GLOBAL PLANT CLINIC

CABI • Rothamsted Research • CSL

Starting Plant Health Clinics in Nepal

Eric Boa and Rob Harling

CABI

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World Vision International Nepal • SECARD

GLOBAL PLANT CLINIC

The **Global Plant Clinic** (GPC) is managed by CABI in alliance with Rothamsted Research and the Central Science Laboratory. The GPC provides and coordinates plant health services in Africa, Asia and Latin America. It has an expert diagnostic service for all plants and types of problems and regularly publishes new disease records. The GPC trains plant doctors and scientists, establishes plant health clinics and builds plant health systems. We link extension, research and farmers and work with all sectors to improve regular and reliable access to technical support and advice. Our aim is to create durable plant health services for those who need them most.

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WORLD VISION INTERNATIONAL NEPAL

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We are indebted to the initiative of Mr Bed Prasad Khatiwada and the support of Mr Surendra Dhakal and Ms Louise Currie, all of WVIN, who made it possible to introduce plant health clinics to Nepal.

The GPC is supported by the **UK Department for International Development.** The views expressed here are not necessarily those of DFID.

A Plant Health System for Nepal

Nepal has 75 districts and most have a hospital. A 2004 survey reported that there were 188 primary health care centres, 698 health posts and 3129 sub-health posts, staffed by 998 doctors, 6214 nurses and 7493 para-medicals. There are pharmacies everywhere. All big cities have diagnostic laboratories and many are run privately.

Animal health services are organised in a similar way, with clinics, veterinarians, community-based healthworkers, dispensaries and so on. What about plants, the backbone of agriculture? Try answering some of these questions.

Who are the plant doctors and healthworkers and where do they work? Where are the health posts or clinics and plant hospitals? Where do you send a sample to be analysed? Who recommends what to buy from Agrochemical supply shops? Are these similar to pharmacies?

Farmers can of course get independent advice on plant health problems but it is haphazard and irregular. Projects come and go and concentrate on a limited range of problems. Government agricultural officers have few resources and are poorly organised. Despite having officers in all districts and good general knowledge of how to manage major problems, millions of farmers fail to get advice when they need it.

A new approach is needed. The Global Plant Clinic helps to establish plant health clinics run by existing organisations whose staff already work with farmers. Thousands of farmers regularly receive advice from plant doctors trained by the GPC in Bolivia, Democratic Republic of the Congo, Uganda, Vietnam and Sierra Leone.

Nicaragua has built a national plant health system based on clinics linked to reliable sources of technical and scientific support. In Bangladesh the plant doctors write 'prescriptions' for eco-friendly agrochemical dealers. Extension is talking to research and diagnostic laboratories and input suppliers are working with the clinics.

This report shows that existing people and organisations in Nepal can provide farmers with the plant health services they deserve. Now is the time to go and do it.

Eric Boa
Head of Global Plant Clinic

Contents

1 A brief word about what we did

Two pilot plant health clinics were held in December 2008 in Lamjung District, one in Sundarbazar and one in Besishahar[1]. The clinics were run by agriculturists and rural development staff who attended module 1 of the 'how to become a plant doctor' course run by the Global Plant Clinic (GPC) and supported by World Vision International Nepal (WVIN).

The clinics attracted 53 farmers (20 women) who asked for advice on 92 problems affecting 24 different crops. Most were associated with fungi and insect pests. Citrus problems were the most difficult to diagnose. Virus-like symptoms on rayo (broad leaf mustard) were widespread and damaging. The disease was confirmed later as Turnip mosaic virus by the GPC.

The clinic in Sundarbazar began outside the district agriculture office but received fewer queries compared to its final location in the weekly market (hat bazaar). Clinics benefit from being in public places and being clearly visible. People who were visiting the market or passing by were attracted to the crowds around the clinic tables and by the distribution of flyers.

The plant doctors learnt a lot in a short time about farmer demand. Some scientists were a little nervous in their new role, perhaps because their knowledge of pests and diseases is limited to selected crops. Agricultural officers were good plant doctors and had a much broader knowledge of crops and farmers. But they need to be as good at listening to farmers as they are at talking.

All plant doctors at the clinics learnt an important lesson; if you don't know, say so. Explain that you will find out more. It takes time to become a good plant doctor. Clinics need wider support.

We achieved a lot in five days. The plant doctors learn how to run a clinic and find out about farmers' problems. They saw that clinics are popular and that giving good advice requires careful thought. Welcome to the start of a plant health system for Nepal.

Healthy plants for healthy people

23 people completed module 1 of 'How to become a Plant Doctor'. (Annex 2). They are now aware of what clinics can do and the role of plant doctors. Raj Kumar Adhikari of SECARD is already running a clinic in Kathmandu. Two are planned for Lamjung district with WVIN support.

[1] This also appears as 'Besisahar' and 'Beshi Shahar'.

2 What happens next

WVIN has offered to facilitate two regular plant clinics, one run by a community-based organisation, CECOD, in Sundarbazar and the other by the District Agricultural Development office in Besishahar. The start of the clinics will be delayed until a replacement for Mr Bed Khatiwada is appointed. Bed now works for Helvetas in Kathmandu and he is helping Raj Kumar of SECARD, an NGO based in Kathmandu, to run clinics near the capital. SECARD has already run a plant clinic and received 60 queries. The GPC will help SECARD continue this good work.

The GPC plans to return in 2009 for more training of plant doctors. We will help to review clinic results, identify current and emerging threats and give further training on management options. The GPC will help the Institute of Agriculture and Animal Sciences in Sundarbazar set up a basic diagnostic laboratory to support the clinics in Lamjung and will visit other diagnostic laboratories interested in working with the clinics.

