



Plantwise Strategy 2015-2020



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Plantwise

is a global programme, led by CABI, to increase food security and improve rural livelihoods by reducing crop losses

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Executive summary

Since 2011, **Plantwise** has grown rapidly to work in 33 countries by the end of 2014 and has met with strong support from its 168 partners, including governments, advisory services, NGOs, farmers, other plant health stakeholders. High demand from farmers, and interest from extension providers and plant protection organisations, has led to the training of over 3,500 plant doctors and the speedy expansion of plant clinic networks in the participating countries. It is estimated that approximately 1,900,000 farmers around the world had been reached directly through 1,413 plant clinics and other Plantwise activities by the end of 2014. More than 75,000 plant clinic data entries from 20 countries have been stored in the knowledge bank and used as the basis for informed decision-making by plant health stakeholders. In addition, the knowledge bank provides critical information such as pest distribution maps, an online diagnostic tool and crop management support through more than 7,500 factsheets on over 2,500 plant pests and other problems. Human resources, structures and processes, including the Plantwise Online Management System, have been put in place to enhance capacity for regular monitoring and evaluation across the programme. While CABI has demonstrated serious commitment to gender, more needs to be done to embed this in field operations to ensure that more women are able to access advisory services. The first large-scale, multi-year impact assessment of Plantwise is underway in Kenya in collaboration with international expert institutions.

Overall, CABI and its partners are making good progress on the path to Plantwise sustainability in many of the participating countries; however, the process is taking longer than originally anticipated and CABI can still do better to reach all of its programme targets. The programme is, in general, at a point of consolidation. This means that Plantwise is successfully moving towards the end of the pilot phase in many countries and to a point where its focus changes from 'proof of concept' to local commitment and ownership by partner organisations. With increasingly strong signs of financial and policy commitment by partners to embed Plantwise concepts into their standard operating procedures, there is a significant opportunity to take the programme even further than originally anticipated.

The Plantwise Strategy is a 'living document', guided by CABI governance bodies, donors and other experts, as well as Plantwise policies. This version of the Plantwise Strategy is an update from the 2011 version, using lessons learned during the first four years of implementation and feedback from the Plantwise Donor Forum and the SDC- and EuropeAid-led external evaluations in 2013 and 2014, respectively. All results presented in the current strategy are based on achievements made by the end of 2014. In driving Plantwise forward, CABI will continue to implement its dynamic and first truly global one-CABI programme through strong partnership with international and national organisations. An important focus going forward will be to ensure the sustainability of the Plantwise approach. A roadmap consisting of five programme phases was developed, using examples and experiences from the countries where Plantwise already works, to identify milestones for each indicator that demonstrate change towards sustainability and impact in terms of improved food security and livelihoods.

Additional support, from a combination of existing and new donors, is required to build on programme successes and to further scale up Plantwise until 2020. The momentum of the programme and the interest and demand it is generating should enable it to reach the new fund-raising target (USD 100 m, of which USD 56 m is already secured). This increase from the initial target reflects not only the recent successes of the programme but also the appreciation by donors that the Plantwise approach is strengthening support services for farmers in a variety of ways: networks of plant clinics are directly helping farmers, national plant health systems are growing stronger and building functioning links among stakeholders, and countries are applying global knowledge bank resources to improve national vigilance against plant health problems, particularly pests.

The main areas for investment in the next programme phase include:

1. consolidation of national plant clinic networks with strengthened support from diagnostic services and improved linkages to agro-input manufacturers and agro-input dealers
2. implementation of rigorous impact assessments in 2-3 selected countries
3. ensuring that all programme activities are underpinned by monitoring and evaluation processes
4. enabling CABI staff at programme and country level to fulfil the advocacy and capacity building requirements for facilitating institutional change
5. development of ICT-based tools to achieve more efficient collection and analysis of data and wider dissemination of high quality agricultural information
6. development of products and services based on new business and content models allowing open access and fee-for-service resources to exist side-by-side, thereby generating income to eventually replace donor funding for maintenance of the knowledge bank services.

Through the further implementation of the programme, Plantwise will contribute to CABI's Vision 2020 and support meeting the Millennium Development Goals as well as the post-2015 UN development agenda.



1. The scale of the problem and the need for information

Based on data from 2012-2014, approximately 805 million people around the world are estimated to be undernourished. Over half are smallholder farmers and their families, who rely on their crops for food and income. Major crops and commodities that are important for food security, income generation and world trade suffer from frequent and severe production constraints due to poor management of agro-ecosystems, which is often the result of limited knowledge on best practice. The problem is aggravated by agricultural intensification and climate change, both of which create challenges that farmers have never faced before, such as degraded soils and unpredictable rainfall. Moreover, intensification and climate change, along with globalisation of trade and travel, are making the problem worse by accelerating the spread of invasive plant pests and increasing the overall impact on crops. Pests are defined as “any species, strain or biotype of plant, animal or pathogenic agent injurious to plants or plant products”¹. On average, 30-40% of crops worldwide are lost before they can be consumed². If the world is to meet the Millennium Development Goals as well as the post-2015 UN development agenda (Goal 2: End hunger, achieve food security and improved nutrition, and promote sustainable agriculture), then we must act to address this problem.

The challenge of getting useful information to farmers

In today's world, we may believe that information is more widely available than ever before, yet agricultural advisory services in developing countries are still weak and there is a fundamentally inconsistent dialogue between farmers and those who are tasked with helping them. Many farmers do not have reliable access to advisory services due to their own restricted mobility. Similarly, the extension workers (official advisory service and support providers) are often too few in number and do not have the budget needed to travel to individual farm sites.

Although there continues to be significant losses of food to plant pests and other disorders, there is a poor and irregular flow of information about the threats that farmers face. Nutrient deficiencies are difficult to diagnose and pest problems can flare up unpredictably, yet often there is no mechanism for responding quickly or providing the technical support necessary to confirm causes and suggest effective, accessible, and pragmatic solutions. Farmers routinely have to make vital decisions in response to unpredictable conditions and unknown risks – and without the right information at the right time, this is truly a stab in the dark. The poorer the farmer, the greater the impact of making the wrong decision or failing to get advice in time. The recommendations given to both female and male farmers have to be effective, available, practical, safe and economical, as well as climate-smart and gender-sensitive. Sources of potential advice include public and private extension providers, agricultural institutes and agro-input shop managers. An inconsistent engagement with farmers has several important consequences for the entire plant health system: slow awareness of new and emerging plant health problems; delayed responses in identifying the nature of the problems and giving suitable recommendations; systematic failure to learn from experiences; and inefficient use of existing sources of technical expertise. The net result is a failure to provide timely solutions that enable farmers to grow more food and earn more money.

These challenges are common in many countries, including those that are CABI members. CABI Member Countries in 2009 and 2011 gave CABI the mandate to develop the Plantwise programme with the aim of enabling female and male farmers around the world to lose less and feed more.

1. FAO, 2013. International Standard for Phytosanitary Measures 5. *Glossary of Phytosanitary Terms*

2. FAO, 2011. *Save and Grow: A policymaker's guide to the sustainable intensification of smallholder crop production*



2. The Plantwise vision: lose less, feed more

The Plantwise global programme aims to contribute to increased food security, alleviated poverty and improved livelihoods by enabling male and female farmers around the world to lose less, produce more and improve the quality of their crops. Through close partnership with relevant stakeholders, Plantwise reached 1,900,000 farmers in 33 countries by the end of 2014. Plantwise is now seeking to reach over 6 million women and men farmers directly (primary reach) through plant clinics, plant health rallies and mass extension campaigns in 40 countries by 2020. A further 24 million farmers will be reached through spill-over effects, or secondary reach, as farmers share new knowledge with neighbours and family. It is anticipated that Plantwise will have even broader, but less measurable, impact over the long term through gradual systems change, or tertiary reach, that lead to increased effectiveness of plant health systems in addressing crop problems.

Three levels of farmer outreach

Primary Reach: **directly** through Plantwise activities including

- Farmers receiving information from plant doctors at plant clinics;
- Farmers receiving information through plant health rallies;
- Farmers receiving information through mass extension campaigns.

Secondary Reach: **indirectly** through spill-over effects as a result of

- Plant doctors using their new skills and networks outside plant clinics to provide advice to farmers;
- Farmers receiving advice directly sharing information with neighbours and relatives;
- Farmers receiving information from advisors who were not directly trained or working with Plantwise but who received knowledge from Plantwise (knowledge bank content, factsheets app, printed extension materials, etc.).

Tertiary Reach: **indirectly** through improved services resulting from systems change

- Plantwise aims to strengthen stakeholder linkages, thereby changing the ways in which they interact to deliver plant health services. These plant health system changes can affect research, input provision, regulation and responsiveness to new pest threats, as well as the delivery of advice. A more rapid response to emerging plant health disorders can prevent or reduce the impact of those problems. This systems change would have a broad reach affecting many farmers.

The appropriate, timely and locally-relevant knowledge imparted by plant doctors helps to give farmers access to the information they need to tackle the plant health problems that currently present one of the biggest challenges to their food security and incomes. Not only does Plantwise help smallholder farmers improve their productivity and reduce their production costs, it also has strong potential to contribute to market access and trade opportunities, thereby enabling farmers to increase their incomes. In particular, Plantwise promotes standards of good practice for crop management that contribute to improved food safety and, where relevant, compliance with export obligations. Especially important to many smallholder farmers is the increased access to higher value national and regional markets by meeting domestic regulations or private regulations of local supermarkets and supply chains. Furthermore, Plantwise also addresses climate-smart agriculture and nutritional concerns through its promotion of crop diversity by providing advisory support on all crops.

The Plantwise approach, as a framework for action, is to strengthen the capacity of agricultural institutions and organisations to establish more effective and sustainable national plant health systems, based on available existing resources and personnel. The key premise of the Plantwise Theory of Change is that plant health systems function to reduce crop losses and promote plant health (see figure 1). Plantwise defines a plant health system by four key components: (1) extension, which delivers available knowledge intended to improve plant health; (2) research, which develops new knowledge about plant health and is often linked to higher level education; (3) input suppliers, who deliver knowledge and physical inputs such as seeds, biological and other crop protection products and fertilisers; and (4) regulation, which regulates sale and use of agricultural inputs, protects countries from new and emerging pests (invasive species included), and regulates produce trade requirements. Strengthening plant health systems removes barriers to high quality information, leading to improved service delivery by all components for better advice and information for farmers.



The Plantwise programme is the set of activities that CABI, with national and international partners, undertakes to implement the Plantwise approach. Many of the services farmers need are present in most countries, but operate in isolation, lack up-to-date information and have poor information flows between them. The Plantwise approach to ensuring that farmers have access to the knowledge they need is based on three inter-linked programme components:

a. Plant Health Systems Development

Networks of locally-owned and operated plant clinics are established, based on a similar approach to human health clinics, where farmers can find advice to manage and prevent crop problems. Agricultural advisory staff, trained as plant doctors, learn methods to diagnose any problem on any crop brought to the clinics, and provide appropriate recommendations guided by national and international best practice standards. Plant clinic records are collated and analysed to support the quality of advice given to farmers and inform decision-making. These plant clinics are an extension tool that are complementary to, and run in collaboration with, existing extension activities. They are the starting point for developing and reinforcing the links that help create a functioning plant health system. Better communication and **stakeholder linkages** in the areas of extension, research, regulation, and input supply enable each of them to become more effective, ultimately benefitting the farmers that depend on the services they provide.

b. Knowledge Bank

Plant clinics are reinforced by the Plantwise **knowledge bank**, a global gateway to practical plant health information from diverse expert sources, with online and off-line resources in multiple languages for advisory services. It also serves as a platform for plant clinic **data management and use**, where permitted, as well as **information exchange** within countries and as part of a global vigilance system to help identify invasive species and other emerging threats to plant health. Overall, the knowledge bank serves as a free, open-access source of locally relevant, comprehensive knowledge about plant health problems affecting any crop grown. At the same time, evidence is gathered to assess impact on crop losses, productivity, food security and livelihoods.

c. Monitoring & Evaluation

Building on lessons learned from **monitoring and evaluation** (M&E) activities, assessing programme impact through internal and external evaluations, and sharing this knowledge among partners, particularly extension providers and policy makers, is a high priority within the Plantwise programme. Research is being carried out to test and improve processes involved in running plant clinics, strengthening plant health systems and delivering the knowledge bank, assessing new ideas and concepts for improving effectiveness and sustainability of plant health systems. At the same time, evidence is gathered to assess impact on crop losses, productivity, food security and livelihoods.

In order to reach more farmers and to complement the face-to-face services provided by plant clinics, Plantwise will link with CABI's mobile agro-advisory initiatives to build partnerships with technology companies (e.g. mobile phone service providers) and with specialists delivering solutions through information and communications technology (ICT), so that farmers can receive highly practical and appropriate advice directly to their handsets. At the same time, the mobile service providers can benefit from access to the information that exists within the knowledge bank and other CABI services.

Further funding is needed to scale up and scale out the Plantwise programme. In particular, investment should be made to strengthen linkages among plant health system stakeholders, enhance use of ICTs and knowledge bank services, conduct further impact assessments, and work towards sustainability of the Plantwise approach in target countries. This will help CABI and its national and international partners to scale up to 30 million farmers around the globe.

