Plantwise private sector engagement

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Abbreviations

AE	Agri-Entrepreneur
AEGF	Agri-Entrepreneur Growth Foundation
ARET	Agriculture Research and Extension Trust
CBF	Community Based Facilitators
CCC	CABI Country Coordinator
COLCO	Colombian Cocoa Control System
CORIP	Cocoa Rehabilitation and Intensification Programme
EMBRAPA	Empresa Brasileira de Pesquisa Agropecuaria
EWS	East-West Seed
FPO	Farmer produce organisation
GDP	Gross domestic product
GPC	Global Plant Clinic
INPRHU	Instituto de Promoción Humana Nicaragua
JFPS	Cooperativa Juan Francisco Paz Silva
LBC	License Buying Companies
NAF	National Agro Foundation
NGO	Non-governmental Organisation
PFFF	Plantwise Factsheet For Farmers
PMDG	Pest Management Decision Guide
RADA	Rural Agricultural Development Authority
RC	CABI Regional Coordinator
RSC	Rural Service Centres
SME	Small and medium-sized enterprises
SFI	Syngenta Foundation India
UNADA	Uganda National Agro-input Dealers Association

Executive summary

Since inception of the Plantwise programme in 2011, implementation was mainly through government partners, with limited engagement with the private sector. As such, there has been no coordinated approach to engagement with private sector partners or specific reporting requirements. This has generally been left to the CABI country teams and local context to determine how to proceed. As a result, the development of partnerships with the private sector has taken many different forms, in terms of the types of partners involved, the objectives and their contributions to the programme. In 2017, CABI developed a position statement on engagement of Plantwise with private sector focussing on how to leverage resources, partnerships and expertise in order to increase the likelihood for sustainability, scale and impact of the programme in the long term.

The purpose of this review was to understand what has been achieved through partnership with private sector actors, in terms of scaling up the programme and potential for increasing its sustainability, and how exactly those partnerships have worked. Limited data exists to assess how the private sector has contributed to programme impact.

Data was provided on private sector engagement from a total of 35 countries. The final analysis was carried out on data for 30 countries. Twenty-eight of those countries were financially supported by Plantwise programme funds while the remaining two (Brazil and Colombia) implemented Plantwise activities through alternative funding sources. Burkina Faso, Pakistan, Suriname, Tanzania and Thailand all reported having no private sector engagement.

The main private sector groups that engaged with the Plantwise programme are agro-input traders (including input manufactures, distributers and retailers), trade hubs (farmer-based organisations, associations and cooperatives), trade associations, and service providers (independent agri-advisors and large production/processing companies. Overall, 105 private sector engagements were recorded over the lifetime of the programme (2011-2020). The highest number of the engagements was reported from the Americas, with 53 contacts made with the private sector, compared to 32 and 20 for Africa and Asia, respectively. The profile of private sector organisations engaged differs by region. In Asia, the highest proportion of engagement was with the agro-input trade sector (30% of all engagements), whilst in the Americas, trade hubs were the main group (60% of the total). In Africa, the types of engagement were more diverse than other regions, with agro-input traders being the main group, representing 41% of the total.

The Plantwise programme has received a lot of interest and has capitalised on a diverse range of opportunities with private sector partners, of which many engagements can be considered to be successful both in the short and long-term:

- The Agri-Entrepreneur Model demonstrated by the Syngenta Foundation in India, farmer hubs in Bangladesh and iDE in Nepal, follow a decentralized approach that empowers young people in rural areas to play an active role in agricultural development in their region. These initiatives have proven to be fertile ground for the integration of the plant clinic concept.
- The role of government in providing an enabling environment for private sector involvement in Plantwise directly correlates with the success of engagement. The success of such buy-in from government is evident in China's "Green Control Programme".
- Engagements with farmer cooperatives, particularly in Latin America have been successful where plant clinic operations are embedded in the cooperatives' activities. This model increases the chance of sustainability.

The inclusion of strategic private sector organisations in steering committees and other national forums has been instrumental in enabling potential partners to develop a better understanding of the programme and develop closer linkages.

In the early part of the programme, there was no clearly defined strategy in place that recognised the different motivations of private sector for engaging with Plantwise.

Data (operational and financial) was not disaggregated between public and private sector in the programme, making it very difficult to assess sustainability and impact of private sector engagements in many cases.

CABI staff did not have the right support to successfully engage with the private sector, resulting in failure to progress with some of the engagements or one-off interactions.

Feedback from some private sector partners revealed that the standard Plantwise training was rigid in its design and needed to be more specifically tailored for their business needs.

Where Plantwise has been "contracted" to provide just training, there is often limited commitment by the private sector organization to collect and report plant clinic data. This lack of interest in data makes it difficult for Plantwise to monitor the impact on beneficiaries, who visit privately run plant clinics.

In summary, CABI has demonstrated that a blend of public and private sector engagement could have potential advantages to the Plantwise programme globally. Embedding plans to engage with private sector at the beginning of the programme, and providing suitable training and mentoring to staff could have benefited the programme. It is also evident, from the varied successes across countries, that engagement with and response to private sector needs flexibility e.g. through tailoring of activities to meet their expectations. The reliance on funding to sustain Plantwise activities in some countries can be addressed by involving private sector organizations, provided they see the added value to their businesses.

Introduction

The Plantwise Programme, led by CABI, is a global multi-donor programme to increase food security and improve rural livelihoods through the reduction crop losses due to plant health problems. Plantwise aims to strengthen national plant health systems by working in close partnership with relevant in-country stakeholders to provide farmers with knowledge to reduce crop losses caused by pests. The standard entry point to achieve this goal is through the establishment of networks of plant clinics run by extension staff trained as plant doctors. Plant clinics support farmers by providing advice on any queries they bring to plant doctors about the health of their crops. The plant clinic service is underpinned by the Plantwise Knowledge Bank (https://www.plantwise.org/knowledgebank/), which provides access to information on diagnosis and management of plant health problems in both online and offline tools.

Plantwise was launched with a strong focus on partnerships with government institutions, particularly departments of plant protection and agricultural extension. It was felt that a national plant health system would be most effectively coordinated by a government partner; hence, Plantwise activities are generally overseen by one of the departments in a country's agriculture ministry. However, since the beginning of the programme, CABI also engaged with other plant health stakeholders, including private sector organisations and NGOs, in an attempt to increase programme reach and scale, sustainability and impact. The opportunities and risks of private sector involvement in the programme have been discussed frequently, including during the annual Plantwise Donor Forum. Some programme donors strongly motivated CABI to explore private sector partnerships, such as linking with specific value chains and embedding plant clinics in private sector business operations. It was in response to this, that CABI developed a position statement on private sector engagement in 2017, attempting to lay out the objectives for engaging with private sector in Plantwise and addressing what the motivations would be for such collaborators.