Photographs and samples of complex problems can be sent to the GPC. We will advise if suitable expertise already exists in Nepal and work with Nepali scientists to help identify the cause of a problem and give advice on control.

Nepal has many skilled agriculturists, whose knowledge, enthusiasm and imagination are a good basis for running regular plant health clinics. We believe that clinics can work in other areas of Nepal but it will need the commitment and support of organisations for them to succeed. The GPC will do everything it can to support new ventures with clinic material (photosheets) and training. The shared goal of running clinics is to show government, donors and other funders how the clinics can play a major part in improving livelihoods and food security.

Planning the future with WVIN

After the success of the course and clinics, Eric and Rob discussed future plans with Surendra Dhakal and his fellow WVIN staff in Besishahar. Surendra explained that WVIN would facilitate clinics but not run them directly. Government agricultural officers and community-based organisations are best suited to this task. The GPC well help to nurture the new clinics, give in-service training and jointly promote clinic results to encourage wider investment and expansion of a network of plant healthcare providers.

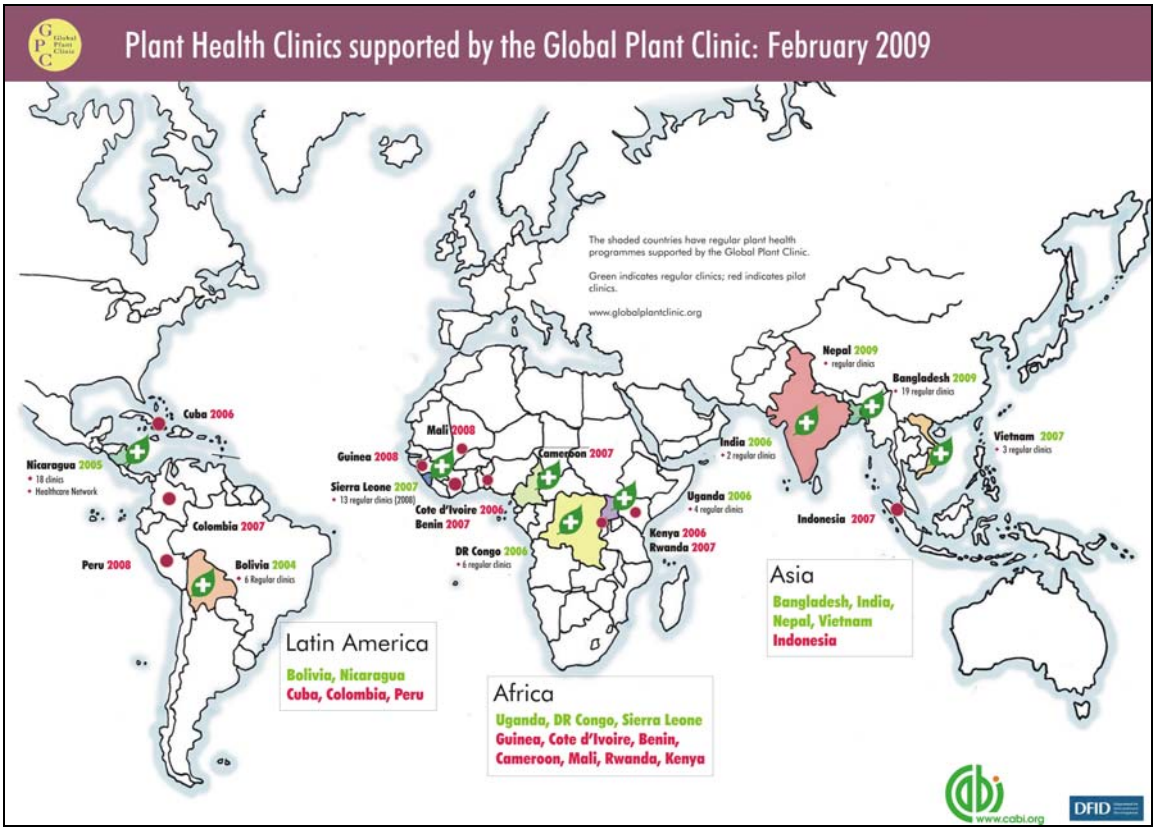
3 Nepal joins a global network

The Global Plant Clinic began introducing plant health clinics in 2004. Bolivia was the first country to start Postas para Plantas (plant health posts). The plant doctor courses started formally in Nicaragua in 2005. More than 400 people have attended, with new modules on monitoring and quality control and farmer-assisted surveillance available from 2008. By the end of 2008 there were 80 regularly held, independently run plant health clinics in eight countries. Nepal will be the ninth country to establish regular clinics. New organisations are invited to run plant health clinics.

The ultimate goal is to link the clinics to diagnostic laboratories, agrochemical dealers, research organisations and national plant protection organisations. The benefits of a having a national health system are well documented for Nicaragua. There the success of clinics led to the creation of a national Diagnostic and Plant Health Management Network, bringing together farmer associations, NGOs, IPM specialists, government diagnostic laboratories, local universities and scientists.

In Bolivia, CIAT Santa Cruz has encouraged other organisations to run plant health clinics while Bangladesh has shown particular skill and imagination in delivering community-based plant healthcare through women plant doctors and schools.

Nepal joins a diverse community of plant healthcare organisations and individuals who share a common aim in providing plant health services to farmers. Now other countries can read about Nepali plant doctors and plant health clinics.



4 Getting started

Bed Khatiwada contacted Eric Boa in early 2008 (see box). The GPC sent publications which explained how clinics had been introduced to other countries and DVDs of plant doctors and clinics in Nicaragua and Bangladesh. WVIN and the GPC agreed to run a training course and hold pilot plant health clinics in Lamjung District, one of several regions in Nepal where WVIN have area development programmes. Livelihood development is key part of these programmes and the idea of plant health clinics was appealing.

