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Scaling out control of banana xanthomonas wilt from community to regional level: A case from Uganda's largest banana growing region

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Banana xanthomonas wilt (BXW) has been successfully controlled in major banana growing areas between 2005 and 2008. This was due to combined use of participatory approaches for mobilising technology users such as farmer field schools and Integrated Agricultural Research for development (IAR4D) using cultural practices. However, the approaches focussed on small communities of about 30 to 300 farmers. Between 2010 and 2012, BXW prevalence in the region increased to 34 and 45%. In 2012, the strategy for BXW control changed from approaches that target technology users at community (village level) to those that target many technology users at regional level. Then the action plans of districts and sub-counties were designed to achieve the goal of the regional action plan rather than support action plans of a community. The overall implementation of the regional plan was spearheaded and coordinated by the regional taskforce, instituted by regional stakeholders. BXW prevalence reduced from about 45% in June 2012 to about 13% in September, 2013, with banana production recovery of 40% from the peak of BXW epidemic in all the 10 districts of the Ankole region. The approaches used have been described in this paper to hopefully contribute to scale out BXW control to other main banana growing areas in Uganda and beyond.

Key words: Banana, BXW, participatory approaches, scale-out.

INTRODUCTION

Many large investments in research and development aim to achieve high rates of adoption but without strategy for encouraging the desired levels of adoption (Millar and Connell, 2010). Consequently, there are poor investment returns and unsatisfactory benefits. Furthermore, agricultural scientists and development specialists often face difficulties in moving beyond demonstrating technologies with farmers on a small scale, to ensure livelihood impacts across larger numbers of households, villages and districts (Snapp and Heong, 2003). It is often believed that if technologies prove useful to farmers, then their diffusion would occur naturally through peers, family members or farmer associations, but does not always happen for complex technologies.

Attempts to scale out complex or risky technologies have resulted in social inequities, environmental degradation, loss of cultural connections and low farmer adoption (Fujisaka, 1994; Walters et al., 1999; Cary et al.,

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2002; Kiptot et al., 2007). A range of case studies reported factors that favour successful scale out of technologies including, clear and tangible benefits for farmers, strong leadership, peer learning, support from officials and donors, availability of credit and security of land tenure, a strong civil society, socio-economic and cultural diversity across communities or areas, the quality of community participation, communication between development partners, and enabling government policies and resources (Gundel et al., 2001; Kolavalli and Kerr, 2002; World Bank, 2003; Gillespie, 2004; IIRR, 2000). If research scientists and extension workers are working towards scaling out useful technologies, they need to have a sound understanding of how farmers learn, how they experiment and innovate, and how local decisions are made in the family and social structures (Scoones and Thompson, 1994; Cary et al., 2002; Pannell et al., 2006).

All the aforementioned are made possible through use of participatory approaches in community mobilisation for participation in a development initiative such as control of banana xanthomonas wilt (BXW) (Bessette, 2004). The key elements of participatory approaches include getting communities together, facilitating them to formulate and implement action plans, mobilizing political and other leaders to support community efforts and ensuring their effective monitoring and evaluation (Kubiriba and Tushemereirwe, 2014). It was possible to control BXW to below 5% in major banana growing areas in Uganda for more than 3 years and more than 90% of the farmers participating in farmer field schools (FFS) controlled in their fields and their communities (Kubiriba et al., 2012a). The efforts, however, focused on small disease pockets in communities of about 100 to 300 farmers or farmers' groups of about 30 farmers. It was not clear whether the same level and kind of institutional support and capacity building within and across participating organizations and their networks, farmer organisation and participation would still deliver similar or higher successful control of BXW at higher epidemic levels on many banana fields across ten districts. Yet, BXW prevalence increased to such levels of 34 and 45% in the whole South-western banana growing region of Uganda between 2010 and 2012, where more than 60% of Uganda's bananas are produced.

This paper describes the adjustments made in the approaches used to organise the various organisations to participate, build capacity for the players for BXW control, legislative support, monitoring and evaluating the activities and effectively communicating the successes to enable effective BXW control beyond the small pockets to a regional scale.

The scale out process

The following detailed activities are aligned to the principles of participatory approaches for technology promotion, that is a process of collective analysis, learning and action. The activities vividly bring out issues of shared understanding of the problems, priorities, agreement on achievable, sustainable change and action, capacity building and empowerment for local stakeholders to solve their own problem as shown in Table 1.

A stakeholders' meeting

A meeting of stakeholders from the 10 districts of Ankole sub-region was held in June, 2012 in Mbarara. Participants included the technical wing (District National Agricultural Advisory services (NAADS) Coordinators, District Agricultural Officers and District Production and Marketing Coordinators); political wing (Local Council V (LCV) Chairpersons, Secretary for production for the district) and administrative wing (Resident District Commissioner (RDC), Chief Administrative Officer). The most severely affected sub-counties in each of the 10 districts were represented by their Local Council III (LCIII) Chairperson, Chief and NAADS Coordinator. Farmers' representatives, Zonal NAADS Coordinator and Zonal Agricultural Research and Development Institutes (ZARDI) and National Agricultural Research Organisation (NARO)'s National Banana Research Programme also participated.