For the greater part of the programme since its inception in 2011, there has been no deliberate and coordinated approach to engagement with private sector partners. It has thus, been left to CABI teams to determine how to proceed in the context of each country. As a result, the development of partnerships with the private sector organizations has taken many different forms, in terms of the types of partners involved and the objectives of collaboration.

For purposes of this review, 'private sector' is defined as entities that engage in profit-seeking activities and have a majority private ownership. They could be corporations, small firms and enterprising individuals. These include: farmer-based organisations (associations and cooperatives), micro entrepreneurs, small traders, savings and credit associations, agro-input manufacturers and traders, commodity brokers, agro-processors, agribusiness companies, beverage companies, supermarkets, commercial banks, investment funds, etc.

The objective of this review was to understand what has been achieved through partnership with private sector actors in Plantwise, in terms of scaling up the programme and increasing potential for its sustainability, and how exactly the partnerships have worked. Limited data exists to assess how the private sector has contributed to impact of Plantwise.

This review specifically sought to provide answers to the following questions:

- What private sector engagements have taken place to date in Plantwise?
- What were those partnerships meant to achieve?
- What have those partnerships actually achieved? Was it considered a success by CABI and by the private sector partners? Did it meet the expectations of the private sector partners?
- What is the current status of that collaboration?
- What did CABI gain from it?

- Overall: To what extent does private sector engagement lead to increased Plantwise scalability, sustainability and impact, for instance in comparison with other partnerships?

Global picture

During the inception of Plantwise in 2011, a decision was taken that national governments should be the primary partner to coordinate Plantwise programme activities in each implementing country as they have the mandate over plant health and therefore proide the best opportunity for programme scalability. Developing partnerships with private sector organisations as national or local implementing organisations was generally not encouraged in endeavours to contribute to strengthening agricultural advisory services to farmers.

However, private sector is known to contribute significantly to rural economies, providing over 90% of jobs. In 2016, it was recognised that the sustainability and expansion of the Plantwise, particularly in certain countries, required engagement with both public and private sector organizations. As a result the Plantwise Private Sector Strategy was drafted from which CABI's Position Statement on Engagement with the Private Sector was developed in 2017. The goals spelt out in the position statement were to be achieved through two pathways:

1) partnering with private sector to increase in-country sustainability of Plantwise through transferring responsibility of activities
2) leveraging existing Plantwise products and services to create new revenue streams (to be reinvested in the programme)

One of the key challenges encountered in the pursuit of the above goals was realization that when engaging with the private sector, supporting farmers to improve productivity through better pest management is largely driven from a security in supply (and income) approach rather than a developmental approach. Therefore, being able to identify added value of Plantwise to private sector business and communicating the benefit to them is different from what works for the public sector. The relationship that public sector has with private sector stakeholders in some of the countries is also a determinant of the consideration that the latter may need in investing in Plantwise. This is reflected in the varying successes with private sector engagements in the different regions and the types of stakeholders involved.

Private sector engagement by region

Data was provided by Plantwise CABI Country Coordinators and Regional Coordinators about private sector engagement from a total of 35 countries and analysis carried out on data for 30 of these. Twenty-eight of the countries were financially supported by Plantwise programme funds while the remaining two (Brazil and Colombia) implemented Plantwise activities through alternative funding sources. Burkina Faso, Pakistan, Suriname, Tanzania and Thailand all reported having no private sector engagement.

The main private sector groups with which Plantwise engaged are agro-input traders (including input manufactures, distributers and retailers), trade hubs (farmer-based organisations, associations and cooperatives), trade associations, and service providers (independent agri-advisors, large production/processing companies and NGOs). Overall, 105 private sector engagements were recorded over the lifetime of the programme (2011-2020). The highest number of the engagements was reported in the Americas, with 53 contacts made with the private sector, compared to 32 and 20 for Africa and Asia, respectively.

The profile of private sector organisations differs by region. In Asia, the highest proportion of engagements was with the agro-input trade sector (30% of all engagements), whilst in the Americas, trade hubs were the main group (60% of the total). In Africa, the types of

engagement were more diverse than other regions, with agro-input traders being the main group, representing 41% of the total (Figure 1).

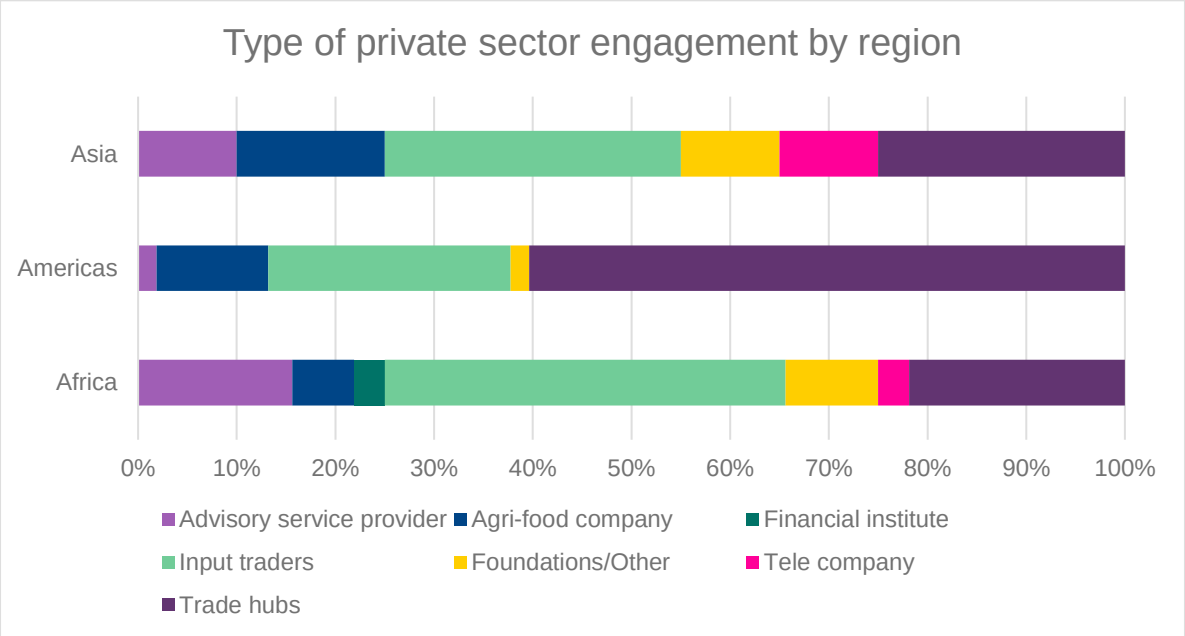


Figure 1. Types of private sector engagement by region

The first private sector engagement in the African region was in 2011 in the Democratic Republic of Congo (DRC) with the agri-food company ESCO Kivu. ESCO is an aggregator of dried cocoa beans that provides technical agronomy support for cocoa and non-cocoa farmers. It set up and ran plant clinics to advise farmers at its cocoa collection depots. However, due to the unstable economic environment in DRC, ESCO were forced to reduce the number of their technical staff and plant clinic services ceased in 2014, ending the 4-year relationship.