How a plant health system works and what it achieves

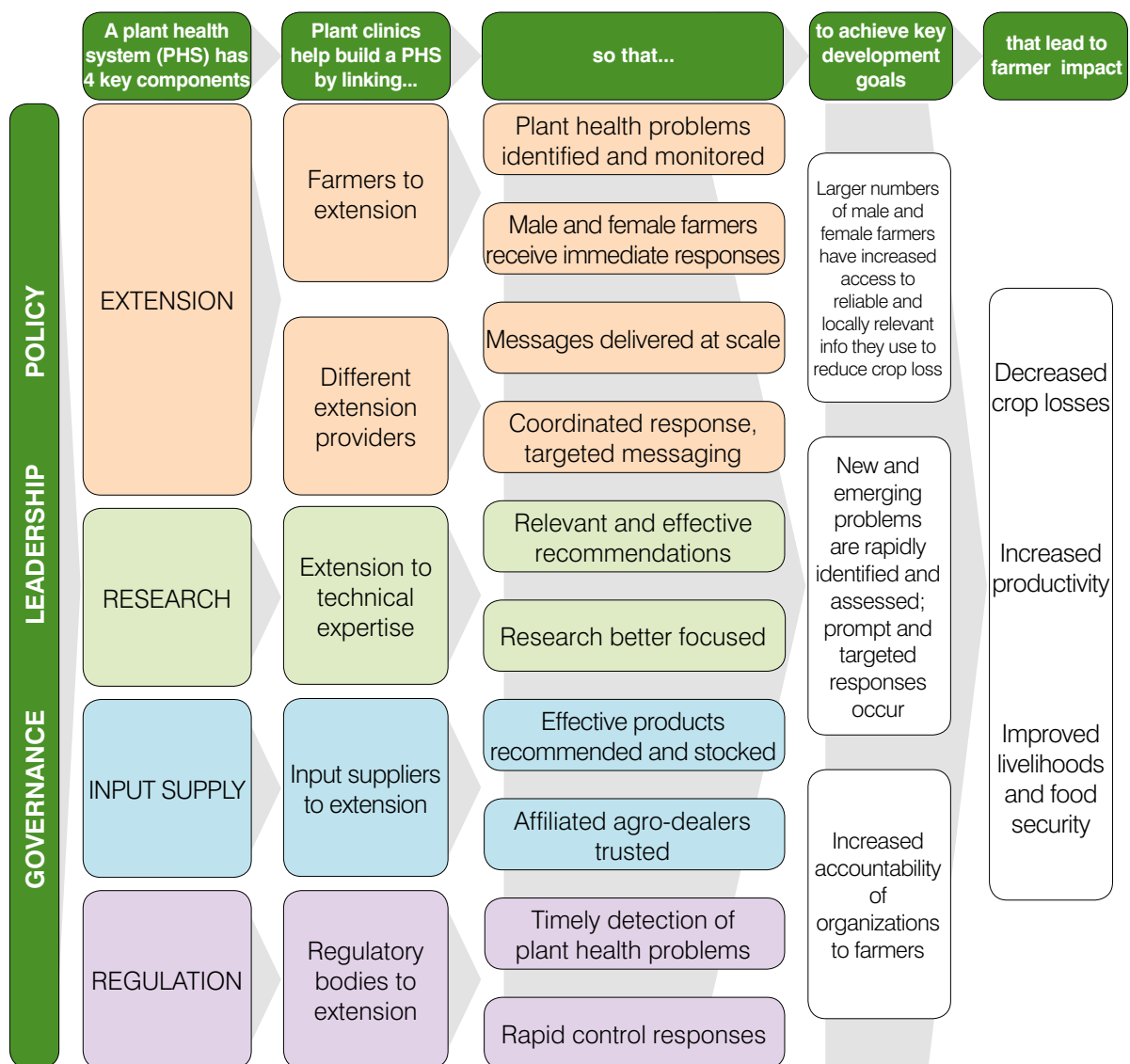


Figure 1: Plantwise Theory of Change

3. Why CABI and its partners

CAB International (CABI – www.cabi.org), originally established in 1910, is a not-for-profit science-based development organisation, operating under a UN-registered international treaty amongst its, currently 48, member countries, which together account for around 75% of the world's population. It has a Headquarters Agreement with the Government of the United Kingdom and operates through a network of centres located around the world. CABI's mission is to improve people's lives worldwide by providing information and applying scientific expertise to solve problems in agriculture and the environment and has worked in the field of plant health for over 100 years.

The organisation has expertise in disseminating agricultural knowledge and training farmers in plant health. Furthermore, CABI manages high quality data on issues relating to plant health, widely used by the global scientific community, as well as legislative and regulatory personnel in developing countries. CAB Abstracts is the world's largest agricultural information resource (about 9.5 million abstracts). Subsets of these abstracts are supplemented by 30,000 pest information data sheets to create the high impact Crop Protection Compendium and by 10,000 invasive species data sheets to create the open access Invasive Species Compendium.

At the CABI Review Conference in 2009, the member countries gave CABI a mandate, based on its global remit, to begin investing in the development of a global programme based on the successes of CABI's Global Plant Clinic (GPC) project. The Plantwise programme was then endorsed by member countries at the 2011 Review Conference as they recognised that CABI is well-placed, due to its network of centres in Africa (Kenya, Ghana), Asia (China, India, Malaysia, Pakistan), the Americas (Brazil, Trinidad & Tobago) and Europe (Switzerland, UK), to deliver such a programme.

Although Plantwise is led by CABI, the success of the programme depends heavily on the extent to which a number of stakeholders at different levels take on ownership and responsibility for plant health systems. In order to achieve the Plantwise goal, CABI has defined a multi-layered stakeholder engagement strategy:

- In each country, a national forum provides a platform to link national plant health stakeholders in support of farmers. Certain members of this national forum could form a steering committee and be key to the development of annual work plans and for taking on responsibilities for implementation of the agreed activities. In this steering committee, one organisation is designated as the 'national responsible organisation' (NRO), responsible for steering the implementation of all planned in-country activities. A National Coordinator, employed within the NRO, is appointed by the partner to actually carry out this task, with CABI providing equipment, travel and support costs for an agreed period of time during the initial stages. One or more organisations are designated as 'local implementing organisations' (LIO), meaning that they are responsible for plant clinic operation and the associated data management. In some cases, the LIO may be the same organisation as the NRO.
- Plantwise also builds linkages with NGOs and private sector players as potential LIOs where appropriate. Research organisations, universities, colleges and other education organizations are primarily publicly funded in developing countries and need to be involved in the plant health system interactions so as to provide technical back-stopping and diagnostic support for the plant clinics.
- Plantwise fosters public-private partnerships, for example involving agro-input dealers (those selling inputs to farmers) and agro-industry (those producing inputs). Organisations that are involved in the input supply chain can also become partners under the conditions laid out in the relevant Plantwise policies.
- Partnerships with international agricultural organisations, political bodies, economic communities and regional plant protection organisations will also help to facilitate Plantwise programme implementation through increased global recognition by broader endorsement as well as improved access to global plant health knowledge, information and other resources (e.g. Food and Agriculture Organisation (FAO) of the United Nations, International Plant Protection Convention (IPPC), etc.).
- Alliances are being established with a broad range of international partners. International Agricultural Research Centres are key, including a number of CGIAR centres such as IITA, IRRI and CIAT.

In addition to building on existing international alliances to access global crop management knowledge, information and other resources, the Plantwise programme will further engage with other existing CABI initiatives as follows:

- Partnership with other major plant health projects/programmes (e.g. African Soil Health Consortium) to access a wider range of global information materials for the knowledge bank, notably on pest diagnosis, management and distribution, in other languages and from other expert sources.
- Development of integrated ICT solutions that complement plant clinics and mass extension campaigns in reaching out to farmers at scale. For example, through CABI's Mobile initiative, Plantwise builds partnerships with technology companies (e.g. mobile phone service providers) and with specialists delivering solutions through information and communications technology (ICT) whose content could benefit from access to the information that exists within the knowledge bank and other CABI services.
- Exploration of opportunities with CABI's mNutrition project to develop an approach towards provision of nutrition-sensitive agricultural information and advice through a variety of communication methods, such as the plant clinics.
- Linkage with CABI's invasive species programme to promote and implement biologically-based, integrated pest management methods for weeds and other invasive plant pests.
- Linkage with the Global Open Data for Agriculture and Nutrition (GODAN) initiative, with its Secretariat is hosted by CABI, to build high-level knowledge management policy and institutional support for open data across the public and private sector.
- Provision of national surveillance and pest reporting to support market access and trade as well as delivery of IPM-based advice by plant doctors to farmers to support compliance with national and international standards of good agricultural practice and food safety.

4. Delivering the Plantwise vision through improved plant health

Providing improved advisory services that are 'regular and reliable' requires innovative solutions that recognise the entrenched weaknesses in agricultural support systems: there are not enough extension workers to reach all farmers using traditional methods, and plant health expertise is limited and difficult to access. There are also positives to build on, though regrettably they are often ignored: extension workers have a good knowledge of farmers and local conditions, researchers want to work more closely with extension while agro-input dealers (also known as stockists or retailers) want to respond to customers' needs and to be trusted.

Plantwise is building on these attributes to make high quality, relevant information available to farmers, extension systems and governments. Plantwise aims to work with existing extension providers and other stakeholders to improve collaboration between them, thereby strengthening national plant health systems.

A plant health system consists of the organisations, people and actions concerned with promoting, restoring and maintaining plant health, in order to reduce crop losses and increase crop quality. A strong plant health system requires the organised efforts and informed decisions of research, extension, input supply and regulation, which all serve to benefit farmers (see figure 2). The interactions among stakeholders in this system are underpinned by knowledge, data and information exchange.

Plant health system components already exist in all countries but often operate in disparate ways. Plantwise acts as a catalyst to stimulate the interaction and integration of these parts into a stronger and more effective system; however, the exact nature of the plant health systems will vary from country to country. The Plantwise approach develops sustainable mechanisms to deliver better plant health services that address farmer needs and improve output, including: (1) improving advisory services based on plant clinics and complementary extension approaches and delivering effective responses to any plant health problem affecting any crop; (2) improving regulatory systems so that plant health problems are detected early and advisory staff on the ground are able to communicate appropriate mitigation measures to farmers before the problems become devastating; (3) stimulating research that supports farmers' needs; and (4) improving input supply ensuring provision of appropriate, legitimate and effective goods.

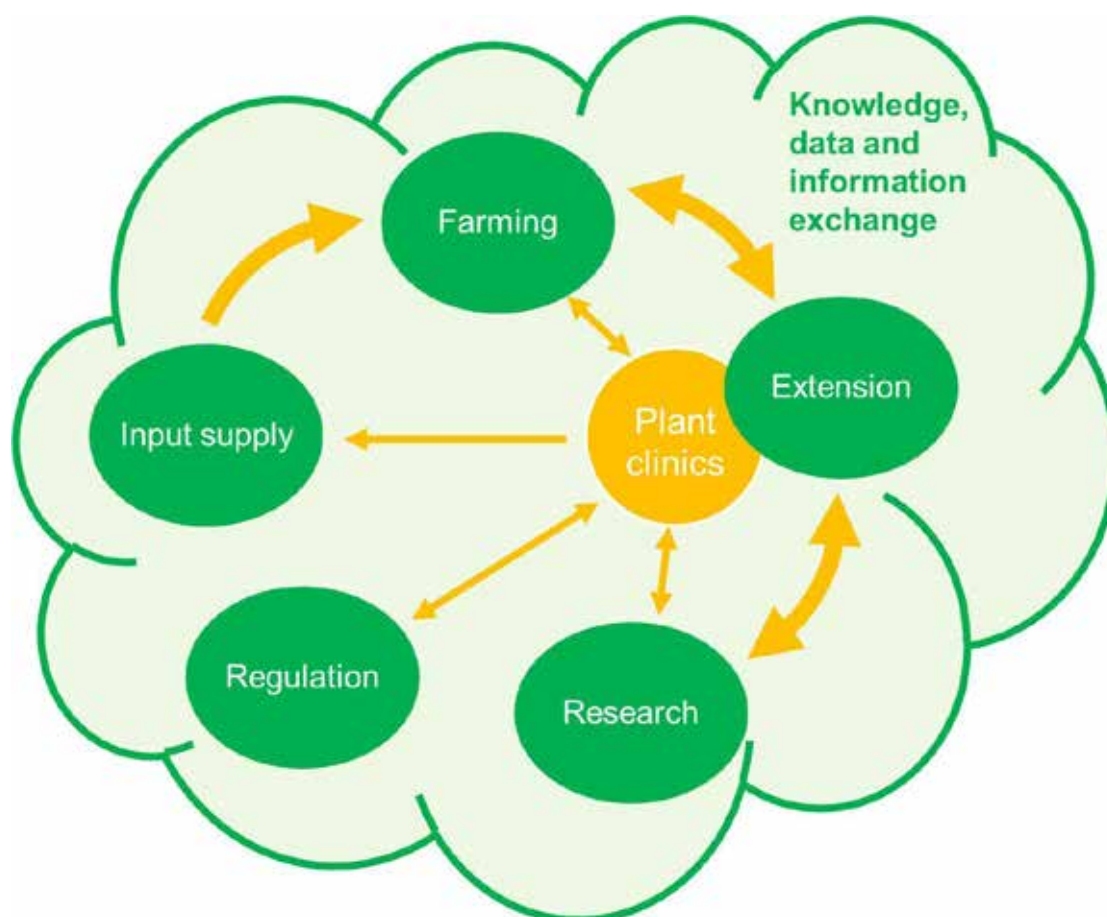


Figure 2: A plant health system is defined by the set of all national plant health stakeholders and their linkages. This diagram illustrates with orange arrows which stakeholder linkages Plantwise most effectively strengthens through plant clinics and other activities.

The plant clinics play a pivotal role in providing plant health advisory services to farmers as well as in serving as an entry point for the Plantwise approach and catalysing new patterns of interaction between stakeholders. Plantwise, through the knowledge bank, also strengthens the availability and exchange of knowledge, data and information among plant health system stakeholders (figure 2).

The Plantwise outcome specified in the programme logical framework is: To strengthen the capacity of agricultural institutions and organisations to establish sustainable plant health systems within their country, using the Plantwise approach as the framework for action. Plantwise will use the following key outcome indicators to determine success:

- Plant clinics are incorporated into national agricultural extension strategies and operate according to standards of good practice, with budgets to sustain them
- Plant health system stakeholders continue to interact in new ways established under the Plantwise approach – e.g. ways in which stakeholders deliver information is improved
- Data management of plant clinic records is integrated with other sources of information and used to make the plant health system responsive to challenges, e.g. plant health stakeholders including policymakers, extension and crop protection personnel, researchers and farmers are using information from plant clinics; new and emerging plant health problems are rapidly identified and assessed, prompting rapid responses
- Information from a variety of sources including the knowledge bank is regularly used to inform activities and materials in user-targeted formats (e.g. factsheets, pest management decision guides etc.) to influence improved plant health management strategies
- Male and female farmers have increased access to appropriate, timely and locally relevant information and advice on plant health through novel extension methods adopted by advisory services and as a result show increased adoption of improved technologies and practices that lead to positive effect at farm level (including crop management strategies, use of inputs such as fertilisers and pesticides)

Plantwise is being rolled-out to target countries selected with reference to the following criteria: i) CABI membership; ii) expressed need at a senior level within relevant national ministries; iii) commitment, including in-kind contributions and funding, to the approach within local and national organisations; iv) operational feasibility

and security; v) opportunities for linkage to, and synergy with, other major programmes or regional bodies (e.g. AFAAS, GFRAS, AGRA, ASARECA, SADC, CORAF, COMESA); and vi) donor priorities and programmes.