The stakeholders reviewed district action plans for BXW control and discussed the implementation modalities. The stakeholders identified the elements of success in the district reports. They included formulation and implementation of by-laws by sub-county chiefs to compel non-compliant farmers to control BXW; involvement of multi-sectoral stakeholders for mobilization and sensitization of communities; community based surveillance persons/extension workers. Challenges identified were politicization of the enforcement of by-laws and need to use non-elected chiefs to enforce by-laws; limited numbers of extension staff and need for training trainers; limited resources to control the disease; need to mobilize other players, for example, NAADS to support BXW control. The review of district action plans was reinforced with experiences shared by the farmers and sub-county leadership of Mwizi, Mbarara District in a field visit. BXW had been effectively controlled in a whole parish of Rubagano of Mwizi sub-county using a combination of farmer field schools and sub-county byelaws. BXW had been eradicated from this parish for over 5 years. The shared experiences were used to formulate a model district action that formed basis for improvement of existing district action plans.

A regional multi-stakeholder platform was established during the meeting. The platform was chaired by the RDC, Mbarara, with membership representative of Zonal NAADS; MBAZARDI; MAAIF; NARO; star-performing farmers, sub-county chief, 2 DAOs and Chairperson LCIII. The terms of reference for the platform (Table 2) became the action plan for the Ankole region covering 10 districts. The goal for regional action plan was to reduce BXW prevalence to below 0.1% from 45% in 18 months. The elected political leaders on the platform were given the role of spearheading mobilisation of farmers, also their voters, for the control of BXW. The technical wing (NAADS, extension and research staff were given a role of effectively delivering technical information for BXW control and the administrative wing the role of supervising the technical staff and mainstreaming BXW control district and sub-county action plans in their respective development programmes. Other platforms for BXW control were established at the district comprising of Chairman LCV, Production secretary, NAADS Coordinator, District Agricultural Officer and at sub-county level comprising of LCIII Chairman, Production secretary, NAADS Coordinator, Chief and 5 councillors and at village level comprising of farmers and opinion leaders.

Demonstration of successful control of BXW on hotspots

Hotspots (the most affected villages) were selected in the most

Table 1. Alignment of activities with process of participatory approaches.

Stage	Activities
Collective assessment of the problem	A stakeholders' meeting; (i) Most players in the banana industry in the region participated; (ii) Agreement that BXW is a problem that needs urgent collective control, (iii) Shared experiences on BXW control in meeting and in field
Design of action plan to tackle the problem drawing from experiences of the community	(i) Action plan developed in the meeting using best practices and shunning bad practices of BXW control from the similar communities
Collective implementation of the Action plan	(i) Platform for implementation of BXW in region also agreed in the meeting (ii) Capacity building for stakeholder to implement a collective action plan through BXW control demonstration on hotspots and training of local government staff. (iii) Scale out activities; Field days, BXW control campaigns, information dissemination
Participatory monitoring of the action plan	Participatory monitoring evaluation where all stakeholders are able to track achievement of targets set collectively and gain confidence from observed positive change

Table 2. Regional strategy for the Ankole region.

Output	Activity
Coordinate the formulation of districts' action plans and implementation	(i) Each district ensuring that their work plans are completed and ready for implementation; (ii) Implementing the work plans; (iii) Review the work plans and level of implementation.
Creating communities of good practice in most affected Sub counties	(i) Identification of the worst hit areas (sub counties /hot spots) in the different districts; (ii) Mobilization and sensitization of relevant actors for BXW control; (iii) BXW management activities implemented in all the hot spots; (iv) Task forces formed in the hot spots and trained to follow up with communities on BXW management; (v) Up scaling of BXW control activities to the neighbouring communities.
Systems of picking new information very quickly and reporting it	(i) Creating a community based surveillance system in all sub counties that reports on the BXW status and level of control.
Dissemination of information and training at regional basis	(i) Conducting field days at the sub county level; (ii) Farmer tour/ exchange visits; (iii) Conducting radio talk shows at least once a month.
Inter district / government cooperation in BBW control e.g. quarantine	(i) Formation of BXW control regional team (Task force); (ii) Establishing the BXW level at various districts Conducting review workshops to review the level of implementation
Monitoring and evaluation of control activities	(i) Reports on progress of implementing BBW control activities; (ii) Technical staffs (SPs and other extension staff(s)) compiling monthly reports from various sub counties for the district; (iii) Quarterly review reports from the districts; (iv) Semi- annual reviews; (v) Spot visits by the regional team

Goal: Reduce BXW in affected farms from 50 to 0.1% by Dec 2013.