It was recognised early on in the programme that engagement with private sector would be challenging and therefore attention on private sector should be focused on only a few countries, namely Kenya, Rwanda and Uganda. This was later extended to other countries. The peak of private sector engagement in this region was between 2014 and 2017, with 20 new relationships established across six countries: Ethiopia (2), Ghana (1), Kenya (5), Malawi (4), Mozambique (1) and Uganda (6).

Overall, 19% (6) of the programme links to private sector in the region were one off engagements. Just over 50% (17) of the engagements have led to ongoing relationships (Table 1.) particularly with input traders, advisory service providers and farmer associations. These relationships are based on funding training, operation of plant clinics, development of extension materials, or participation in the steering committee national forum events.

In the majority of cases, Plantwise provided training for field staff with some form of financial support from the partners, which led to formal engagement. Corteva Agriscience (formerly Dow), an agro-input company, engaged with Plantwise through its philanthropic programme to supply tablets on an annual basis and funded training to support use of these digital devices. This arrangement continued up until Dow management structure changed, as a result of their merger with DuPont. This engagement did not extend to a commercial relationship with them, however the impact of the plant clinics using tablets has sustained.

Table 1. Ongoing private sector engagements in Africa

Country	Partner name	Type of engagement	Year of initial engagement
Ethiopia	Agro-input dealers (various)	Input trader	2015
	CropLife Ethiopia	Input trader	2016
Kenya	Katoloni Community Based Organization	Trade hub	2012
	Agrochemical Association of Kenya	Input trader	2012
	Koppert Biological Systems	Input trader	2015
Malawi	CropLife Malawi	Input trader	2015
	Agriculture Research and Extension Trust (ARET)	Advisory service provider	2015
Mozambique	Agrifocus	Input trader	2015
Rwanda	Agro Input Suppliers Federation	Input trader	2012
	IMBARAGA Farmers Organization	Trade hub	2012
Uganda	IBO Mixed Farm	Advisory service provider	2014
	Uganda National Farmers Federation	Trade hub	2017
	Uganda National Agro-input Dealers Association	Input trader	2017
Zambia	Zambia National Farmers' Union ZNFU	Trade hub	2013
	CropLife Zambia	Input trader	2018
	Zambian Fertilizer	Input trader	2018
	Good Nature Agro	Advisory service provider	2019

The first private sector engagement related to plant clinic operations in the Americas region was in 2005 when agronomists from 3 farmer cooperatives in Nicaragua were trained to run plant clinics. Another 6 plant clinics were set up by farmer cooperatives between 2007 and 2009. These relationships were developed through the Global Plant Clinic (GPC), a project led by CABI and the predecessor to the Plantwise programme. Two of these original private sector plant clinics, namely, Cooperative Juan Francisco Paz Silva (JFPS) and Cooperative Santiago, are still running since the initial engagement. Many of the other plant clinics were sustained for several years, including the coffee farmers' cooperative Cooperativa de Servicios Multiples Campesinos Activos de Jalapa (CCAJ) which ran successfully for 14 years until the plant doctor left the cooperative in 2018.

Of the 53 private sector relationships in the region, just over a third (20) are still ongoing (Table 2). Just over half (52%) of these are with farmer-based organisations (classified in this report as trade hubs), 21% with agri-food companies, 21% with input suppliers and the remaining 5% with advisory service providers. The majority of these run clinics or provide venues to run clinics.

Table 2. Ongoing private sector engagements in the Americas

Country	Partner name	Type of engagement	Year of initial engagement
Barbados	Carters Agro-input dealer	Input trader	2017
	Massy Distributors (Agro-Chem Dept.)	Input trader	2017
Bolivia	El Huerto	Input trader	2018
Colombia	Fedecacao	Trade hubs	2019
	Compañía Nacional de Chocolates	Agri-food company	2019
	Compañía Colombiana de Cacao	Agri-food company	2019
Grenada	Marketing Board	Agri-food company	2016
	Cocoa and Coffee Board	Agri-food company	2016
Honduras	ASOFAIL	Trade hub	Unknown
	APROALSE	Trade hub	Unknown
	Asociación Distrito de Riego Selguapa	Trade hub	Unknown
	Asociación de Regantes de Cane	Trade hub	Unknown
	SOLUTEC	Input trader	Unknown
Jamaica			2020
	Jamaica Commodities Group	Trade hub	2017
Nicaragua	Coop. JFPS	Trade hub	2009
	Coop. SANTIAGO	Trade hub	2007
	Norwelk Nagarote	Trade hub	2015
	Paisaje Urbano	Advisory service provider	2016
	Coop. ACODEPEC	Trade hub	2018

In the Americas, Grenada and Jamaica have provided funds to support the training of plant doctors through marketing or commodity groups. Early on in the programme, farmer-based organisations were recognised as a model for sustainability to embed plant clinics in Nicaragua and this approach was successfully replicated in Bolivia and Honduras. On two occasions in the region, plant doctors trained through the programme left their organisations and became independent plant health advisors. Once case was in Nicaragua, where two plant doctors set up their own independent advisory service offering farmers advice on pest and disease problems for a fee. The service was running successfully but has been postponed during the Covid-19 pandemic. In Honduras, a plant doctor who had been working for one of the original cooperative plant clinics (Solutec) left the clinic when the organisation decided to close the clinic. He subsequently installed the plant clinic in his own small agro-input shop, which gives him competitive business advantage as none of his many competitors in the area provide this service. He continues to be a trusted and well-respected member of the farming community in Ocotepeque.

In Asia there were a total of 20 private sector engagements. India was the first country in the region to engage with private sector partners in 2010. When BioControl Research Laboratories in Bangalore set up and ran plant clinics and produced extension materials. However, the marketing division was not convinced that the clinic activities were adequately promoting their products, and the relationship ended after a couple of years. Overall, 50% of the relationships initiated in Asia are still ongoing (Table 3), with the majority of these having been established relatively recently (2017-2020). Of the remainder, 15% of the engagements in Asia were one-offs, with an input trader, trade hub and agri-food company, primarily focussed on the delivery of Plantwise training. Thirty five percent of relationships lasted for varying periods of time (2-7 years) but have not continued due to various reasons such as limitations in plant clinic reach, linked with donor funded projects that ended, conflict with government interests or changes in business direction, as was the case of Sichuan Weinong Technology Ltd. in China.

