

## Reaching out to farmers with plant health clinics in Uganda

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### Abstract

Ugandan farmers experience low farm level productivity attributed to various factors that include poor management practices, use of unimproved varieties, poor soil fertility and losses to pests and diseases. Pests and diseases cause 30-40% pre-harvest and post-harvest losses. The Plantwise initiative aims at improving the availability of knowledge and information on pest and disease management to farmers through strengthening existing in-country plant health systems and providing a knowledge bank that supports the country's knowledge base. Farmers receive free extension advice based on their specific crop problems presented at 145 plant clinics that have been established in 70 districts and run by more than 200 trained plant doctors. The plant clinic approach will be beneficial to farmers if aspects of increased access, gender concerns and capacity are addressed. It can yield success when embedded in national systems and organisations thereby building the links and relationships necessary for a functioning plant health system that adequately links research, extension, farmers, agro-dealers and regulatory bodies.

**Key words:** Agrochemicals, diagnosis, knowledge bank, safe use

### Introduction

It is estimated that 40 percent of the food grown globally is lost to pests and diseases (Oerke, 2006), with Africa having higher than average losses. In the case of Uganda, the Agricultural Sector Development Strategy and Investment Plan (DSIP) (MAAIF, 2010), proposes key intervention areas including increased access to quality planting material, advisory services, pest and disease control, crop research, regulatory services, farmer institutional development, farm mechanisation, provision of information and water for production.

Plantwise, a global initiative led by CABI, and adopted by the government's DSIP, is addressing crop losses to pests and diseases through supporting the creation of a network of plant health clinics for providing advisory services to farmers. Plantwise aims to improve the availability of knowledge and information on pest and disease management to farmers, through strengthening existing in-country plant health systems, and providing knowledge bank to support the country's knowledge base. The objective of this paper is to describe the Plantwise approach to improving plant health advisory services,

and the progress that has been made in Uganda.

### ***What is a plant clinic?***

A Plant clinic is a designated place by plant doctors for offering advice on a regular basis to farmers on crop pest and disease management. The central part of the Plantwise approach is the establishment of a network of plant health clinics, which operates similar to the human medical clinics. It is run in terms of diagnosis, treatment, control and prevention of illness. Clinics are operated by specially trained personnel referred to as “plant doctors”. Plant doctors are personnel selected by local partners (government or NGOs who are already providing agricultural advice to farmers) to undergo a training focused on how to establish and manage plant clinics and how to give appropriate advice to farmers.

Plant clinics are usually stationed in one location and run at specific times on specific days of the week, and not open continuously. The clinics are mostly run in mobile shelters, in contrast with human health clinics. Thus, they can be set up with a few chairs and tables in a market place or other locations frequented by farmers, so as to ease visiting the clinic.

Farmers usually bring their defective plants to the clinics for diagnosis and intervention advice. Findings from the diagnosis and intervention advice are filled in a “prescription book”, with a copy given to the farmer at the end of the consultation. Plant clinics services are initially provided free of charge to farmers; but in the long run, the associated costs can be partaken by farmers especially in farmer cooperatives that hire own extension staff. The intervention advices are given based on the principles of Integrated Pest Management (IPM) to

achieve the most effective, safe to use and practical intervention for the farmer.

Unlike the conventional extension system, where extension workers visit individual farmers’ fields, farmers come to the Plant clinics. Within a few hours, a clinic can serve as many as sixty farmers. This saves the extension worker’s time and fuel if services were provided conventionally. Moreover, farmers use their written recommendations when visiting agro-input dealers.

Under circumstances where the plant doctor is unable to identify the plant health problem presented, a visit to the farmer’s fields is arranged to properly ascertain the problem. More difficult problems to determine are referred to the regional or Ministry laboratories for diagnosis by scientists.

Plant doctors are equipped with reference materials, such as factsheets and photo sheets of typical crops and pests in their respective agro-ecological zones or districts, to support the diagnosis and eventual recommendations. In some cases, plant doctors are assisted by lead farmers or community based facilitators with good experience in management of pests and diseases. These assistants are referred to as ‘plant nurses’.

