry and Fisheries) and funded by DFID (Department for International Development). A ‘mobile plant clinic’ model was being developed in Bolivia, Bangladesh and Nicaragua during 2003-2005, and it was envisaged that the model might be appropriate for Uganda as a way to ensure better plant health advisory services for farmers.

The first step towards establishing plant clinics was taken in July 2005, where MAAIF held a planning meeting in the UNFFE Hall in Kampala. Participants included staff of MAAIF, National Agricultural Research Organization (NARO), Local Government (LG), NGOs, Uganda National Farmers Federation (UNFFE) and the GPC. The NGOs were Horticultural Exporters' Association (HORTEXA), Sasakawa Global 2000 (SG2000) and Soroti Catholic Diocese Integrated Development Organization (SOCADIDO). Later, it was agreed to replace HORTEXA with CARITAS because the former was only dealing with horticultural crops.

It was further decided that the clinics would be run by NGO staff with support from LG extension staff in Mukono, Iganga and Soroti districts. The role of MAAIF was to coordinate and oversee the plant clinics and to disburse funds to the partners. NARO agreed to run a mobile plant clinic at Serere Agricultural and Animal Research Institute (SAARI) drawing on own resources. The clinics would run twice a month in the markets of Nkokonjeru, Kawete and Katine in the districts of Mukono, Iganga and Soroti, respectively.

The participants agreed on the following objectives of the mobile plant clinics in Uganda:

- 1) To provide advice to farmers on how to handle pest and diseases problems; and
- 2) To use clinics as a surveillance and monitoring tool for pests and diseases.

These objectives reflect the motives of the partners to engage in the initiative: MAAIF saw the clinics as a way to improve pest and disease surveillance at community level, and for the District

Agricultural Departments as well as the NGOs the clinics were a way of improving their extension activities, enabling them to reach more farmers and expand their target groups beyond projects.

Two pilot clinics were run in July 2005 in Nakifuma (Mukono District) and Nabumali (Mbale District) under the guidance of the GPC as a practical training in clinic operation. A third clinic trial was held in January 2006 in Nakifuma.

MAAIF organised several workshops/meetings during 2005 and 2006, including sensitization meetings with LG officials (Chief Administrative Officers, District Agricultural Officers, District Production Officers), NGO administrators, lead farmers and local communities. A training workshop was held in Mukono 2006 where the procedures for running the clinics were formulated and discussed. During these meetings and workshop, the concepts and practical arrangements related to clinic operation and management were defined, including nomenclature of clinic staff (see section 4.1). An implementation plan with activities for each quarter was made to orient the clinic staff and others.

For various reasons including work load of MAAIF staff, confusion about the organization of the clinic start-up and delays in transfers of funds, it was not until November 2006 that the clinic started to operate on a regular basis.

In Mukono they decided to maintain Nakifuma as a clinic venue, in addition to Nkokonjeru. By the end of 2006 there were four mobile plant clinics running on a fortnightly basis, 2 in Mukono, 1 in Iganga and 1 in Soroti (Table 2).

Table 2. Time and venue of clinic operation in the three districts involved in the plant clinic initiative.

District	Location	Organisation	Opening hour
Soroti	Katine and Ocapa markets (alternating)	SOCADIDO District Agric Department	Every other Tuesday 10am – 1pm
Mukono	Nkokonjeru market	CARITAS District Agric Department	Every other Tuesday 11am – 2pm
Mukono	Nakifuma market	CARITAS District Agric Department	Every other Wednesday 8am – noon
Iganga	Kawete market	SG2000 District Agric Department	Every other Saturday 9am – 1pm

4. Plant clinic operations

The trip to the three districts revealed that the plant clinics had not operated since mid 2009. SOCADIDO has recently revived the clinic in Soroti but the clinics in Mukono and Iganga remain stalled due to lack of funds and clinic staff. The information and findings included in this chapter refer to the operational procedures used when the clinics were still active.

4.1 Organisation and management

ORGANISATIONAL ARRANGEMENTS

Right from the beginning the GPC stressed that the plant clinics were an *initiative* and not a *project* to signal that the plant clinics were meant to be a regular and permanent service owned by the partners who operated them, unlike a project, which has a defined end point. In August 2005, a short Plant Health Services initiative (PHS_i) document to support the initiative was written by the GPC and

distributed to partners. In this document the activities, responsibilities and outputs were laid out for the setting up and running of the clinics. The purpose of the PHSi was described as follows:

'The emphasis will be on mobile plant clinics and seeing how these can be successfully operated by NGOs together with inputs from staff at district agricultural offices. Further work is needed to iron out minor problems and identify the best procedures for operating them. That is the main purpose of the PHSi programme from now until March 2006.'

As of now, no formal, joint agreement has been signed by the partners. Since the plant clinics was a new method both for the GPC as well as the Ugandan partners, the PHSi was deliberately established as an experiment with few formal arrangements to allow partners being creative and flexible. However, the lack of a formal agreement to back up the initiative was mentioned by several as a problem, since it prevented them from integrating the clinics into their work plans and getting a broader buy-in. As expressed by a senior MAAIF official: *"Some systems don't work here. So if you come with a pilot and insert it into a non-functioning system you will not get good results. There should be clear agreements and backward linkages."*

The way the clinics were managed differed slightly from district to district. In *Mukono* and *Iganga* the plant clinics were run mainly by LG staffs who acted as plant doctors. The roles of the NGOs, CARITAS and SG2000, respectively, were to coordinate activities, release funds for clinic operations, mobilise farmers and initially to identify lead farmers to act as nursing aids. In *Nakifuma*, the plant nurse was a CARITAS employee, while the plant nurse who used to attend the clinic in *Nkokonjeru* was sub-county extension worker of the LG. In contrast, in *Iganga* the clinic was entirely run by LG staff. In *Soroti*, the opposite was the case. The plant clinic was coordinated and run by SOCADIDO staff with the occasional support of LG staff.

The original arrangement aimed at creating flexible and responsive LG-NGO alliances in the districts. The LGs would mainly provide technical capacity. It was thought that the NGOs would have more operational flexibility than the LGs and that they would be able to complement with own resources from other extension related programmes. The experiences with this model have been mixed. The role of the NGOs in *Mukono* and *Iganga* has been subject to some confusion and discussion. The money was transferred through the NGOs, yet it was the LG staff that did most of the clinic work. Some saw it as the LG carrying out work for the NGOs and could not see the point in that. The lack of clarity about roles became more pronounced when the clinic coordinators of CARITAS and SG2000 left their positions to undertake other work. As of today they have not been replaced and the status of the plant clinics is uncertain. In *Soroti*, SOCADIDO has taken the role as clinic protagonist, providing coordination, technical capacity as well as supplementary funds.

CLINIC COSTS AND FINANCING

The average costs involved in running a fully funded clinic are estimated at US\$150,000 per event. This includes allowances for clinic staff, transport of furniture and tent, labour to help set up the tent, publicity, and in the case of *Iganga*, a coordination trip to *Kampala* to interact with SG2000 headquarters.

A small grant was provided by the GPC to MAAIF to pay for operational costs of the clinics and travel and subsistence costs for MAAIF staff. In addition to this, the GPC would provide plant doctor training, technical backstop support and occasional follow-up visits to monitor progress.

Initially MAAIF covered the clinic costs directly. Transferring funds from MAAIF's account to the district partners was somewhat complicated, so they decided to bring the money in cash. The support team scheduled trips to the clinics with Ministry transport and facilitated the clinics upon arrival. However, due to problems with timely disbursement of funds from the Ministry, the GPC

took the decision in 2006 to transfer the funds for clinic operation directly to the NGOs (in the order of GBP700 – 1,000 per district per year).

Some partners felt there should have been more discussions between GPC, MAAIF and NGOs about money management to establish clear terms and conditions. According to a MAAIF official there were not enough consultations with the NGOs when the GPC decided to transfer the funds to them. “*They started calling us: ‘we got the money for the clinics, now what do we do?’*” Having overcome initial confusion about procedures, the plant clinics started operating more regularly from November 2006.

Two problems related to plant clinic funding were consistently mentioned by the interviewees. The funds were too small to ensure continuous operation and the transfers were too intermittent. Sometimes plant clinic staffs were paid in advance, but sometimes they had to operate with own means and receive a refund later (see Box 1). Some complained that the payments took a long time and that the incentives were too small. As one plant doctor said, “*The people need to feel some kind of benefit for the effort they make, especially on a weekend. We just got a small allowance for fuel etc, so at the end of the day you remained with nothing. We have been living on hope that thing would improve since we are still piloting to see if it works, if the farmers appreciate it.*”

After a period of rather consistent clinic operation in 2007 and 2008¹, clinic activities declined during the first half of 2009 and eventually stopped in May – July.

The GPC expected the clinic partners to contribute to the initiative with own resources. Various attempts were made to attract additional funds. At some point the clinic in Iganga operated on funds from SG2000 for a period when the GPC money had run out. The clinic team applied for funds from PMA (Plan for Modernisation of Agriculture) and PAF (Poverty Alleviation Fund) through the LG, but with no success. The PAF funds were later diverted to NAADS (National Agricultural Advisory Services). As they explained, “*The PAF funds were supposed to be used in plant protection, but they didn’t want to run parallel programs, so they gave it to NAADS although NAADS does not deal much with crop protection. So we got stuck when the GPC funds ended.*” The GPC made an effort to engage with NAADS to create synergies and share resources but according to GPC staff, NAADS had its own agenda and showed little interest in engaging with the plant clinics.

In Mukono they managed to get funds from PMA to support the clinics for a period, but the funds were small and intermittent. They tried to access the PAF funds to follow up on the agreements from the GPC workshop in Soroti 2009² to hold a ‘medical conference’, but without luck.

