

Sowing the seed:

Adoption processes of good horticulture practices in northern Uganda



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 Watch a short introduction video



Introduction

KT Officers on their way to the fields



In 2018 East-West Seed Knowledge Transfer and the ISSD Plus program teamed up to see if they could effectively introduce high quality vegetable seed and necessary horticultural skills to Northern Uganda. Within two years of starting to work together, there seems to be unusually enthusiastic uptake of the techniques shared and quality seeds demonstrated. The question this case explores is “How do farmers respond to the vegetable promotion activities, and why?”

Uganda has enormous horticulture potential. It’s fairly well distributed rainfall and moderate climate make it capable of producing most of the tropical and sub-tropical fruits and vegetables, herbs and spices, or even temperate fruits and vegetables in the higher altitude areas. While the natural conditions are in place, the sector can still grow significantly. Key limiting factors include poor infrastructure, low productivity and production, quality, food safety and traceability issue and counterfeit inputs especially seeds. Small-scale rain-fed farms dominate a dispersed sub-sector. (Agriprofocus, 2015)

Horticulture production is country-wide, with commercial activity focused in the west and southwest. The northern region is not traditionally seen as a strong vegetable production area due to long dry seasons. Highly disruptive armed conflict from 1986 – 2009 further blocked improvements in the agricultural sector in the north. Currently no vegetable seed company or government agency invests in the vegetable sector structurally. Farmers therefore depend on their own experience and seed, and the level of knowledge and inputs provided by agro-input retailer, to produce what they can.

Both ISSD Plus and EWS-Knowledge Transfer (EWS-KT) are of the opinion that with improved production knowledge farmers can benefit more from using improved vegetable varieties adapted to local agronomic and climatic conditions. Alongside better farm practices, improved plant varieties offer smallholder farmers a greater resilience to disease and stress and increased yields. In addition, vegetables with superior post-harvest qualities are better marketable and can lead to increased market demand.

ISSD Plus aims to improve the access of vegetable producers to high quality seed and seedlings through the introduction of improved varieties and improving farmers’ skills in vegetable production. They organize various activities implemented in partnership with six Dutch seed companies. One of these is East-West Seed International.

East-West Seed supports intensive training to farmers as a precursor to commercial activities in less developed or emerging markets. To ensure that these pre-commercial training activities are most effectively geared towards benefiting smallholder farmers, the company created an independent non-profit foundation ‘East-West Seed Knowledge Transfer’. Within the company, EWS-KT showcases profitable and sustainable farming practices in areas that would otherwise be of limited interest to other seed companies. In this collaboration, EWS-KT is one of two companies carrying out all jointly agreed farmer outreach activities, while ISSD Plus co-funds and manages quality assurance of the activities.

Interview ISSD Plus

Cate N. Adilu Vegetable Manager, ISSD

In-depth farmer training

We partnered with East-West Seed to set up 600 training sites in Lira and Gulu in northern Uganda. When they set up a training site, they set it up like a demonstration site. That means there is an actual crop that is growing under improved techniques. This is done together with a group of 25 farmers who keep coming to receive training sessions throughout the crop cycle. That's why we call it in-depth farmer training.

Training topics

In our training we are prioritizing the high-value vegetables. These include tomato, cucumber, pumpkins, carrots, onions, cabbage, peppers, egg plants, and African egg plants. They are high value, they are nutritious, and someone with a small area can confidently grow enough to take to the market.



Transplant raising near Gulu

For the project, the four priority topics are seedling raising & transplanting, fertilization, crop protection, and soil moisture conservation techniques. We promote low-cost techniques – just raised beds, irrigation with watering cans, trellising and mulching. That's what we demonstrate on all our sites. We are not demonstrating greenhouses, it's outdoor production, and the crops are doing well. It's something that farmers can easily replicate.

Previous situation

I visited this area before the project really started, and what I noticed was that there was minimal production of the [high-value] vegetables. All the fields we visited, farmers were showing us the indigenous ones like *malakwang* (traditional leafy vegetable) and others, but there was very little production of tomatoes, and if farmers were growing tomatoes or cabbage, the quality was not good. Actually, we happened to visit during the main season, and they were saying, "We don't have time for vegetables, it's only time for the main crops". So vegetables were not a priority at all.

Also there was a lot of fear among farmers about counterfeit seeds. Actually, as we were coming, they were always saying, "How sure are we that you have quality seeds, and they are not counterfeits?" So having a seed company that is present and can take responsibility in case there are problems with their varieties, has also encouraged farmers to take on the varieties we are promoting.