affected sub-counties in each of the 10 districts during the regional stakeholders' meeting described. A hotspot was a LCI village, comprising of about 300 households, where all the banana fields were affected by BXW. The regional platform members, the district teams (Production secretary, NAADS Coordinator, District Agricultural Officer) and sub-county teams (Production secretary, NAADS Coordinator, Chief) moved together to the selected hotspots. The meeting at the hotspots had been aggressively mobilized by the sub-county teams with an aim of getting most of the farmers in the village to attend. During the meeting, the BXW problem (identification, means of spread and control practices) was described by the farmers. The visiting team members only filled the missing gaps. The visiting teams also shared the experience of successful and unsuccessful control of BXW in other banana growing areas. The discussions informed the farmers' decisions made to effectively control BXW from their fields. These farmers' decisions were then crystallized in a community action plan for BXW control, complete with time lines and a monitoring and evaluation framework. Task forces were established in each of the 10 host spots to mobilise the farming community to institute BXW control as agreed in the community meeting. The village platform members also tracked BXW control in the village and reported progress of BXW control activities to the sub-counties and districts.

Local government stakeholders trained in BXW control using participatory approaches

Platform team members at the district and sub-county levels were trained by the regional platform members as BXW control was being initiated at the hotspots. A training meeting took place at the sub-county headquarters of the most severely affected sub-counties. The trainers were the regional platform members and the participants were members at the district and the sub-county platforms. The regional platform shared with them technical information of BXW control and stakeholder mobilisation for the technology uptake by the farming communities. Issues of different offices not working well together (team work) came up as one of the reasons for lack of BXW control in their areas of operation. They were advised by members of the regional platform of their level (e.g. Chief by chief on the regional platform) do execute their work as a team and that this would not only affect BXW control but also other areas of service delivery.

All the platform members moved to the hotspot villages. The regional platform members spearheaded facilitation of the village meeting with participation of all other stakeholders including farmers, sub-county and district team members. At the end of the whole exercise capacity had been built for platform members at village, sub-county and district to effectively deliver technical information and also mobilise the receptive machinery for the BXW control technologies in all areas.

Scaling out BXW control

Already scale-out of BXW control was being effected on the hotspot villages, the platforms of the sub-counties hosting the hotspots had formulated sub-county action plans to mobilise farming communities in all affected villages in the sub-counties using the skills gained in the regional meeting and training meetings at the sub-counties. The district platforms were to refine the district action plans using the model district action plan formulated during the regional stakeholders' meeting and mobilise all affected sub-counties in their districts to effectively control BXW.

Field days were conducted in Kitagata-Sheema District and Bukiro-Mbarara District, the outstanding performing hotspots, in January, 2013 to reinforce scale out of BXW control already kick-started. Other than the hotspots, BXW had been effectively controlled in other 9 neighbouring villages in Kitagata of Sheema District and in other 10 villages in Bukiro of Mbarara, together covering about 3,000 fields cleared of BXW in 4 months. Participants from Districts of Mbarara, Ntungamo, Isingiro, Ibanda and Kiruhura attended the field day in Bukiro-Mbarara. Participants from Districts of Sheema, Mitooma, Bushenyi, Buhweju, Rubirizi attended the field day in Kitagata - Sheema District. Invited guests from each District included LCV Chairperson, RDC, Chief Administrative Officer, District Production Secretary, District Production and Marketing Officer, District NAADS Coordinator. All sub-counties in the Districts hosting the 2 field days were represented by stakeholders structured as at district level. NARO's Banana Research Programme, Mbarara Zonal Agricultural Research Institute, together with Zonal NAADS Coordinator also attended.

BXW control campaigns

Even after conducting field days to showcase successful BXW control in the hotspots, the regional platform was not sure that BXW would be controlled in almost all affected fields to reduce BXW incidence to less than 0.1% in the whole of Ankole originally agreed in the regional action plan. It was decided that a community mobilisation approach code named 'Intervention for Rapid Results' be used to remove all infected plants in the whole of Ankole in 30 days. The BXW control campaign run from 20th May, 2013 to 20th June, 2013.

All households affected by BXW were listed village by village using the networks of stakeholders at community and parish level already established. The sub-county platforms identified 2 convenient days in the week solely devoted to BXW control during the 30 days. The information was shared with the District and regional teams. The regional, district and sub county teams set up programmes of supervisory visits. The kick out BXW campaigns were launched by the LCV Chairpersons of the Districts of Mbarara and Bushenyi on the eve of 20th May, 2013 on FM radios. Then community taskforces ensured that all infected plants are removed by the farmers. All sub-counties actively implemented bye-laws (Plates 1 and 2). Meanwhile the BXW control campaign was continuously covered on regional FM radios of Radio West and Bushenyi FM.