SOCADIDO have had better means to finance some clinic activities with funds from other projects under the Livelihoods Programme where the plant clinic is based. For instance, they have used resources from a farmer training programme to follow up on the advice given at the clinic.

Box 1. The frustrations of being stuck

“When you come to attend the clinics, the nursing aids expect you to pay their allowances and the other costs incurred. I told to them that I was trying to get some funds from the district, but then later when I said that the money was not there, I got a bit stuck. I said “*I don’t have much to say until I get feedback from PMA or PAF. But as for now, you can just sacrifice and stay on station!*” The nursing aids have had to cover mobilisation of materials and publicity from their own allowances. People in the field also complain about the tables, chairs and tent that have to be moved for every clinic event. If it weren’t for those bulky items, maybe they could sacrifice and come on station. When I go there they look at me expecting help!”

Plant doctor, Mukono

¹ Verified for Mukono through the clinic registers. Not verified for Iganga and Soroti.

² GPC workshop on ‘Monitoring Progress and Quality of Plant Health Clinics’ held in Soroti, Sept 2009

SOCADIDO have also contributed with transport to the clinic venue, a big tent as well as radio announcements.

PLANT CLINIC STAFF AND TRAINING

From early on the partners agreed on clinic staff categories, based on position, seniority and function in the clinic. At the beginning it included five categories, but it was later reduced to three, plant doctors, plant nurses and nursing aids (Table 3). These are not official titles. The distinction between plant doctor and plant nurse does not necessarily reflect differences in technical qualifications. It is more related to the location, plant doctors being extension staff based at the districts, and plant nurses being sub-county extension staff. This staff structure was linked to the original idea of running clinics through sub-county extension staff (nurses), occasionally backed up by plant doctors from the district. Since this model has become more blurred with time; there is now a tendency to use only two staff titles, plant doctor and nursing aid. The distinction between doctor/nurse and nursing aid is clearer. The nursing aids are lead farmers, who undertake the practical arrangements at the clinics and the registration of clients.

Table 3. Plant clinic staff structure defined by national partners in 2005.

Clinic staff category	Occupation	Function in the plant clinic
Plant doctor	District level agricultural or plant protection officer	To offer specialised plant health services which the staff below them cannot handle
Plant nurse	Sub-county level field officer	To run the clinic providing on spot solutions to problems and referring cases to laboratories
Nursing aid	Lead farmer, farmer facilitator	To register farmers and handle simple cases within their knowledge when all other persons are absent

There are so far no formal qualifications defined for plant doctors. The districts and NGOs picked candidates with background in crop protection and vast practical experience. They have received different types of training over the years through MAAIF, FAO, CGIAR centres and others.

The plant doctor training has been undertaken and funded entirely by the GPC. The training was highly appreciated by clinic partners. It was agreed at the beginning that MAAIF and NARO would provide additional training and backstopping but this has not materialised yet³. In 2006 MAAIF provided an orientation workshop in Mukono for clinic staff to initiate the clinic operation and re-invigorate the initiative after having stalled since July 2005.

Just as the plant clinic concept and operations have evolved since its initiation in 2003 in Bolivia, so has the GPC training of plant clinic staff. At the beginning the courses focused mainly on symptom recognition. Now, the basic plant doctor training comprises 3 modules of 3 days each under the course heading '*How to Become a Plant Doctor*'. The topics addressed are the following:

- MODULE 1 – Basic course: field diagnosis, how to run a Plant Clinic
- MODULE 2 – Basic Plant Healthcare: control options, decision-making, quality of service
- MODULE 3 – How to design an extension messages and write Fact Sheets.

³ In 2007 the GPC gave an additional course on phytoplasma identification to plant pathologists from Uganda, DR Congo and Kenya, including 11 NARO researchers.

Since the modules were developed and modified during the plant clinic implementation period in Uganda, they have not been taught chronologically. Module 2 has not been implemented yet. An additional course on monitoring was developed in 2008: *'Monitoring Progress and Quality of Plant Health Clinics'* and taught in Uganda in 2009.

A total of 29 persons have received some kind of GPC training since 2006. Of these, 14 are no longer available to the initiative, either because they have changed job, retired or because they have left the country to study abroad. Table 4 summaries the GPC training given to staff who is currently available to support the initiative in case the clinics are to be revived. Only three persons have attended the course on fact sheet writing, of these none are plant doctors. The majority of the nursing aids have not received any training.

Table 4. Number of available clinic staffs and GPC training received.

Position	# staffs available	# who have received GPC training			
		Mod. 3 (2006)	Mod. 1 (2008)	M&E (2009)	No training
Plant doctor	5	-	4	5	-
Plant nurse	2	1	2	1	-
Nursing aid	8	2	1	1	5
Total clinic staff	15	3	7	7	5
Coordinator/ supporter, clinic org.	2	-	-	2	-
Coordinator/ supervisor, MAA4IF	4	1	2	2	2
Total support staff	6	1	2	4	2

Mod. 1: Field Diagnosis and Operation of Plant Health Clinic (Module 1) 3 days, January 2008

Mod. 3: Fact Sheets for Farmers (partial), 2 days, July, 2006

M&E: Monitoring Progress and Quality of Plant Clinics, 3 days, Sept 2009

The plant clinic initiative is short of staff. There are currently five plant doctors to attend four clinics. Of these, one is about to retire. In Mukono there is only one plant doctor to attend the two clinics, which is one of the reasons why they stopped operating. In all districts it seems to be a challenge for the extension staff to make the clinic attendance fit with competing activities, especially the NAADS programme which relies on LG extension staff to implement their activities.

REGISTER MANAGEMENT

All clinics use the same principles for recording the queries received at the clinics. The clients are received by the nursing aids who record their data in a register book. They also fill out the first part of the query form (date, name, origin, crop), which the client then brings to the plant doctor where the consultation takes place.

The query form and the registration procedures have undergone several changes (see Box 2). At the beginning several queries were entered in one form. It was later converted into a one-query-per-sheet form to make room for more information about the problem and the

Box 2. Making client registration more simple

"Initially the farmers would first get registered by the nursing aid, then take the clinic form to the nurse who wrote the description of the problem and make a first diagnosis, and then pass it on to the doctors, who would then have to ask the same questions to understand the problem. It was a long procedure and when you get an influx of farmers it takes too much time. So now the form comes directly from the nursing aid to the plant doctor."

Plant clinic staff, Iganga

recommendation given. The form is produced in three copies with either carbon paper (Iganga, Soroti) or carbonated books (Mukono). The original is for the client and the two copies stay with the clinic staff (see Monitoring and Reporting below). The form was modified in late 2008 to add a space to note whether the client brought a sample or not, and to note any feedback comment from return clients. The revised form has not yet been used by all clinics.

The queries are given a code to identify the client and the problems brought. For example the code KT-3-2-1 means: Kawete clinic, client no. 3, sample no. 2, problem no. 1 on that sample. This coding system is not applied consistently and a general revision of the registers revealed many mistakes. It is a question though, how useful this system is. At each clinic day the numbering starts from 1, meaning that the codes are not unique and can therefore not be used to track individual queries. To our knowledge the codes have never been used for a particular follow-up purpose.

Although registration procedures have been discussed and modified several times, there are still some weaknesses. The copies are not always readable and sometimes loose sheets get lost. In Mukono the registration book includes only date, name and origin of clients. It does not include information about the crop or the problem. In contrast, in Soroti the registration book also includes information about crop and pest, and lately about the recommendation given. That makes the registration book more informative, but it also means that the recording procedures become more tedious and prone to errors. The nursing aids enter the additional information from the copy after the client has left, so if time is scarce the recording may not be completed.



In Soroti (left) they use carbon paper and loose paper sheets held together with a needle to produce copies of the query form. In Mukono (right) they use a carbonated register book.

The electronic recording of clinic data is still under development. The results from the first trials in 2005 and 2006 were entered in a simple Word table. Neither diagnosis nor advice was recorded. Later a simple Excel format was introduced by the GPC to make data clinic data easier to summarise and analyse. Still, there are no common standards for the electronic recording and no consensus among the clinic partners about format and how the data should be used.

In all districts, plant doctors have attempted to type up clinic data in Excel and the external consultant hired by the GPC (see below) also undertook some of the data entry. Some were reluctant to work on the Excel register since it was not part of their official work plan. They saw it as a task to be carried out for the GPC without remuneration. The existing electronic data remain incomplete and not up to date. This is partly because some of the clinic staffs are constrained regarding computer access and literacy, and partly because of the lack of well-defined roles and responsibilities in the register management. The issues of data quality will be addressed in more detail in Section 4.2.

MONITORING AND REPORTING

Monitoring, follow-up. Initially MAAIF established a team of four officials that would follow-up on the plant clinic activities and document result. They usually visited the clinics in teams of two. At the beginning the visits were frequent, that is when the money from GPC was channelled through MAAIF. When the money was transferred directly to the NGOs, the MAAIF visits became less regularly. A MAAIF official tells that, *“We kept on going for some time subsequently, thinking that at some point the clinics would be able to cope themselves. Then we could withdraw.”*

In 2005 GPC hired an external consultant to support clinic operations and gather result. Later, the assignment also included monitoring quality and performance. At the beginning the consultant went together with the MAAIF team to visit the clinics. Later they went separately, since it was complicated to match procedures and working schedules.

The follow-up visits involved checking whether the clinic staff conducted their work according to the guidelines and if all practical arrangements were in place. A wrap-up meeting was held in the end to discuss how it went and what could be improved. Occasionally the support team also acted as plant doctors to help diagnose problems and sometimes they brought samples back to Kampala for further analysis. Generally the clinic staff appreciated the support from the follow-up team. It helped them improve procedures, update technical knowledge, and equally important, it helped them feel backed up and connected.