Based on the Theory of Change, a Theory of Action (country intervention strategy) has been developed to describe how Plantwise can move from assessment activities, through piloting plant clinics, to wide-scale operation in participating countries with the overall aim of supporting the strengthening of national plant health systems. There is a sequence of Plantwise activities that take place as a country progresses towards a more effective plant health system through five phases briefly outlined below (see figure 3, Theory of Action, for more details):

1. *Assessment* – Understand country context to evaluate suitability for the Plantwise approach
2. *Pilot* – Test Plantwise approach and relevance for the country
3. *Consolidation* – Strengthen in-country activities based on lessons learned to establish a critical mass of plant clinics with the necessary links to key stakeholders
4. *Scale-up* – Embed the organisational changes and new practices to enable expansion of Plantwise activities by national partners
5. *Sustainability* – Build national institutional capacity and facilitate national ownership and responsibility to ensure that the Plantwise approach is fully integrated into their standard operating procedures and budgets

The specific Plantwise activities are grouped into five broad work areas based on the five programme logical framework outputs: (1) plant clinics, (2) stakeholder linkages, (3) data management and use, (4) information exchange and knowledge bank, and (5) monitoring and evaluation.

The key work areas described above are supported by on-going capacity building and advocacy that works towards embedding new practices and behaviours in organisations (e.g. reorganising staff roles and financial resources, establishing sustainable mechanisms through which stakeholders can interact, etc.). Sustainability is achieved as a result of organisational and behavioural change. Advocacy or communication strategies are developed based on an understanding of the organisational environment and involve regular engagement with diverse stakeholders at all levels of a national plant health system. Engagement includes workshops with the national forum, face-to-face meetings, field visits and country exchanges for key individuals. Preparation and distribution of advocacy materials, such as video and printed materials, is also important as this will raise awareness of successes and show others how plant clinics and plant health systems can function.

Plant clinics

Plant clinics are a valuable channel for facilitating the face-to-face exchange and two-way flow of knowledge and information between plant doctors and farmers. They respond to the immediate needs of farmers, offering advice on demand. Plant clinics, owned and run by national and local bodies, should take place on a regular basis, at least once every two weeks, in public places that are best suited to meeting farmers. These locations should be readily accessible and already visited as a regular part of the farmer's normal routine. The farmer brings a sample of the affected crop, discusses the problem with a plant doctor and receives a diagnosis of the problem affecting his or her crop, together with written and verbal recommendations for managing it. Throughout this interaction at a plant clinic, the plant doctor completes a standard form, either in printed form or by using a hand-held tablet device, to record information about the plant health problem and the advice given. Data about each farmer's visit are held within a central repository and can be analysed to assess suitability of the advice given and enhance the accountability of the advisory service in a country.

Farmers can and do ask for assistance on any problem concerning the crops they grow, so plant clinics accept 'any problem on any crop'. The various crop problems brought to plant clinics can be related to either abiotic factors (e.g. nutrient deficiency, water-logging, chemical misuse, etc.) or biotic factors (e.g. pathogens, insects, rats, etc.). Plant doctors should be knowledgeable about farmers and farming conditions, speak the local language and know what inputs are available. This puts them in an excellent position to offer the farmers practical advice. Plant doctors are usually trained extension workers and remain employed by their current organisations. They participate in custom-made training courses designed by CABI. These courses build on the plant doctors' existing knowledge and show them how to use their skills to maximum effect when diagnosing problems and giving recommendations. Plantwise promotes mechanisms that enable plant clinics to receive technical support for identification or diagnosis of plant health problems from national diagnostic laboratories, backed up as necessary by the Plantwise diagnostic and advisory service in the United Kingdom (UK) or other international services. The Plantwise programme encourages plant doctors to offer plant health management advice guided by the principles of integrated pest management (IPM) when dealing with biotic factors. In those cases, they are advised and given information tools to recommend only locally-registered and available pesticides, which are not restricted by international conventions.

Stakeholder linkages

An effective plant health system is dependent on strong interactions among the system stakeholders. Key stakeholders are brought together in a national forum that meets regularly to plan activities and guide progress. This is also a key mechanism to explore ways of embedding successful activities into organisational working practices. Plantwise consolidates links between stakeholders using the network of plant clinics and the data they generate as a catalyst to stimulate additional interactions between farmers, extension, research, input supply, regulation at local and national levels. Understanding their current mandates, institutional set-up and ways of working enables CABI to work with its partners to encourage and facilitate engagement between plant health stakeholders. Some of the important interactions between plant health system stakeholders are described below:

- Extension workers provide advice to farmers while the farmers share their own experiences with the extension workers.
- Extension workers are a conduit for communication between researchers and farmers. The technologies resulting from research can be disseminated to farmers while observations from the field (e.g. suspected development of pesticide resistance in pest populations) can be used to inform the prioritisation of research activities.
- Researchers provide scientific data that are used by regulatory bodies to influence the development or modification of agriculture policies relating to crop production standards and food safety.
- Regulatory bodies provide researchers, extension workers and farmers with a legal framework that sets the expected standards for crop production to ensure food safety and meet international trade obligations.
- Regulatory bodies oversee the function and operation of agro-input dealers.
- Agro-input dealers are in direct contact with farmers for the sale of agro-inputs and often provide advice on the use of the inputs.

In addition to in-country linkages, Plantwise provides opportunities for key national partners to attend regional meetings where they can share experiences and lessons learned about Plantwise implementation in their respective countries. These events are informal networking meetings that greatly help Plantwise to develop new activities and consolidate existing ones.

Country intervention strategy: Theory of Action

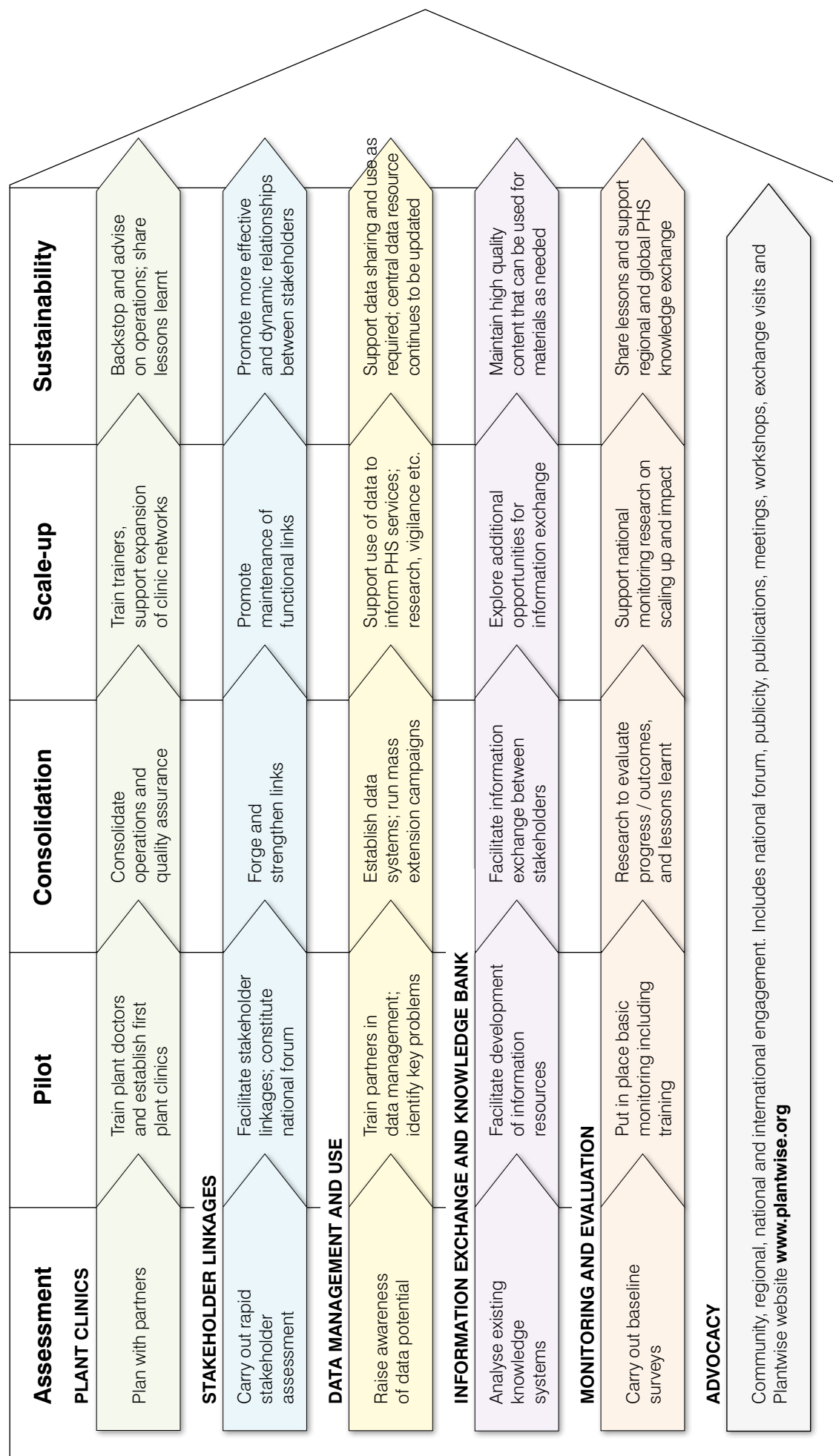


Figure 3: Plantwise Theory of Action

Data management and use

The information collected through the plant clinics on current plant health problems is a valuable resource that can be used to inform plant health stakeholders and other knowledge delivery systems to strengthen the plant health system. Roundtable discussions are held with representatives of organizations or initiatives involved in sharing plant health data to identify information gaps and ways in which it could feed into and inform their activities. A number of in-country personnel are trained in data management procedures including the collection, processing, analysis, sharing, and use of information from plant clinics. These national data management systems are linked to and supported by the Plantwise knowledge bank.

The plant clinic data can be used to inform plant health services in various ways. For instance, aggregated observations from the plant clinic data can help to identify new and emerging plant health problems and act as an early warning system to the regulatory bodies responsible for surveillance and response.

Data can also be used to inform topics for plant health rallies and mass extension campaigns that reach a wider audience with targeted, relevant messages about current plant health problems. A plant health rally is an extension method for providing validated advice to farmers on a single plant health topic of known importance (e.g. detecting and/or managing an emerging plant health problem). Plant health rallies are held in public spaces and are of relatively short duration to reach dozens or even hundreds of people within a given target area where the subject is important. Multiple plant health rallies on the same topic at different locations within a short period make up a 'plant health campaign'. In contrast, mass extension campaigns are major events to deliver targeted plant health messages to thousands of farmers through relevant media, such as radio, television, mobile phones, etc.

Information exchange and Knowledge Bank

Providing access to a wide range of information, from international scientific literature to simple extension materials in local language for farmers, is central to success in managing plant health problems. Plantwise is underpinned with a web-based knowledge bank, developed and hosted by CABI. This acts as a central information source, providing a searchable database containing factsheets, pest management decision guides and other information sources on all aspects of plant health. Plant doctors and extension workers are encouraged to use the knowledge bank products to access comprehensive, locally relevant, and actionable information to help farmers on the ground.

In addition to information from the plant clinics and CABI's own scientific resources, the knowledge bank provides access to data and information from a wide range of partner organisations and initiatives, for example, the Consultative Group on International Agricultural Research (CGIAR) (e.g. International Center for Tropical Agriculture (CIAT) and the International Rice Research Institute (IRRI), the US Department of Agriculture (USDA) and the UK Food and Environment Research Agency (FERA)). This gives researchers and extension workers instant access to a network of free and open-access plant health information. New content is also generated in collaboration with in-country experts, for example through writing or modifying extension materials (e.g. pest management decision guides and related factsheets).

The Plantwise Online Management System (POMS), an access-controlled section within the knowledge bank, is a central resource for managing plant clinic data as well as programme monitoring, detailing the core Plantwise outputs. Information on training, people, partners, clinics and activities is held here for easy retrieval. Through access to the POMS, authorised national stakeholders are able to examine the Plantwise activities and results for their countries. Training in the POMS is given and the system will continue to be developed to meet extended stakeholder needs, such as offline viewing.

Other established partner-supplied features requiring linkage include:

- diagnostic search tool
- country-specific webpages with tailor-made location-specific information as a way of providing national plant health portals that might not otherwise exist
- interactive crop and pest distribution maps
- advice on the safe application of pesticides
- advice on the availability of registered agro-inputs
- links to other key experts (e.g. a directory of diagnostic services)
- locally-targeted services that may arise as a result of emerging pest problems
- pest risk analysis tools

CABI builds partnerships with those who can help disseminate information effectively, such as media outlets (e.g. radio and television) to get key plant health messages to a broader audience of farmers. In particular, CABI will build partnerships with mobile technology companies (e.g. Airtel) and with specialists to deliver plant health information through information and communications technology (ICT) (e.g. IKSL, Grameen).

Monitoring and evaluation

Monitoring and evaluation (M&E) is carried out at a number of different levels: local, national and global. At a local level, M&E focuses more closely on plant clinic operations so that the organisations running the clinics can improve their performance in terms of quality of advice, geographic coverage, farmer satisfaction, productivity etc. At a national level, questions of interest to government policy are more relevant, for example how plant clinics contribute to delivering national objectives of supporting agriculture and managing plant disorders resulting from biotic and abiotic factors, and the implications, including cost of government ownership of clinics and capacity development. At the programme level, CAB International is interested in how the programme itself is performing and in learning lessons that will inform its future development. This might include decisions on consolidation and scaling up in participating countries. The programme also aims to understand how country context influences implementation of the Plantwise approach and impact on crop losses, productivity, livelihoods and food security.

Monitoring and evaluation outputs include information on good practices, lessons learned, successes and challenges. Monitoring and evaluation is a continuous process within the Plantwise programme and must be deeply embedded in the management approach. This facilitates adjustments in response to emerging insights into needs, relative effectiveness of programme activities etc. Additional research into plant health systems, such as short studies and large-scale impact assessments are being used to further develop specific intervention approaches and, most importantly, evidence that Plantwise is contributing to improved food security and livelihoods through increased productivity and household level income.