Through the Plantwise knowledge bank (<http://www.plantwise.org/KnowledgeBank/home.aspx>), plant doctors can access reference materials that help in making accurate diagnoses and effective recommendations. The Plantwise knowledge bank (KB) is a source of numerous factsheets on specific topics such as diagnostic information, crop/pest management advice and treatment options. For unfamiliar plant symptoms, plant doctors use the tools to support diagnoses.

To qualify for training as a plant doctor, one is required to have a background in the field of agriculture, with a minimum qualification of a diploma in general agriculture, preferably with the crops option. A standardised training programme has been developed, with the initial trainings undertaken by CABI. However, in recent years, Ugandan trainers are gradually taking charge of the trainings. These are mainly plant pathologists, entomologists, extension experts and scientists from MAAIF, Makerere University and NARO, who have been trained on how to run plant clinics, as well as train plant doctors.

#### ***Genesis of Plantwise and pilot work in Uganda***

The Plantwise initiative grew out of the early pilot clinics in Uganda and other countries in different parts of the world including Asia and South America. With the launching of Plantwise, more clinics have been established, and the Ministry of Agriculture, Animal Industry and Fisheries and other partners plan to have plant clinics opened in all districts of Uganda (MAAIF, 2010). This vision results from the positive feedback from clinic users and extension service providers, especially the District Local Governments. Lessons learned during the pilot phase (Danielsen, 2010) have also been taken into account. The first clinics were established in eastern and central regions of the country as a pilot scheme in collaboration with the Local Governments (LGs), National Agricultural Advisory Services (NAADS) and Non-Governmental Organisations (NGOs) that include SOCADIDO, Self Help Africa, Rwenzori Information Centres Networks, Caritas in Mukono (Nakifuma and Nkokonjeru markets), Iganga (Kawete

market) and Soroti (Katine and Ocapa markets). CABI provided training, technical backstopping and a small grant for operational costs.

#### ***Distribution of plant clinics by geographical regions***

The programme has worked with local governments and various partners to identify and train plant doctors from various regions and districts. To date the initiative has spread to 19 districts in central, 22 in the east, 5 in the north and 24 in the western region of the country (Fig. 1). This corresponds to over 90% of districts in the western region, over 80% in central, nearly 70% in Eastern, and 17% of Districts in the Northern region (Table 1).

Through the initiative, 257 plant doctors have been trained, 81 in central, 87 in eastern, 60 in western and 14 in the northern region. Fifteen trainers have been trained; five from Makerere University, three from MAAIF, two from NARO and five from District Local Governments. With the assumption that having at least one plant clinic per sub-county increases farmers' access to advice, the current number of clinics is still low, with central Uganda having only 16 percent of the sub-counties with plant clinics, and even fewer in the other regions. Furthermore, most districts run only one to two clinics (Fig. 2).

Running clinics requires availability of trained plant doctors, equipment and operating costs. Unfortunately, some districts have considerable trained doctors, but few established clinics as presented in Figure 2. The districts that have more clinics are those where district budget allocations have been made, and the trained staff are most actively implementing the approach. In the long



**Figure 1. Geographical distribution of Plant Clinics in Uganda.**

**Table 1. Distribution of Plant clinics by region, districts and sub-counties in Uganda**

Description	Central	Eastern	Northern	Western
Number of districts in region	23	32	30	26
Number of districts with Plant Clinics in region	19	22	5	24
Number of sub-counties in the region	235	400	304	381
Number of Plant Clinics in the region	42	49	7	47
Percentage of districts with Plant Clinics by region	82.6	68.8	16.7	92.3
Percentage of sub-counties with Plant Clinics by region	17.9	12.3	2.3	12.3

term, if good coverage of clinics is to be achieved, it is the districts that will need to take responsibility for establishing, running and financing clinics, which is already happening in some districts such as Mbarara, Bukedea, Hoima, Mukono, Soroti and Ntungamo.