Table 3. Ongoing private sector engagements in Asia

Country	Partner name	Type of engagement	Year of initial engagement
Bangladesh	Private agricultural services	Trade hubs	2020
China	China Wisdom City Working Committee (CCIT)	Other	2017
	Agro-input dealers (more than 60 in Sihuan province of China)	Input trader	2018
	Agro-input dealers (more than 80 in Beijing area of China)	Input trader	2012
	Farmer Associations (18 in Beijing area of China)	Trade hubs	2012
India	National Agro Foundation (NAF)	Trade hubs	2017
	Agri-Entrepreneur Growth Foundation (via Syngenta Foundation of India)	Trade hubs	2019
Nepal	Community Based Facilitators (via NGO iDE)	Advisory service provider	2018
Sri Lanka	Mobitel	Tele company	2019
Vietnam	ECOM - SMS	Agri-food company	2019

In some countries in Asia, governments were not supportive of the programme engaging with private sector. This was the case in Bangladesh, where only government extension was recognised as being qualified to give advice on plant health problems to farmers. This changed in 2020, with the outbreak of FAW, leading to a decision at the Plantwise national stakeholder's forum to have input suppliers trained as plant doctors to improve penetration of key messages in rural communities.

Engaging with private sector in Southeast Asia has been challenging. A number of opportunities have arisen in Myanmar, Cambodia and Vietnam, but have resulted in negative feedback from clients, mainly due to the rigid structuring the plant doctor training. In Myanmar, plant doctor training for staff of East-West Seed was initially considered successful (see Case Study 2); however, further collaboration was hampered by training module content not meeting

their needs. This is similar for WeltBio in Cambodia and Olam in Vietnam, where plant doctor training was considered insufficiently focussed on the peppercorn crop.

Private sector engagement by type

The type of private sector that Plantwise is likely to engage with are those linked with agriculture and the environment sector. These entities could be any size from SMEs to multinational companies. This report excludes individual farmers that are considered as beneficiaries but does include farmer-based organisations. The number of different private sector stakeholders is diverse across the countries where Plantwise is active. For convenience, the stakeholders have been put into groups depending on where in the value chain they sit: input traders (input manufacturers, dealers and retailers), trade hubs (including trade associations and farmer cooperatives and associations), service providers (independent agricultural service providers and large production/processing companies), and others (including financial institutes and foundations). NGOs are not normally considered as private sector but, as their engagement with Plantwise is often similar to that of a private sector entity, they were considered. Upon investigation, it was seen that they also provided potential links to private sector engagement opportunities.

Input Traders

Input traders include all those companies that manufacture and trade in agro-inputs. This range from large multinational companies, such as Corteva (formerly Dow) and Syngenta, to local retail stores. Input traders play an important role in the production of crops. Despite inherent concerns on conflict of interest, they are often the main point of contact for smallholder farmers seeking advice on how to increase production and deal with plant health problems such as pests and diseases. This is particularly valuable where governmental extension services may be lacking due to remoteness. Most input traders are aware that providing advice that doesn't necessarily lead to an immediate sale is important for building their reputation as a trusted source of reliable information, and therefore trusted when it comes to buying inputs. A product that gets misused has direct impact on their future business. Farmers and input traders therefore rely on each other for agri-business to thrive.

Small retailers are usually supported by distribution companies or manufacturers themselves, providing training, information materials, and in some cases supporting the establishment of demonstration plots and delivery of farmer training courses. This category of private sector therefore provides multiple entry points for Plantwise.

From the information gathered from CCCs, Plantwise provides multiple benefits for input traders including:

- Plantwise factsheets provide a ready-for-use information resource to support their sales teams and provide materials to farmers;
- Profile raising can be costly and time consuming, particularly in remote areas where farmers are widely dispersed. Being present at farmer gatherings, such as plant clinics, whether it is a market or a village/town centre, provides opportunities to connect with potential customers and promote products;
- They have an interest in providing good advice to farmers; therefore, plant clinic training can build the capacity of their retailers, adding value to their customer offer.

Benefits for Plantwise include:

- Increased reach through access to an established network of farmers
- Long-term financial support and sustainability by linking sales to an established advisory model

The attitude towards engagement with input traders has always been cautious in the Plantwise programme, mainly due to the commercial interests of the input trade. This was seen as a possible area of conflict with Plantwise ethos of being an independent, verified source of information. For instance, the PMDGs are designed to avoid favouring any particular products over others e.g. use of active ingredients instead of trade names. However, plant doctors have always been actively encouraged to develop relationships with local agro-input dealers, who serve the local farming community, to familiarise themselves with the products stocked, advise agro-input dealers on less toxic alternatives and offer plant health advice when needed.

Plantwise has also actively engaged with agro-input associations in many countries and have invited them to sit on the Plantwise National Steering Committees and attend the National Stakeholder Forums, where progress is reviewed and planning for programme activities is conducted. Table 4 gives a summary of the outcomes of these engagements across regions.

In Bangladesh initial engagement with the Bangladesh Crop Protection Association was disrupted due to the government's concerns over the involvement of private sector. In 2019, when FAW became a problem, the government recognised the private sector was necessary to disseminate advice to farmers and requested Plantwise to train agro-input suppliers.

Table 4. Summary of engagement with agro-input associations in the different regions

Region	Association	Success of engagement	Engagement
Asia	Bangladesh Crop Protection Association	Unsuccessful after 3 years of engagement	Government was a barrier to developing a full engagement. Still attends Plantwise Stakeholder Forum
Africa	CropLife Ethiopia and Malawi	Ongoing	Member of the Plantwise National Steering Committee in both countries
	Agro-chemical associations of Kenya	Ongoing	Disseminates Plantwise PMDGs and PFFFs to network of agro-input dealers. Member of the National Steering Committee and attends Plantwise Stakeholder Forum
	Agro-input Suppliers Federation of Rwanda	Ongoing	Member of the Plantwise National Steering Committee
	Uganda National Agro-input Dealers Association (UNADA)	Ongoing	Funded training of 25 agro-input dealers to use Plantwise PMDGs and PFFFs
Americas	Brazil Association of Agrochemical manufactures	Ongoing	Printing technical Plantwise technical documents. Introduction to using the BioProtection Portal. Engagement initiated through EMPRAPA
	Jamaica Agro-Chemical Association	Recent engagement	Rural Agricultural Development Authority (RADA) is promoting joint activities with Plantwise – currently defining terms of collaboration

A number of agro-input dealer associations are responsible for contributing and sharing Plantwise information through their network of members. The UNADA contributed to the cost of training 25 agro-input dealers to use Plantwise offline and online resources such as the Factsheet Library and Knowledge Bank using smartphones. The Agrochemical Association of Kenya/CropLife uses Plantwise-produced training content and pest management materials (PMDGs and PFFFs), the former to train and the latter to aid agro-input dealers in making plant pest and disease diagnoses and giving good advice to farmers. In collaboration with Plantwise, CropLife reviewed the curriculum for training of agro-input dealers to include sections on pesticide residue management, diagnosis and Integrated Pest Management (IPM) thus, embedding practices promoted by Plantwise in future trainings.