As per the Plantwise gender strategy, special attention should be paid to gender, monitoring the number of male and female plant doctors trained. In addition, the implementing teams should seek to understand the different needs of male and female farmers, both young and old, in accessing plant health information, and to evaluate the effectiveness of Plantwise in reaching different types of farmers. All plant clinic data collected are disaggregated by gender in order to facilitate detailed analysis of gender differences in access to clinics, changes in farming practices, and livelihood impacts.

5. What has been achieved so far

Since 2011, Plantwise has grown rapidly to work in 33 countries by the end of 2014 and has received strong support from governments, advisory services, NGOs, farmers, other plant health stakeholders and programme donors. The increasing number of partnerships has led to significant progress both in-country and at the programme level. In general, interactions between plant health stakeholders are being strengthened through Plantwise activities. High demand from farmers, and interest from extension providers and plant protection organisations, has led to the rapid expansion of plant clinic networks in the participating countries. These plant clinics and other complementary extension methods facilitated through Plantwise are reaching rapidly increasing numbers of female and male farmers. It is estimated that approximately 1,900,000 farmers around the world had been reached directly through plant clinics and other Plantwise activities, as well as indirectly through farmer-to-farmer exchange and other spill-over effects, by the end of 2014. More and more plant clinic data are being stored in the knowledge bank and used as the basis for informed decision-making by plant health stakeholders. In addition, the knowledge bank provides critical information such as pest distribution maps, an online diagnostic tool and crop management support. Structures and processes have been put in place to enhance capacity for regular monitoring and evaluation across the programme. The foundations have been laid for large-scale impact assessment of Plantwise in collaboration with international partners. All results presented in the current strategy are based on achievements made by the end of 2014.



Figure 4. Programme countries (as at end of 2014)

Plant clinics

- Facilitated the establishment of over 1,400 plant clinics that run sessions for farmers across 33 countries
- Trained over 3,500 national male and female extension staff to become plant doctors
- Initiated links with national universities in 3 countries for the delivery of plant doctor training modules as part of curriculum
- National partners are increasingly including plant clinic operations in their annual budgets



Figure 5. In-country programme outputs (cumulative figures: 2012-2014)

Stakeholder linkages

- Made significant progress in strengthening linkages with other international organisations, such as the International Plant Protection Convention Secretariat (IPPC, hosted by the Food and Agriculture Organisation (FAO))
- Signed formal partnership agreements with national partners in most countries (e.g. Ministry of Agriculture)
- Began strengthening links between extension providers and diagnostic support services

Data management and use

- Trained dozens of local partners on data management and validation
- Developed a programme-level plant clinic data management strategy and procedures, including data collection, processing, validation, analysis and sharing
- Data from over 75,000 clinic prescription forms from 20 countries in the knowledge bank

Information exchange and Knowledge Bank

- Developed the access-controlled section of the knowledge bank, the Plantwise Online Management System (POMS), as a key tool for data management and programme monitoring
- Built a partnership of content owners to make the Plantwise knowledge bank an open-access gateway to information on over 2,500 plant pests and their ability to attack 4,000 host plants worldwide
- Provided access to more than 7,500 factsheets on the knowledge bank, of which over 700 were developed through training and collaboration with Plantwise partners
- Pest alert information actively requested by hundreds of experts, including 169 NPPO contacts, from 200 countries
- Developed new tools to enhance offline availability of knowledge bank content for use on simple mobile devices, such as basic smart phones or even tablets, by plant doctors

Monitoring and evaluation

- Updated the programme 'logical framework' with the support of the International NGO Training and Research Centre (INTRAC)
- Launched the POMS as a central resource for monitoring programme outputs and for providing detailed, gender-disaggregated information about the core Plantwise outputs
- Developed capacity and plans for partner-led plant clinic performance monitoring in a number of countries
- Facilitated the execution of an SDC-led external evaluation of programme-level operations and in-country implementation in 2013 (Kenya, Tanzania, Rwanda)
- Facilitated the execution of a EuropeAid-led external evaluation of programme-level operations and in-country implementation in 2014 (Kenya, Ghana, Malawi, Zambia, Uganda, Rwanda)
- Worked with 3ie to contract the American Institute of Research in collaboration with American University to carry out a rigorous impact assessment of Plantwise activities in Kenya

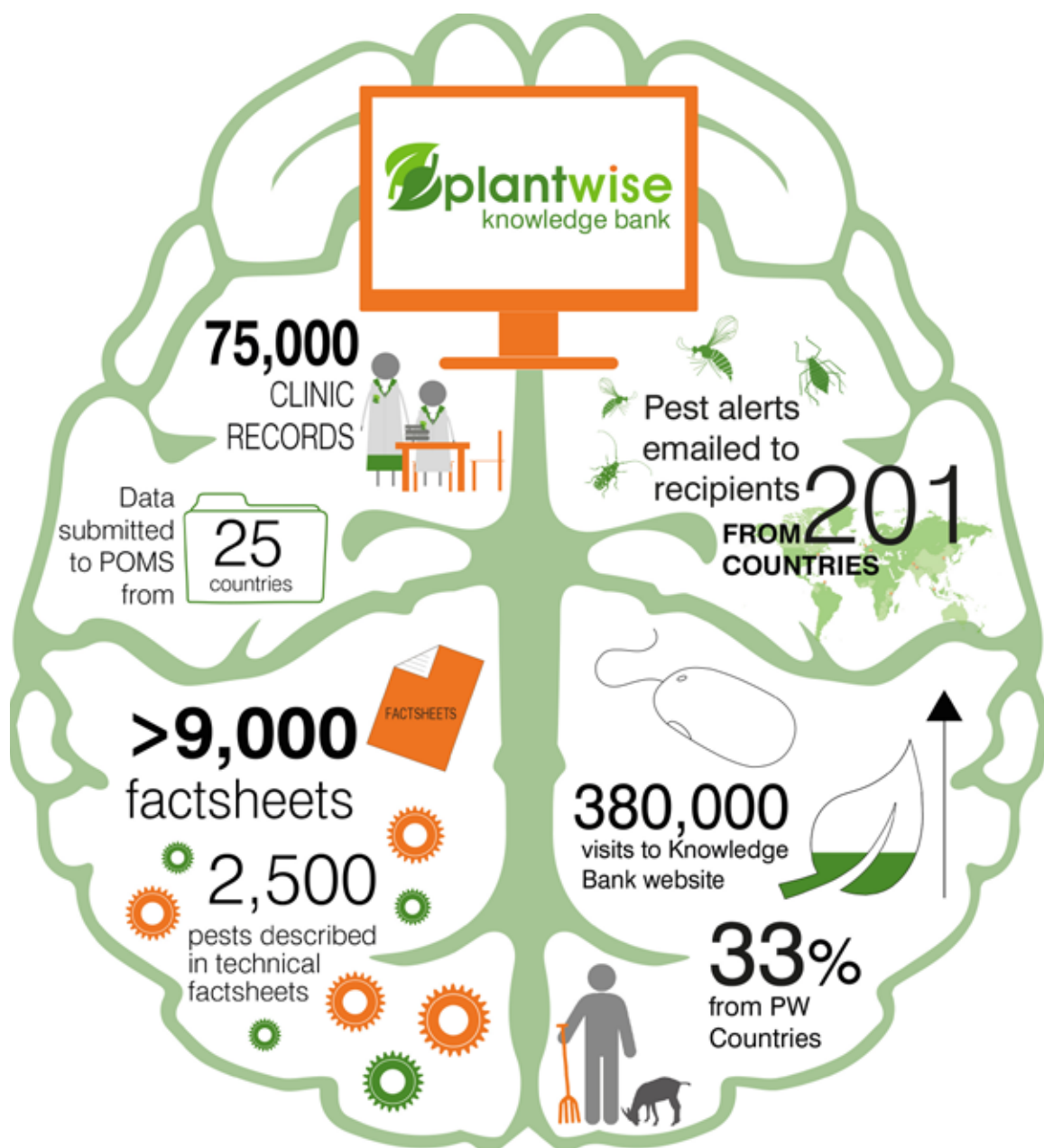


Figure 6. Knowledge banks outputs (2011-2014)

6. Lessons learned

The implementation of a standardised Plantwise programme in so many partner countries presents various challenges: (1) the widespread and varied distribution of plant clinic clients; (2) the heavily context-specific features of gender, institutional structures and work cultures in partner countries with varied social and cultural settings; (3) the efforts required for translation into local languages, which is important for not only understanding but also ownership; and (4) the diversity of crops, natural resource bases and stages of agricultural development. Lessons learned from internal feedback mechanisms plus external evaluations are incorporated back into the programme as quickly as possible to ensure that the success of Plantwise is not threatened by these kinds of challenges. The nature of Plantwise interventions ('supportive', not 'controlling') makes it complicated to identify change through the programme activities.

Many of the challenges faced can be overcome through a sound understanding of the political and institutional context, including also structural barriers, into which the Plantwise approach is being introduced. For instance, having a thorough understanding of existing extension systems and approaches, as well as their efficacy, will make it easier to ensure that plant clinics and other Plantwise concepts are embedded into the existing structures, rather than being viewed as parallel and 'additional work'. Plantwise is implemented in diverse environments with a myriad of simultaneous (and often competing and fragmenting) projects and interventions. This creates opportunities for synergy but also risks of further fragmentation if Plantwise is perceived as an external and parallel system.

A key lesson learned is that developing in-country ownership of the Plantwise approach requires sustained engagement and trust building with partners over a number of years, especially during early stages. The development of strong and lasting partnerships among plant health system stakeholders and with CABI require more time than initially expected. Nonetheless, it has been shown that formal partnership agreements can contribute significantly to the smooth implementation of activities in the country as they help to establish a common understanding of the responsibilities of all partners. This particularly relates to issues such as developing comprehensive mid-term and long-term country plans, streamlining budget processes, establishing funding transfer mechanisms and ensuring financial accountability. The management of each country programme requires great involvement of CABI teams to support the necessary capacity building of national counterparts on both a technical and management level. In conclusion, advocacy efforts need to be increased at national and local levels for greater commitment, sustained support and ownership of the Plantwise approach at the country level.

Until 2014, there was a focus on expanding the programme to new countries; however, it is felt that, going forward, more focus should be on consolidation and developing national ownership within the existing programme countries. Therefore, Plantwise will retain its original target of 40 participating countries to progress as far as possible through the phases towards sustainability. CABI must be able to prioritise Plantwise countries in an objective and transparent manner to invest stronger support into activities that show promise while reducing focus on areas where lessons learned have demonstrated that further investment would not be worthwhile.

While Plantwise is excelling in reaching most of its programme targets, the 2014 year-end results suggest that it is below target in terms of farmers reached. This shortfall will be addressed both through establishing more efficient methods of information delivery, including ICT-based approaches, and through developing sound methods for recording metrics on reach.



Plant clinics

There is welcome evidence of national acceptance and ownership of the plant clinic concept. CABI sees a tremendous demand from partners for scaling up of plant clinics and related activities; however, consolidation and quality of existing clinic networks needs prioritisation in many cases before scaling up should proceed. It is important to ensure that the existing plant clinics in a country, often still referred to as pilots, are operating at an appropriate standard before they become a model for replication across a larger geographical area. Decisions to scale up will also depend on the degree of the financial and in-kind contributions made by various in-country partners.

In a number of participating countries, partner organisations have begun to build the plant clinic tool into their standard extension duties, such as making the plant doctor role a part-time element of official work of field staff. Nonetheless, one lesson learned is that **increased advocacy effort is still required in some areas to instigate institutional change and to truly embed plant clinics within existing extension structures**. This change requires the reallocation of national resources and the inclusion of plant clinic activities in the terms of reference for extension staff. Therefore, an appropriate national plan should clearly state the roles of each partner and the sources of funding to facilitate long-term sustainability.

Programme monitoring has shown that **the number of farmers attending plant clinics is highly variable**. Plant clinic data submitted to the POMS indicate that, for a single plant clinic session (2-3 hours), the number of recorded visits has ranged from 1 to 86. Where farmer attendance at plant clinics is consistently low, innovative methods are needed to increase the attendance, including ways to advertise and raise awareness of clinics and make them more accessible (location and/or timing), as well as considering different operational models such as mobile clinics or more frequent clinic sessions.

The development and distribution of technical reference materials to plant doctors has been very successful, with strong positive feedback from plant clinic staff. However, plant doctors in many countries have expressed a need for further extension materials to support them in their diagnostic and advisory role. Where plant doctor review and feedback meetings have taken place, plant doctors benefitted from the opportunity to exchange experiences and learn through team self-reviews on technical issues such as difficult diagnostic challenges. Further engagement is required through **more formal channels to provide free access for plant doctors to professional diagnostic support**. One lesson learned is that there is often a lack of clear policies and quality assurance mechanisms at the national level to guide recommendations given by advisory staff, especially relating to banned/restricted pesticides.

Due to CABI's limited direct interaction with plant doctors, it is necessary to consider innovative ideas to keep plant doctors engaged with learning and self-assessment. One approach that holds promise is **the use of 'serious gaming' (= educational simulators) to augment plant doctor training** in Plantwise. Training through interactive games on the topic of field diagnosis and recommendations would increase plant doctors' capacity to identify plant health problems and give feedback to farmers. Moreover, serious games on an electronic device can even serve as powerful M&E tools for assessing possible gaps in plant doctors' knowledge.

Stakeholder linkages

There has been a strong focus in Plantwise on the establishment of new plant clinics but there is still some way to go in strengthening broader plant health systems. It has been recognised that, to better inform actions to strengthen linkages within a plant health system, **a more rigorous stakeholder assessment should be conducted in all countries** to ensure that partners are involved according to their national mandates.

Furthermore, it has been observed that local levels of government (e.g. district, county) must be engaged more directly to increase awareness and ownership of Plantwise, which will be needed for sustainability. Plantwise has had much success in achieving national level buy-in, which is the logical entry point for the programme in a country; however, the programme must increasingly involve district and county level partners, particularly in countries where governance systems are decentralised.

The value of a **national steering committee, or a similar national forum, is recognised as a key mechanism for linking plant health stakeholders**, strengthening national ownership and guiding the national programme implementation. One of the lessons learned is that linkages to other stakeholders such as those involved in agro-input supply, as well as their associations, and education institutions need to be strengthened. For instance, **more attention should be given to assessing ways to strengthen links between plant clinics and agro-input dealers** to ensure that plant doctors are more familiar with the inputs available locally and to improve the availability of IPM-compatible crop protection products on the market.