#### ***Attendance at plant clinics***

From the available national records accessed from Plantwise knowledge bank

for the period 2011 to 2013 it is seen that generally more men than women attended clinic sessions (Figs. 3, 4, 5). Lower attendance by women is an area to be further looked into, to ensure that clinics are equally accessible to women and men. An assessment of key factors hindering clinic attendance is necessary in various communities and may include considering the clinic operation hours, location, and communication channels among others.

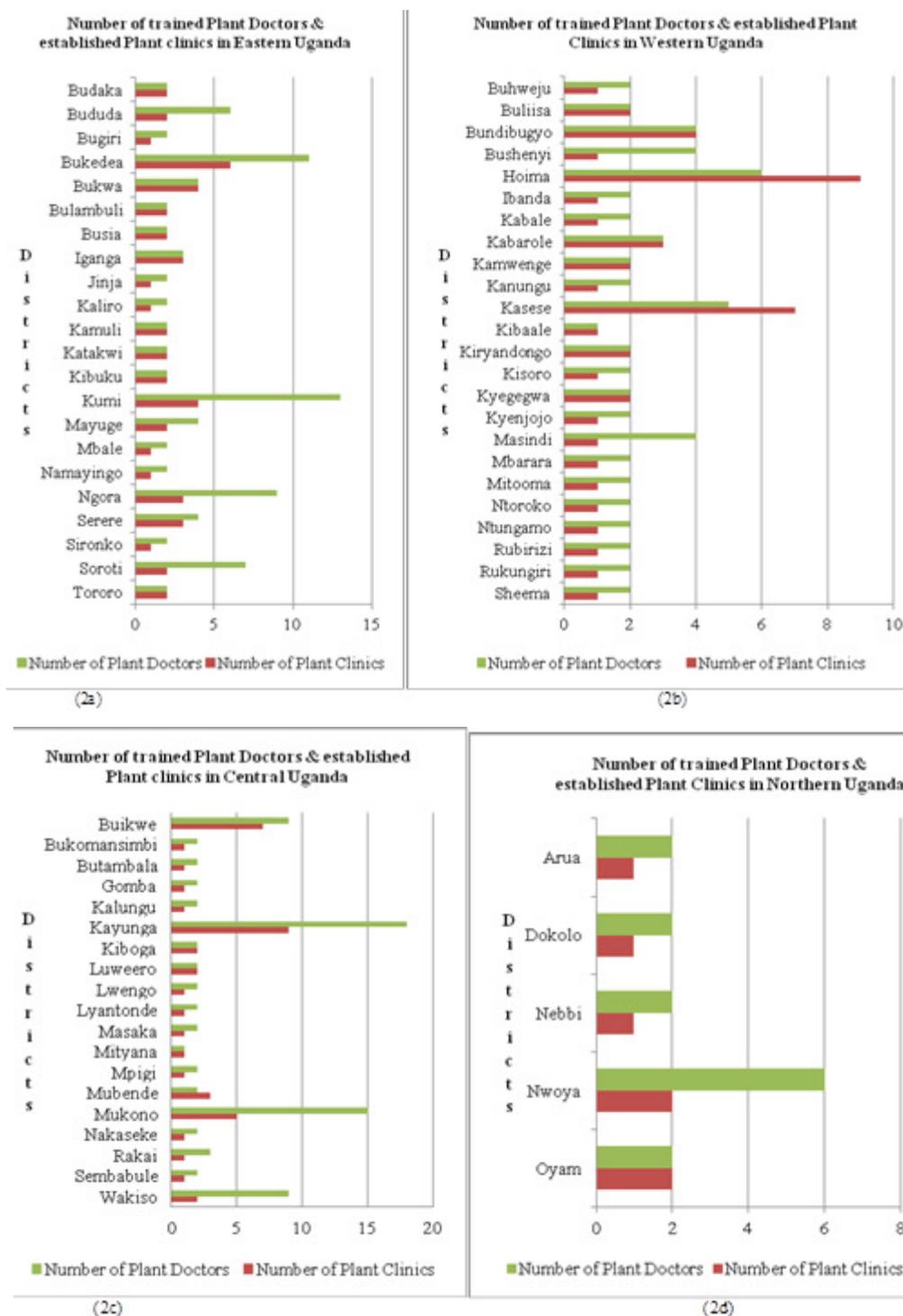
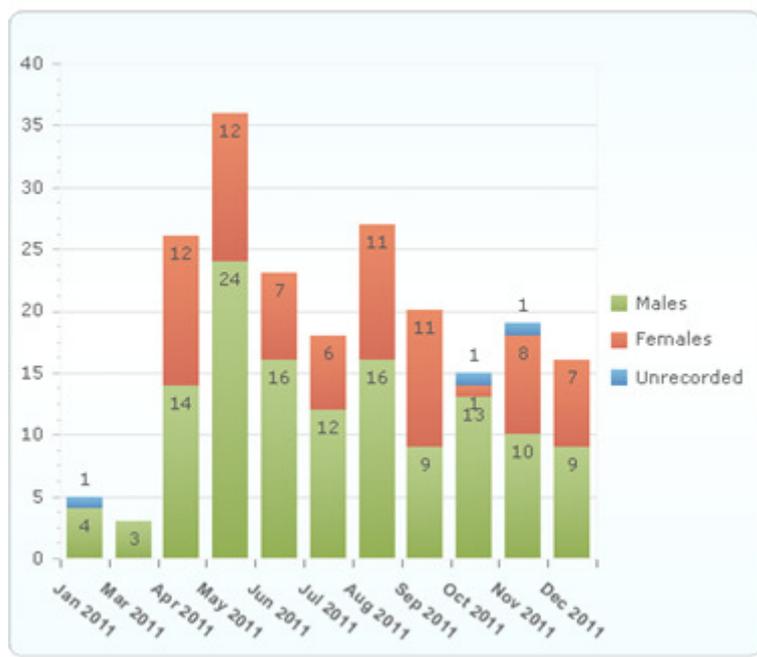
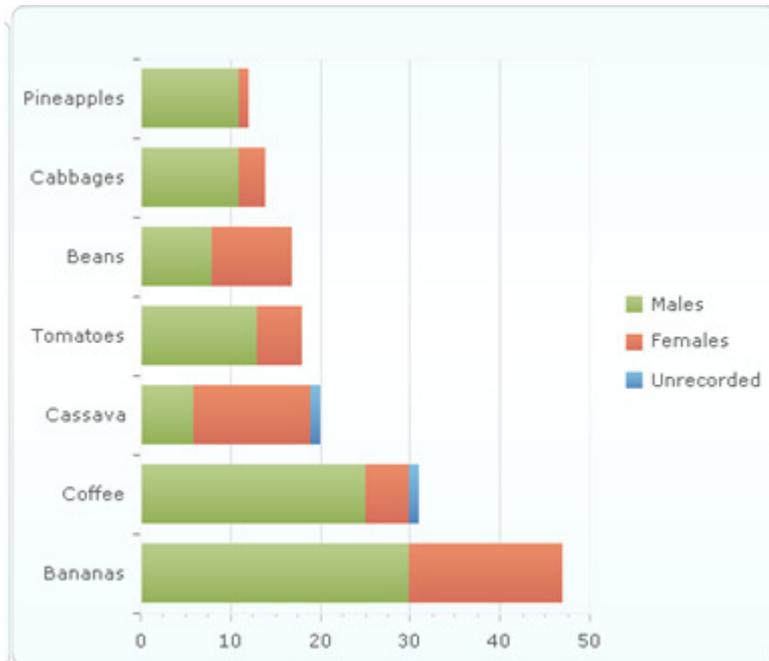