Dissemination of information about BXW control

The Mbarara Information Officer was facilitated to mobilize the media to attend and document activities on all major events and were widely aired on Local and National FM radios. Articles covering the field days also featured in the National newspapers (Plate 3). Documentaries were produced. The regional platform aired radio spot messages for 30 days at the onset of second rains in August and September, 2012 when the farmers are massively pruning their plantations. During the same period, two radio phone-in talk shows were led by LCV Chairperson of Mbarara on Radio West in Mbarara and LCV Chairperson of Bushenyi on Bushenyi FM. The two radios have listenership from the regions of Ankole, Kigezi, parts of Mt. Rwenzori in Uganda and Northern parts of Tanzania and Rwanda. Both activities were to sensitise farmers about the dangers of spreading BXW through cutting tools and urging local governments to actively participate and support BXW control.

Monitoring and evaluation

The BXW control activities were monitored using three fronts. Various review meetings were held at different levels. At the village

4 ENTATSI, Orwakabiri, Maaci/Katumba 26

Abagaiga Babateire Ahari Rumanda Ahabwa Kajunde

Amodias Ayebazibwe Bwizibwera

KOOTI OMURI Bwiizibwera ekuriirwe omuramuzi Okipi Robert esabiiti ehweire esindikire kabura muriro abagaiga 3 Kyamugorani ahabwa Kajunde.

Omu kiirwamu orubanja boona baikiriize omushango gw'okugira ngu bakanga kurwanisa endwara ya kajunde n'okuteera ripooti yendwara ya kajunde.

Abatweirwe omu kihome bamanyirwe nka Makokyera Silver orikuruga omuri Kakondo 11 Bukiro, Kashari , Kamugisha Ndunde kuruga omu kyaro nikyo kimwe hamwe na Kato Bamuhaga orikuruga omuri Kaziga 1 Bukiro, Kashari, Mbarara. Omu kiirwamu omushango omuramuzi agizire ngu amateeka g'okuikwata aba kajunde akagachangaho mbwenu tiwe yaagateirelho na munonga eiteeka rya 2 ry'obitagiro rya kajunde ngu omuntu yaakwatwa atagambire ninga atarwanise kajunde omu rutookye rwe ngu naaza kutanizibwa

Makokyera, Kamugisha na Kato baaheza kukwatwa

50,000+ za buri mutumba ogurwaire. Omu kaire ako nikwe omuramuzi kubaragiira kwihamu enkaito akaragiira abaserukare kubatwara omu kihome kubitebya. Nikwe kubatwara omu kihome reero za motoka zaabo ezi babaire beizire nikwe kuzipakinga aha kihome babyesire ebizaano. We Kazywanisa wa NAADS Mugabe Vincent ow'egoomborora ya Bukiro agambiire

Entatsi ngu nibenda kugumizamu n'omuhiigo kureeba ngu barwanisa kujunde omu gomborora egyo. We ow'egoomborora ya Bukiro Ronald Taremwa agizire aba-ahabw'okwerwara ngu baine akasente bakanga nkana okurwanis endwara ya kajunde ngu ow'esente tarikugambwa ngu nibaza kutwara sente baziheereze omuramuzi abeibeho orubanja.

Plate 1. News about 3 rich farmers who defaulted on BXW control in Bukiro sub-county, Mbarara District in Vanercular newspaper.

Daily Monitor
WEDNESDAY, JANUARY 30, 2013
www.monitor.co.ug

western

Civil society, civil servants clean Ntungamo town. Civil Society Organisations members and government employees in Ntungamo Municipality at the weekend participated in a general cleaning campaign. Members from Excel Real Actors, Ntungamo Municipal Council Staff, and politicians said the move was aimed at improving the sentation of the area. Speaking at the end of the exercise, Ntungamo Deputy Mayor Monica Kobusingye urged residents to maintain cleanliness and appealed to civil society organisations to take the lead in the campaign. [Perez Rumanzi, Monitor]

Ankole farmers face prosecution over Banana Wilt disease fight

Struggle. Leaders say farmers from districts neighbouring Mbarara should step up the fight against the banana disease in order to ensure food security.

BY RAJAB MUKOMBOZI

MEASURES

Some of the measures for control of BBW include disinfecting tools using pk or fire after use, uprooting and burying the infected plant and discouraging use of pangas and other garden tools from one plantation to another, especially by matooke traders.

MBARARA. Authorities in Mbarara District have warned farmers against encouraging the spread of Banana Bacterial Wilt disease (BBW), which has destroyed plantations in Ankole in recent months.

During a field visit to Bucuro Sub-county, which had been hit by the disease on Monday, local leaders observed that farmers elsewhere had failed to follow the recommended measures to check the spread of BBW.

Bucuro and Mwizi sub-counties have shown signs of success in the fight.

"Enough sensitisation has been done on the control of the disease, now what remains is to arrest and prosecute those [farmers] who have failed to follow control," Mr Nickson Kabuye, the Isingiro District Resident District Commissioner (RDC), said.