Data management and use

There are considerable on-going challenges to develop the data management systems, including data collection, validation and analysis that are different for each country. These challenges include: sensitivity of governments to data sharing; incentives for data collection; practicalities of the data management process; variety of languages used; and availability of staff resources, computer skills and equipment in different countries. One of the lessons learned in the initial stages of data management is that CABI needs to **engage closely with partners to understand existing information management systems and streamline all aspects of the data management process**, working with the in-country infrastructure available and bolstering it where possible. It is also important to understand the motivation and incentives of staff for engaging in data management activities. CABI must recognise the novelty of this data management approach for many programme partners and therefore continue to provide technical support and capacity building when needed.

Moreover, **the quality of plant clinic data requires further attention** in many areas. Providing incentives to partners by showing the value of the data helps overcome these difficulties. This is particularly challenging in the early stages of data management; however, as more data become available and are analysed it becomes clearer to all that such information provides a crucial means to monitor and improve overall Plantwise processes and to inform in-country decision-making, e.g. on research or policy priorities.

At the programme level, there is an on-going need to find validation processes that can be standardised and, preferably, automated. This will help to deliver consistent assessment of the plant clinic data and ensure that feedback on quality of advice is provided. At the local level, simplified tools and processes for data validation are required to ensure that plant clinic staff can learn from their previous experiences and offer an increasingly effective service for farmers.

Information exchange and knowledge bank

Feedback from partners is particularly important for further developing the knowledge bank in such a way that the needs of plant health stakeholders are accommodated. The **knowledge bank continues to be valued for the quality of the content and its online delivery, but there is a need for even more localised information and offline delivery** that is more suited to plant doctors in a number of countries where internet access is still unavailable, expensive or unreliable. As the content of the knowledge bank grows and the format types expand (pest management decision guides, factsheets for farmers, SMS messages, etc.), there is a challenge to ensure that the advice that Plantwise delivers is always of high quality and represents best practice. The validation processes in place to ensure high quality content and appropriateness for end users require considerable time and inevitably slow down the delivery of final products to in-country partners and the knowledge bank. Creating a comprehensive collection of pest management decision guides, and ensuring the effective production, validation, dissemination and consistent use of this content, remains a high priority.

Approaches are also needed to ensure that content can be disseminated to plant doctors and farmers in the field in the most appropriate medium, including ICT. Progress is being made in exploring how ICTs can improve farmer reach, clinic attendance, service quality, and responsiveness to local plant health problems. **An initial trial of tablet use by plant doctors to improve collection of plant clinic data was very positive**, with many improvements to the plant clinic service: a) tablet use does not interfere with a plant doctor's interaction with the farmer; b) data collected are more consistent; c) clinic data, and related images that help with data validation, were received for central analysis on the same day that the clinic session took place; and d) advice provided to the farmer can be seen to be linked to the best practice given in the Plantwise factsheets on the app. In terms of using ICT for mass extension, there are **promising signs for synergy by linking Plantwise high quality information with the large farmer audiences of CABI's Direct2Farm (D2F) programme**.

The POMS is in use by CABI's Plantwise staff and by several in-country stakeholders who have been identified as the relevant authorities to manage both operational and plant clinic data. However, more **work is required to ensure that the POMS is designed to deliver information that programme partners require in usable formats** and that all countries that share data with the knowledge bank can effectively access the analysed information in the POMS, either online or offline. This will further cement in stakeholders' minds the value of the information that M&E and plant clinic data can provide.

In order for the Plantwise knowledge bank to become independent of donor funding, **business models must be developed that support the knowledge bank in its growth and maintenance**, developing specialist analysis tools, products, services and spin-off projects while continuing to ensure that the core information remains an open access public good.

Monitoring and evaluation

Feedback from the Plantwise implementation teams has shown that M&E may sometimes be inadvertently perceived by partners as a policing tool and something that is implemented only by CABI. There is, therefore, a strong need to address how CABI staff can **engage with partners to demonstrate the importance of M&E and implement processes** that enable them to review their own activities. In general, there should be greater time allocated to review, analysis and learning.

Evidence from M&E studies in Kenya and Uganda indicates that, in the absence of plant clinics, agro-input shops are often the principal source of advice for plant health problems; however, plant clinic users prefer the plant doctors over agro-input dealers as a source of advice.

The same studies revealed that attendance at clinics by women is highly variable between and within countries, and that plant clinics managed by NGOs associated with women's groups can increase attendance. Of the 1,500 plant doctors trained in Plantwise over the past few years, 24% have been women. Globally, the gender-disaggregated plant clinic data show that about one quarter of clinic clients have been women; however, the gender balance among clinic clients varies considerably from country to country. In countries like Pakistan, Afghanistan and Bolivia, the attendance is almost exclusively by men. In countries like Kenya and Sierra Leone, women account for about one third of the client base.

While CABI has demonstrated serious commitment to gender, more needs to be done to embed this in field operations to ensure that women are able to access advisory services. To facilitate this and monitor change, gender analysis must be undertaken at the outset. CABI must continue to work with its partners to ensure that they keep gender issues at the forefront when planning and implementing extension activities.

Early impact evaluations of plant clinics did not use the robust methods expected of rigorous impact assessment. It is now understood that assessing the impact of Plantwise on farm productivity, income and food security is a complex process because multiple sources of variation (e.g. many crops, problems, seasonal variations) and possible biases (e.g. self-selection of clinic users) make it difficult to attribute positive changes to the outputs of the programme. To address this complexity, CABI is partnering with organisations with the necessary expertise to implement **randomised control trials** (RCT). A first RCT is being carried out in Kenya and will continue until 2018.

The SDC-led external evaluation presented a first opportunity for an in-depth, third-party analysis of Plantwise coordination and implementation. This was followed by a EuropeAid-led external evaluation along the same lines one year later. These evaluations contributed valuable feedback, with a number of recommendations that have been considered in the planning of next steps. The Plantwise programme has a lot to gain from other similar external evaluations that are being planned with donors in a harmonised approach.

Sustainability Indicator Map



In **NICARAGUA**, Plantwise has found its place among key stakeholders in plant health, with farmer cooperatives, NGOs and universities allocating resources to operate clinics and use data. Technical schools and universities have integrated Plantwise materials into education.



Plantwise has grown into the heart of daily research and extension activities in **PAKISTAN** and is now poised to expand. Data management and clinic operations are a major role in government job descriptions, including those of national plant doctor trainers and monitoring & evaluation teams who ensure quality of advice into the future.



As a sign of high-level commitment, the Deputy Director of the General Directorate of Agriculture in **CAMBODIA** has mandated plant clinics in his Terms of Reference.



With plant clinics as one of the top 5 national priorities in **SIERRA LEONE**, the President, the Agricultural Minister and the Assistant Chief Agricultural Officer are advocates. The government ensures that plant clinics are linked to new development investments after seeing the immense value- through Plantwise, they are already identifying and mitigating major new pest problems.



Implementing partner INIA invested its own budget to double the size of the plant clinic network across 8 regions of **PERU** in 2013 and embedded clinics into existing initiatives like its coffee rust programme.



In **UGANDA**, the next generation of agriculturalists is growing up with Plantwise. As part of the government's 5-year plan, which includes funding and outfitting clinics with equipment, a team of national Plantwise trainers is being established and the materials are even being integrated into Makerere University's curriculum.



KENYA is a model of Plantwise ownership, demonstrating the power of plant clinics and clinic data to connect and inform a national plant health system. Clinics and data management are embedded in day-to-day roles, while the National Steering Committee for Plantwise and working teams watch over all operations.



With over 200 plant doctors undergoing training and establishing plant clinics in **SRI LANKA**, this is currently the largest Plantwise network in the world. All government extension staff are to be trained as plant doctors with funds of the government for their 'Permanent Crop Clinic Programme.'

Figure 7. Case study snapshots provide evidence of countries' uptake of plant clinics and other Plantwise concepts.

7. Sustainability of Plantwise

A fundamental assumption of Plantwise is that organisational change is required for plant clinics and plant health systems to function effectively. The way in which organisations function and interact with each other will depend on a given country context. Therefore, although we have guiding principles for implementation, we cannot predict the exact form in which the progress towards sustainability should take place. In addition, several key assumptions related to outreach and inclusiveness of plant clinics, development of plant health systems, the functioning of and buy-in to the knowledge bank remain to be tested. This implies a need for experimentation and frequent feedback loops to nurture critical analysis and reflection. Interventions will inevitably change and evolve over time.

Sustainability roadmap and progress assessment tool

Internal discussions on sustainability revealed that there are inconsistent views on what sustainability is and how to recognise it. This showed the need for a sustainability roadmap, with clearly defined sustainability indicators, that clarifies what Plantwise sustainability means and what CABI's role is in achieving it.

When Plantwise refers to sustainability, this means that positive changes will continue beyond the lifetime of the programme and independent of direct support from CABI or Plantwise donors. These positive changes refer to the way stakeholders in a given country interact to fulfil their mandates as a result of implementing the Plantwise approach. Key indicators of change towards sustainability are behavioural indicators related to the way in which different stakeholders interact and the roles and responsibilities they take on.

A roadmap was developed, using examples and experiences from the countries where Plantwise already works, to identify milestones for each key indicator that demonstrate change towards sustainability. These can be grouped under the 5 work areas in the Theory of Action: (1) plant clinics, (2) stakeholder linkages, (3) data management and use, (4) information exchange and knowledge bank and (5) monitoring and evaluation. An additional sixth category was also included to track commitment of relevant stakeholders to Plantwise. Expected milestones for each work area are given for each of the five implementation phases in the Theory of Action: assessment; pilot; consolidation; scale-up; and sustainability. The ways in which country programmes evolve towards sustainability will depend on country context, including political systems, the way extension, crop protection and research stakeholders currently function and services are delivered, culture, agriculture systems etc. Nonetheless, there should be a generally consistent transition from one step to the next towards sustainability.

The sustainability roadmap provides a basis for the development and integration of a tool to evaluate progress of countries from one stage to another towards sustainability of the Plantwise approach. The combined sustainability roadmap and progress assessment tool (Table 1) was designed for use by both CABI and its national partners, and offers a more standardised assessment procedure across Plantwise countries. Plantwise partners should monitor progress using the tool on a regular basis e.g., annually. A score between 0 and 5 is allocated to quantify the approximate progress against each milestone. The scores within the work areas (horizontal categories) are then compiled to calculate a '% completed' score for each work area. This enables Plantwise partners to assess their relative progress in different aspects of programme implementation (e.g. plant clinics, stakeholder linkages, M&E). Similarly, '% completed' scores can be calculated vertically for each phase, which helps partners determine in which phase, overall, their national programme is. The assessment tool enables Plantwise partners to more objectively review programme progress, identify key achievements and hold targeted discussions on areas that need further attention. Due to inevitable subjectivity in quantifying progress against each milestone, the progress assessment tool is most effectively used for in-country progress over time rather than instantaneous comparisons between countries.

For CABI, the progress assessment tool will facilitate more objective decision making related to the level of investment and the role of CABI versus partners. Of particular importance are decisions on when a country is ready to move to the consolidation and scale-up phases, as well as decisions on when and how CABI should withdraw its support from countries. The sustainability roadmap shown in Table 1 is very much like the Plantwise strategy itself in that it will likely evolve over time as it is used by diverse partners and lessons are continuously gathered and incorporated as relevant.

Work Areas	Programme Implementation Phases Along the Sustainability Roadmap							% of total for work areas		
	ASSESSMENT	PILOT	CONSOLIDATION	SCALE UP		SUSTAINABILITY				
Clinic coverage and operations	1) Country organisations with an extension mandate recognise the relevance of Plantwise and show an interest in incorporating plant clinics into their existing systems and agree to work with CABI to pilot plant clinics	Score	1.1) Country partners send staff to participate in training by CABI on relevant modules and learn to be plant doctors	Score	1.1) Country partners cover staff time and at least 50% of direct costs of running clinics (materials, travel & subsistence)	Score	1.1) Country partners cover staff time and 90% of additional direct costs as numbers of clinics expand	Score	1.1) Country partners are responsible for all operational activities and cover 100% of direct costs and staff time	Score
	2) Country organisations identify areas where plant clinic pilots will take place	Score	2) At least X plant clinics (X is likely to be 10 except in small countries) established and operational in some areas within the country	Score	1.2) Country partners send staff to training of trainers activities and work with CABI to train new plant doctors	Score	1.2) Country partner trainers train new plant doctors with little or no CABI support	Score	1.2) Country partners manage all training of plant doctors and have capacity to train new trainers	Score
					2) A critical mass of clinics (likely to vary in different sized countries) run regularly, clustered in a few administrative areas with farmer attendance levels that help partners to meet or exceed their own organisational targets	Score	2) Scale-up planned in consultation with farmer communities leading to more clinics run regularly in existing clusters and new administrative areas with farmer attendance levels that help partners to meet or exceed their own organisational targets	Score	2) Clusters of clinics are present in all targeted administrative areas of the country and operate regularly with farmer attendance levels that help partners to meet or exceed their own organisational targets	Score
	3) Country organisations identify plant doctors for training	Score	3) Country partners consult with communities to agree on appropriate plant clinic sites and times	Score	3) Country partners adjust clinic operations to local farmer needs and their own capacity (resources and skills) and integrate them into their regular operations or staff performance contracts	Score	3) Farmer satisfaction with plant clinics is high – with a high proportion of repeat visits	Score	3) Plant clinics accepted and demanded by farmers as a permanent rural advisory service	Score
Stakeholder linkages	1) Country organisations involved in delivering plant health system functions (e.g. regulation, research, input supply, extension and farming) participate in a stakeholder analysis process to understand roles, behaviours, interactions, interests and influences	Score	1) Country partners involved in plant health system functions meet and discuss how plant health system services are delivered, identify bottlenecks and new ways of working together that would address these issues	Score	1.1) New ways of linking plant clinics to diagnostic services (e.g. plant doctors send samples and receive timely advice) piloted by country partners 1.2) Plant doctors know which inputs are available locally and make recommendations accordingly	Score	1.1) Diagnostic services, with facilitation by CABI, provide necessary support to plant doctors as and when required as standard part of work 1.2) New ways of linking extension and input suppliers piloted by country partners, with support from CABI (e.g. agro-input suppliers participate at plant clinics to provide information on correct pesticide usage; agro-input suppliers stock products recommended by plant doctors or other Plantwise partners)	Score	1.1) Diagnostic services provide necessary support to plant doctors as and when required as standard part of work with no facilitation by CABI 1.2) Linkages between extension and agro-input suppliers self-sustaining, with no support from CABI and additional new linkages are established	Score
		Score		Score	1.3) Extension and crop protection partners work together to explore how plant clinics can provide a vigilance mechanism 1.4) Researchers provide feedback and technical backstopping for plant doctors	Score	1.3) Information from plant clinics is used by crop protection partners, with support from CABI, to plan activities	Score	1.3) Information from plant clinics is regularly used by crop protection partners to plan their activities with no support from CABI	Score
				Score	1.4) Researchers provide feedback and technical backstopping for plant doctors	Score	1.4) Researchers, with support from CABI, use information gathered at plant clinics to identify research needs	Score	1.4) Researchers plan and conduct studies based on needs identified through plant clinics and develop new ways of linking with extension	Score
					1.5) Extension providers identify existing relevant mass media (e.g. radio, TV, mobile) that could assist in delivery of extension messages and explore possible collaborations	Score	1.5) Extension providers improve links with mass media (e.g. radio, TV, mobile) and jointly develop and disseminate messages for farmers, with CABI support	Score	1.5) Extension providers continue collaboration with mass media (e.g. radio, TV, mobile) to jointly develop and disseminate messages for farmers, without CABI support	Score