Figure 2. Number of plant doctors and clinics by district in (a) eastern, (b) western, (c) central and (d) northern Uganda.

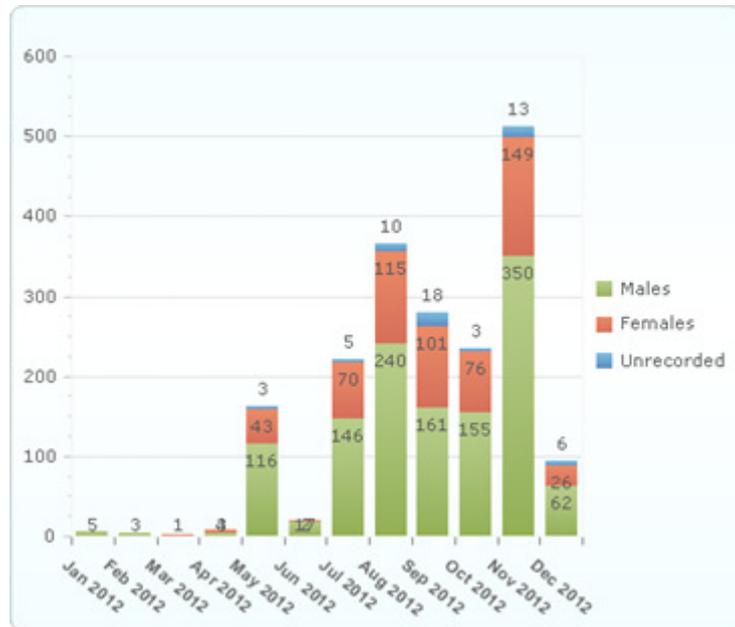


2011a

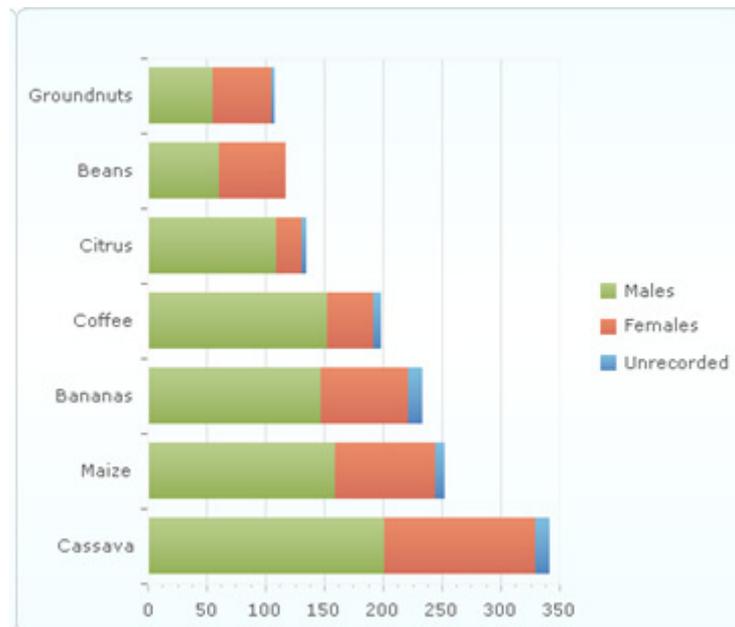


2011b

**Figure 3. Attendance at plant clinics by males and females and respective top crops brought in 2011 in Uganda.**

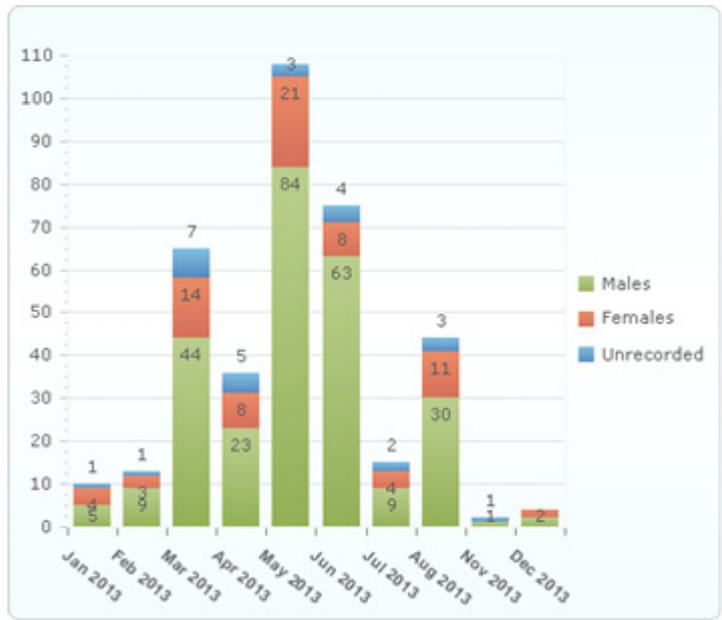


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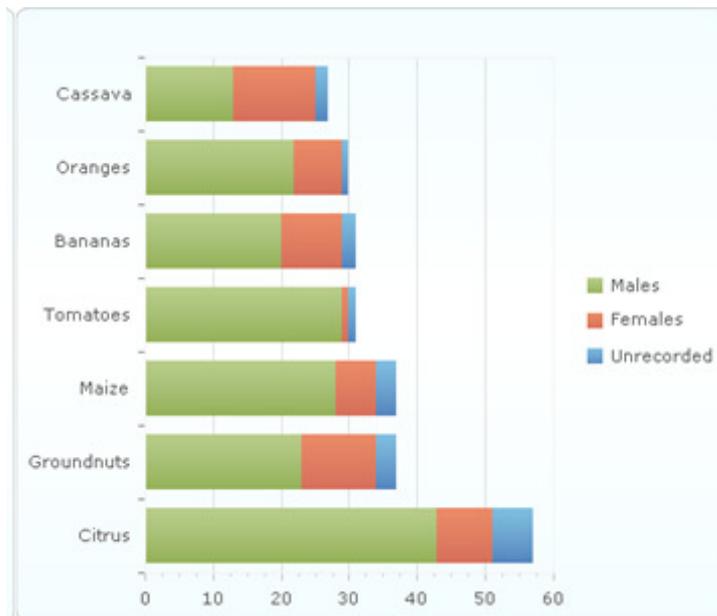


2012b

**Figure 4. Attendance at plant clinics by males and females and respective top crops brought in 2012 in Uganda.**



2013a



2013b

**Figure 5. Attendance at plant clinics by males and females and respective top crops brought in 2013 in Uganda.**

Records from plant clinics are computerised, allowing analysis of who is coming to the clinics, and what crops they are having problems with. However, the process through which this happens is still being strengthened, therefore full data records are not available for analysis.

As these data are not yet complete, care is needed in interpreting them. However, in 2013 the highest attendance was recorded from the month of May, while less attendance was recorded in the months of January, February, November and December (Figs. 2011a, 2012a and 2013a). This is probably related to the stage of the cropping season. Patterns of attendance can be examined to help guide decisions on the opening times and frequency of operation of clinics.

The top crops brought to plant clinic sessions in 2013 by men were mainly citrus, tomatoes and maize; while women brought mainly cassava, bananas and groundnuts. However, it is quite likely that there will be variation between different agro-ecological zones and communities, and at different times of the year. Similarly, the types of problems that farmers present will also be analysed as more data from plant clinics become available.

#### ***Data management***

Data collected from clinics can potentially provide very useful information on pest distribution, pesticide use and new pest outbreaks. However, this requires a system for proper data collection and management. Currently, clinic data are collected and forwarded to the District Agriculture Office. Data from districts are aggregated at the NARO's zonal offices where they are keyed into spreadsheets. The compiled zonal data are then sent to the national data office at MAAIF for harmonisation, validation and analysis.