The GPC made three follow-up visits, in 2006, 2008 and 2009. The visits included plant doctor training as well as visits to selected clinics and clinic partners. Each visit was documented in a photo report. Although the reports were distributed widely to the clinic partners by email, not all received a copy. Some do not have an email account and even those who have one may have limited or random access. The GPC reports included detailed discussions and action points for further progress; however, it is a question to what extent they have helped orient and improve clinic operations.

From 2007 and onwards, the GPC began testing ways to improve monitoring of plant clinics. A simple one-page form was developed with partners in Bangladesh and Vietnam to guide monitoring visits in a more systematic way. The GPC consultant began using the form in 2008. The form was meant to be part of a monitoring system, which includes other elements such as revision of clinic registers, regular follow-up meetings with clinic staff and support team, capturing feedback from farmers and follow-up visits in farmers' fields. The tools and principles of plant clinic monitoring were taught at the GPC workshop in September 2009 (see Table 4). However, at that time all the clinics had ceased to operate, so the outputs from the workshop were never put into practice.

Reporting. As mentioned above the query forms were produced in three copies, the original for the client, a copy for the clinic organisation and a copy for the GPC consultant. The latter was later sent to the GPC together with the Excel file. For MAAIF to get access to the original clinic data they had to visit the clinics and consult the registers to summarise the data manually for their internal reporting. So essentially there were two parallel, independent follow-up and reporting systems. The consultant reported to the GPC and the MAAIF team reported to the Department of Crop Protection, with little or no feedback to the clinic organisations in both cases.

The parallel GPC/MAAIF reporting systems and general lack of information sharing were an obstacle to the establishment of an effective data management and reporting system. It also maintained the impression that the plant clinics were a ‘GPC project’. The confusion about roles, responsibilities and ownership to the data has limited the use of the clinic results and experiences. So far the clinic results have not been documented for a wider audience, except through the GPC travel reports.

The clinic organisations used their own way of reporting clinic activities. In Iganga they made a short 2-p summary report after each clinic event, which they submitted to the SG2000 country director. In Soroti they made summaries in Excel as part of the internal quarterly reporting system of SOCADIDO. A progress report for April-August 2008 was submitted to GPC. We were not able to find out how reporting was done in Mukono.

COORDINATION AND COMMUNICATION

The coordination of clinic activities in the districts was done by either NGO or LG staff as explained earlier. The overall coordination was done through the MAAIF team and was mainly concentrated around organising GPC visits. There have hardly been any joint activities for all partners beyond the ones driven by the GPC. This added to the notion of the clinics being a ‘GPC project’.

The communication was perceived as a problem by most of the interviewees. The limited feedback and systematic exchange of information and reports has left many uninformed about clinic activities, results, experiences and plans, except that *‘there are no more funds’*. The fact that the GPC was/is seen as the main sponsor and driver of the plant clinics made the long gaps between GPC visits a problem for communication and continuous development and follow-up of the initiative. Despite many attempts to encourage simple documentation and regular information sharing, the GPC received very little feedback and information from Uganda about progress and problems, which made follow-up even more difficult.

No clear paths of communication were established for the initiative and it seems to be random who received information and reports and who did not. Messages and reports from the GPC were sent by email, however, nursing aids do not have access to email, and not all plant doctors and nurses have either. Those who do have an email are required to pay for internet use and photocopying themselves, except in SOCADIDO, being the only plant clinic organisation with own internet connection. SOCADIDO have more facilities and capacity to maintain effective communication links with the GPC and MAAIF as opposed to the other clinic partners. They have a resource centre where all the GPC reports are put on display for anybody who wants to enquire about the initiative.

4.2 Plant clinic use

The data presented in this section were retrieved from the plant clinic registers, either electronic or manual (query forms and register books). It has been a long and time-consuming process to gather, clean and consolidate the data and a lot of confusion has been involved. The difficulties in getting access to the data reflect the same weaknesses stated above on reporting and information flow: lack of clarity about roles, responsibilities and procedures in data management. Who does what and how? The electronic registers are not up to date in any district and the formats used vary greatly. This makes analysis complicated. Some of the general mistakes found in the Excel data are listed in Box 3.

Box 3. Typical mistakes observed in Excel data

- Mix of date formats (some dates had inversed day-month sequences)
- Lack of agreement between Excel data and the physical register
- Spelling mistakes, extra spaces
- Use of different formats
- Same code used for two clinics
- Information missing

There are some gaps in the data since it was not possible to get access to all the registers. There are no data from Katine and Kawete clinics for the period May 2007–July 2008, which means that the

numbers presented may be substantially under-estimated. After merging all the data into one Excel file they were cleaned, harmonised, corrected and subsequently summarised by using the ‘data filter’ and ‘pivot tables’. We were not able to verify all client and village names so these numbers may be slightly overestimated. For the same reason the number of return clients may be too low.

The plant clinics received a total of 1,947 queries by 1,123 clients from 408 villages during the entire period including the first clinic trials in 2005 and 2006 (Tables 5 and 6). The ten most frequently presented villages at each clinic represented between 29% (Ocapa) and 58% (Katine) of all queries (data not shown). The total number of crops presented was 62, varying from 23 in Katine to 39 in Nkokonjeru. The overall average of women clients was 26% with substantial difference between districts (Table 6). Katine had the highest proportion of women (46%) and Iganga the lowest (6.5%). A total of 81 clients visited the clinics more than once.

Table 5. Number of queries presented at the plant clinics from 2005 to 2010.

Clinic	2005	2006	2007	2008	2009	2010	Total
Nabumali (pilot)	50						50
Kawete, Iganga		286	94	151	91		622
Katine, Soroti		157	28	56	35	14	290
Ocapa, Soroti				160	12		172
Nakifuma, Mukono	58	39	62	55	62		276
Nkokonjeru, Mukono		114	180	173	61	9	537
Total	108	596	364	595	261	23	1947

Grey areas indicate periods without operation

Table 6. Overall summary of queries presented at the plant clinics from 2005 to 2010.

Clinic	# queries	# clients	# return clients	% women	# villages	# crops
Nabumali (pilot)	50	13	-	44	-	10
Kawete, Iganga	622	252	30	6.5	80	42
Katine, Soroti	290	180	13	46	70	23
Ocapa, Soroti	172	132	7	30	89	21
Nakifuma, Mukono	276	194	6	22	69	29
Nkokonjeru, Mukono	537	352	25	39	100	39
Total	1947	1123	81	26	408	62

A total of 145 clinic events were held in the reported period (Table 7). The majority of the clinics (102) were held in Mukono, followed by Iganga (24) and Soroti (18). However, this probably does not present the true picture due to the 14-month gap in the data from Iganga and Soroti as mentioned earlier.

The registers show that the clinics in Mukono operated consistently on a fortnightly basis in 2007 and 2008, especially the clinic in Nkokonjeru. The clinics in Iganga and Soroti seem to have been less regular. Table 7 also shows the average number of queries received at the clinics. Iganga and Soroti received the highest number, between 22 and 34, while the clinics in Mukono received between 7 and 9 queries on an average.

Table 7. Number of clinic events held at each clinic location and average number of queries received.

Clinic	# clinic events held							Average # queries received per clinic						
	2005	2006	2007	2008	2009	2010	Total	2005	2006	2007	2008	2009	2010	Avr.
Nabumali (pilot)	1						1	50						50
Kawete (I)		5	3	9	7		24		57	31	17	13		26
Katine (S)		4	3	2	3	1	13		39	9	28	12	14	22
Ocapa (S)				4	1		5				40	12		34
Nakifuma (M)	1	1	13	16	8		39	58	39	5	3	8		7
Nkokonjeru (M)		5	21	27	9	1	63		23	9	6	7	9	9
Total	2	15	40	58	28	2	145	54	40	9	10	9	12	13

Grey areas indicate periods without operation; **I** – Iganga; **S** – Soroti; **M** – Mukono

Of the 62 crops, the three most important ones were banana, cassava and orange with 16, 11 and 10%, respectively (Table 8). The crops included a wide range of roots and tubers, cereals, vegetables, pulses as well as a minor proportion of tree and oil crops, spices and ornamentals.

Table 8. Number and percentage of crops presented at the plant clinics in the three districts.

Rank	Crop	#	%	Rank	Crop	#	%
1	Banana	298	16	19	Avocado	16	0.9
2	Cassava	207	11	20	Citrus	16	0.9
3	Orange	188	10	21	Cowpea	15	0.8
4	Maize	147	8	22	Bitter berry	14	0.8
5	Tomato	143	8	23-28	Green pepper, Jackfruit, Onion, Pumpkin, Simsim, Yam	10	0.5
6	Coffee	125	6.8	29-31	Eucalyptus, Potato, Vanilla	8	0.4
7	Groundnut	103	5.6	32	Soybean	6	0.3
8	Cabbage	77	4.2	33-35	Cocoa yam, Millet, Napier grass	5	0.3
9	Sorghum	59	3.2	36-37	Cereal, Cotton	4	0.2
10	Rice	43	2.3	38-42	Elephant grass, Guava, Nakati, Soar berry, Solanum sp.	3	0.2
11	Sweet potato	39	2.1	43-46	Lemon, Pineapple, Red Pepper, Sugarcane	2	0.1
12	Water melon	39	2.1	47-62	Anona, Apple, Arrow root, Cocoa, Entula, Ficus spp, Finger millet, Forest trees, Kayinja, Kulekula nuts, Ntende, Ntula, Pea, Shrub tree, Sukuma wiki, Sweet pepper	1	0.1
13	Eggplant	36	2.0				
14	Bean	33	1.8				
15	Pawpaw	29	1.6				
16	Passion fruit	21	1.1				
17	Mango	20	1.1				
18	Green gram	19	1.0				
					Total *	1839	100

* The total is smaller than in Table 5, since some data were taken from the register books where crop names were not included.

The crops vary from district to district (table 9). In Iganga maize is the dominating crop, in Soroti it is orange and in Mukono banana is the most important one. Cassava ranks high in Soroti and Mukono. Groundnut is important in Iganga and Soroti but rare in Mukono. There is no single crop in the top-five that cuts across all districts.