Table 1. Roadmap to sustainability (indicators and milestones for tracking a country's progress within the Plantwise programme)

	ASSESSMENT	PILOT	CONSOLIDATION	SCALE UP	SUSTAINABILITY	% of total for work areas
Data management and use	1) Country organisations involved in collecting, analysing and using agriculturally relevant data engage with CABI staff (e.g. system to record farmers seen by extension officers; systems to track observations of pests and diseases by crop protection; systems to track use and distribution of pesticides etc.) 2) Country processes for data management, data processing and data use explained	1.1) Country partners engage in testing data collection and management system and work with CABI to adjust to meet country-specific needs 1.2) Data sharing agreement(s) signed by relevant country partners	1.1) Country partners collect data and enter into POMS directly or use own system on a regular basis with support from CABI 1.2) Country partners running plant clinics are satisfied with prescription forms and feedback mechanisms at relevant administrative levels	1.1) Country partners collecting data from all plant clinics and managing it with POMS or their own system with limited support from CABI 1.2) Country partners running plant clinics streamline clinic data management system with existing data management systems	1.1) Country partners collecting data from all plant clinics and managing it with POMS or their own system with no support from CABI 1.2) Functional data management system managed and funded by country partners with clear functions that are agreed by relevant stakeholders at national and sub-national level – either led by country partners running plant clinics or with their full support 2.1) Country partners manage data collection with no financial or operational support by CABI	0
		2.1) Country partners provide data manager(s) and staff to support clinic data collection and digitisation 2.2) Country partners send staff to participate in CABI-led training to collect, harmonise, validate and analyse clinic data	2.1) Country partners contribute 100% staff time and at least 50% of direct costs to manage plant clinic data collection and digitisation 2.2.1) Country partners contribute staff time to validate and analyse clinic data 2.2.2) Country partners pilot ways in which the clinic data can be used e.g. for vigilance; to track pesticide use; to inform mass extension campaigns using complementary extension approaches	2.1) Country partners cover 100% of additional direct costs needed to expand plant clinic data collection 2.2.1) Country partners cover 100% of additional direct costs to validate and analyse clinic data 2.2.2) At least one country partner is using data regularly to inform decision making at local and national level	2.2.1) Country partners manage data validation with no financial or operational support by CABI 2.2.2) Multiple country partners use data regularly in multiple ways to inform extension, crop protection, input supply and research	
		1.1) Country partners send staff to Extension Messages module training and produce extension materials with CABI support 1.2) Plant doctors access information via the knowledge bank with some CABI support, either online or offline (e.g. printed materials or with an electronic device)	1.1) Country partners trained through Plantwise begin drafting extension materials without CABI support 1.2) Country partners are aware of the knowledge bank and (where national online systems exist) identify concrete ways to establish a direct electronic link between their information repositories and the knowledge bank	1.1) Country partners responsible for developing information materials continue to regularly use skills from Plantwise training to develop extension materials without CABI support 1.2) Country partners who are not directly involved in running plant clinics use the knowledge bank to download information or link to the knowledge bank through their own knowledge management systems	1) The knowledge bank is integrated with country knowledge management systems 1.2) Country partners regularly access and use resources and content from the knowledge bank with no support from CABI	
Information exchange and knowledge bank	1) Country organisations involved in information exchange (developing extension materials, managing online knowledge systems, managing crop protection product lists etc.) describe the existing national systems for storing and sharing information and identify needs to strengthen those systems					0

	ASSESSMENT	PILOT	CONSOLIDATION	SCALE UP	SUSTAINABILITY	% of total for work areas
Monitoring and evaluation	1) Country organisational systems for accountability and monitoring and evaluation understood - particularly organisations responsible for extension and crop protection	1.1) Country partners send staff to the CABI-led training on Monitoring Plant Clinic Performance (MPCP)	1.1) Country partners send staff to MPCP training of trainers activities	1.1) Country partners carry out all MPCP trainings with backstopping support from CABI	1.1) Country partners implement any new training in MPCP with no support from CABI	SCORE
		1.2) Country partners responsible for plant clinics develop monitoring plans as a result of MPCP training (there may be more than one plan depending on location and implementing organisation, though in some cases they may be similar or the same)	1.2) Plant clinic monitoring plan(s) are adapted and used by country partners running plant clinics, with regular support from CABI	1.2) Plant clinic monitoring plans scaled up and adjusted as needed, with support from CABI, leading to consistent quality criteria across clinics	1.2) Plant clinic monitoring plans integrated with existing national level monitoring systems	SCORE
		1.3) Farmer feedback mechanisms included in the plans are tested and plant clinic operations adjusted according to feedback	1.3) Farmer feedback mechanisms form part of regular performance assessment of plant clinics and feedback is used to improve operations	1.3) Proven farmer feedback mechanisms embedded in the plant clinic operations and monitoring plan	1.3) Farmer feedback continually influences plant clinic operations	SCORE
		1.4) Country partners identify supervisory staff (e.g. cluster coordinators) and other senior staff to mentor plant doctors	1.4) Country partners commit supervisor time from within the existing management structure (e.g. cluster coordinators) to mentor plant doctors and support implementation of monitoring plan e.g. through plant clinic visits, office meetings etc.	1.4) Country partners cover staff time as well as at least 50% of direct costs for clinic cluster coordinators (i.e. coordinators of groups of clinics that are relatively close together or run by the same office) and other coordinating staff to oversee expansion of plant clinics and monitoring plans	1.4) Country partners cover 100% of all costs to mentor plant doctors and oversee implementation of monitoring plan	SCORE
Stakeholder commitment	1) Country partners, both at national and sub-national level, sign Partnership Statement(s) and engage with CABI staff through meetings where concepts are introduced and the program discussed and understand the concept of plant clinics and potential use of data related to extension and crop protection	1) Country partners, both at national and sub-national level, are happy with initial results and are advocating for plant clinics in their areas; Partnership Agreement(s) signed by relevant country partners	1) Country partners are aware of the opportunity to adapt national policy based on the lessons learned through the Plantwise approach and are discussing inclusion of plant clinics and data management in policy on extension and crop protection	1) Plantwise activities such as use of plant clinics, data management and new arrangements between stakeholders appear in written policy and start to be seen as standard part of delivery of plant health system functions including extension, regulation, input supply and research	1) Plantwise activities such as use of plant clinics, data management, new ways of working between stakeholders, strong monitoring mechanisms that take account of farmer needs are integrated into national policy and implementation plans and fully budgeted for at national and sub-national (provincial/district) level	SCORE
	2) Plantwise national coordinator assigned by the national responsible organisation	2) National steering committee established for Plantwise	2) National forum established and meetings co-facilitated by CABI for sharing results and feedback from Plantwise experiences and national steering committee holding regular meetings, with CABI support as necessary, to critically review Plantwise progress and adapt the implementation strategy based on lessons learned	2) National forum meetings co-facilitated by CABI and national steering committee meetings held without direct support from CABI	2) National structures to coordinate plant clinics and established linkages between country partners exist and operate without support from CABI	SCORE
% of total for programme phases	0	0	0	0	0	"Overall % of total" 0



Role of CABI in country intervention phases

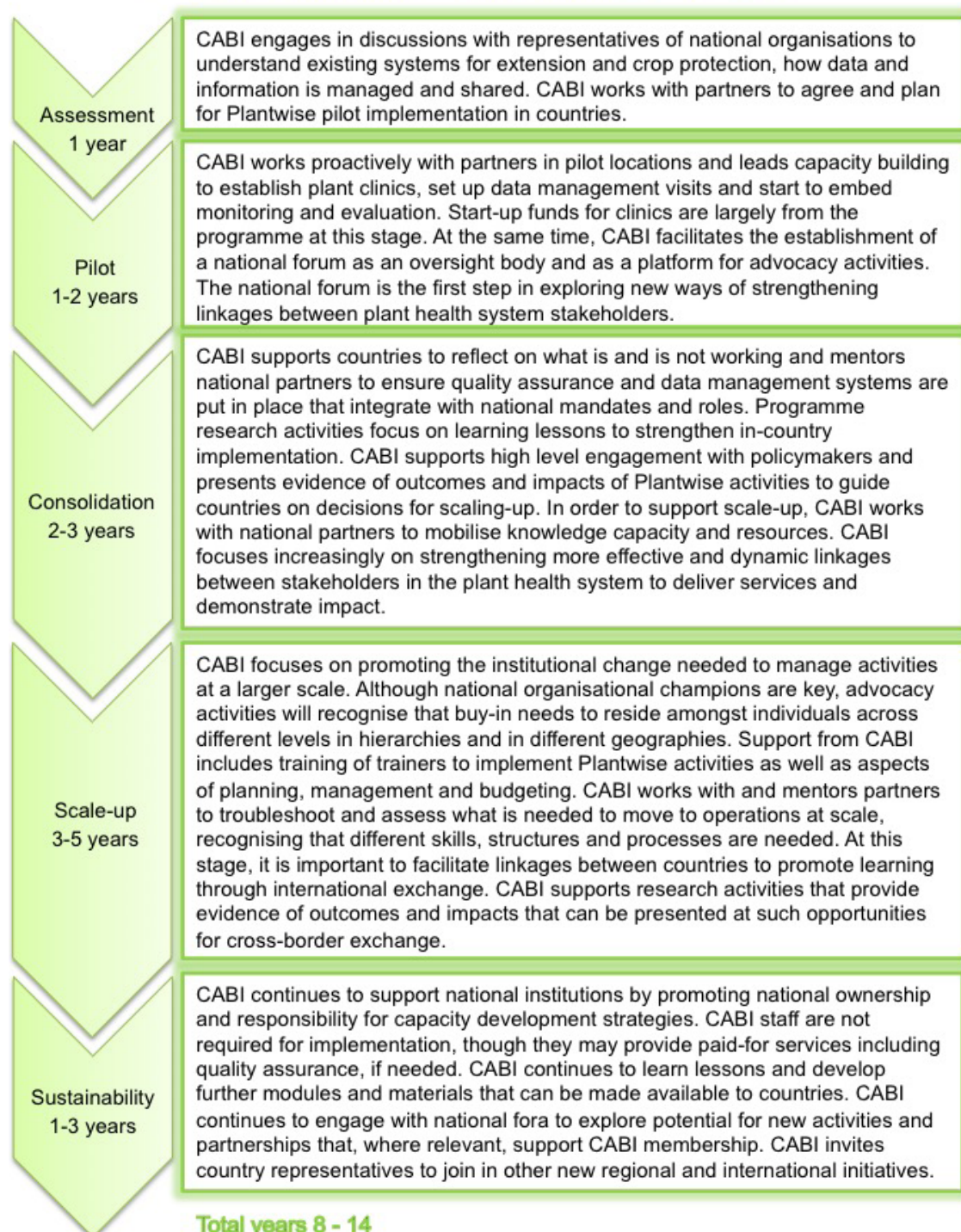


Figure 8. CABI's roles in implementing the Plantwise programme in-country

Sustainability of the Plantwise knowledge bank

The Plantwise knowledge bank will continue to enhance its value for in-country users until 2020. New countries will be helped in diverse aspects of plant health data and information management through the assessment, pilot and consolidation stages but those that move on through scale-up and sustainability should have developed internal capacity and incentives to the point that they should need limited centralised assistance only. This will lead to the situation where the operational funds for the knowledge bank can be reduced.

In order to become independent of donor funding, business models will be created that support the knowledge bank in its growth and maintenance, developing specialist analysis tools, products, services and spin-off projects while continuing to ensure that the core information remains an open access public good. Content systems, such as a database for repurposing good practice crop management advice, will be developed to enable both open access and fee-for-service resources to exist side-by-side. Chargeable elements might include any commercial use of analysed data with country permission, consultancies to countries or companies, add-on services, a series of saleable products associated with plant health, use of the knowledge bank in other major projects, or commercial subsidies to provide (unbiased) links to agro-input solutions. The knowledge bank will also forge partnerships with external organisations to explore how core data and information, together with that from clinics, where permitted, can be used in large-scale projects or other business opportunities. The net profit from these additional business activities will provide the necessary financial resources to maintain the knowledge bank service to the Plantwise countries.

Knowledge bank plans and operations will be linked more closely with the other CABI themes and business areas that focus on knowledge dissemination so that the innovative concepts developed by the knowledge bank (content, tools and technology) can be fully integrated under one CABI knowledge business platform. The knowledge bank developments and expertise will add value to existing CABI products, such as the Crop Protection Compendium and Invasive Species Compendium, and projects, for instance the m-Nutrition project and CABI's mobile phone content delivery programme Direct2Farm (D2F). Moreover, there will be joint exploration of market opportunities and potential for new products (e.g. mobile factsheet app) and services in agro-informatics and data handling capabilities, risk reduction in the use of chemicals in IPM solutions, plant protection and prevention of economic losses (e.g. Pest Risk Assessment (PRA) assistance).