The GPC responds quickly to interest in plant health clinics from new countries. There are two basic requirements for agreeing a visit: local support for a training course and a desire to establish clinics. The organisation requesting the visit does not need to run a clinic themselves but they must be able to suggest others who could and support their endeavours. Being a plant doctor should allow you to fulfil existing job responsibilities. The time required to run clinics is short, around half a day each week. If additional funding is needed to establish clinics they are less likely to continue.

Clinics should be part of existing activities. They complement integrated pest management (IPM) projects and increase the range of problems and crops that can be tackled. Clinic results and farmer impact help to attract financial support from governments (e.g. Sierra Leone) and local authorities (e.g. Bolivia). Clinics show how organisations respond to farmers' needs. They increase awareness of current and emerging threats to crops and help to reduce use of pesticides. Farmers are expected to pay something towards services received.

The most important ingredient for establishing a clinic is the support of an organisation. WVIN sponsored the training course and the two pilot clinics and the GPC paid for flights from the UK and staff costs. These are positive starts for plant clinics in Nepal.

Read globally, act locally

Bed Prasad Khatiwada read about plant health clinics in LEISA, a development newsletter. He emailed Eric Boa in early 2008 and said that World Vision International wanted to start clinics. The GPC, funded by DFID, agreed to jointly support a training course. Enthusiasm, commitment and rapid responses have helped introduce clinics to Nepal. The clinics now need to become established and deliver a quality service to farmers, supported by WVIN, the GPC and other plant health organisations.

5 Training

Module 1 of the 'how to become a plant doctor' course was held in the Hotel Tukuche Peak in Besishahar, Lamjung District from 8-10 December. It was attended by 23 people and included 5 agrochemical dealers, 4 Government agricultural officers, 3 staff and students from the Institute for Agricultural and Animal Sciences (Tribhuvan University) based in Sundarbazar, 4 staff of World Vision International Nepal (WVIN), 6 people from partner organisations who work on livelihood projects in Lamjung District and 1 person from an NGO in Kathmandu (Annex 2).

Some were surprised by the mix of professions and backgrounds present on the course (Annex 2). The course material is, however, designed for mixed groups and all participants liked the style of teaching and learning (see feedback below). Advanced knowledge of pests and diseases is useful but it's not essential. You don't need an advanced degree to be a plant doctor. Observing symptoms, listening to farmers and asking the right questions are key skills for plant doctors. Several people with general knowledge of pests and diseases were good interviewers.

There are three modules that comprise the 'how to become a plant doctor course'. Module 1 explains how to identify the most likely cause of a plant health problem using symptoms and information from the farmer, a method we call field diagnosis. We used fresh plants and photographs for exercises so that participants could see a wide range of symptoms from different crops. Participants learnt how to run a plant clinic. They practised interviewing farmers, filling out the clinic register and making recommendations to solve plant health problems.

Modules 2 and 3 also last three days each and pay closer attention to decision making for advice and how to write fact sheets. Other training explains how to monitor the performance of clinics and maintain a quality service. It takes more than a few short training courses to become a good plant doctor and in-service training and supervision is essential.

Interview skills

Khaga Raj Sapkota is an agrochemical dealer, keen to improve the advice he is often asked for by farmers in his shop. Here he's learning more about a problem on broad-leaved mustard which makes the leaves 'leathery, fibrous and untasty'. Accurate notes and samples help explain that this could be a virus disease (later confirmed by the GPC).

Feedback from participants

These are selected comments from the 'Letter to Eric and Rob' after the course had ended. Participants were asked what they liked, what could be improved and how they would use their new knowledge. Some said a course with people from similar backgrounds would be better; others disagreed. Several people are willing to run clinics after the course.

Good to focus on problems that are hard to diagnose; good presentation along with extremely good elaborative photos.

Bed Prasad Khatiwada

First of all I would like to thank both Dr Eric and Dr Rob for their teaching, and lovely sound during this training. I felt so good about the subject matter. The training can get successful if there is some laboratory techniques for identifying some major farmers problems.

Bijay Paudel

I think after 2 month I will start plant health clinic at field level for mobile co-ordination in government offices and with any NGO. I hope my performance is good.

Binod Raj Chiluwal

This training is very useful and important but the duration should be of 8-10 days (*others mentioned this*). Moreover some curative measures and treatment are also needed so that we can advise the farmers in effective way.

Hari Krishna Tiwari

Very good and practical training, I am very much impressed by your training style, not boring, not lengthy. You handle very wisely the (mixed group) to a common goal of serving farmers' problems. I suggest basic laboratory diagnosis for agricultural graduate or university faculties I will use this (new) knowledge to teach BSc graduate students at IAAS.

Janma Jaya Gairhe

Good participatory teaching and learning, showing practical colour photos and practical way to run plant clinic.

After learning this course we will conduct plant clinic in rural area where poor farmers are growing crops and not getting such service from my project. (We need) more photos and description of micronutrients problems because (other) symptoms can be confused.

Jiban Jung Thapa

I am an agrovet owner therefore so many cases of plant sickness to come to me. This training helped me very much to diagnose the problems. I hope you will provide all the training materials used in this training as possible. (All participants received a CD with course and clinic material.)

Khaga Raj Sapkota

I am fully satisfied with the training which is in my line of expectation. The teaching style and the presentation were very simple, almost all things were understandable. Additionally the photos were the key to categorise the problems and their causes.

It is better to deliver the courses to participants (from similar background).

Lastly I would like to ensure you that I will use all my resources and efforts to run plant clinic in my working area as soon as possible, taking the local stakeholders together. Thank you very very much.

Raj Kumar Adhikari

Facilitators speak very simple language. Group works are good. Sometimes there are confusion about language and terms and terminology. If possible translation is good (*others mentioned this*).