Table 9. The most important crops in each district. Numbers in brackets are the # of queries presented.

Rank	Iganga	Soroti	Mukono
1	Maize (113)	Orange (149)	Banana (190)
2	Banana (80)	Cassava (69)	Cassava (104)
3	Tomato (67)	Sorghum (59)	Coffee (72)
4	Groundnut (57)	Groundnut (29)	Tomato (51)
5	Coffee (52)	Tomato (21)	Cabbage (43)

Table 10 summaries the diagnoses made according to the type of cause. Insects comprise the largest group (23%), followed by fungi, bacteria and viruses with 17, 11 and 9%, respectively. The weeds are almost entirely problems with *Striga* in cereals. Only a few cases of nematodes were recorded. The vast majority of virus cases were from cassava and groundnut. Eleven percent of the queries were not assigned to a specific cause, rather described by the symptoms. It is likely that the diagnoses given at the clinics to some extent reflect the ease by which symptoms can be recognised. More discussions on the quality of the diagnoses will follow in Section 4.3.

The relatively high proportion of undiagnosed/unrecorded cases (18%) is due to the fact that 1) at the three first clinic trials the diagnoses were not recorded (147 cases) and 2) some of the data from Nkokonjeru were taken from the register book where crops and diagnoses were not entered (135 cases).

A wealth of problems was brought to the clinics. Only the most important ones are presented here. Table 11 lists the five most frequent problems in each of the main crops. Banana bacterial wilt (BBW) is by far the highest scoring disease of all. Cassava mosaic and cassava brown streak comprise the vast majority of cases in cassava.

Leaf miner, fruit fly and scab are equally represented in orange, while the remaining crops each have one predominant problem: *Striga* in maize, *Fusarium* wilt in tomato, coffee wilt in coffee, rosette virus in groundnut, black rot in cabbage and stalk borer in sorghum. To what extent these disease profiles coincide with the official disease statistics remains to be examined.

Some major diseases have received a lot of public awareness, such as banana bacterial wilt, *Striga*, cassava mosaic and cassava brown streak. This may have helped the plant clinic staff recognise typical symptoms. In some cases the cause of the problem is not clear. It is not stated whether 'banana wilt' is caused by bacteria or *Fusarium*. Root rot in cassava, tomato blight and sorghum stunt may have various causes.

Table 10. Diagnoses by type of cause.

Diagnosis recorded	#	%
Insects	481	23
Fungi	350	17
Bacteria	234	11
Viruses	189	9
Weeds	103	4,9
Nutrient deficiency	50	2,4
General agronomy advice	29	1,4
Abiotic stress	23	1,1
Rodents	12	0,6
Nematodes	7	0,3
Mycoplasma	7	0,3
Symptom description, no specific pest	227	11
Not diagnosed or not recorded	384	18
Total *	2096	100

* The total is higher than the number of queries, since some of the samples had more than one problem. 125 samples had two problems, 11 samples had three problems and 1 sample had four problems.

Table 11. The most important plant health problems identified in the major crops.

Banana	#	Cassava	#	Orange	#
Bacterial wilt	178	Cassava mosaic	69	Leaf miner	40
Banana wilt *	30	Cassava brown streak	28	Fruit fly	36
Banana weevil	24	Root rot **	16	Scab	35
Nematodes	4	Mealy bug	8	Scales	6
Fusarium wilt	4	Green mite	3	Aphids	5
Maize	#	Tomato	#	Coffee	#
Striga	80	Fusarium wilt	32	Coffee wilt	70
Stalk borer	19	Bacterial wilt	8	Stem borer	14
Smut	9	Tomato blight **	8	Mealy bug	5
Nutrient deficiencies	6	Nutrient deficiency	4	Black ants	2
Streak virus	5	Tobacco leaf curl virus	4	Coffee berry disease	3
Groundnut	#	Cabbage	#	Sorghum	#
Rosette virus	48	Black rot	19	Stalk borer	29
Cercospora leaf spot	5	Diamond black moth	8	Striga	6
Leaf miner	3	Aphids	8	Smut	5
Aphids	3	Caterpillars	6	Stunt **	3
Drought	3	Collar rot	2	Shoot fly	3

* unclear if it is bacterial or Fusarium wilt; ** unclear whether it is the disease name or symptom description



The four most common problems presented at the plant clinics are **Banana bacterial wilt** (upper left), **Striga** (upper right), **Cassava mosaic** (lower left) and **Coffee wilt** (lower right).



4.3 Quality assessment of plant clinics

A complete assessment of clinic quality would require using different methods, such as clinic visits, revision of registers, interviews with clients and visits to farmers' fields to track the effect of advice given. In this study, however, the assessment is based mainly on the clinic registers, revision of the monitoring reports prepared by the GPC consultant as well as feedback from clinic staff. Because of the inactivity of the clinics, we were only able to make one proper clinic visit, namely to Katine market, where SOCADIDO is attempting to revive the clinic. A few exit interviews were made on that occasion. A clinic was set up especially for us in Nkokonjeru but it was not possible to make a proper assessment of the operations since heavy rains literally washed the clinic away and prevented the plant doctor from arriving on time from Mukono.

PLANT CLINIC VENUE

The current plant clinic venues are all perceived as good and accessible to farmers. They are all market places where people come from far to buy and sell. Many of them are farmers. The exact catchment area for each clinic remains to be determined, yet the number of villages listed in Table 6 indicates a substantial outreach, each clinic reaching between 69 and 100 villages.

During 2008-2009 the Katine clinic experienced a decrease in clinic attendance. The reasons are not clear but the staff attributed it to the many problems farmers in the Katine area had faced in the past and at present. Many farmers are poor subsistence farmers. They have little planting materials and are vulnerable to the extreme rainfalls experienced in recent years. There is famine in some parts of the area and foodstuff is expensive. SOCADIDO decided to use Ocapa more frequently as an alternative venue. The turn-out is higher there, apparently because farmers in the Ocapa area are commercially oriented.

Equity in plant clinic access is largely an unexplored topic. Do all types of farmers have equal access to the clinics? The proportion of women clients (Table 6) suggests a bias against women in some areas, especially in Iganga. Is this because fewer women go to the market? Or are they too busy to visit the clinic? Do they know about it? These issues should be addressed in future studies.

MATERIALS

At the beginning there was only a table and a clinic banner at the clinic venue, but it soon became clear that they needed more furniture and some shade to attend the clients under proper conditions. Now all plant clinics have a kit of basic equipment and materials (Box 4). Nonetheless, the plant clinics are seriously under-equipped. The tents are too small and the quality is inadequate, except in Soroti where SOCADIDO has provided a big robust tent. The first tent they got in Nkokonjeru was destroyed by the weather. The one they used for our visit was borrowed from a neighbour and it did not pass the test of the heavy rains and winds.

Box 4. Plant clinic materials

- Tent, tables, chairs and benches
- Banner
- T-shirts and caps
- Registration book and query form
- A set of 16 Fact Sheets for farmers
- Camera (not all)
- Occasionally fresh samples

A part from a set of 16 fact sheets produced at the GPC course in 2006, there is no reference material to support the plant doctors in their work and there is no material to hand out to the farmers apart from the prescription. Only a few new fact sheets have been prepared since the 2006 course. There are various reasons for this. First, only few of the present clinic staffs have received

the GPC course on fact sheet writing. Second, writing a fact sheet requires access to a computer and a camera, which not all have. Third, it requires practice and certain skills to write fact sheet with confidence. More backup support is needed to do it. Fourth, the lack of clear agreements on roles and responsibilities within the plant clinic alliance made some ask why they should do it at all. “*Who is going to pay us for writing fact sheets?*”, some asked. It was thought that fact sheet writing would be part of their work as extension workers and that it would benefit the organisation in other ways but it was never agreed upon and written into the work plans.

The clinics are also short of tools to examine the samples, such as a hand lens and a knife, and materials to pack and store samples for referral to labs. Apart from the fact sheets and the occasional fresh plant samples, there are no visual materials to guide the clinic staff and clients.

Various materials were mentioned as essential to upgrade the clinics and thereby enhance the quality and appearance of the service (Box 5). Among these it was suggested that the clinics should have a bin for safe disposal of infected samples to avoid spread of inoculum and to show a good example to the clients.

A nursing aid explained the importance of good clinic appearance: “*Just as a human clinic, the plant clinic also requires some basic equipment and facilities for normal operation. Imagine a traditional healer who claims to be giving out medicine for richness but he is very shabby himself. Would you agree to take up his medicine? Therefore the clinic requires a good face value that reflects its importance and value to the community.*”

Box 5. Materials needed at the plant clinics

- A bigger and more robust tent (Mukono, Iganga)
- More fact sheets and reference literature
- Basic tools to examine samples
- Posters and photographs on display
- Package and storage materials for samples
- Camera (for those that do not have)
- Bin for disposal of infected plants



Under-equipped. The plant clinics need more and better equipment. The tents they have in Mukono and Iganga are too weak to withstand heavy weather and apart from the set of fact sheets produced in 2006 there are no reference materials for the clinic staff and the clients.

PUBLICITY

The clinic organisations used what they had at their disposal to announce the clinic days. In Nkokonjeru the nursing aids made announcements through the community radio. It only reaches people within 5 km so the farmers in the villages were missed out. They also made announcements through the churches and they requested farmers to pass on the information to fellow farmers.

In Nakifuma, publicity was done on an *ad hoc* basis by the nursing aid who worked with the NAADS programme as a Community-based Facilitator. He publicised the clinic as he moved around on bicycle doing NAADS activities. He also used a megaphone from Nakifuma Township.