The most successful engagement with agro-input dealers to date is in China, where the Beijing regional government has been subsidising biocontrol and other safer plant protection options for farmers through the "Green Programme" (see Case Study 1). It was a private sector engagement success, achievable through policy developed by government. The Plantwise model enables large numbers of small-scale farmers to be reached, meeting their objective to prioritise non-chemical/less-toxic plant protection products.

Case study 1 – input traders in China

Agriculture in Beijing

Beijing has a population of over 20 million and, in order to supply fresh produce to people living in and around the city, urban and suburban agriculture is practiced. The agricultural area around Beijing is estimated at around 215,000 ha and produces cereals, vegetables and fruits, with local government planning to significantly increase the area used for vegetable production to maintain local supply. Many of the vegetable crops are grown all year round in small greenhouses which can result in a higher incidence of pest and disease problems and many farmers resort to chemical pesticides to manage these problems.

The Chinese government has been promoting the use of IPM compatible "Green Pest Control" as a way to reduce reliance on chemical pesticides. In line with national policy, the local government of Beijing initiated the 'Green Pest Control Subsidy Programme' in 2009. In 2018, USD 4.4 million in subsidies were provided via the Beijing Plant Protection Station for Green Pest Control products for farmers in the Beijing region. The prioritised plant protection products included natural enemies, pollinating insects, biopesticides, plant protection tools and least toxic synthetic pesticides that were subsidised at different rates (below).

Plantwise in Beijing

Plantwise was first launched in China in 2012 and a series of plant clinic networks have been established in the provinces of Beijing, Guangxi and Sichuan. These are mainly linked to governmental plant protection and extension services, although some are linked to private service providers. In the Beijing province, CABI has collaborated with the Beijing Plant Protection Station as a local implementing organization to establish 86 plant clinics that cover around 70% of the agricultural area around Beijing, including 1,106 villages in 13 districts.

Plant clinics originally operated on the more traditional Plantwise model, through existing government extension services with the aim of improving the outreach and the quality of advice offered to smallholder farmers. However, from 2017 onwards, this plant clinic network was combined with a governmental "Green Pest Control Subsidy Programme" with the aim of reducing hazardous pesticides by promoting non-chemical and least toxic chemical pest protection products to these farmers.

Working in partnership with local government and agro-input providers

Prior to 2017, the subsidy implementation approach relied on government-purchased plant protection products being distributed free of charge to farmers; however, this mainly benefitted larger farms, larger cooperatives or demonstration plots in policy-targeted areas and led to waste/over use of subsidies, limited coverage and decreasing farmer interest. The plant clinic model was found to improve the outreach of the subsidy programme to smallholder farmers. With Plantwise, a plant doctor diagnoses a plant health problem and provides a "prescription" (recommendation) to the farmer at the plant clinic. In case a product is recommended, the farmer can take the prescription to a registered local agro-input shop to buy the recommended product. If the product is on the Green Pest Control Product List, the farmer can purchase it at the subsidised price. The subsidies are paid by the input suppliers and once the products are sold the suppliers can claim back the subsidy from the Beijing Plant Protection Station.

Dr Yan Qiao, the Plantwise local implementing organisation coordinator in Beijing said that the "plant clinic networks greatly improved the outreach and efficiency of implementing pesticide reduction through policy-driven IPM-compatible product subsidies, and helped famers to grow high quality, safer and more nutritious food to meet high value market requirements and thereby increased their incomes." Between 2015 and 2018, the use of non-chemical plant protection products increased by at least 20% and pesticide purchases decreased by 4% (based on data collected through the plant clinics).

Overall, there have been mixed results in engaging with input traders. There have been a number of engagements that did not progress beyond the initial engagement or pilot, for example East-West Seed in Myanmar (see Case Study 2). A collaboration was also initiated with Koppert Biological Systems (Koppert) to develop a complementary short course to increase plant doctors' awareness of less hazardous plant protection methods and products. The Koppert Foundation financed the development of the short course and its piloting in Kenya and India. An assessment of plant doctors' recommendations before and immediately after the training in Kenya failed to demonstrate any obvious changes due to the training. However, plant doctors who were interviewed as part of the assessment felt that their advice to farmers had changed, e.g., giving cautions about pesticide use and tips on conservation biocontrol and commercial biocontrol products. This training was updated using feedback and lessons learned from the pilot and is now being integrated into new Plantwise interventions. Furthermore, CABI and Koppert are disseminating the training through online platforms to maximise its uptake. Multinational companies such as Cortiva and Syngenta were only engaged through their philanthropic foundations.

Case study 2 – Input traders in Myanmar

East-West Seed in Myanmar

East-West Seed (EWS) is one of the world's leading vegetable seed producing companies, predominantly in Asia and currently expanding rapidly in Africa and Latin America. Their focus is on tropical agriculture and their mission is to provide smallholder farmers with high quality vegetable seeds.

Engagement with Plantwise

CABI and EWS have had an open dialogue for some time, both at headquarter and regional levels. CABI and EWS began exploring opportunities and more strategic ways to partner particularly on the subject of knowledge transfer. One option that was taken forward was for CABI to provide plant doctor training under the Plantwise programme for EWS field staff. In Myanmar in 2017, 25 super-trainers received the Plantwise Plant Doctor Training. This collaboration built on the VegCAP project whose aim was to reach 65,000 farmers in 3 years. If EWS considered the training useful, they were to use the plant clinic model in their extension hubs.

EWS's view on the Plantwise programme

Although there were other areas of collaboration discussed after the first plant doctor training, EWS decided not to continue with the collaboration as the training did not fit their specific needs and they could not find sufficient synergies between Plantwise and their extension hubs.

Trade Hubs

Trade hubs include farmer-based organisations such as farmer associations and trading centres, as well as trade associations. These are grouped together as they provide commercial and financial support to farmers. They are usually a paid-for service, paid through levies, or membership, and provide natural aggregation points for sharing information and delivering training.