Saraswati Bhandari

Even though my field is livestock, I became familiarised with plant diseases, insect pests, nutritional disorder and measures to overcome. I am happy and proud to be a participant of this course.

Shiva Kanta Khanal

I think this module is one of the best approach and helped us (agriculture technicians) to solve the farmers problems.

Suresh Baral

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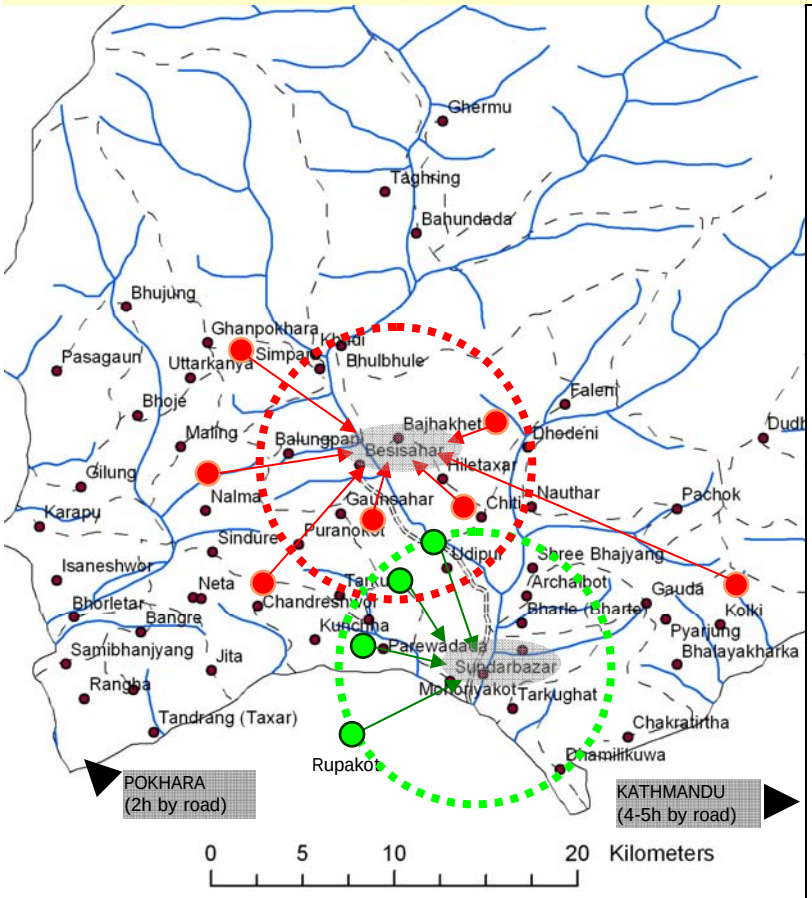
6 Pilot Plant Health Clinics

The two pilot clinics were used by 53 farmers (Table 1), with women well represented at the busiest clinic in Sundarbazar (14 out of 31 users). The plant doctors recorded 92 queries and we estimated that a further 30 were not written down. It is easy to get flustered on your first time as a plant doctor. It is vital, however, that all farmer information is accurately recorded. The clinic data allow others to review advice given to farmers, the types of problems presented, and where farmers come from. The results are used to attract government support and encourage others to run clinics.

Around one third of the users at both clinics were women but they only presented 20% of the queries. There were long queues to see the plant doctors at Sundarbazar and men were better at capturing the attention of the plant doctors. The women were happy to present their problems to men. Plant doctors need to spend enough time with all clinic users to gather all the useful information about plant health problems. Some clinic users waited a long time to see the doctors and it is important that people are seen in order of arrival.

Some farmers came from more than 20km away (see map). Most lived within an approximate radius of 15 km. WVIN and its partner organisations alerted local communities to the clinics but significant numbers of users happened to be in the vicinity of the clinic on the day. The flyers, a large clinic sign and of course the activities of the clinic itself helped to attract people.

Outreach of two Plant clinics in Lamjung district, December 2008



Circles show 15 km radius from clinic location.

8 VDCs of **16 people** who visited the clinic in **BESISHAHAR**

- Bajakhet
- Besishahar
- Chiti
- Gaunsahar
- Kolki
- Nalma
- Simpani
- Udipur

7 VDCs of **37 people** who visited the clinic in **SUNDARBAZAR**

- Dhusheni (Chandreshwor VDC)
- Parawadada
- Rupakot (Tanahu district)
- Satrasaya (Tarku VDC)
- Sundarbazar
- Tarku
- Thakle (Tarku VDC)

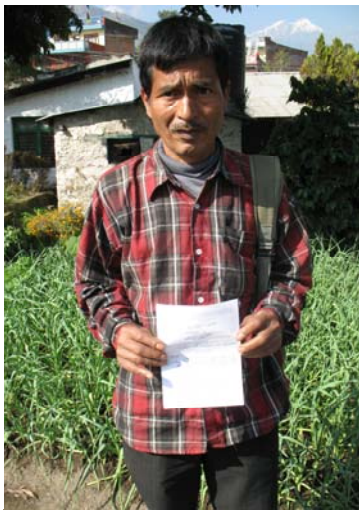
VDC – Village Development Committee.

All VDCs are in Lamjung District except Rupakot. Map courtesy Digital Himalaya, with thanks to Kabindra of CARE.

Table 1: Users and queries recorded by plant doctors at plant health clinics in Sundarbazar and Besishahar, Lamjung Province, 10-11 December 2008

ITEM	SUNDARBAZAR	BESISHAHAR	BOTH CLINICS
Female users	*20*	*2*	*22*
Male users	*17*	*14*	*31*
All users	**37**	**16**	**53**
Female queries	*36*	*3*	*39*
Male queries	*36*	*17*	*53*
All queries	**72**	**20**	**92**
Villages (VDCs where users lived)	7	8	15

WVIN has a network of community-based organisations that is an excellent way to make people aware of clinics and encourage use. Some communities are far from Sundarbazar and Besishahar and one suggestion is to run mobile plant clinics perhaps once a month. This is the way services are provided to difficult to reach farmers in Vietnam and Bangladesh. People can of course send samples and photographs by mobile phone (service permitting) at any time.