In Soroti they make publicity through SOCADIDO'S own radio, the church and through community mobilisers. The radio is an effective means of communication. It covers the whole of the Teso region and beyond. The day of our visit to the Katine clinic, no radio announcements had been made beforehand. This was deliberate since the plant doctor knew he would be the only plant doctor on duty and he feared that there would be too many clients if the clinic were announced widely. As a consequence of this, all the clients of that day were spontaneous by-passers who came without a sample. They were attracted by the banner and the input display.

In Iganga the clinic was initially announced by word of mouth. When the GPC funds became available they announced the clinic on NBS radio once or twice in the week when the clinic was going to operate. They also used the market loud speaker to announce the clinic. Sometimes the nursing aids borrowed a megaphone from a nearby trading centre to make publicity.

There is a general perception among clinic staff that the publicity methods have worked but they are not enough. Still there were people coming to the clinics unaware of their existence. In order to create a stable demand, two key factors need to be in place: 1) regular operation and 2) permanent publicity. Early on it was agreed that each clinic should have a permanent signpost placed at a strategic place. They remain to be made.

TIMELINESS AND REGULARITY

The announced opening hours have to a large extent been kept. Occasionally farmers were attended after the usual closing hour if waiting time was long. In Soroti we observed that most of the time there were 2-4 people waiting their turn. Most of them listened to or participated in the on-going consultation, so it was not all wasted time. Sometimes the discussions became quite vivid. The practice of letting clients wait on a bench next to the plant doctor opens for the possibility to engage in discussions with more people. That way the clinic becomes a space for spontaneous learning and interaction. The consultation time could be shortened if the plant doctors had printed fact sheets to hand out on specific problems, especially because many problems are the same. As it is now, they write down the same recommendations many times.

Lack of regular clinic operation has been one of the major problems of the initiative. *"If the clinics are not consistent, the farmers stop coming,"* was a frequent comment from clinic staff. The clinics have been interrupted due to intermittent funds, unavailability of staff and work load. It is difficult to create the notion of a permanent community service if regularity is compromised. All clinic organisations have experienced the difficulties in creating awareness about the nature and existence of the clinics and in educating farmers to bring samples. So when the clinics had been inactive for a period it was like starting all over again. A plant doctor from Iganga regrets these constant drawbacks: *"The farmers were very enthusiastic at the beginning. I think if we had maintained that regime of going every fortnight we would have reached far by now. Farmers would be looking for us wherever we are."*

There was a long period in 2007 and 2008 where the clinics in Mukono ran very consistently, especially in Nkokonjeru. Whether the same was the case in Iganga and Soroti could not be determined since the clinic registers for that period were unavailable. Late 2008 the operations became more irregular. Despite the fact that SOCADIDO have more resources and operational flexibility than the other clinic organisations, the register data show that the Soroti clinic has been the most irregular of all.

ATTITUDE AND COMMUNICATION

Good communication between clinic staff and the clients is essential to ensure that the problems are described and understood properly, and the advice conveyed in a clear and understandable way. The fact that most farmers do not bring a physical sample to the clinic makes good communication even more important (see below). The farmer's description of the problem is important, not only to understand the scope and context of the problem, but also to understand their perceptions and current practices. This knowledge helps shape the extension message.

The clinic staffs have consistently been reported to have a good relationship with the clients. They attend people with respect and courtesy and take good time with each of the clients allowing them to ask for more answers and information. The nursing aids feel at home at the clinic. Some of the clients are neighbours and fellow farmers, so for the nursing aids it is a source of pride being able to attend the public at the clinic.

The recommendations are delivered verbally during the consultation and in writing via the prescription, written in English. So far little is known about how the clients perceive and understand these messages. Do they understand it? Will they remember it? Is the hand-writing readable? Is the English a problem for some? Those who are illiterate, what do they do with the prescription? The fact sheets were meant to be handed out to the clients as a means of delivering a quality message but until now, the fact sheets are few and only kept in one copy at the clinic.

QUALITY OF DIAGNOSES

Diagnosing plant health problems based on symptoms is challenging given the diversity of crops and causes (Table 8 and 10). In module 1 of the GPC course '*How to become a plant doctor*' the trainees learn the principles of field diagnostics, which include a systematic process of 1) symptom observation, 2) conversation with the farmer to learn more about the crop, disease history and the severity of the problem, and 3) diagnosis by elimination (excluding the unlikely causes one by one).

It is repeatedly mentioned in various reports that only few clients bring samples. Although it was agreed some time back that clinic staff should note whether the client brings a sample or not, we only saw this practice applied in Iganga for six clinic events, from 31.01.2009 to 02.05.2009. Of the 78 queries received, only 18 (23%) involved a physical sample brought by the farmer. The lack of a physical sample and appropriate reference materials makes diagnosing even more challenging.

However, the plant doctors seem to have gained enough knowledge and experience to enable them to diagnose many common problems. Most of the problems listed in Table 11 are known to the plant doctors and can be reliably diagnosed based on the symptoms. The monitoring reports state that, "*there is generally a good correlation between the description of symptoms, the diagnosis and the recommendation made.*"

Box 6. Diagnosing without a sample

"I observed that farmers describe their problems using gestures (facial, by hand or acts) in addition to words. In one case, a farmer had a serious concern when he kept on drawing a line on the table as he explained to the plant doctor his tomato problem. He kept explaining how one side of the tomato vine develops a dry lesion that goes up along the vine. The doctor understood and replied that it was a bacterial canker problem. The farmers had no sample but his explanation was close to what I had read in the literature. The doctor consoled the farmer that such a problem is usually not a serious one. The vine may topple (due to semi-breaking) from a point near soil level on the damaged side but the plant produces roots on the unaffected side, thus recovering from the problem. The farmer was happy and he smiled a bit."

Field report, Kawete plant clinic 2006

One of the problems presented at the Katine clinic was orange dog fly. When asked how he could tell when the client had not brought a sample, the plant doctor replied “*The farmer told me that the insect had bone-like structures and characteristic colours and that it leaves a sticky substance on the leaf. That is typical for orange dog fly*”.

Other problems such as leaf miners, Striga and stalk borer can also be diagnosed with a verbal description but it requires that the plant doctor is able to listen, observe and ask the right questions (Box 6). Other problems are more complicated to diagnose. Fungal and bacterial infections can be tricky to identify and distinguish. Abiotic causes can also be difficult since symptoms are often vague and general.

It was not possible to make a thorough assessment of the quality of the diagnoses within the given timeframe. However, a brief look at the clinic registers gives an indication of some of the weak points. Apart from the ‘no diagnoses/not recorded’ cases, around 11% of the problems are described with symptoms, not a diagnosis (Table 10). Some of them are shown in Table 12. In some cases the confusion may be due to the way they are recorded. ‘Wilt’ in coffee can be a general symptom description or it can be the specific disease ‘Coffee wilt’ caused by *Fusarium xylarioides*.

Table 10 can also be used to raise additional questions regarding diagnostic quality. Almost all weed queries are on Striga. How about other weed problems? There are only 7 queries on nematodes. Is it because nematodes are unimportant in the three districts or because they are difficult to identify? Based on what symptoms was mycoplasma identified? Most of the bacterial cases were BBW. Did they check for typical symptoms inside the fruits to verify the cause and distinguish it from banana wilt caused by *Fusarium*? How did they identify BBW if farmers did not bring a sample? One could suspect that the strong public awareness about BBW led the plant doctors to ‘over-diagnose’ the problem. These are issues that need to be dealt with when training plant clinic staff and monitoring quality of the diagnoses.

Table 12. Cases of unclear diagnoses retrieved from the clinic registers.

Unclear diagnosis	# cases	Comment
Wilt in several crops	32	Symptom description or disease name? Most likely cause?
Blight in several crop	11	Symptom description or disease name? Most likely cause?
Rot in groundnut	1	Symptom description or disease name? Most likely cause?
Leaf yellowing in rice	1	Symptom description or disease name? Most likely cause?
White fruit fly in cassava and pawpaw	2	White fly or fruit fly?
Total	47	

Technical backstopping from national laboratories was thought to be part of the clinic initiative from early on. The plant clinics would inevitably face problems they could not solve, so access to lab services was seen as key to ensure technical quality and to create confidence in the plant clinics. At the beginning the MAAIF support team would occasionally bring back samples and refer them to a lab. Later when the visits became less frequent, partners agreed that samples would be sent to MAAIF in Entebbe and from there to the lab in Namalere.

Despite many discussions and attempts to create a useful referral system, it never worked (Box 7). MAAIF’s laboratory in Namalere is remote and still not fully functional despite years of planning and construction. We could not get the exact number, but approximately 5 to 10 samples had been sent from the plant clinics to MAAIF’s labs. Two of these cases were recorded in the register as ‘lab referral’. No results were returned to the clinics.

The GPC has provided technical backstopping on a number of occasions. Five samples were brought back to the UK in connection to GPC visits to Uganda and one was sent by post from Mukono. The cases included citrus, cassava, groundnut and napier grass. A common problem in citrus in Soroti had been diagnosed as scab at the plant clinic (caused by *Elsinoe fawcettii*) but the test performed by the GPC revealed that it was a different disease caused by *Pseudocercospora angolensis*.

The lack of technical backstopping is strongly felt in the districts where lab facilities are scarce or non-existing. Initially NARO had agreed to become involved in the clinic initiative through Serere Agricultural and Animal Research Institute (SAARI) in Soroti but this never materialised. The contact between plant clinic staff and SAARI is sporadic and informal. Sometimes SOCADIDO staff is invited to their Demonstration Plots Open Days. In Soroti there is a 'plant clinic' in a small separate building at the LG premises with some basic lab equipment. It is supposed to strengthen the regulatory capacity in the district but it is still not operational due to lack of skilled staff and lab materials. In Mukono and Iganga there are no lab facilities.