Some of the leaders visit a banana plantation in Mbarara on Monday. PHOTO BY RAJAB MUKOMBOZI

Mbarara enacted a bylaw two years ago to prosecute farmers who do not heed control and eradication measures recommended by agriculture extension workers. Several culprits have been taken to court and fined.

Mbarara RDC Clement Kandole said Ugandans were citing human rights to shield themselves from prosecution.

He, however, warned that laxity on the part of farmers would not be tolerated in the fight of the banana disease.

RDCs, farmers, CAOs, district chairpersons and extension farmers from Isingiro, Ibanda, Ntungamo, Sheema, Bushenyi, Mitooma, Rubirizi and Buhweju had visited Mbarara to learn from Bucuro success story in the fight against the wilt disease.

But Nya District LCS Chairman Denis Turinawe said the neighbouring districts would be frustrating their efforts if they don't force farmers to comply.

Kabale

40 injured in accident

About 40 people were on Monday seriously injured after the bus they were traveling in veered off the road. The 7am accident occurred at Heissero, about 40km from Kabale town on the Kabale-Kisoro road. The police spokesman for Kigezi, Mr Elly Maate, said the bus from Kampala was headed to Kisoro. [Robert Muhereza, Monitor]

Kiboga

District in huge debt

Kiboga District is chocking in debts, officials have said. The district had a Shs519 million debt accruing from lost court cases since 2011 and has only cleared Shs97m. The CAO, Ms Roselyn Adong Ruhoni, said they have to pay the debt, a thing that the district chair, Mr Israel Yiga, said has constrained their activities. [David Ayebale, Monitor]

Plate 2. BXW control in the Daily Monitor newspaper, January 2013.

Banana farmers urged to accept expert advice

BY FRED ANYINE

SHEEMA. Banana farmers in Ankole sub-region have been urged to follow advice from farming experts if they are to sustain banana growing.

The chairperson of task force on Banana Bacterial Wilt (BBW) disease control in the sub-region, Mr Clement Kandole, made the appeal during a field study on the impact of the disease in Kitagata Sub-county, Sheema District on Wednesday.

"It is possible to fight and eradicate the disease using the skills and knowledge acquired from sensitisation programmes by the technocrats," Mr Kandole said at Kashekuro Church of Uganda which has a demonstration centre for control of BBW.

This comes after politicians, civil servants and farmers from the sub-region joined efforts to fight the disease that is threatening to wipe out their livelihood.

They are also supported by the Food Agricultural Organization and the Ministry of Agriculture.

He also called for by-laws to deal with those who do not want to cooperate.

Mr Kandole, who is also the Mbarara District resident district commissioner, also warned that political interference would undermine the efforts in fighting the disease.

Farmers gave testimonies on how they have managed the disease, such as cutting and uprooting infected banana plants and chopping them, avoiding sharing of farm tools, and regular surveillance of banana plants, among others.

Kabarole

Two suspects held

Police in Fort Portal are holding two people for allegedly killing a man over a girlfriend. The western region police spokesperson, Mr Bakari Muga Bashir, said the suspects allegedly killed Bagume Patrick, 23, who had gone for to a dance party in Kyakazinc village in Buharo Sub-county. The deceased is said to have picked quarrel with the suspects, leading to a fight. Mr Bakari said the deceased was stabbed in the neck with a knife and died instantly. Investigations are ongoing. [Ruth Katusabe, Monitor]

Varsity designs programme to protect River Mpanga

BY RUTH KATUSABE & FELIX BAGUMA

River Mpanga which is under threat as a result of human activities.

KABAROLE. Mountains of the Moon University (MMU) in Kabarole District has designed a public awareness programme to protect the environment in the Rwenzori sub-region.

The package involves using Mpanga Game designed to create a change in their livelihood and protect the natural resources, especially River Mpanga that emanates from Mount Rwenzori and snakes through several districts in the sub-region.

According to Mr Clovise Kabaseke, a lecturer at the university, the game is different from others because everyone is a winner.

"Every player wants to achieve, at the end of the game it identifies the problem of every human activity done on the river and also gets a solution," Mr Kabaseke said at the game inauguration workshop in Fort Portal on Tuesday.

Fort Portal Municipality MP Alex Ruhunda promised to market the idea and lobby Parliament to invite MMU officials to present it to the House.

MMU decided to design the game to protect River Mpanga after a report from the district environment and natural resources department showed that there is over exploitation and degrading of the river.

Mr Gerald Twehazi, the speaker for Kasenge District, also urged to residents to embrace the project.