By far, the region engaging with the highest number of trade hubs is the Americas. Thirty-two farmer cooperatives, accounting for 60% of private sector engagements in the region, have integrated the running of plant clinics in their normal duties, most notably Bolivia, Honduras and Nicaragua. Plant clinics in Nicaragua have been operating since 2005 when the concept was introduced by the Global Plant Clinic initiative, the precursor to Plantwise. Of the 17 farmer cooperative clinics established in Nicaragua, only 4 are still running today. The plant clinic at Cooperative JFPS has been running for 13 years and Cooperative Santiago for 15 years. Many of the others have ceased to operate mainly due to lack of trained staff, priority changes in the organisation, the cooperatives have ceased to operate and for those that are supported by donor project funds the funding has finished. Of those that ceased to operate, many ran for 4-6 years and the Cooperatives CCAJ and Flor de Café sustained their plant clinics for 14 and 12 years, respectively.

The cooperative model appears to be relatively sustainable as they are self-funding through membership fees paid by farmers and sale of inputs. This allows the cooperative to hire agronomists to provide technical advice to farmers. Some of the reasons that plant clinics have stopped operating in the cooperatives include: a change of priorities, lack of funds to keep plant doctors employed and reliance of some cooperatives on project funding to provide

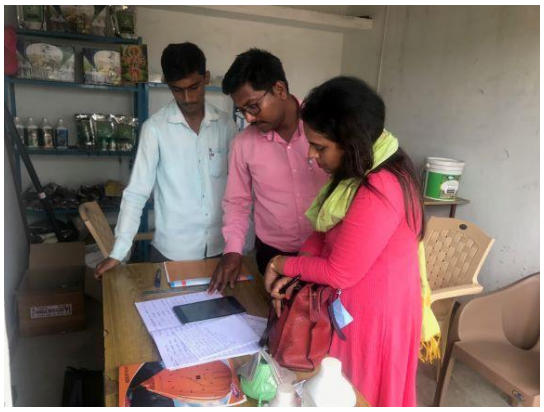
this service. One of the constraints of integrating plant clinics into cooperatives is the fact that they often operate in isolation from each other. Therefore, making contact and setting up agreements with individual cooperatives time consuming.

In India, Plantwise engaged with six farmer producer organisations (FPOs) in 2017. These are limited registered companies through the National Agro Foundation (NAF). The initial plant doctor training was funded by Plantwise. The FPOs fund the ongoing operational costs of the plant clinics, and Plantwise has been invited back to give a refresher training course. Several of the FPOs have their own agro-input shops, and some who produce homemade botanical sprays, reported that their business had increased due to plant doctors' presence. Some of these products were also available for sale in the clinics in a number of locations. Plant clinics are still operational although the plant doctors have little interest in collecting and using data from the Plantwise prescription forms, so progress is difficult to follow.

Elsewhere in India, CABI linked the Plantwise programme with Syngenta Foundation's agri-entrepreneur (AE) model. AE mentors were first trained as plant doctors to enable them transfer their new skills on to the agri-entrepreneurs. This increases the quality of interactions between AEs and farmers, and farmers' overall satisfaction with the service (Case Study 3).

Case study 3 – Trade hubs in India

Trading hubs in India and Bangladesh
By Malvika Chaudhary



Syngenta Foundation India (SFI) was established as an independent not-for-profit organization in 2005. From the outset, SFI's mission was to have small and marginal farmers participate in agricultural development by improving their access to better seeds and other inputs, increasing their knowledge of agronomic practices, establishing ease of access to credit and providing systematic market linkages. Launched in 2014, the agri-entrepreneur (AE) model is Syngenta Foundation India's (SFI's) flagship initiative. The model follows a decentralized approach in empowering young people in rural areas to play an active role in agriculture development in their region. An AE brings together services such as credit, market linkages, access to high-quality input and crop advisory for a group of farmers.

Engagement with Plantwise
The Agri-Entrepreneur Growth Foundation (AEGF) is the responsible organisation for recruiting 100,000 AEs to reach out to 20 million farmers by 2023. An AE registers 150 – 200 farmers in her/his locality and runs a for-profit social enterprise. Plantwise India is collaborating with AEGF's program to train Agri-Entrepreneur Mentors (AEMs) as plant doctors so they can forward their skills to AEs, who will then be able to interact with farmers more effectively. The trainings resulted in an increase in diagnostic skills and the ability of AEMs to give better plant health recommendations to farmers.

View on the Plantwise programme partnership
The feedback from trainees as well as project leaders was excellent and gives an opportunity to build Plantwise training modules into the curriculum for the AEM training which is now functional across 14 states of India. Unfortunately, due to the Covid-19 pandemic, this could not be realised in 2020 and was postponed to 2021 As the emphasis is on face-to-face trainings.

Vision for future engagement
Following success in India, Plantwise approached Syngenta Foundation Bangladesh to deliver a similar service. This is still in its infancy but provides a great opportunity to explore rolling out Plantwise activities as a bolt-on or bundled package to other advisory services.

A promising opportunity to integrate plant clinics into rural service centres (RSC) for cocoa farmers in Ghana was identified in 2017 through the CORIP programme led by Solidaridad. Agronomists from cocoa licenced buying companies were trained to set up a network of hubs to provide services for thousands of cocoa farmers. Unfortunately, the opportunity was not successful (see Case Study 4).

Case study 4 – Trade hubs Ghana

The Cocoa Rehabilitation and Intensification Program (CORIP) in Ghana was launched in 2014, funded by the Dutch Government and led by the international civil society organisation Solidaridad. The programme established 20 RSCs across 14 districts in the main cocoa producing regions of Ghana: Ashanti, Brong-Ahafo, Western and Central Regions. The RSCs are operated by agronomists and technicians from various cocoa Licensed Buying Companies (LBCs) operating in Ghana, with international commodity traders such as Cargill, Olam, Ecom and local companies such as Kuapa Kokoo, Federated Commodities and Produce Buying Company. The purpose of the RSCs was to provide assistance to cocoa farmers for the implementation of best agronomic and farm management practices including access to improved planting material, quality fertilizers and 'safe' pesticides through a service-based, paid-for model. It was hoped this would eventually become a self-financing business that could be scaled up throughout the entire cocoa sector.

Engagement with Plantwise

In 2015, Plantwise approached the lead of the programme through Solidaridad to explore a collaboration between the Plantwise programme and the CORIP project. Solidaridad could see the benefit of bringing Plantwise onboard to train agronomists running the RSCs to improve their service by including pest and disease management advice for cocoa, which was not included in the original training offering. The aim was to expand the plant clinic network into the cocoa growing areas by embedding clinics into the RSCs to add value to the service offering to farmers.