Box 7. A long way to the lab

"We have the Namalere lab, but sending to there we pass through MAAIF. It takes time. They may not look at the sample as urgently as needed. Sometimes I send them with post. It takes 3 days to Entebbe. From Entebbe they send it quickly to Namalere, but the problem is when it reaches the lab. The person may take his or her time and the sample is lost."

Plant doctor, Soroti

The limited access to backstopping and updated information on pests and diseases constrains the plant doctors in dealing with the more challenging and doubtful cases. Some of them said they have felt a bit stuck at times. *"To give an answer to a farmer's problem you need to be prompt with the advice. Farmers want immediate solutions! So it is good if you can call somebody and discuss and ask for further information,"* a plant doctor commented. There are useful internet resources such as Infonet-Biovision⁴ but the limited access to internet and slow connections are an obstacle to regular use.

QUALITY OF ADVICE

Quality of advice comprises both technical quality (does it work?) and feasibility (will/can farmers apply it?). The ultimate proof of quality is the results obtained in farmers' field. However, it is not possible to follow up with field visits on more than a small fraction of the consultations. Monitoring visits to clinics, analyses of clinic registers and gathering of feedback from return clients are other means of assessing quality. In this study we have not made a detailed assessment of the quality of advice. We rely mainly on the existing monitoring reports, and some additional observations made during clinic visits and conversations with clinic staff and a few clients.

The recommendations given include both preventive and curative methods: cultural practices, improved varieties, clean planting material and pesticides. The plant doctors said that they aim at recommending cultural practices first and pesticides as a last resort. A thorough analysis of the clinic registers will give a clearer picture of the types of recommendations given and where there may be some gaps in knowledge. The monitoring reports conclude that, *"All recommendations are those widely given by public and private extension service and research institutions under Ugandan conditions."* The plant doctors seem to do what can be expected from them under the given conditions.

Some of the weaknesses observed in the prescriptions by the GPC consultant include lack of details about spraying and varieties as well as insufficient information about what measures are curative (can help solve the problems now) and what are preventive (will help the next season) (Box 8).

⁴ <http://www.infonet-biovision.org>, a web-based information tool offering information on major main pests, diseases, weeds and natural enemies common in East Africa.

Additional information was conveyed verbally to the farmers with the risk that the farmer might not remember the information once at home.

Feedback from clients gives an indication of how useful the recommendations have been. Some farmers have come back to report that their problem was solved and thank the clinic staff (see Chapter 5). The comments have mainly been positive, but some have reported limited effect of the advice. Of the eight exit interviews made at the Katine clinic, five clients said they would follow the advice, while three said they could not afford to buy the inputs. In Iganga, there was a problem with mites in tomatoes. *“It came in so big quantities that the recommendation we thought would work, did not have any effect. We knew it was mites, so we wondered why the chemical didn’t work,”* a plant doctor explained. Whether the lack of effect was due to the chemical or to wrong application remains uncertain.

Sometimes additional information is needed after the application of a technology. A client at the Katine clinic told the plant doctor that he was losing confidence in the new cassava variety he had planted (2961 NARO, resistant against brown streak) because after 6 months part of the root was woody and apparently useless. The plant doctor explained that it is a late maturing variety that requires a full 12-month growing season before it is ready to harvest. Other varieties require the same growth period, but after 6 months the roots are soft and eatable. Sometimes in moments of hunger, people harvest early. With the improved variety they cannot do that.

Box 8. Some weaknesses observed in the prescriptions

- Intervals and duration of spraying not given
- Names of resistant/tolerant varieties not given
- Spraying details missing (concentration, volume, timing)
- Information missing on precautions to be taken when spraying and when to start harvesting after spraying
- Recommendation for control of BBW not complete
- Recommendation was given although the problem was not diagnosed
- Both trade names and chemical names should be used for clarity
- Insufficient information about nature of recommendations (preventive vs. curative)

Monitoring reports, all clinics

The plant doctors recognise the importance of doing follow-up visits in farmers’ field to verify the effects of the advice and to understand where things might have gone wrong. The ability of clinic staff to do follow-up visits is limited because it requires additional resources. In Iganga and Mukono they have only done a few. In Soroti they have more resources to visit clinic clients, since SOCADIDO combines resources from other areas under their Livelihoods Programme. The past year they made 16 follow-up visits according to the plant doctor. They analyse the clinic register, and select examples to follow up on. The visits are sometimes based on problems brought directly to the office or comments from return clients.

In one case a client came to the Katine clinic to tell that the advice that not worked. *“We visited him and it turned out that what he thought was a fungicide was actually a fertilizer. He had been misguided by the stockist,”* the plant doctor explained. There was another case of scab in orange where the effect of the recommendation was limited because the client did not use the full quantity of fungicide to save money. These are issues that are beyond the control of the clinic staff. However, it shows the importance of conveying clear messages and understanding people’s practices and attitudes.

Access to good and affordable inputs is a key concern to all small-scale farmers. The ability and willingness of clinic users to apply a given recommendation depends in many cases on whether they have access to the recommended inputs and money to buy them. Some farmers feel they should be able to buy the medicine at the clinic (or get it for free), so they don’t have to spend time and money to make another travel to buy the stuff elsewhere. The plant clinics have tried to address the input issue. In Soroti and Iganga they bring a selection of registered products to the clinic for

display. That helps the clinic staff educate farmers to buy registered products from registered dealers and avoid the open markets where fake products flourish.

In Soroti they have taken it a step further. Now they bring a larger selection of products (vegetable and hybrid maize seed, pesticides) and they have started to sell them, a little cheaper than in the shops according to the clinic staff. An added value of the input display is that it attracts a lot of attention from the public. It provides an additional opportunity to explain about the clinic service, which is now a combined plant clinic and plant pharmacy.



The input sale at the Katine clinic attracts a lot of attention from the by-passers, which allows the clinic staff to inform about registered products and the plant clinic services.

5. Plant clinic outcomes

IMPROVED PLANT HEALTH

As mentioned previously the evidence for improved plant health is mainly based on testimonies from return clients, a few follow-up visits as well as the general perceptions of clinic staff. The fact that some farmers return to the clinic with a different problem is an indicator of client satisfaction. *“If the advice it didn’t work, they wouldn’t come back,”* as a plant doctor said. Most of the feedback has been positive and the clients seem to appreciate the clinic. There are many cases of clinic users who tell that the advice given has helped them solve their problems.

Clinic staff from Mukono claim that important diseases, such as BBW, coffee wilt and cassava brown streak have declined. According to the plant doctors of Iganga many banana and coffee plantations have been saved. A ‘habitat management’ system has helped some farmers control Striga, the most important problem in Iganga. By planting Desmodium, a wild weed, in the infected field the seeds of Striga are killed. The seeds sprout, but they don’t germinate. Desmodium is a common weed so farmers themselves can collect seeds from the field and plant them.

The plant clinics try to promote more rational use of pesticides. It is not uncommon that for any plant health problem farmers have, they are used to bombard the crop with chemicals. *“We emphasise that for some cases there is no need for chemicals. In some cases just a resistant variety. That has helped solve some cases and they come to thank us,”* a plant doctor testified.

Farmers who grow horticultural crops face many pests and diseases. Heat treatment of cabbage seed against black rot, a bacterial disease, has proven to be an effective control method, which some farmers in Iganga have benefitted from (Box 9).

Aphids in watermelon is another challenging pest. Many farmers don't know how to grow watermelon but a certain farmer in Iganga who frequented the clinic was able to grow watermelon guided by the advice he received, a plant doctor told. Later the farmer bought himself a motor cycle and he came back to thank the plant clinic staff.

BETTER VIGILANCE

The plant clinics have shown their potential to improve disease vigilance at community level by identifying epidemics at an early stage and by picking up new diseases. One of the LG staffs said that *“Before we didn't have any information about the diseases in the district”*. The clinic results have helped the organisations identify the most prevalent problems and be more responsive.

Since the plant clinics started, three new diseases have been found in Uganda. One of them, black spot in sweet orange, was presented at a plant clinic and the other two were found in connection to other GPC activities in the country. The samples were subsequently brought to the GPC for identification (Table 13).

Table 13. New diseases from Uganda since 2006 confirmed by the GPC and published in Plant Pathology.

Crop	Disease	Pathogen	Year
Sweet orange *	Citrus black spot	<i>Guignardia citricarpa</i>	2008
Cassava + four other hosts **	Phytoplasma	'Candidatus Phytoplasma aurantifolia' (16SrII gr.)	2008
Artemisia **	Wilt	<i>Xanthomonas hortorum</i>	2009

* sample brought to Katine clinic; ** samples collected through other GPC activities.

CHANGING VIEWS AND ATTITUDES

It took some time for the clinic users to understand what the plant clinic service was about. A nursing aid told, *“At the beginning some thought they would get something back, medicine. They are used to that. They thought they would receive information in a group. They were not used to the individual attention. We have sensitised them and explained it is a like human clinic. Some were astonished to see plant clinic in operation, but later on they realised its importance.”* Other clinic staff emphasise that the plant clinics have helped change farmers' views on agricultural services. Now they can take action themselves and be more pro-active in seeking advice when they need it (Box 10).

The clinics have also boosted the pride and confidence of the clinic staff. The nursing aids appreciate being able to help fellow farmers in their communities and are proud of being part of the clinic initiative. They have become more known and occasionally people come to them to ask for advice, either in their homes or when they meet them other places.

Box 9. Killing bacteria with heat

“We recommend them to get a vacuum flask, and heat water estimated to 50C (at the point when the water is too hot to put your finger in it). At that point you remove it from the heating place, fill the flask half way, wrap the seed in a handkerchief, and hang over the water line and then close the flask for 15 min.

Then farmers started becoming innovative. A woman farmer didn't have a flask, so instead she boiled the water in a kettle, removed it from the heating place at boiling point, wrapped the seed in a handkerchief and hung it in the steam. The woman said it was fantastic, it worked.”