The types of problems diagnosed (Table 2) reflect the time of year and crops in season. Queries on rice and mangoes are expected during their growing seasons. The recording of information in the clinic register was generally good but the use of terms such as 'necrosis' suggests that the plant doctor was interpreting what a farmer said rather than actual speech.

Table 1 includes only one bacterial disease yet citrus greening disease is common in Lamjung and we would expect to find bacterial wilt on potatoes and other vegetables. We saw more virus problems in the field than appeared at the clinic. Insect pests attack many crops yet they are over-represented in the clinic register, probably because they are easy to find. Not all insects are pests, however, and one of the next tasks is to review diagnoses recorded by the plant doctors and encourage farmers to bring in all potential diseases, not just those they can 'see'.

Unknown problems were often diagnosed as abiotic and lack of soil nutrients was most often cited as the cause. Other possibilities exist and care is needed in making a diagnosis. The clinic register allows you to review decisions and suggest improvements.

Table 2 Causes of problems from 92 queries, as diagnosed by plant doctors

DIAGNOSED CAUSE	SUNDARBAZAR	BESISHAHAR	BOTH CLINICS
Abiotic problems	12	1	**13**
Bacteria	1	0	**1**
Fungi	7	6	**13**
Nematode	0	1	**1**
Virus	0	1	**1**
Insects	35	5	**40**
Mites	2	0	**2**
'Confused' (EB judgement)	6	1	**7**
Unknown	9	5	**14**
Total	**72**	**20**	**92**

We liked the idea of distributing clinic flyers along the main road. Many people picked them up. One young girl read the flyer to an older man and Bed explained the clinic to a lady passing by. The photosheet on the next page gives a quick idea of how a clinic runs.

Publicity in action: These flyers announce the arrival of a plant health clinic. The logo is adapted from that used by the plant clinics in Bangladesh. They are scattered along the main road (above, left) to Sundarbazar. Bed (below, right) hands one a flyer to a passing farmer, who then stops to visit the clinic with a sick orange. The clinic in Besishahar could not be seen from the main road so flyers were handed to passing farmers (bottom left). Some returned with samples.

A Village Development Committee might support a clinic, but first they would want to know more about them. The photosheet introduces the clinic to new potential operators and investors. Photosheets help to explain the innovations that clinic organisations and plant doctors create. Make your own!

Nepal • Mobile Plant Clinic

Healthy plants for Nepali Farmers
Sundarbazaar, Lamjung

Trained and ready to go. On Wednesday we completed the plant doctor course and on Thursday we held the first ever plant health clinic in Nepal. World Vision and its partner organisations alerted local communities and over 40 farmers brought their sick plants. Some came from more than 15 km away while others saw the clinic on the day, with its big white sign, and came to ask questions. The plant doctors used their new skills to help people whose only source of advice is often an agrochemical shop. An impressive 100 or so queries were received of which 70% were diagnosed and advice given. You can't do everything first time.

PLANT DOCTORS: **Kishor, Khaga, Rekha, Renuka, Prem, Ramesh, Jamna, Ramji, Saraswati and others.** TEXT AND PHOTOS: **Eric Boa.** December 2008.

7 Farmers' plant problems and advice

There are three stages in giving advice on a plant health problem: gather information; diagnose the problem; make a recommendation. Undiagnosed problems require further investigation and we discuss in section 8 links between clinics and diagnostic laboratories.

1 Gather information: Examine symptoms and ask the farmer about how the crop is grown. The quality of citrus samples presented at the clinics was poor – dead branches do not tell a story. Farmers need advice on what part of the plant to bring and the younger the symptoms the better. The plant doctors had examples of common problems on display and two photosheets made during the course were also used to illustrate key symptoms. Live plants and fresh symptoms are always preferable but they are often difficult to obtain.

Photosheets can be used by other clinics and new ones produced that reflect problems and crops that occur at different times of the year. Course participants were shown how to make their own photosheets in Word and Raj Kumar produced his own photosheet (see below) for SECARD.

2. Diagnosis: Symptoms can be confusing. Early and late blight on tomato have similar foliar features. Internal symptoms and changes to the roots helped to differentiate tomato problems that had similar leaf symptoms (see photographs). It's often easier to say what something is not. Plant doctors are taught to eliminate the most unlikely causes first, leaving a shorter list of possible causes to choose from.

3. Recommendation: A good diagnosis is essential. Giving good advice is more difficult than many imagine though some recommendations are straightforward, as in 'do not use chemicals because they do not work'. Other problems are difficult to resolve because they lack effective solutions. As clinics operate regularly so plant doctors, scientists and farmers will learn more about what works. The key message is that farmers cannot wait for the results of research or trials. They need solutions that make best use of available knowledge and are suitable for them to try.

Growing tomatoes under plastic houses is a relatively new venture in Lamjung, creating new market opportunities but also new problems.

More production, more problems

Built from locally available bamboo and covered in plastic sheeting, these plastic houses extend the tomato growing season and increase production. But growing tomatoes under cover also leads to new pest and disease problems. Ramesh Subedi, an agricultural officer, said that a previously unknown rotting of stems and general wilt had become serious in 2007. Galling of roots and decline of tomato plants was widespread, suggesting nematode attack.