In 2017, Plantwise Plant Doctor Training was given, with an additional cocoa module, including a field trip. 40 people from the licence buying companies were trained over 5 – 6 days. Plantwise funded the trainers, and Solidaridad paid for the participants to attend.

Why was the engagement unsuccessful?

Unfortunately, the approach was too top down and did not take into consideration the level of buy-in that was needed from the LBCs themselves. There was also more consideration needed as to how the 'free' plant clinic service would fit within the paid for business model of the RSCs. Plantwise and Solidaridad followed up with the 7 individual LBCs but they did not see how the plant clinic activities could be easily integrated into the RSCs model.

Service providers (Advisory and capacity building)

Service providers include private companies that provide fee-for-service advisory and training to producers and producer groups, either directly or via an intermediary. The grouping also includes private companies that have their own advisory teams that support producers in their supply chain. NGOs are also included in this group for the reasons previously mentioned.

Independent advisors/brokers

In Nepal, iDE is allocating resources to support establishment of plant clinics and to train Community Based Facilitators (CBF) to run private sector plant clinics. The focus of this initiative is to create positive impact for the rural poor through market-based interventions, thus called the “commercial pocket” approach. CBFs are entrepreneurial farmers, based in the community, who act as last-mile input supply chain actors. They earn a commission on sales of agricultural inputs, thereby generating an additional income source for the farmers, especially women and youth, while creating a sustainable model for provision of agriculture extension services. Apart from the routine services, it also proved to be enhancing the incomes of the CBFs by 25-30% (who can earn, on average, USD100-150/month) who also gain recognition in the community. There are 300 CBFs in 5 provinces of Nepal and 45 were trained as plant doctors. One of the negative aspects of this type of engagement is that CABI loses contact and, therefore, influence over the trained CBFs as they do not report to CABI (or iDE for that matter). The CBFs are essentially free to operate independently once the Plantwise training is completed. One consequence of this is that no farmer query data is submitted to the Plantwise Online Management System (POMS) as these plant doctors do not see the collection of data as important. This, in turn, makes assessing the quality and impact of the Plantwise programme difficult. The national responsible organization for Plantwise in Nepal, the Plant Quarantine and Pesticide Management Centre, does however keep links with iDE and can disseminate information to the CBFs on important issues, such as fall armyworm.

In Asia, a number of digital service providers have also been engaged. In Sri Lanka, Dialog, a mobile service provider, created an app to provide advice on pests and diseases of banana and other crops. Dialog paid CABI to develop and supply content for the app, based largely on Plantwise Knowledge Bank factsheets.

In India, the Digitally Empowered Self-Employed Force (DESEE Force) is an initiative where agricultural advisors use digital decision support tools to provide appropriate advice to farmers. In 2017, CABI delivered the Plantwise Plant Doctor Training to a group of master trainers as part of a Training of Trainers process. The idea was to ensure that the field staff had at least a basic level of plant health knowledge to complement what could be provided through the digital tools. Whilst the DESEE Force did not need Plantwise infrastructure (e.g. data management system), they were keen to have CABI onboard as a quality assurance partner. However, due to limitations with the technology at the time and investment/sustainability issues, this partnership did not continue.

Larger production/processing companies

Larger companies routinely source raw materials from smallholder farmers in some supply chains and, therefore, often provide support services to ensure supply of quality product, which is essentially sold under their name. They also provide a source of income that could be channelled to support activities in other areas. Examples of Plantwise engagement with these types of countries is best illustrated in the peppercorn sector in Vietnam and Cambodia. Olam, for example, is keen to improve capacity of their staff so that through hands-on experience on their own farms, they can advise and train smallholder farmers who supply them with peppercorn. Although the training did not wholly meet their expectations, as it was not specific to peppercorn crop, they recognised the value of improving technical ability in providing improved diagnoses of pests and diseases and management in their Smart Agriculture Programme (Figure 2).

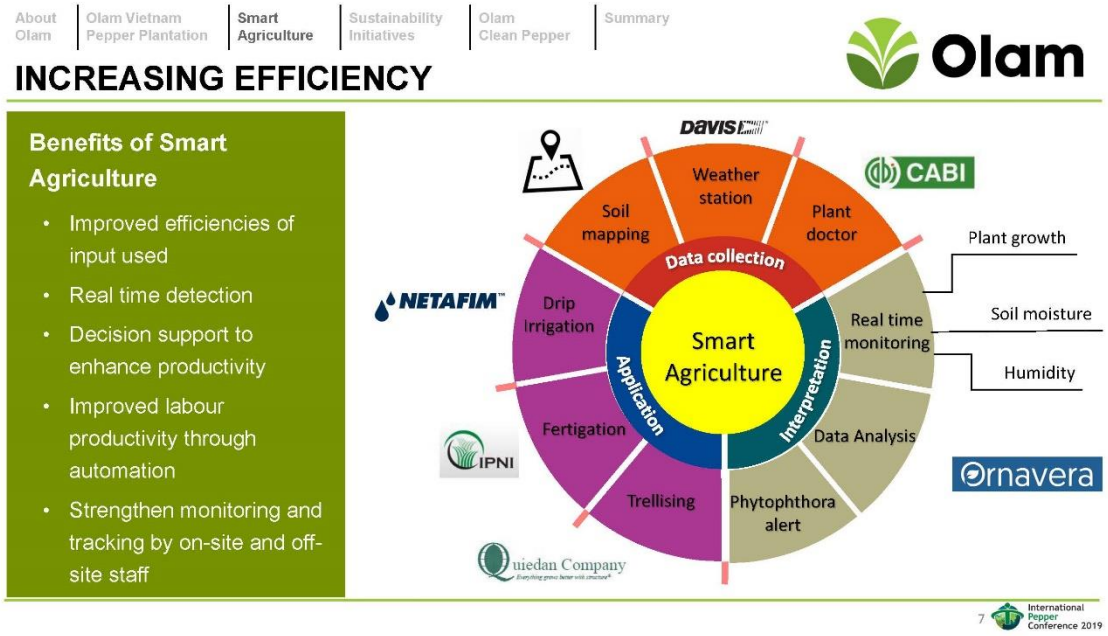


Figure 2. Slide presented by Olam at the 2019 IPC Conference acknowledging the role of Plantwise for increasing efficiency in a Smart Agriculture Programme

Dissatisfaction about the training content was also expressed by the Managing Director of WeltBio, Cambodia, who stated that it "*wasn't specific enough for their needs, and didn't really tell them anything new*" for their business. This shows clearly that the Plantwise Plant Doctor Training fits a certain niche where general plant health knowledge is needed. Delivering the same kind of training to specific value chains requires a level of adaptation to ensure it fits the existing need.