Plant doctor, Iganga

According to the plant doctors the clinics have an important advantage compared to other extension methods: it enables them to reach more farmers and address more problems. *“The clinic can do something that no other method can,”* was a frequent comment. *“When you go to the field, you visit very few farmers in a day. And the rest will miss out. In our normal work we are rarely faced with such challenges on specific problems. The clinic has proved to be the best approach in solving the plant health problems.”*

All plant doctors like their job. The personal and professional satisfaction of interacting with farmers and trying to help is motivating. One said, *“I feel a changed person, I have gained experience and the appreciation of farmers motivates me. I feel I am doing a good job. I am adding to the knowledge I had.”* They feel confident with the clinic method and know how to handle it.

The challenges of being a plant doctor are hard felt. It requires substantial knowledge and experience to address such a variety of problems, and the face-to-face situation with the clients demands a prompt response. It forces the plant doctors to stay alert and do some homework to keep up with the task (Box 11). The satisfaction of feeling useful, being accepted by the farmers and learning new things was stressed as a personal achievement and a motivation for continuing if the clinics are to be revived. *“The clinics are capacity building for us,”* one said.

Box 10. Changing attitudes of farmers

“Farmers are traditionally used to seeing extension staff moving to them. So they are just waiting for programmes that will come and teach them this and that. With the clinics farmers have to seek advice themselves. It has not been common here in Uganda. So we are trying to change that attitude. Compare to human health. When you have a patient in your house, only you know you have a patient. The medical staff will not go round to look for patients to treat! So the farmers are realising that if you just sit and wait, you may wait and wait and never get assistance and you end up losing and give up. So we say ‘when you have a problem you go to the clinic and you can get advice when you need it.’ The attitude is changing.”

Plant doctor, Iganga

Box 11. ‘Not like normal extension work’

“The plant clinic puts the staff in the centre of activity. There you sit and you are seriously faced with the challenges. Farmers come and they want a solution. You can’t escape. You are practicing every day and it encourages you to research more. So if you have some doubts, you consult a book or other experts. I was forced to go and do a bit of reference, which we normally don’t do”.

“It is assumed we know things. Just reach the motorcycle, go and meet a group of farmers, and you go home. But here you are interviewing about specific, often not obvious cases. It is a serious issue, treating individual cases. You need to organise your head to meet farmers in this way, unlike the normal extension approach, where you can talk the way you feel. We usually don’t have enough time to talk to farmers. As an individual you become better prepared. You talk as a professional, explain in detail. I like it”.

Plant doctors (combined)

NEW DEMAND AND SYNERGIES

There are a few examples of how the plant clinics have helped identify new demand and create synergies between activities and institutions. Cases of Striga were brought repeatedly to the plant clinic in Iganga. Those farmers with severe Striga infestations were selected to take part in collaborative research with national and international partners to assess the effectiveness of the ‘Strigaway’ maize variety. Strigaway maize is resistant to the herbicide Imazapyr (IR-maize) which is used to coat the seed. The herbicide prevents Striga from attaching to the maize. Subsequently farmers came and asked for the materials that performed well in the trials.

In Soroti the clinic activities have helped inform and orient other parts of the Livelihoods Programme of SOCADIDO. *“The clinic identified that the problems affecting groundnut, sweet potato, cassava were wide spread beyond the communities we were working with. It made it easier to catch the attention of the LG authorities. So it helped us.”* The clinic experiences also feed into SOCADIDO’S radio programme.

The plant clinics have subtly unveiled a demand for animal health service. In all districts some farmers asked for advice about animal health at the plant clinics. However, these queries were not recorded so it is not possible to assess the scope of this demand. In Iganga, they had the privilege of being able to refer these queries to the veterinary inspector who was also present at the Kawete market on Saturdays, just next to the plant clinic. In Mukono and Soroti the clinic staff tried to orient the client as best as they could.

PART OF NEW GOVERNMENT STRATEGY

The plant clinics have been written into MAAIF’S new Development Strategy and Investment Plan (DSIP) for 2010/11–2015/16. They are part of the Sub-programme on Pest and Disease Control under the Enhancing Production and Productivity Programme.

The Ministry saw from early on that the clinics would be an important complement to the national surveillance system, helping raise community awareness about pests and diseases and improving feedback from the district. The plant clinics fall under the core mandate of the Department of Crop Protection. The Ministry has observed an increasing interest in the plant clinics. More than 10 districts have contacted MAAIF HQ asking for assistance to set up plant clinics so farmers can seek advice. The new strategy provides the base for scaling up and integration into the existing structures. As a senior official of MAAIF said, *“We need to get the clinics back on track?”*.

The new DSIP reflects a serious Government commitment to strengthening pest and disease control in the country. Pests and diseases are regarded as one of the most important production constraints. The Ministry want the Plant Protection Officer in the districts to be a gazetted and fully funded post within the structure of MAAIF. The LG of Mukono consider the inclusion of the plant clinics in the DSIP an important condition for their institutionalisation. Pest and disease control is already part of their mandate and they see the plant clinics as a way of fulfilling that mandate more effectively.

The DSIP allows the Districts and Central Government to work more closely together on key priority areas. Under the decentralisation law the LG staffs are only answerable to the CAO (Chief Administrative Officer) with often thin linkages with the mother ministry. One of the plant doctors explained that some of the core functions will now be managed from Central Government and delegated to the Districts. The setup is more well-defined and it will help the districts become more answerable to the ministry. *“It will make us stronger in arguing our issues and getting more support by Central Government. So far our voice has not been very strong because we were only here at the district. So we couldn’t push. We are happy with the Ministry.”* The funding and implementation of DSIP remain to be negotiated.

6. Discussion and conclusions

Plant clinic achievements. The fact that the plant clinics have attended more than 2,000 queries in dozens of crops is an important achievement. All plant doctors highlighted the enhanced outreach and direct identification of demand as major advantages of the plant clinics. Although there needs to be more systematic follow up to track farmer responses to advice and the impact on crop management practices and productivity, there are indications that the clinics have helped solve many plant health problems. With the plant clinics a new low-cost method has been introduced to provide plant health advice to Ugandan small-scale farmers and to support disease surveillance. The Government has responded to the early results by including the clinics in its new DSIP, thus creating a strong momentum for lifting the clinics to another level.

The plant clinics have also stimulated a change in clinic staff's view on extension work. For the plant doctors it is a serious challenge, but also a source of personal and professional satisfaction, to meet farmers face to face trying to help solve concrete problems. The plant clinic staffs are directly accountable to their clients. This is important to create a reliable service.

Clinic staff and training. The human resource base of the plant clinics is weak, both in number and level of plant doctor training. That is one of the reasons why the clinics stopped operating. The plant doctors who have retired or been transferred to new jobs have not been replaced. To ensure that the clinics are properly staffed it is urgent that Uganda creates its own capacity to train plant doctors so maintenance of the human resource base does not rely on the continuous support of the GPC. There is vast plant health capacity within MAAIF, NARO and Makerere University to draw on. The challenge will be to organise the institutions around such a joint effort.

The nursing aids are the most stable staff category, since they are farmers based in the communities where the clinics operate. That helps create local ownership. The nursing aids feel proud of being able to contribute to their communities. So far they have received little or no training. With some basic plant health training they could potentially function as 'community plant health workers' to undertake some of the more common and easily recognizable problems. This would make the service more available to the public; reduce costs as well as vulnerability to fluctuations in support from plant doctors. The 'community health worker' concept is well known from human health and recognised as a means to bring health services to places where formal services do not exist.

Clinic access. Although the existing venues are regarded appropriate, it would be worth reflecting on the following: How can more clients be attracted to the clinics in Mukono? Is the low turn-out (av. 7-9 queries/clinic) due to the venue or insufficient publicity? How can more women be attracted to the clinic in Kawete? What types of farmers come to the clinics? Do all have equal access?

Technical backstopping. The weak technical backstopping limits the capacity of the plant clinics. Although there is much diagnostic capacity in Uganda; exiting labs are not designed to function as a public service for farmers and extension agencies. Government labs are mainly set up for quarantine purposes and the labs of NARO and Makerere mainly service research and teaching purposes. The clinics have had little contact to research institutions despite repeated efforts to engage with NARO in particular. Systemic changes are needed to formalise links between plant clinics, research, laboratories and other key actors in plant health, e.g. input suppliers. For example, research institutions, MAAIF and numerous development programmes produce information and extension materials on a regular basis about new technologies, disease alerts and other relevant topics. The plant clinics could be used systematically as an outlet for these materials.

Quality of diagnosis and advice. Despite the many limitations the plant clinics have faced, clinic staffs seem to have operated the clinics to the best of their ability. Although a proper assessment of

the quality of the diagnoses and the advice remains to be done, the general impression was that the clinic staff have done what they could under the given the circumstances. The plant doctors' vast experience in crop protection helped them cope with the challenge, but in the future the issues of quality must be addressed much more thoroughly.

Data management. The plant clinic registers constitute a new method for systematic collection of information about pests and diseases in the farmers' field. The plant clinic staffs have become familiar with the recording system, which is an integrated part of plant clinic operation. The register has shown to be a useful tool for targeting interventions on specific pests and diseases. It is a unique resource that has the potential to improve decision making as well as quality control of the plant clinics. However, the way the registers are managed does not allow the registers to be used to its full potential. The difficulties in accessing the register data, the use varying formats, the inappropriate coding system, the incomplete entry into Excel, as well as the lack of data sharing make the clinic data seriously under-used. If the plant clinics are to become a pillar of the national disease surveillance system, the data management has to be improved substantially.

Monitoring and reporting. The current monitoring and reporting procedures have some serious weaknesses. The format and quality of reports from clinic organisations are mixed and in most cases the information is only circulated to few people. The parallel GPC/MAAIF reporting systems and general lack of information sharing have been an obstacle for effective documentation of clinic activities and performance.