Plate 3. Speech of Chairman LCV Sheema District capture in the National Daily, January 2013.

level, farmers exchanged experiences of BXW control. They named farmers that successfully controlled BXW and shamed the ones not controlling BXW. In totality, the farmers gained confidence as they progressively recognised it is possible to control BXW and put in more efforts in the control of the disease. Inception regional stakeholders meeting already described was held in July, 2012 to set up action plans and their implementation mechanism. Another similar meeting held in July, 2013 was to track the progress of the control efforts over the past year. The success stories shared in the meetings were an encouragement for the partners lagging behind. It was also realised the long list of challenges highlighted in initial meeting as serious hindrance to effective BXW control had been overcome easily in communities that effectively controlled BXW. There were also regional, district and sub-county platform meetings before and after major activities for organisational purposes.

There was a surveillance system instituted at the community level to primarily inform the sub-county platforms of the defaulting farmers for effective implementation of the byelaws. The community taskforce members and farmers were responsible for tracking all infected plants in all villages. Data collected through this front by sub-county platform was also used to report to the district. The real value of this data was in encouraging all farmers with infected fields to control BXW, not in scientific reporting value.

BXW infection data was collected by members of the regional platform under the guidance of NARO team members in August, 2012, December, 2012 and June, 2013. Data was collected on BXW incidence, BXW prevalence and yield recovery. Rather than collect data on randomly selected fields, to give an average picture of BXW control, as is the common practice in Research, we opted to collect data on the worst scenario cases, which would give a wholesome BXW control picture in the region. We collected data in most infected villages (hotspots). Data in randomly sampled fields was collected for the national survey in November 2013. These two data sets are the ones reported for this paper.

RESULTS

Information reported by the District teams in Stakeholders' meeting, July, 2013

Information reported by the districts teams during the meeting showed a wholesome district picture of BXW control status. In Rubirizi District, for example, all households in 10 sub-counties had fields affected by BXW in June 2012. The district was net-importing bananas from Isingiro and Bushenyi Districts. In June, 2013, most households had BXW incidence drastically reduced and fields got back into production. Overall BXW incidence reduced from 75 to 15%. The affected households were cutting 2 to 7 infected plants per week. 20 lorries of bananas were sold from the district every week.

In Mbarara District, number of affected household reduced from 2931 in July, 2012 to 771 in July, 2013, with overall BXW incidence reduction from 15 to 3%. There were pockets of BXW infection in the sub-counties of Rubindi, Biharwe, Bugamba, Rugando and Kashare of the previously BXW infected 14 sub-counties.

In Bushenyi District, the number of households affected by BXW August, 2012 ranged from 15 to 353 which reduced to 0 to 42 per sub-county after the BXW control campaigns (June, 2013). Pockets of BXW infection were in sub-counties of Nyabubare, Kyamuhunga, Keizooba, Ibaare and Central of the 12 previously affected sub-counties. Other districts reported similar levels of successful BXW control included Isingiro, Mitooma, Ibanda, Buweju and Kiruhura. Ntungamo District lagged behind because the technical team did not properly constitute the bye-laws and had sizeable opposition during their implementation. But all the same, Ntungamo reported reduction of BXW incidence by 80%. Again the value of such reports from review meetings is stakeholder mobilisation rather than scientific reporting.

In August, 2012, 93.4% of the farmers in selected hotspots had over 20 infected plants in their fields. The rest had 1 to 20 infected plants and no farmer had a field with no BXW infection (Table 3). The hotspot in Isingiro was the most affected with 200 fields with over 100 infected plants. By December, 2012 (within 4 months), 17.9% of the farmers in selected hotspots had over 20 infected plants. There were no farmers in the hotspots of Districts of Mbarara, Isingiro, Ntungamo, Rubirizi, Sheema and Buhweju with more 20 infected plants in their fields. Proportion of farmers with 1 to 20 infected plants in their fields were more than 90% in hotspots in the Districts of Isingiro, Ntungamo and Rubirizi and between 50 and 77% in the hotspots of the Districts of Mbarara, Sheema, Buhweju, Kiruhura and Ibanda. Outstanding successful BXW control was with farmers in hotspots of Mbarara, Buhweju and Sheema with 34, 33 and 23% of previously infected fields, respectively were cleared of BXW infection within 4 months. The sub-counties hosting the hotspots in Districts of Mbarara and Sheema had in addition greatly controlled BXW in 10 and 9 other villages surrounding the hotspots (data not available) and were selected to host the field days to showcase successful BXW control.

In July, 2012, about 600 banana bunches per month were sold from hotspots in Mbarara and Bushenyi. Farmers in hotspots of Isingiro and Ibanda sold 50 and 200 bunch per month, respectively, the rest of the hotspots hardly sold any bananas (Figure 1). In November, 2012, banana sales had increased in the hotspots of Mbarara, Isingiro, Rubirizi, Sheema and Kiruhura. There was drastic reduction in banana sales in Bushenyi District.

By June, 2013, BXW had been controlled in over 90% and over 70% of the previously affected fields in 6 and 3 hotspots, respectively. It was only the hotspot in Bushenyi, where BXW had been effectively controlled on only a half of the previously affected fields. Farmers continued to remove infected plants from their fields at an average of less than 4 infected plants per farmer per week (Table 4).