A recently established collaboration with Catapult Satellite Applications Ltd and the Manufacturing Technology Centre on the Colombian Cocoa Control System (COLCO) project aimed to improve the quality and volume of cocoa production in Colombia (see Case Study 5)

Case study 5 – Improving cocoa production and quality in Colombia

Improving production and quality of cocoa in Colombia with the Colombian Cocoa Control System (COLCO) project

The COLCO project is led two of the UK backed Catapult Centres (Catapult Satellite Applications and Manufacturing Technology Centre) and funded by Innovate UK as part of the Newton-Caldas Fund. The project aims to deliver growth across Colombia's cocoa sector through partnerships between UK and Colombian entities through the developing an integrated technology service throughout the sector.

Engagement with Plantwise

CABI's role in the project is to help reduce cocoa production losses caused by pests and diseases using the Plantwise approach. The three Colombian partners are private sector companies, Compañía Nacional de Chocolates (part of Grupo Nutresa) is an agri-food processing company producing a range of products including chocolate and snacks for markets in Latin

America; Compañia Colombiana de Cacao is an agribusiness producing fine flavour cacao for domestic and export markets; and the third is FEDECACAO, a federation that represents the interests of cocoa producers. As part of its mandate, FEDECACAO provides rural extension services to farmers.

Plantwise activities have been carried out in Colombia using COLCO project funds with additional financial support from the private sector partners. After the initial training session, it became evident that each of the companies had very specific needs and expectations from the Plantwise intervention. The three companies were engaged in the training and saw the value of the general Plantwise approach but also requested specific training on management of cocoa pests and diseases. They were also interested in data collection and use, but again this required tailoring as the existing Plantwise tools were not fit for the specific needs of large commercial farmers.

View on the Plantwise programme partnership
As part of the project there is a regular 'Future Forum' which engages with all project partners to assess which services offered by UK providers (in CABI's case Plantwise) the private companies in Colombia would be willing to pay for once the project is finished. From this discussion, further training and plant clinic backstopping were selected as priorities.

Vision for future engagement
In early 2020, a training of trainers was held in preparation for scaling up plant doctor training; however, face-to-face training was cancelled due to Covid-19. The positive momentum had slowed during 2020 but there are ongoing discussions for next steps for a Phase 3 of the project.

NGOs

NGOs are not normally considered as private sector; however, their local presence often means that they are well connected and have extensive reach into the rural communities where they work. Those organisations that seek to support farmers offer a potential opportunity to extend Plantwise reach and provide regular income, thereby contributing to the sustainability of the programme. Some NGO's have a specific vision to engage with private sector through the programmes they implement, in this way, creating opportunities to reach private sector, particularly SMEs.

Many NGOs, particularly those with a multi-country presence, are supported by sizable long-term grants. Plantwise has the potential to be a "plug-in" service that can help them reach their targets and satisfy their donors. NGO's like Self Help Africa is an example of a successful relationship established in Kenya and Malawi, that could lead to private sector engagement through their project activities.

NGOs play a key enabling role for CABI to increase country profile and reach, providing visibility and linkages that include local private sector companies. Self Help Africa and Conversation Farming Unit are two examples, where relationships have been established in a particular country. They also provide an opportunity to deliver the same service in other programme countries. However, like CABI, they are reliant on funding and Plantwise activities are only sustainable as long as activities can be incorporated into projects and programmes.

Lessons Learnt

What worked well

- The Plantwise programme has received a lot of interest and has capitalised on a diverse range of opportunities with private sector partners, of which, many engagements can be considered to be successful both in the short and long-term.
- Even without a robust private sector strategy in place at the beginning, the programme realised the potential of private sector, as evidenced by the number of engagements and opportunities seized early on to improve the sustainability of the programme.
- The decentralised, agri-entrepreneur type of model demonstrated by the Syngenta Foundation in India and Bangladesh, and by iDE in Nepal empowers young people in rural areas to play an active role in agriculture development in their region. This effectively promotes privately-run plant clinics, thus sustaining the Plantwise approach. Its autonomy does create challenges but also opportunities for Plantwise to explore backstopping services to quality assure services provided.
- The role of government in providing an enabling environment for private sector involvement in Plantwise directly correlates with the success of engagement. The success of such buy-in from government is evident in China, and its “Green Control Programme”. In contrast, engagement was more limited in countries with a poorly developed or weak private sector and where there was government mistrust of the sector in serving smallholder farmers.
- Engagements with farmer cooperatives, particularly in Latin America, have been successful where plant clinic operations are embedded into the cooperatives’ activities. This model increases the chance of sustainability as farmers pay a membership or levy to the association, which, in turn, provides technical support to the farmers.
- Inclusion of strategic private sector organisations in steering committees and other national forums has been instrumental in enabling potential partners to develop a better understanding of the programme and develop closer linkages and potential partnerships.

What didn’t work so well

- In the early phase of the programme, there was no clearly defined strategy in place that recognised the different motivations of private sector for engaging with Plantwise. A more strategic approach could have been taken at an earlier stage to help focus and capitalise on successful private sector partnerships.
- Data (operational and financial) was not disaggregated between public and private sector in the programme, making it very difficult to assess sustainability and impact of private sector engagements in many cases.
- Private sector relationships can require a significant investment of time to develop and CABI staff sometimes felt they did not have adequate skills and time to devote to developing and maintaining these relationships.
- There were several examples where engagements failed to progress or resulted in one-off interactions. These were mainly because Plantwise did not meet the needs of the private sector stakeholders. For instance, feedback from agri-food producers such as Olam revealed that they are often only interested in a limited range of commodity crops and therefore require specifically tailored information for these.
- One of the challenges of Plantwise as a provider of training, as seen with iDE in Nepal and with WeltBio and Olam in Vietnam, is that data is often not collected and Plantwise has no or very limited visibility of the quality of services and impact on the beneficiaries. This could be overcome by encouraging dialogue and creating a reason for customers to stay engaged with the programme, either through regular updates on factsheets, or

news feeds on outbreaks in their region. Another option would be providing refresher training courses or linking in other support services such as ongoing consultation.

Summary

This report has demonstrated that private sector engagement has been benefited the Plantwise programme. Embedding plans to engage with the private sector at the beginning of the programme and providing suitable guidance to CABI staff involved in implementation would have benefited the programme. Often, successful engagement with private sector takes time and requires nurturing. The late introduction of this aspect into the programme in many countries means that some relationships with private sector have not yet had sufficient time to flourish. The reliance on funding to sustain Plantwise activities can be addressed by involving private sector companies, provided the added value to their business is realised, to justify continued investment. While this may change the way in which services are provided (e.g. focal regions, crops and farmers) compared to purely public sector models, it does increase opportunities for scale, sustainability and impact.

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