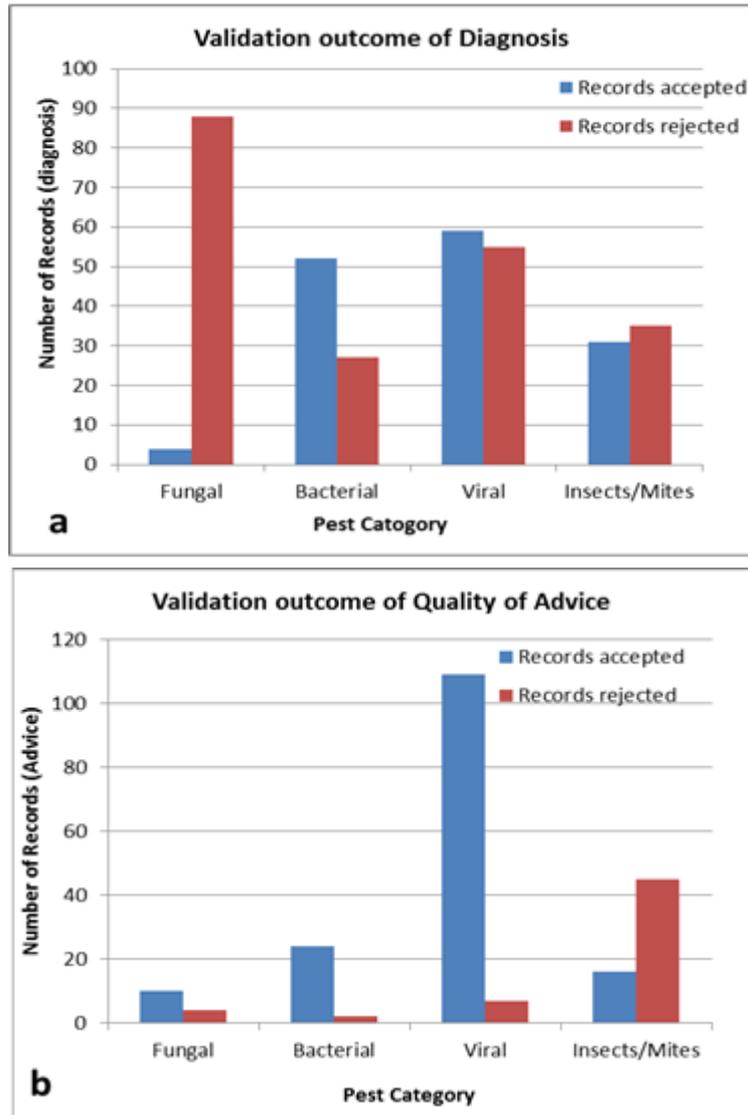
After analysis, the data are shared with relevant stakeholders.

A key step in this process is "data validation". Data can only be analysed and used if there is confidence in their accuracy. Hence, an agreed procedure is required for assessing whether individual data records, that is, details of a single consultation are valid. There are two key aspects to this; the accuracy of the diagnosis, and the quality of the advice given. The advice provided by plant doctors is validated by technical team constituted from Makerere University, NARO and MAAIF's department of crop protection for its appropriateness, as well as its safety and practicability to farmers.

A preliminary review of 351 clinic data records from four districts (Mukono, Buikwe, Bukedea and Kumi) found that 217 records were valid for both the diagnosis and for quality of advice. The highest number of rejected diagnoses were for fungal and insect/mite problems (Fig. 6a and b). The rejected diagnoses were due to poor symptom description and mixed diagnosis by plant doctors. Poor knowledge of pests on major crops in particular regions were also responsible for poor diagnosis of fungal and insect/mite problems.

In the case of quality of advice of plant pests, the highest number of rejected records was for insect/mite management approaches (Fig. 6b). A number of the rejected records were due to recommendation of toxic insecticides not safe for farmers. Use of safe and practical cultural approaches for management was responsible for the high level of valid records for viral, bacterial and fungal problems (Fig. 6b).

Analysis of the plant clinic records in this way can show whether appropriate advice is reaching farmers, and whether



**Figure 6.** Validation outcome of the 351 plant clinic data records collected from plant clinics in 4 districts of Mukono, Buikwe, Bukedea and Kumi in Uganda. (a) for diagnosis and (b) quality of advice.

additional training or information is needed for the extensionists working as plant doctors. From the above preliminary analysis, it was agreed that there is need to improve outreach by NARO on available new crop varieties through demonstration sites with farmers and extension officers. It was also noted that

extension officers need to retrain in management of pests and diseases of major crops in given regions, such as citrus for eastern and banana for central, and western. Knowing which pesticides are appropriate for which crop pests is also an important issue.

Once data have been validated, it is possible to establish the most common pest and disease problems reported by farmers and to plan how to address these using other extension methods. Plant clinics can provide a high quality extension-farmer interaction for farmers attending clinics, but many farmers not attending clinics are likely to have similar problems. Thus, the data from plant clinics can be used to guide the need for campaigns using mass media and other methods that reach large numbers of farmers. The validated data can provide a form of surveillance on outbreaks or new reported cases of pests and diseases that can then feed into the national pest and disease surveillance system.