BXW status of the Ankole - national survey data

Survey data collected from all the main banana growing regions of Uganda revealed that 29.1% of the banana

Table 3. Level of implementation of BXW control activities in the 10 hotspots.

District	Number of households cutting various numbers of infected plants			
	0 plant	1-20 plants	20-100 plants	>100 plants
Baseline – August 2012				
Mbarara	0	55	130	100
Isingiro	0	0	0	200
Ntungamo	0	0	58	10
Rubirizi	0	0	155	32
Sheema	0	7	95	56
Buhweiju	0	19	30	50
Kiruhura	0	0	50	100
Mitooma	0	0	90	20
Ibanda	0	15	56	35
Bushenyi	0	0	90	12
4 months later - December 2012				
Mbarara *	97	188	0	0
Isingiro	20	180	0	0
Ntungamo	1	67	0	0
Rubirizi	17	170	0	0
Sheema*	15	50	0	0
Buhweiju	33	66	0	0
Kiruhura	6	83	61	0
Mitooma	0	12	88	0
Ibanda	0	71	25	10
Bushenyi	0	23	70	9
11 months later - June 2013				
Mbarara *	273	12	0	0
Isingiro	186	14	0	0
Ntungamo	50	18	0	0
Rubirizi	157	30	0	0
Sheema*	149	9	0	0
Buhweiju	87	12	0	0
Kiruhura	142	8	0	0
Mitooma	104	6	0	0
Ibanda	99	7	0	0
Bushenyi	54	48	0	0

fields still had infection in the Southwest including the Kigezi region (Table 5). BXW prevalence in Ankole alone is 13%. While BXW was effectively controlled on 60.9% of the previously affected fields in the South West, BXW effectively controlled 87% of the previously affected controlled BXW in Ankole. This translated into banana production recovery of 40% (Figure 1).

DISCUSSION

Governments, citizens, and donors across the globe want to see evidence that their investment in agricultural research and development leads to significant and widespread livelihood improvements among poor households (Pachico and Fujisaka, 2004). This will not happen if technologies developed to increase agricultural productivity and improved quality remain either on shelf or are promoted to only a small section of users from small demonstration trials (Hawkins et al., 2009). Farmers need to be engaged in a facilitated, interactive learning environment which enables them to deploy the technology within their specific environments, compare

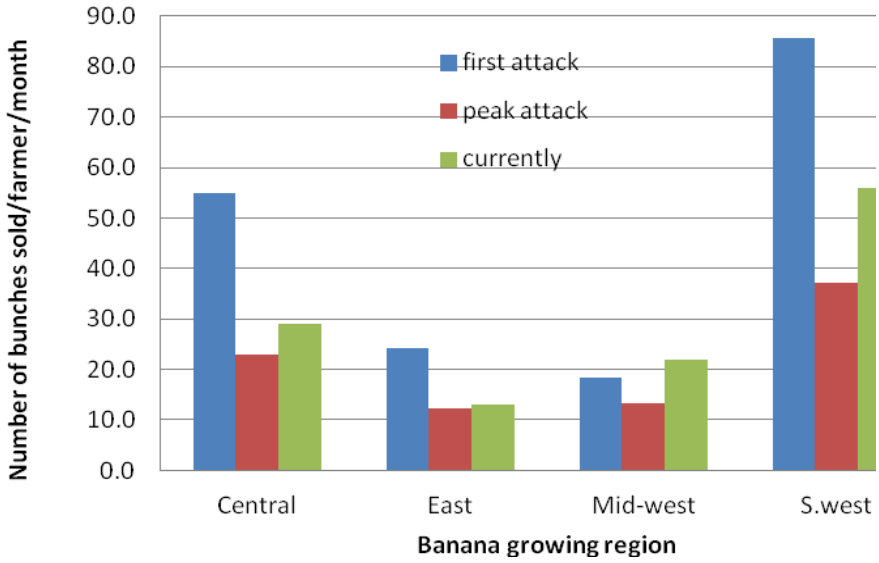

Figure 1. Mean monthly banana sales from previously affected fields on the 10 hotspots.

Table 4. Mean number of infected plants being continuously removed from affected fields per week.

District	Mean number of infected plants removed per field per week	
	July 2012	June 2013
Mbarara	82	2.5
Isingiro	150	1
Ntungamo	73	2
Rubirizi	75	1.3
Sheema	89.7	2
Buhweju	95.6	1
Kiruhura	120	1
Mitooma	76.4	0.8
Ibanda	82.7	1.2
Bushenyi	70.6	3.5

Table 5. BXW prevalence in Uganda by region as at November 2013

Region	% of farms that still BXW	% of previously affected fields where BXW was controlled
Central	56.0	36.2
East	66.7	24.1
Mid-west	54.6	28.5
S.west	29.1	60.9
Over all	**51.1**	**37.4**

results with their peers, and see impacts as they emerge (Pannell et al., 2006). Then farmers would be linked with networks of organizations, enterprises, and individuals focused on getting many more people who use the technologies for greater economic benefit, together with the institutions and policies that affect their behavior and

performance (Bentley et al., 2007).