The external monitoring was ostensibly done for the GPC and not used for continuous learning and improvement of the clinic operations. The monitoring reports include many useful observations regarding the quality of diagnoses and advice, but since the information was not shared with the partners of the initiative there was no follow up on the recommendations. The on-the-spot support of the consultant was appreciated by the clinic staff but the importance of supportive and regular monitoring for quality control, documentation of results and informed decision making was never internalised. The lack of a common space for regular follow up, coordination and sharing of results and experiences caused some frustrations and a feeling of being left alone. The potential value of the clinics can be boosted substantially by improving monitoring and reporting procedures.

Organisation of the initiative. The 'loose' arrangements established at the beginning between the GPC, MAAIF and the districts were meant to enable the partners to experiment and be flexible in the implementation of the initiative. However, this flexible approach also had drawbacks since it was unclear how to proceed from experiment to full-time operations. The roles, responsibilities and procedures were vaguely defined and it took a long time for the national partners to organise themselves around clinic implementation. It took almost a year and a half from the first planning meeting took place (July 2005) until the clinics started more regular operation (November 2006). A more formal agreement would have helped the partners put their case forward to the DAO, CAO and heads of NGO and negotiate the inclusion of the clinics in the work plans and budgets.

Running a pilot requires flexibility and room for organic growth and adoption of new ideas. But it also requires clear guidelines and a well-defined forum for continuous reflection and feedback so lessons can be captured and used to adjust operations, internalise and pursue new ideas. This has not taken place in Uganda. The only times clinic staff and coordinators from all partner organisations got together were during GPC visits. That was insufficient time to reflect on progress and plan new activities and approaches. There is a limit to how much 'things develop by themselves'. Experiments need to end and results used to improve future actions.

Commitment and staff motivation. The plant clinics were to a large extent seen as a 'GPC project' from within Uganda. This perception affected the commitment and ownership of people

who ran and supported the clinics. The notion of the clinics being a GPC project was inadvertently reinforced by GPC's decision to transfer the money directly to the NGOs and by hiring an external consultant to report back to the GPC. MAAIF was supposed to continue playing a coordinating and backstopping role but the terms and conditions were not clear and the Ministry became more disconnected over time.

The incentive system for extension workers in Uganda does not leave much room for creativity and flexibility. Salaries are meagre, people are expected to pay for airtime and internet use themselves, and the safari day allowance system for carrying out field work makes people dependent on availability of funds. They cannot (or will not) move if they are not 'facilitated'. The same applies to government staff and many project-based workers. There is little motivation for doing an extra effort since it would most likely imply personal costs and extra workload. Nonetheless, the plant clinic in Nkokonjeru kept on working for a long time without funds from the initiative, which shows an extraordinary personal commitment of the clinic staff. In contrast, the better position of SOCADIDO in terms of operational flexibility and ability to mobilise own resources to support the clinic, is not reflected in the regularity of the clinic. Fewer clinics were run in Soroti compared to Iganga and Mukono.

Management of funds. It remains to be discussed how effective management of funds can be guaranteed so the clinic staff won't get stuck because they do not have funds for transport or publicity. The initial mechanism of channelling funds through MAAIF caused heavy delays in transfers to the clinics and the transaction costs were high, since the MAAIF team would bring the money in cash to the districts to facilitate each clinic event. However, the alternative of letting the NGOs manage the funds prevented the LGs from becoming fully committed in some cases. There is a challenge ahead in finding models for effective management of funds and establishment of equitable alliances where each partner is equally committed and supported.

Role of the GPC. Since the first pilot plant clinics were established in 2003 in Bolivia, the GPC interventions have changed as a consequence of the experiences and lessons learnt from counties across Latin America, Africa and Asia. Especially the plant doctor training and procedures for register management, monitoring and quality control have evolved substantially. Some of the changes have been introduced into Uganda, yet they remain to become internalised.

The GPC contributions were highly appreciated although the visits have been few. The GPC support has mainly concentrated on training, guidance and follow-up on clinic procedures, technical backstopping and advocacy with key actors in plant health. There has been less focus on engaging with the senior managers of the partner organisations and trying to find ways to embed the clinics into the existing organisational structures and mandates to enhance ownership.

The action points defined during the GPC visits (e.g. keeping electronic registers, writing fact sheets) rested on the assumption that the plant clinic staff were in a position to carry out these actions. However, these assumptions often turned out to be wrong and there was not enough follow-up to try to understand the constraints the clinic staff faced in terms of time, funds, skills and permission from their organisations. As the clinics were not part of the official work plans, all 'extra' activities were somehow expected to be remunerated.

As the scope and operations of the plant clinics have evolved over the past six years, the GPC interventions are also being adjusted. It is necessary to engage more with the organisations to look at internal procedures and help find ways to enable clinic staff and the coordinators integrate clinic tasks in their work routines and make the most of the clinic outcomes. A broader engagement with other plant health stakeholders is also essential to support the integration of the clinics into a 'plant health system' where key actors are better connected.

Institutionalization. Institutionalisation is essential for the sustainability of the clinics. The clinics have not yet been integrated into the official work plans and procedures of the organizations, except in SOCADIDO where the clinic is included in the quarterly work plans. Even though the plant clinics fit well with the mandate of the NGOs and LGs, it has shown difficult to integrate them into the organizational structures. Most NGOs work on a project base which does not necessarily match regular clinic attendance. The technical staff is hired to execute specific project activities so the clinics have to be ‘squeezed’ in when there is time. That may explain the irregular operation of the clinic in Soroti. The engagement of LG staff is also hampered by the informal status of the clinics. When time and resources are restricted, the official duties get first priority.

One could ask why none of the clinic partners took the initiative to formalise the plant clinics and create the necessary base and ownership for their institutionalisation? The lack of clear leadership and orientation created the impression that the plant clinics were unconnected to other extension and advisory services, with the inevitable result that clinic operations depended on availability of funds from the GPC. The GPC funds were small and it was expected that the partners would co-finance the clinics or roll them into other programmes. But this has only happened to a limited extent, despite the existence of major national programmes to improve agricultural advisory services, notably NAADS, and regular advocacy by the GPC to encourage cost-sharing.

There needs to be a broader institutional commitment backed up by the necessary formal agreements between clinic operators, MAAIF and other relevant actors. This will enable the partners define roles and responsibilities and align the clinics with existing procedures, an important condition for creating ownership, ensuring effective operations and seeking financial sustainability. The dominating ‘project mentality’ is a severe constraint to institutional change in Uganda. Therefore there is a major challenge ahead in matching funding, human resources and work modes within and between organisations.

As the ideas for scaling-up in the districts are being rolled out, there is one particular challenge that needs special attention. Several LG officers have suggested that new clinics should be run by sub-county extension officers backed up and supervised by the district staff. This would reduce time and resources for transport and logistics. This seems to be a rational and cost-effective solution that builds on existing structures and resources. However, since the new NAADS programme relies on LG extension staff to carry out activities, a question remains as to what extent the districts and sub-county extension people will be able to take responsibility for new plant clinics. The clinics fit well into their mandate, but may not necessarily fit with the current organizational structure of NAADS and the LGs. It will require discussions between MAAIF and NAADS to find an arrangement that will make the clinics work within the existing structure, something that must happen if the clinics are to become institutionalised.

Concluding remarks. Although the plant clinics ceased to operate in July 2009, there is keen interest in reviving them. The plant clinics have shown their value as a means to reach farmers who are deprived of access to advisory services and the Government is committed to strengthen the clinics as a strategic pillar of the national disease control and surveillance system. There is a momentum for taking the plant clinics beyond the pilot phase and creating stronger national ownership and commitment. The partners have gained vast experience since the initiative started in 2005. The lessons learned, positive and negative, provide an important base for designing a new phase where the essential components of a ‘plant health system’ will be in place.

7. Revised documents

Planning documents, progress and monitoring reports

- MAAIF. 2006. Minutes of plant clinics planning meeting held on 18th January 2006 at UNFFE
- MAAIF. 2006. Mobile plant clinics progress report (ref. local training held in Mukono)
- MAAIF. 2007. Field report on mobile plant clinic conducted on 24.04.07 in Katine sub-county, Soroti District.
- MAAIF. 2008. Report on the meeting held at Wash & Wills Hotel in Mbale and plant clinics conducted in Iganga and Mukono Districts.
- MAAIF. 2009. Project proposal. Scaling out plant health clinic operations in Uganda.
- Kabeere, F. 2006. Briefs on mobile plant clinic project in Uganda, January – August 2006.
- Kabeere, F. 2006. Progress report on implementation of the pilot mobile plant clinics in Uganda.
- Kabeere, F. 2007. A general review on the performance of mobile plant clinics in Uganda: July 2006 – April 2007.
- Kabeere, F. 2006-2009. A series of field and monitoring reports from clinic visits.

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- Boa, E. 2006. Plant Health Services Initiative Uganda 2005 – 2006
- Boa, E., Asaba, J. 2003. BTOR. Visit to Uganda: DFID plant pathology support service.
- Boa, E., Nash, P. 2006. BTOR. Global Plant Clinic Uganda and DR Congo, GPC
- Reeder, R. 2006. Mobile plant clinics in Uganda, GPC
- Reeder, R., Harling, R. 2008. Plant health clinics in Uganda: 2008 update.
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Summary reports from clinic organizations

- Department of Agriculture, LG Iganga. 2008. A series of summary reports from clinic events.
- SOCADIDO. 2008. Progress plant clinic report for August to November 2008.
- SOCADIDO. 2009. Excel file with summaries of four clinic events in 2009

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- Ssekiwoko F, Mulumba JW, Carter BA, Stanford H, Parkinson P, Kelly P, Smith JJ. 2009. *Xanthomonas hortorum* pathogenic on *Artemisia annua* newly reported in Uganda. *Plant Pathology* 58, 795.

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