#### ***Roles of different stakeholders in Plantwise***

For plant clinics to deliver good advice to farmers on a sustainable and ongoing basis, various different actors and stakeholders have a role to play. The combined effort of all the different plant health stakeholders is referred to as the plant health system.

#### ***Role of districts in supporting plant clinics***

Local Governments (Districts and Sub-Counties) play a key role in facilitating the implementation of the plant clinics, providing various resources. This includes personnel who act as the plant doctors, equipment for running clinics (such as portable tables and chairs, information materials, diagnostic tools such as lenses) and operating costs for activities such as advertising and promoting the clinics, as well as running them.

Some districts have already integrated plant clinics into their work-plans and secured and allocated funds to support

clinic activities and training of their extension workers. Such districts include Soroti, Bukedea, Hoima, Bududa and Kumi. Experiences from the districts that first piloted plant clinics, such as Mukono, Soroti and Iganga, have also been vital to the successful scaling up of the Plantwise initiative in Uganda.

#### ***Role of NARO and universities***

Agricultural research is fundamental in development and scaling up and out the plant clinics and their services. Apart from such institutions being a key training resource, they support clinics further through provision of information and materials for both plant doctors and farmers. This could range from information on varieties of crops released and the respective agronomic, pest and disease management options. Also, NARO should support Plant doctors through offering further advice to farmers by conducting demonstrations in locations where plant clinics are held. In addition, further support is required for building capacity in diagnosis, symptom descriptions and guidance in making recommendations. On a longer term basis, problems beyond the capacity of the plant clinics need to be partaken by NARO and the Universities.

#### ***Contribution of NGOs/CBOs***

Organisations with existing programmes for providing advice to farmers can include running plant clinics as one of their approaches. Their extension staff in the respective programmes can be trained as plant doctors and facilitated to run the clinics as a part of their work. In this way, more plant clinics will be rolled out, thereby increasing access by more farmers. This approach is already being used by some NGOs. In this case, the Plantwise initiative

provides a framework for coordinating and adding value to local activities from a national perspective.

### ***Contribution of agro-dealers***

Agro-dealers are important actors in plant health systems. Often, they are a source of advice to farmers, although it is not always clear how informed the advice is. Moreover, agro-dealers are likely to recommend products that they sell. However, they can be provided with the same information and factsheets used by the plant clinics, so that they can adjust their own advice and product range accordingly. On the other hand, plant doctors can give more useful advice if they are aware of the inputs that are locally available; there is little value in giving recommendations to farmers if they are to use inputs that are not available. Plant doctors can also advise farmers on the value of purchasing inputs from trustworthy dealers.

### **Conclusion**

Through plant clinics, farmers access plant health advisory services that are specific to their individual problems occurring in their fields. Plant clinics are thus demand-driven, an important aspect of any service delivery. A significant move has thus been made by MAAIF and partners in strengthening plant health services through plant clinics. Currently, plant clinics have been established in seventy four districts, although the number of sub-counties with clinics is still low. There is need, therefore, to scale up and out across the country within the districts and sub-counties, to enable access by more farmers. However, how many clinics are needed is a question yet to be addressed, as it may be that it is not

necessary for every farmer to have easy access to a clinic.

The extension staffs operating plant clinics need further support in diagnosis of plant health problems and in making recommendations to farmers. Nonetheless, in contrast with some extension methods, records from plant clinics provide a way of identifying precise training needs, such as on diagnosing particular types of disease, problems on particular crops, or in recommending IPM approaches. NARO, MAAIF, NAADS and NGOs need to respond to these identified needs and develop and provide appropriate training. Such training should include safe handling and use of agrochemicals and information on recommended application rates as a priority.

Plant doctors also need to be provided with up to date information on newly released technologies with their respective technology attributes. This could be done through conducting demonstrations with farmers and extension officers, but other opportunities should also be explored.

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