Beginning in 2017, programme funding from donors to the knowledge bank will be scaled back in a step-wise fashion to a level of approximately USD 250 k by the end of 2020. At this point, a low-maintenance, core Plantwise knowledge bank information resource will continue with a repository of relevant, high-quality content that can be added to as required. There will be a growing central store of plant clinic data which will be linked to a set of data manipulation tools to support the basic clinic data processing and analysis activities that countries themselves will undertake using their own resources. This will be achieved through automated and rationalised processes with a greatly reduced central cost base.

8. Next steps

In driving Plantwise forward, CABI will continue to implement its dynamic and first truly global one-CABI programme through strong partnership with international and national organisations, paying particular attention to sustainability and impact. This is outlined in the programme logical framework and CABI's Medium Term Strategy 2014-2016. Through the further implementation of the programme, Plantwise will contribute to CABI's Vision 2020 and support meeting the Millennium Development Goals No.1 (Eradicate extreme poverty and hunger) and No.7 (Ensure environmental sustainability), as well as the post-2015 UN development agenda, which is anticipated to be even more ambitious.

To meet these goals, CABI needs to facilitate the institutionalisation of practices in the strategies, policies and actions of national, international and even corporate partners in order to ensure sustainability of the Plantwise approach. We must grow Plantwise as an honest broker and facilitator in the development of high-quality information and integrated solutions to national and international problems of plant health, and the facilitation of the delivery of safe and practical advice to all farmers, thereby improving food security and safety.

Plantwise will be scaled up and scaled out to achieve its target of reaching 30 million female and male farmers by 2020 through the implementation of the Plantwise approach in a total of 40 countries. CABI will maintain its close engagement with national and local partners to ensure a shared vision and commitment towards reaching sustainability of the Plantwise approach. This will require greater involvement of CABI regional teams to build trust to facilitate the sustainable institutional and policy changes needed. Therefore, advocacy efforts are needed at all levels of the programme to ensure greater commitment, sustained support and ownership of the Plantwise approach.

The next steps grouped below under the five work areas will address the key lessons learned during the first four years of the programme. For each, there is an explanation of what Plantwise will continue to do, or do differently or more effectively, to achieve the desired results.

Plant clinics

Outputs of Next Steps	Action required to achieve outputs
Plant clinics embedded in partners' work programming and budgeting	• Conduct meetings and other advocacy activities at a national level to get Plantwise included in the next phase (e.g. 5-year) of agricultural development plans • Foster partnerships with stakeholders at local levels, not only national level, to ensure the local ownership and responsibility for the sustainable operation of plant clinics • Establish a roadmap and associated plans that clearly state the roles of each partner and the sources of funding to facilitate long-term sustainability • Identify the financial and in-kind contributions by various in-country partners to facilitate scaling-up decisions and lobby for increased contributions from partners
Plant clinic attendance increased	• Test innovative methods to advertise and raise awareness of plant clinics among farmers • Test alternative plant clinic models to increase accessibility (location and/or timing) and regularity
Plant doctors' access to diagnostic support enhanced	• Strengthen linkages between plant doctors and diagnostic support services through more formal channels to ensure free access to professional diagnostic support • Facilitate the development of diagnostic photosheets and other supporting reference materials (e.g. Diagnostic Field Guide)
Simulation gaming developed to provide on-going training and monitoring of plant doctors	• Develop, through external partnerships, a Plant Doctor Simulator game • Assess how other innovative ICT tools can be used as training aids, simultaneously improving quality assurance of plant doctors, acting as a means of continuous professional development for plant doctors

Stakeholder linkages

Outputs of Next Steps	Action required to achieve outputs
Stakeholder assessments conducted in programme countries	Conduct a stakeholder analysis to understand current plant health system linkages and to lay the foundations for strong partnerships according to mandates
National fora and/or steering committees operated under good governance practices	Introduce good governance practices to partners to facilitate sustainable operation of the national fora
Linkages improved between plant clinics and agro-input dealers	Assess ways to strengthen links between plant clinics and agro-input dealers so that plant doctors are more familiar with the inputs available locally and to improve the availability of IPM-compatible crop protection products on the market

Data management and use

Outputs of Next Steps	Action required to achieve outputs
Data management processes further developed and streamlined	- Develop user-friendly, and potentially automated, data validation tools to ensure that feedback on quality of diagnosis and advice is provided - Enhance in-country capacity to enable data management processes to be integrated into standard operating procedures
Quality assurance schemes for plant clinics established	- Develop, test and implement quality assurance mechanisms, such as regular data validation, according to country needs - Demonstrate the value of plant clinic data to relevant stakeholders to support quality assurance, identify targeted topics for mass extension campaigns, identify research topics and enhance vigilance against pests and other crop threats

Information exchange and knowledge bank

Outputs of Next Steps	Action required to achieve outputs
High quality extension materials produced for online and offline delivery to plant doctors	- Facilitate the production, validation and collection of IPM-based extension materials in local languages and English to equip plant doctors with knowledge on effective, practical, locally available, safe and affordable management recommendations - Develop and test methods for disseminating plant health information in different format types (factsheets, pest management decision guides, SMS, etc.) to plant doctors in the field
ICTs tested for plant clinic data collection and the mass delivery of extension messages to farmers and other stakeholders	- Test and validate ICTs for data collection at plant clinics as a mechanism of real-time information access - Conduct gender-sensitive mass extension campaigns using links to existing communication services (e.g. mobile, including voicemail and SMS, radio, television, etc)
Plantwise Online Management System further developed according to programme- and country-level M&E needs	- Conduct capacity building with authorised in-country partners - Gather continuous feedback from partners and work with the in-country infrastructure available to field test data management systems, particularly POMS, to ensure that they become less labour intensive and time consuming
Knowledge bank services to Plantwise countries maintained through a new business model	Develop products and services based on a new business model, allowing open access and fee-for-service resources to exist side-by-side, to generate the required net profit for financing knowledge bank maintenance



Monitoring & Evaluation

Outputs of Next Steps	Action required to achieve outputs
M&E processes and tools firmly embedded in programme-level and in-country Plantwise operations	• Ensure that there is sufficient M&E capacity and support among CABI Plantwise staff and partners, a strong understanding of gender issues and appropriate time available to implement M&E activities • Engage with partners to demonstrate the importance of M&E and implement processes that enable them to review their own activities • Promote plant clinic review meetings to facilitate peer-to-peer exchange among plant doctors and learning through self-evaluation • Facilitate research through special studies, involving both established and young male and female researchers • Host Plantwise Donor Forum meetings and regional/global implementation team meetings to facilitate learning, review and discussions about programme progress
Gender considerations embedded in all activities at field level	• Promote the participation of women in Plantwise training modules and plant clinic operation • Work with partners to ensure that women have equal opportunity to benefit from the advisory services provided, such as experimenting with methods, timing and locations
Impact assessments conducted by independent external collaborators	• Facilitate a comprehensive first impact assessment in Kenya, based on qualitative methods and a quantitative randomised control trial (RCT) design, and led by the American Institute of Research and American University • Conduct two to three additional impact assessments in other selected countries
Programme evaluations conducted by independent external collaborators	• Based on experiences with external evaluations in Africa (2013 & 2014), facilitate additional external evaluations in Asia and the Americas, conducted by independent consultants

9. Resource requirements and donor support

Additional support is required to build on our successes and to scale up Plantwise by 2020. We are confident that the momentum of the programme and the interest and demand it is generating will enable us to reach the new target of USD 100 m, of which USD 56 m has been secured. This increase from the initial target of USD 50 m reflects not only the recent success of the programme, but also the appreciation by donors that through implementation of the Plantwise approach, networks of plant clinics are helping farmers, national plant health systems are growing stronger and building functioning links among stakeholders, and countries are applying global knowledge bank resources to improve national vigilance against plant health problems. The SDC- and EuropeAid-led external evaluations conducted in 2013 and 2014, respectively, reported similar conclusions that Plantwise [in the visited countries] is a highly relevant, effective, efficient and well managed programme. This growing recognition was also reflected in the 2013 Innovation Award that CABI received for the Plantwise programme at the 10th annual National Engineering Foundation (NEF) Innovisions Conference in London, UK. NEF judged nominees for their clarity of intended purpose, uniqueness of approach, potential impact, and whether they stimulated and galvanised others. Plantwise was chosen as the best example of government policy supporting innovation, with its unique approach to improving food security. In 2014, Plantwise won the Open Data Institute Award for Social Impact. With this award, Plantwise was recognised for its success in connecting smallholder farmers with actionable information based on science-based good agricultural practice.

Cumulative funds secured for Plantwise between 1 January 2010 and 31 December 2014 stood at almost USD 56 m. In this same time period, USD 32 m was needed for Plantwise implementation, with a significant increase in annual spending, as predicted at the start of the programme. The programme began with an annual budget of less than USD 1.4 m in 2010 but grew to an annual spend of USD 11.9 m in 2014. It is foreseen that the continued operation of Plantwise as outlined in this strategy document and the logical framework until 2020 will require an estimated annual budget of approximately USD 11.2 m. Fluctuations in annual spending will occur since investments vary across countries reflecting variability in costs and the phases according to the Theory of Action, with highest investments made in those countries that show good signs of progression towards sustainable change and impact.

In order to reach the new programme funding target of USD 100 m, an additional USD 44 m will be required for the implementation of the Plantwise programme until 2020. These funds will need to be secured from existing and new donors. Overall, this investment is expected to provide 30 million farmers with access to high quality agricultural advice through the strengthening of plant health systems, including national networks of plant clinics underpinned by the Plantwise knowledge bank, across 40 countries by the end of 2020.

In particular, the investment will be used to continue implementing the programme according to the logical framework with special emphasis on the sustainability of the Plantwise approach and on topics that have been prioritised to maximise programme impact. The main areas for investment in the next steps include: (1) enabling CABI staff at programme and country level to fulfil the advocacy and capacity building requirements for facilitating institutional changes; (2) consolidation of national plant clinic networks with strengthened support from diagnostic services and improved linkages to agro-input supply stakeholders (3) implementation of rigorous impact assessments in 2-3 selected countries, (4) ensuring that all programme activities are underpinned by M&E processes, (5) development of ICT-based tools to achieve more efficient collection and analysis of data and wider dissemination of high quality agricultural information, (6) development of products and services based on new business and content models allowing open access and fee-for-service resources to exist side-by-side, thereby generating income to eventually replace donor funding for maintenance of the knowledge bank services.

Donor support for Plantwise

CABI seeks to continue raising funds from Plantwise donors, which can be grouped into four 'donor categories'. Donor categories begin at a threshold of USD 50 k up to USD 1.5 m per year. In return for funding, donor contributions are recognised through a scale of acknowledgements and benefits (see table 2 below).

The common route for Plantwise donor contributions is through the CABI Development Fund (CDF). The CDF is used to implement scientific research and development projects that respond to the needs of CABI's member countries, with the aim of working towards the Millennium Development Goals and therefore the aims of the Fund's supporters. The CDF has already been in operation since 1990 and is well-accepted by donors and members owing to its transparency, its commitment to focus upon Member Country priorities and its robust independent auditing.



MINISTÉRIO DA AGRICULTURA
DIRECÇÃO NACIONAL DE SERVIÇOS AGRÁRIOS
DIRECÇÃO NACIONAL DE EXTENSÃO AGRÁRIA



Clínica de Plantas



CABI's Plantwise programme provides donor agencies with an opportunity to support commitments made to the Aid Effectiveness agenda. The programme is aligned with national plant health strategies and works in conjunction rather than in competition with these, strengthening the capacity of partner country extension services. The development outputs and data produced as part of the Plantwise programme are owned by partner countries. Commitments to robust and systematic M&E, including a donor-harmonised approach to external evaluations, ensure that the programme is managed for results and that data and insights generated can be used to iteratively improve outcomes. Donor-harmonised programme reporting and review of technical achievements, milestones reached and financial management, ensure mutual accountability and reduced transaction costs in comparison to individual donor-specific reporting and review.

Although donors are encouraged to support Plantwise as a whole, there are three possible routes for support as follows:

- Programme fund: Support for this fund will be at the overall programme level with no country- or thematic-specific restrictions
- Country fund: This will allow donors to target their support to one or more priority countries, although this will have to be coordinated with the geographical priorities that CABI sets annually in consultation with the expert advisory group and the Plantwise donor forum
- Thematic fund: Contributions to this fund will support CABI's activities in specific thematic areas, such as specific crops, gender, information and communication technology, climate smart agriculture, capacity building and innovation

By the end of 2014, investments in the Plantwise programme had come from a collection of development cooperation agencies, governments, private sector and from some linked projects. Lead donors include the Department for International Development (DFID, United Kingdom), Swiss Agency for Development and Cooperation (SDC, Switzerland), EuropeAid – Development Cooperation (European Commission) and Directorate General International Cooperation (DGIS, Netherlands). Core donors are the International Fund for Agricultural Development (IFAD), Irish Aid (Ireland) and the Australian Centre for International Agricultural Research (ACIAR, Australia). The Ministry of Agriculture of the Peoples' Republic of China is a Foundation donor and DAS Hunger Solutions is a Contributing donor.

	Minimum entry level	3 year commitment	Opportunity to become a Plantwise Ambassador	Attend CABI hosted events	Attend CABI Review Conferences	Attend Annual Donor Forums	Attend CABI Regional Consultations	Network with CABI Member In-Country Liaison Officers	Funding provided via CABI Development Fund	Targeted funding options	Tailored programmes with direct Annual Report	Plantwise website acknowledgement	Annual Plantwise Report	Quarterly Plantwise Newsletter
Lead	\$1,500,000	\$4,500,000	✓	✓	✓	✓	✓	✓	✓	Programme Country Thematic	✓	Partner Logo Website Link	✓	✓
Core	\$500,000	\$1,500,000		✓		✓	✓		✓	Programme Country Thematic		Partner Logo Website Link	✓	✓
Foundation	\$100,000	\$300,000				✓			✓	Programme Country Thematic		Acknowledgement	✓	✓
Contributing	\$50,000								✓			Acknowledgement	✓	✓

Table 2. Plantwise donor categories, showing funding thresholds (USD) and partners' benefits.