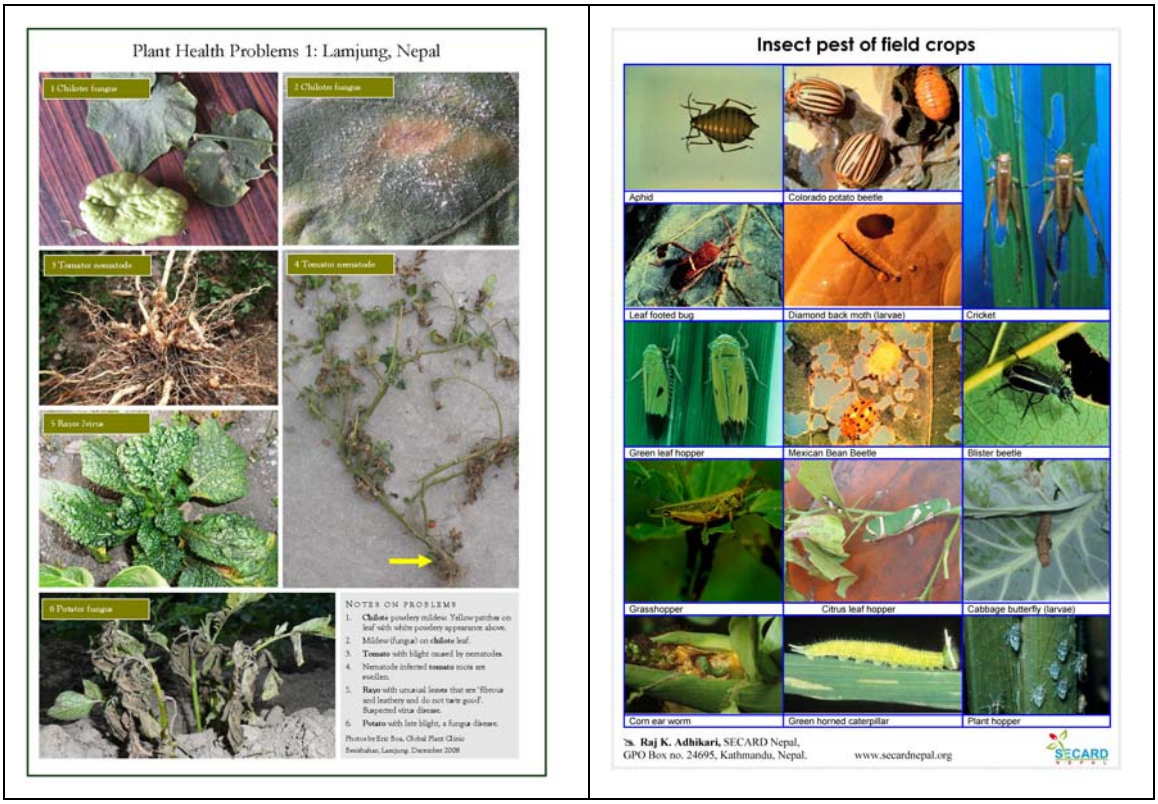
Nematodes and fungal wilt are two new problems on tomato (see below). Powdery mildew on tomato was seen in Ramkot (near Kathmandu) and Besishahar and can be very damaging. These are all well known examples of diseases yet developing solutions for farmers in Lamjung requires local knowledge – of growers as well as growing conditions. Clinics are a good way to identify solutions and get feedback on how well recommendations actually work.

Tomato problems in Sundarbazar and Besishahar

Are these the same problem? They symptoms above are similar: leaves going brown, drying out and a general decline. There is little to distinguish at least two major causes of disease until the roots and stem are examine more closely. The swellings on the root suggest nematode attack (top left) while a brown stem indicates a fungal wilt, possibly Fusarium (above, middle and right). The old lesion or canker (below, right) is too old to be of much use in diagnosis. The white covering could be a secondary fungus.

We first came across a disease on broad leaf mustard, a popular and widely grown vegetable, after an exercise in the training course. One group interviewed a farmer who said that affected leaves (see photo overleaf) were almost inedible. We found many more examples of this suspected virus disease as we walked around Besishahar. We brought samples back to the UK, where the GPC confirmed the presence of Turnip mosaic virus or TuMV. This is how clinics can benefit from good access to diagnostic laboratories and then take action to reduce losses.

The photosheets are no substitute for fresh plant material but they help stimulate discussion and jog memories. They help farmers become familiar with unusual symptoms (e.g. viruses) or a new problem that is spreading quickly. Clinics help to maintain 'community-based surveillance'.



Here's one I made earlier: Photosheets help to illustrate new or unfamiliar problems. They are important tool in surveillance in combination with field detection and scientific confirmation. The technical quality of photographs and clarity of symptoms are important. Digital cameras are widely available but more training is needed on how to use them. An office inkjet printer and glossy paper produces good quality prints.

At least 24 different crops were presented at the two clinics. The types grown were suited to the cool and dry season conditions at mid-altitudes of 600-800 masl. Most queries were on high-value crops and this group is well represented in queries received by many plant clinics. Annual crops are most susceptible to pest and disease damage and farmers keep a keen eye out for problems. Surprisingly, one major problem was not presented to the clinics; a confirmed virus disease of broad-leaf mustard. Farmers complained that the affected leaves were 'fibrous and untasty' yet may not have believed that this was a disease.

As the rains return so the types of crops grown and problems that occur will change. The advantage of clinics is that they can readily adapt to different demands. More farmers are planting tomatoes under plastic houses and new problems have arisen. Clinics can respond quickly and prompt simple yet effective actions to help reduce root knot nematode infections, a common tomato problem affecting many farmers.