Innovation platforms of actors need an initial push or opportunity to break barriers against joint discussion, action, sharing and learning (Waters-Bayer et al., 2009; Hall et al. 2006; Röling and Wagemakers, 1989). Rather than kick-start this process in farming communities (Tushemereirwe et al., 2006), this was initiated at regional level comprising of hundreds of farming communities. A regional action plan for BXW control was developed, with goal of controlling BXW to below 1% in 18 months at regional level. All other action plans developed at district, sub-county and village levels were to support achievement of the goal set at regional level. This was contrasting to approaches earlier used for BXW control (Tushemereirwe et al., 2006), where focus of action was at village and action plans at the sub-county and district levels were only supportive to the community action plans. The regional platform, the implementing wing of the regional action was absent in the previous participatory approaches.

Scaling-up is a multi-stakeholder process consisting of framing the context, promoting participation, fostering learning, strengthening institutions, and disseminating successful experiences (CSD NGO, 2008). Successful BXW control at the selected hotspots had the value of showing the surrounding, less affected communities that it was possible to control BXW. The idea was to have hundreds of farmers (a mix of all categories; the rich, the poor, the widows, the old) demonstrating successful BXW control. Farmers targeted for scale-out mirror themselves in farmers at hotspots, with similar capacity, benefits, roles and responsibilities and therefore gain confidence that they can also do it. Other players at sub-county and district levels who support farmers to take up technologies also mirror themselves where there is successful BXW control at their levels. Besides, successful BXW control became so conspicuous and obvious that other target farmers and their supporting structures would not miss it. The situation seems to be different when a few farmers demonstrate the benefit of the BXW control at a smaller scale (Tushemereirwe et al., 2006).

Farmers' knowledge on, and their decision to control plant diseases is shaped by accessibility and packaging of information about improved technologies for disease control (Sherwood, 1997). Previously, awareness campaigns were based on information generated by the Research team and were also always spearheaded by the Research, supported by Inspectors at Ministry of Agriculture, production departments at local government (Bagamba et al., 2006). This time round, information was picked from the participating communities as they implemented BXW control and packaged by the media houses that eventually disseminated it. Information was more focussed on how the stakeholders were organised to control BXW, covering the mobilisation, implementation of byelaws. Farmers tend to use information from fellow farmers than from any other sources (Bagamba et al., 2006), we thought capturing information from farmers, free of scientific jargon and disseminating through radio and newsprint would improve information access and used for decision making by the final beneficiaries.

Linking of farmers with networks of organizations and individuals which focused on getting many more people to use the technologies for greater economic benefit (Bentley et al., 2007) was executed through field days and BXW control campaigns. They were held in hotspots that achieved BXW control beyond their own communities (in at least 10 other surrounding affected communities). Clearly there were lessons to learn by their peers in way the farmers organised themselves for drastically reducing BXW incidence and surveillance for diseased plants at community level. Additionally, there were lessons about successful support of the practicing farmers by the administrative and political support through effective formulation and implementation of bye-laws at sub-county level. The idea was to mobilise the network of partners necessary to institute and monitor BXW control activities in all affected villages in Ankole using the farmers and sub-county leaders with fresh experiences of successful control of BXW on star performing hotspots. While the field days served the purpose of the showing the scaling partners that it was possible to control BXW at large scale, the BXW control campaigns aimed at supporting the same scaling agents in implementing what they experienced. No wonder it was code named 'Intervention for Rapid Results' to be used to remove all infected plants in the whole of Ankole in 30 days.

Another important aspect for successful scale out is for farmers and scaling partners to compare results with their peers, and see impacts as they emerge (Pannell et al., 2006). Scientists collected BXW control data representing worst case scenario, rather than average scenario is the common research practice. The idea was to capture a wholesome BXW control status, rather than a normal distribution picture. This seemed to be effective in captured data at large scale. This then was used update stakeholders on the implementation of the regional action plan in various review meetings, who would confirm it by sharing their own experiences.

Scale out of technologies should finally result in more quality benefits to more people, more quickly, more equitably, more lasting over a wide geographical area (IIRR, 2000). Most farmers (90%) were able to clear BXW from previously infected fields within a year. Within 4 months, some banana sales recovery was recorded from fields previously affected by BXW. Banana production recovery of 40% was reported from the South Western region. This demonstrates that with right engagement of stakeholders and a technology beneficial to end-users, some plant epidemics can be effectively controlled within relatively a short time at a relatively large scale. The

scale-out process detailed in the paper that led to achievement of the results is adoptable in other banana growing regions for more effective BXW control in Uganda and beyond.

Conflict of Interests

The authors have not declared any conflict of interests.

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