10. Governance

Organisation and management

The Plantwise Strategy acts as a 'user manual' providing a definitive statement of 'what Plantwise is all about'. It is a 'living document', guided by CABI governance bodies, donors and other experts, as well as the Plantwise policies. Figure 9 illustrates the structure for steering, managing and implementing the Plantwise programme. CABI's Member Countries give guidance to the programme through their feedback at the Review Conference and Executive Council meetings. The CABI Board is informed of programme progress and gives approval on strategic directions through CABI's CEO, who leads the CABI Executive Management Team (EMT). All Foundation, Core and Lead Plantwise donors (Table 2) are members of the Plantwise Donor Forum, which meets annually to provide advice on both strategic and operational issues of the programme.

The Plantwise Programme Board (PWPB) is the key management group coordinating the implementation of all Plantwise activities. This board, consisting of CABI personnel representing all global regions and themes relevant to Plantwise, collects and considers the feedback and advice from the above-mentioned groups as well as other thematic coordinators and chief scientists within CABI when steering the programme, such as when deciding to scale up and scale out activities. The PWPB sets the programme direction according to the programme-level logical framework, facilitates the development of programme strategies and policies, provides guidance on operational issues and develops proposals as part of the donor engagement strategy. Plantwise coordination is led by a Programme Executive (budget holder) who, with support from a Programme Support Manager, takes overall accountability for delivery of the Plantwise programme, in line with the mandate provided by CABI's EMT. The Advisory Board is not a formal group with permanent members. The Plantwise Programme Executive consults with individual internal and external experts as required for strategic guidance.

At the interface between programme coordination and activity implementation, Global Directors for each of the programme's components work closely with the Plantwise Regional Coordinators and CABI Regional Teams that conduct the in-country work with national partners. These programme components include:

- **Plant Health Systems Development (PHSD):** responsible for improving collaboration and flow of information between plant health stakeholders in support of farmers, based around the introduction and scaling up of plant clinic networks;
- **Knowledge Bank (KB):** responsible for building the global plant health information resource and ensuring in-country accessibility of information to national advisory services an online database of locally relevant plant health data and information to support plant doctors, researchers and policy makers;
- **Monitoring and Evaluation (M&E):** responsible for monitoring programme progress, guiding in-country M&E capacity building, testing assumptions through formal and informal studies, and using lessons learned to enhance programme efficiency and impact.

CABI's Regional Teams provide local knowledge, member country linkages and staff resources on the ground, to support effective implementation, country by country. Each of the CABI Regional Teams is led by the relevant CABI Centre, which leads country-level implementation of the programme's activities within their regions, based on the country-specific, annual activity plans and budgets developed in collaboration with the Global Directors of the programme components. The CABI Regional Teams are responsible for day-to-day activities in all country schemes and lead interactions with partners. CABI's in-country partners for programme implementation range across all components of the plant health system (i.e. farming, extension, research, regulation and input supply) including farmers, farmer associations, NGO's, extension services, civil society organisations, national and international research organisations, ministries of agriculture and environment etc. The exact nature of the in-country implementation partnerships depend on the respective local and national institutions and on the existing challenges that need addressing.

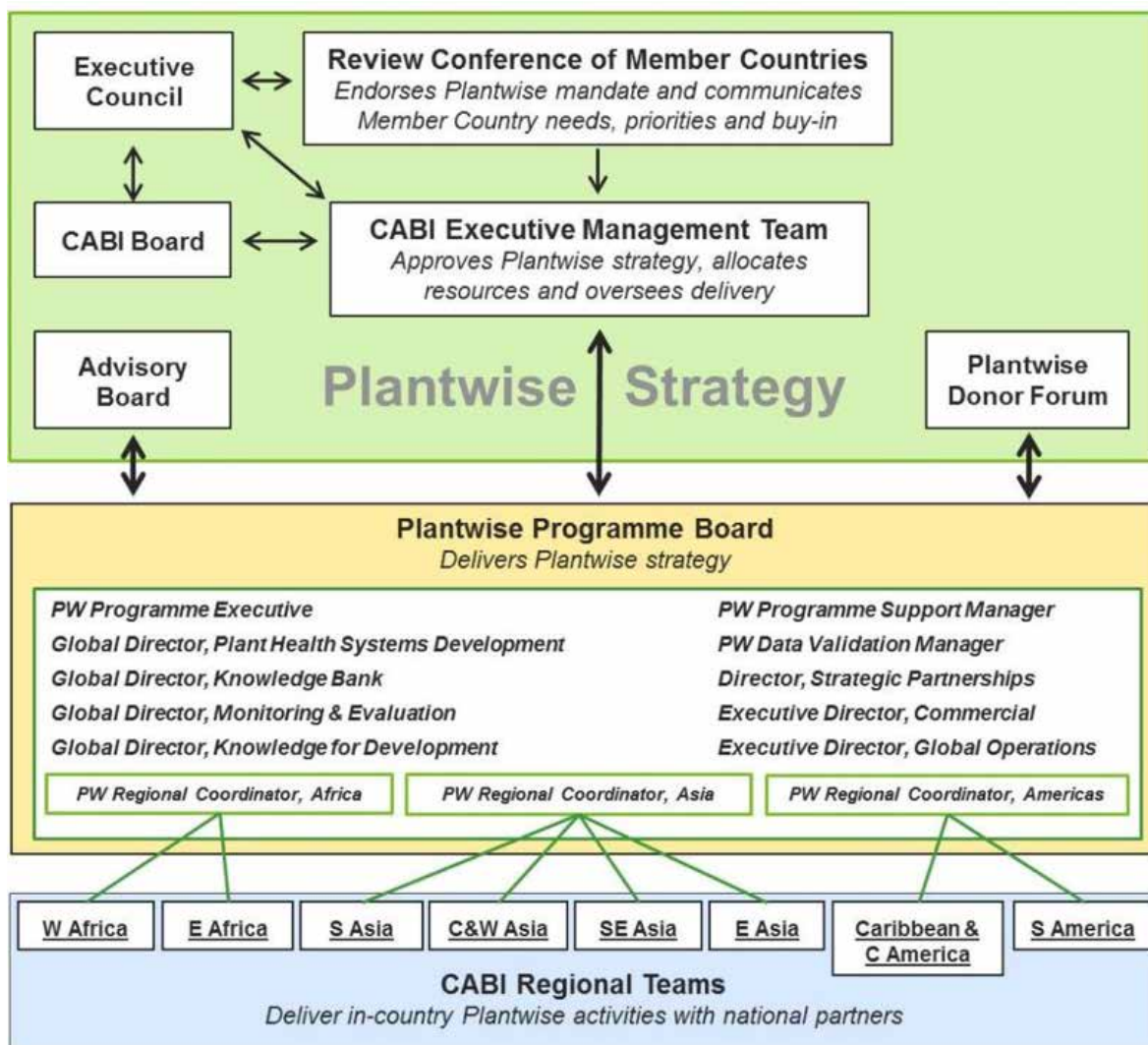


Figure 9. Plantwise organisational set-up

Budgetary management, control and reporting

CABI already has extensive experience of managing the delivery of complex multi-country, multi-partner programmes within the highly effective PRINCE2 project management framework. The experiences gained during the first years of the Plantwise programme have helped to streamline complex budget processes resulting from multi-donor support. Our approach allows us to ensure overall integration and coordination of resources across Plantwise, while at the same time devolving day-to-day budgetary control to the level of those responsible for delivering specific objectives and agreed donor requirements.

CABI's project and financial control systems permit the tracking of progress against key milestones (logical framework) and associated expenditure at the level of the overall Plantwise programme, by programme component or by country. For each operational country, a country plan is developed in consultation with partners with defined budgets, objectives, roles and responsibilities. Operational funds for in-country work administered by CABI may be transferred to partner organisations in advance of the activities performed. Such advances are made under signed agreements that clarify the targets to be achieved as well as the financial reports and accountability expected of the partners.

CABI, through the Plantwise Programme Board, reports the financial and service performance of all individual Plantwise country schemes, and of the programme overall at an annual Donor Forum and in a separate Annual Donor Report. CABI, as an organisation, including the Plantwise programme funds, is independently audited by PricewaterhouseCoopers. A recent BDO audit examined the Plantwise programme management and concluded very positively that there is "substantial assurance over the effectiveness of the controls in place and moderate assurance over their effectiveness in relation to Plantwise"

Plantwise policies for harmonised implementation

In implementing Plantwise, CABI endeavours to support a number of international conventions, regulations and standards relevant to the diverse aspects of the Plantwise programme. By the end of 2014, seven Plantwise policies have been established to ensure that the programme is implemented in a responsible manner. Additional policies and/or updates to existing ones may be developed as the programme evolves. Plantwise programme staff are made aware of these policies and their responsibilities with regard to how each should be implemented through Plantwise activities. The Plantwise policies, listed below, are available at www.plantwise.org:

- International transfer of biological specimens for identification
- Pest reports
- Use of plant clinic data
- Personal data protection
- Pesticide use
- Engaging agro-input suppliers
- Principles and ethics of fundraising

Management of risks

CABI already has well developed systems of risk management, reputation building and disaster recovery plans at the corporate level and for our businesses and Regional Centres. Since Plantwise will be supported through every CABI location and across businesses, it will be much more resilient to a catastrophic event at a single site. A detailed risk assessment, showing the estimated likelihood and impact as well as planned mitigation measures for each risk, is available upon request.

As with any major project, there are organizational risks associated with CABI's reputation, intergovernmental status and the nature of the work we do, which is often dependent upon the skills and experience of a limited number of key individuals. Partnerships with plant health stakeholders are key to the success of Plantwise, and the biggest risk that the programme faces is the possibility of not securing the co-ownership of the programme by our intended country stakeholders and content partners. Preconditions and assumptions include:

- Government authorities will remain committed to strengthening national plant health systems and advisory services
- Programme development will not be hindered by competition for human and financial resources from other programmes/projects/NGOs in target countries' national systems
- Long-term cooperation can be established with implementing partners (content partners for the knowledge bank and local implementing organisations for plant clinics and other community-level extension activities).

Our experience so far in participating countries has been of good engagement with both Government and implementing partners, and we will continue to mitigate this risk by our focus on engagement with the entire plant health system.

Financial sustainability is another key risk. Donor funding and partner investments will drive the establishment and development of Plantwise. However, the Plantwise approach must become self-funding over the longer term. For the plant clinics, in-country sustainability will come from local ownership and integration within national plant health systems. Long-term financial support will have to come from a mixture of national and local government funding, and in some instances from the private sector (e.g. agri-food industry, grower's associations and retailers). The knowledge bank team will develop business models to support its growth and maintenance, developing saleable knowledge products and services to help transition the knowledge bank away from a reliance on donor funding, whilst continuing to ensure that the core information remains an open access public good.



2015-2020 milestones

General						
Key Milestones	2015	2016	2017	2018	2019	2020
Countries participating (cumulative)	34	36	38	40	40	40
Male and female farmers reached with timely and locally relevant information and advice on plant health (primary reach ¹ ; cumulative)	1,000,000	2,000,000	3,000,000	4,000,000	5,000,000	6,000,000
Male and female farmers reached with timely and locally relevant information and advice on plant health (secondary reach ² ; cumulative)	4,000,000	8,000,000	12,000,000	16,000,000	20,000,000	24,000,000
Countries reaching consolidation phase (cumulative)	22	25	30	36	38	40
Countries reaching scale-up and/or sustainability phase (cumulative)	5	7	10	15	20	25 ³
Knowledge Bank						
Key Milestones	2015	2016	2017	2018	2019	2020
Knowledge bank maintenance funds generated through affiliated project income for sustainability (yearly)	\$114,000	\$91,000	\$166,000	\$190,000	\$223,000	\$310,000
Data Sharing Agreements with NROs (countries; cumulative)	20	24	28	32	36	40
Knowledge bank open-access content accessed by users (site visits; cumulative)	450,000	650,000	900,000	1,400,000	2,400,000	5,000,000
Factsheets and other advisory materials published on the knowledge bank (cumulative)	9,000	10,000	11,000	12,000	13,500	15,000
Plant clinic data stored in POMS (queries; cumulative)	150,000	300,000	450,000	600,000	800,000	1,000,000

Plant Health Systems Development							
Key Milestones	2015	2016	2017	2018	2019	2020	
Partnership Agreements with NROs (countries; cumulative)	22	25	28	32	36	40	
National coordination units (national forum and/or steering committee) operational (countries; cumulative)	24	25	30	36	38	40	
Plant doctors trained (cumulative)	4,300	4,900	5,500	6,100	6,700	7,300	
Plant clinics in operation (cumulative)	1,800	2,100	2,400	2,700	3,000	3,300	
Plantwise activities written into partners' policies and/or supported by partners' budgets (countries; cumulative)	22	25	30	36	38	40	
Pest Management Decision Guides and Factsheets for Farmers locally developed and validated (cumulative)	2,000	2,700	3,300	3,800	4,200	4,500	
Countries operating their own plant clinic data management systems (cumulative)	5	7	10	15	20	25	
Plant clinic data used by national stakeholders for monitoring and decision making (countries; cumulative)	5	7	10	14	19	25	

Monitoring and Evaluation							
Key Milestones	2015	2016	2017	2018	2019	2020	
Basic and systematic M&E established in all countries (countries; cumulative)	34	35	36	38	39	40	
Gender strategy implemented (countries; cumulative)	5	15	25	30	35	40	
Region-specific external evaluations conducted (cumulative)	3	4	5	6	7	8	
Country-specific external impact assessments finalised (final reports; cumulative)	0	0	0	1	2	3	
National plant health systems characterised through stakeholder analysis (countries; cumulative)	16	30	38	40	40	40	
Papers published on lessons learned through Plantwise implementation (yearly)	3	3	3	3	3	3	

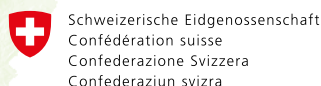
1. Primary reach = through plant clinics, plant health rallies, mass extension campaigns based on ICTs and other methods
2. Secondary reach = through farmer-to-farmer exchange (=4x primary reach) plus enhanced services via indirect use of Plantwise training and messaging
3. It is anticipated that not all Plantwise countries will have progressed sufficiently by 2020 to be considered at the 'scale-up' or 'sustainability' phase.

Plantwise is a global programme, led by CABI, working to increase food security and improve rural livelihoods by reducing crop losses

Interested?

Then join us, visit www.plantwise.org to find out more, see the organizations involved and access the latest updates, or email plantwise@cabi.org

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Irish Aid
Rialtas na hÉireann
Government of Ireland

Ministry of Agriculture
People's Republic of China



Contact

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