Table 3: Frequency of crop queries recorded by plant doctors at plant health clinics in Sundarbazar and Besishahar, Lamjung Province, 10-11 December 2008

CROP	SUNDARBAZAR	BESISHAHAR	BOTH
Asparagus	1	0	**1**
Avocado	1	0	**1**
Banana	3	1	**4**
Bean	7	0	**7**
Brinjal	3	0	**3**
Cabbage	5	0	**5**
Cauliflower	9	3	**12**
Chili	1	0	**1**
Citrus – Lime	2	0	**2**
Citrus -mandarin	0	1	**1**
Citrus – orange	12	6	**12**
Citrus (unspecified)	1	0	**1**
Citrus -sweet orange	3	1	**3**
Colocasia	1	0	**1**
Cucurbits	1	0	**1**
Fruit (unspecified)	1	0	**1**
Guava	1	0	**1**
Knolkhol (kohl rabi)	**1**	0	**1**
Litchi	3	0	**3**
Mango	2	0	**2**
Potato	1	1	**2**
Radish	2	1	**3**
Rayo	4	2	**6**
Tomato	7	4	**11**
Total queries	**72**	**20**	**92**

8 Plant healthcare and plant health systems

Plant healthcare means keeping plants healthy and productive. Controlling pests and diseases, maintaining soil health and good agricultural practices are all part of plant healthcare, as are integrated pest management and the use of healthy planting material. A plant health system does more than give advice: it responds to existing problems and prevents and detects new ones.

One of the first demands of a new clinic is to diagnose unknown problems. It is not easy to find a plant diagnostic laboratory in Nepal. IAAS Rampur tests for citrus greening, Green Research and Technology does virus testing of horticultural crops for tissue culture and other laboratories study plant diseases in Nepal. It is doubtful if any have received samples from more than a handful of farmers, agricultural officers and NGOs.

Scientific effort in Nepal is focused on major problems, as it is in most countries, and diagnostic laboratories offer limited support to farmers and extension workers. Making a link is only the first stage. Diagnosticians will need help in dealing with the range of crops and problems that clinics submit and the GPC will offer assistance. The GPC offers direct expert assistance on the more complex problems, such as viruses and phytoplasmas.

We know from other countries that it is difficult to send samples from rural areas to diagnostic laboratories in major cities. There is a laboratory at the IAAS campus in Sundarbazar with microscopes and able to isolate fungi and bacteria. The GPC will advise on setting up a basic diagnostic service that can help resolve common problems that plant doctors struggle to diagnose.

We also hope that the publication of this report will attract interest from other scientists and institutes interested in working with plant health clinics in Nepal. Please contact the GPC or other people named at the beginning of this report.

Laboratory support for clinics

The Institute of Agricultural and Animal Sciences in Sundarbazar is close to the pilot plant health clinic. The laboratory is used for teaching students but it could help plant doctors do a better job. Jamma Jaya Gairhe, a lecturer, says there are microscopes and facilities for isolating fungi and bacteria from diseased material. Closer examination of disease structures can also help suggest a cause. Before the laboratory is set-up we need to understand more about the types of problems faced by the plant doctors.

Annex 1

HOW TO BECOME A PLANT DOCTOR

Module 1: Field diagnosis and operation of clinics

Hotel Tukuche Peak, Lamjung, Nepal. 8-10 December 2008

	EXERCISE
C1-1	Personal profile
P1-1	Introduction to module 1
C1-2	The crops of Nepal
F1-1	Describing symptoms
P1-2	A global guide to symptoms
C1-3	ABC: first diagnosis with photos
	DVD of clinics Bangladesh or Nicaragua
	DAY 2
P1-3	Field diagnosis
C1-4	Definitions
P1-4	Causes of plant health problems
F1-2	ABC: first diagnosis with plants
F1-3	Second diagnosis with plants
P1-5	How to be a detective

	EXERCISE
C1-5	Common symptoms and their causes (1)
P1-6	Common symptoms and their causes
C1-8	How to listen to interviews
C1-6	Common symptoms and their causes (2)
F1-4	Interviews and observations of symptoms
P1-8	Listen to learn: interviews
	DAY 3
P1-9	Plant health clinics in Sierra Leone and Uganda
C1-9	How to write a prescription and complete the register
P1-7	How to manage a clinic
C1-7	Second diagnosis with photos
C1-10	Evaluation of course (and diploma)

C – class exercise
F – field exercise
P – presentation (Powerpoint)
H – handout (information sheet)

Annex 2

Besishahar

WVIN – World Vision International Nepal. Staff based in Besishahar, Lamjung District.

IAAS – Institute of Agriculture and Animal Science (Tribhuvan University), based in Sundarbazar.

NAME, JOB	RESPONSIBILITIES	INTERESTS, EXPECTATIONS
Basu Dev Pant *BSc Ag* ADARSHA AGROVET, LAMJUNG	Seeds and pesticides sales; giving farmers advice	Horticultural crops, agronomical crops; different biological problems (especially disease). **I hope to:** identify and control plant diseases
Bimal Poudel *Vet. ITA (CTEVT)* MANAKAMANA AGROVET, BESISHAHAR	Sell seeds, pesticides and other agricultural goods; farmers' satisfaction; technical advice	Potato, fungus **I hope to:** analyse plant problems, diagnose and treat
Khaga Raj Sapkota *Agric (Hort), Punjab Agric. Univ.* AGRICULTURE INPUT SHOP	Make available to farmers: inputs to farmer in time; technical knowledge; receive problems and send them to suitable organisations	Veg and fruit; mostly insect pests and diseases **I hope to:** diagnose problems and their solutions
Shiva Kanta Khanal *ISc Agric. Livestock, CTEVT* AGRICULTURE INPUT SHOP	Vegetable seed distribution, pesticides distribution	Veg and fruits **I hope to:** learn diagnosis
Ramji Thakuri *ISc Ag* AGRICULTURE INPUT SHOP	Seed and pesticides distribution	Citrus, tomato, potato and many problems **I hope to:** learn about all things
Dol Krishna Subedi *MSc [Hort.]* AGRICULTURE DEVT. OFFICE, LAMJUNG	Horticulture extension, orchard management, veg and plantation crop production assistance to farmers	All horticultural crops; pest and disease problems in coffee, citrus greening, tomato wilting (main problems) **I hope to:** find farmers' problem solution quickly
Hari Krishna Tiwari *1 yr Ag* AGRICULTURE DEVT. OFFICE, LAMJUNG	Agricultural extension	Cauliflower; decaying spp (??) and boron deficiency **I hope to:** identify decay of and other insect and disease problems
Naba Raj Baral ISc Ag AGRICULTURE DEVT. OFFICE, LAMJUNG	Extension with farmers' groups	Tomato cultivation in plastic house; nematodes and wilting **I hope to:** identify mainly tomato insect and diseases, and on vegetables
Ramesh Subedi *BSc Ag* AGRICULTURE DEVT. OFFICE, LAMJUNG	Plant protection officer, Lamjung District	Vegetable crops **I hope to:** Techniques of handle plant clinics; diagnostic methods; better communication systems with farmers
Janma Jaya Gairhe *MSc Ag [Soil Science]* IAAS, LAMJUNG CAMPUS	Teaching soil science to graduate students, practical classes regarding soil nutrient content, plant uptake and plant disorders	Rice, maize, wheat; veg e.g. cole crops, cucurbits. **I hope to:** learn basic diagnosis of symptoms specifically due to microbes and nutrient deficiency and/or toxicity
Kishor Chandra Dahal MSc IAAS, LAMJUNG CAMPUS	Lecturer in horticulture. Farm manager, IAAS Campus; membership Secretary of R&D Committee	Pomology, ornamentals. **I hope to:** know what is a plant clinic and how can it be (applied) to our situation

NAME, JOB	RESPONSIBILITIES	INTERESTS, EXPECTATIONS
Rekha Sapkota *Msc Ag. [entomology]* IAAS, LAMJUNG CAMPUS	To solve problems of insect pests	Rice: borers; potato red ants; wheat diseases, mainly rust. **I hope to:** know about different pest and disease problems and their solutions using organic methods
Prem Bahadur Thapa *1 yr Ag training* WVIN, LAMJUNG ADP	Community development facilitator	Citrus virus? problem. **I hope to:** Identification and knowledge of disease
Saraswati Bhandari *MA [Rural Devt]* WVIN, LAMJUNG ADP	Community Development Facilitator	Tomato and veg crops, leaf and root damage. **I hope to:** learn how to identify and treat problems of veg crops
Renuka Shahi Thakuri *IA [Humanities]* WVIN, LAMJUNG ADP	Community Devt. Facilitator. Improve income, prepare nutritious food, disease control in organic crops.	Veg crops **I hope to:** diagnose and solve plant problems
Bed Prasad Khatiwada MSc WVIN, LAMJUNG ADP	Provide technical guidance to food security and livelihood project. Monitor and supervise field activities	Vegetables, fruit, cereals. Mostly insect pests and diseases. **I hope to:** diagnose plant health problems; recommend solutions to farmers' problems
Surendra Osti *BSc undergrad* INTEGRATED COMMUNITY DEVT. CENTRE, SUNDARBAZAR, LAMJUNG	Improve farmers' incomes through agriculture	Potato late blight; tomato fungal disease **I hope to:** learn diagnosis and control
Suresh Baral *BSc AG* FORUM OF THE INTEGRATED DEVT. OF HERBS AND AGRICULTURE FOR POVERTY ALLEVIATION	Overall management of programme, training and research on veg crops, reporting results.	Growing tomato, cardamom, garlic, citrus. Interested in bacterial/fungal wilts, nematode, root rot, citrus greening. **I hope to:** enrich me as plant doctor to deal with farmers' problems; identify sick animals and help to diagnose them; better able to identify solutions.
Raj Kumar Adhikari *MSc Ag.* SECARD (BASED IN, KATHMANDU	Programme development and execution; training of staff and farmers; co-ordinate field activities; publication	Tomato, potato late blight; cole crops (Cercospora leaf spot); wheat rust; citrus greening, wilt. Problems in organic production **I hope to:** (learn how to) identify problems, explore the best solution; improve crop management by organic methods
Bijay Paudel *BSc Ag* CENTRE FOR ENVIRONMENT AND COMMUNITY DEVT. (CECOD NEPAL)	Programme co-ordinator, field training and research, reporting	Veg crops (cole, cucurbits, leafy veg); tomato wilting, stem rot, fruit borer, nematode. **I hope to:** give sustainable plant treatment (for local) environment without depending on external factors
Binod Raj Chiluwal *ISc Ag.* CHILD HEALTH AND ENVIRONMENT. SAVE SOCIETY (CHESS NEPAL)	Agriculture technician; training and mobilisation of farmer groups	Solanaceous and cole crops; diseases and insects; tomato cultivation in plastic houses. **I hope to:** I hope general problems(diseases, insects) will be solved in this training
Jiban Jung Thapa *ISc Ag.* NEPAL SMALLHOLDER IRRIGATION MARKET INITIATIVE	Training of farmers; Agrivet and market committee; general management	Citrus; off season veg production; major problems in general. **I hope to:** learn how to recognise plant diseases
Ram Bhakta Neupane *BSc. Ag* ENVIRONMENT AND ECONOMIC DEVT. CENTRE (CEED NEPAL)	Programme co-ordinator	Tomato, cauliflower, cucurbits. Nematodes, wilting, fruit rust. **I hope to:** identify problems, how to protect plants

/*the* Global Plant Clinic

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KNOWLEDGE FOR LIFE