Training results

What I've seen after the interventions with East-West Seed, now people are beginning to prioritize vegetables. Some farmers are feeling like, "Yes,

"What I've seen after the interventions with East-West Seed, now people are beginning to prioritize vegetables"



for vegetables, I can have even a small garden, it will still bring me money, and I will take care of it whether in season or out of season". So that has been really a big change and is surprising. Because of our activities, farmers feel confident that they can access technical assistance as they take on these varieties. Because of the practical training, people are able to see the varieties we are talking about, evaluate them, and then they are trained on how to grow them. So that has also enhanced the uptake because they know what they can expect when they grow the varieties we are promoting.

Future potential

I really see a lot of potential, as farmers take it on. If the farmers are trained and they are confident that they can do it, they can easily continue that way. And we've also seen some farmers have come up as volunteer trainers; they are helping others

to take on the skills and technologies, that's very encouraging.

Another reason why I see a lot of potential is the market. The northern region was not originally known for producing vegetables, especially the kind that we are promoting. So the market is still really big, it will take them long before they can flood the market in the northern region. And also neighboring countries – I think South Sudan can easily take produce from here because the market is there.

We also feel it when we talk to the farmers. They'll say, "I have to help my neighbor to grow so that traders can just come this way". They don't even feel the competition. So there is really potential and I see the possibility of business growing and being sustained because of that.

Reaching out to farmers: Activities

The farmer outreach program was developed in collaboration between ISSD Plus and EWS-KT. It draws on 6+ years of ISSD experience in promoting the use of good quality seed in Uganda. It also builds on the extensive experience of EWS-KT in eight countries. While national and regional contexts differ, the science of good horticulture practice is the same everywhere. Farmer outreach thus combines good science and extensive experience with effective ways of working with farmers in Uganda and elsewhere.

The first six months were spent recruiting and intensively training two teams of Knowledge Transfer Officers (KTOs): one to work in Lira district, one in Gulu. Early 2018 activities started in Lira. In Gulu, the team started their work with farmers early 2019. The first seasons were challenging: both teams started in the dry season, countering general wisdom in the region that you can't grow vegetables in the dry season.

1 In-depth training

A field-based training program of 5 sessions is the foundational work. Per season every KTO finds 20+ key farmers spread around their (sub)district, each of whom is interested in hosting a training site. With these key farmers the KTOs cultivate a plot of 250m² during the season. During five sessions lasting several hours, each step in well-managed vegetable production is explained and demonstrated by the KTOs and implemented on the training site by participating farmers. At the

end of the season the harvest is shared among participants to compensate for the hours of work they put into the training site.

Training sites are selected to be along well-traveled routes so that they have a strong demonstration effect towards passersby. Key farmers must be motivated to apply what they are learning consistently, and must be willing to answer questions from anyone walking by their farm. They are also responsible for ensuring other farmers nearby attend the five training sessions; while 25 farmers are targeted, typically 15+ farmers participate at each session. A key farmer can host a training site for a maximum of two seasons.

In exchange, key farmers get weekly advice from the KTOs to ensure the training sites are optimally managed. The first season, all cash production costs are paid by the program, in the second season costs are split with the key farmer.



It takes a heart, it takes a sacrifice to be a voluntary trainer, because at the end of the day he gets nothing. He does out of his own will. No one pays him. But if he gets to the next level he wants the people of his community also to get to the next level, also have their lives changed. Any farmer can do it, but you need to find the ones that have a passion for their jobs and that are willing to share.

Nancy Achen, EWS Knowledge Transfer officer, Lira

Six activities form the farmer outreach program

- 1 In-depth training
- 2 Training of trainers
- 3 Farmer field days
- 4 Key farmer gatherings
- 5 Radio programs
- 6 Ongoing informal KTO support

Five of these are formally planned for, the sixth is a practical reality and critical to overall success.



Farmers at a 'raised beds' training

2 Training of Trainers

Training of trainers are organized along similar lines as above. The main differences are that each session lasts 4 days, allowing far broader and deeper coverage. Participants are people who in some way work professionally with horticulture: extension officers, agro input dealers, researchers, etc. Participants can earn a certificate of attendance, or a certificate of competence.

3 Farmer field days

Another way to reach larger numbers of farmers less intensively are farmer field days directly organized by ISSD Plus. Participants of the training of trainers must jointly set up and run their own demonstration plots as part of their training. Each demo plot highlights a different topic; all are at one location. Farmers from a wider catchment are invited to attend during a day of demonstrations and explanations. They follow a carefully orchestrated program that takes them to all demos. Typically, 200-250 farmers attend such farmer field days.

There are also smaller field days organized by seed companies. In the case of East-West Seed, the commercial wing is responsible for setting up variety demonstration sites. These are set up in areas where vegetable production is developed to a certain level but farmers just need awareness on the variety assortment within the country. The variety demonstration sites are meant to showcase the distinctive characteristics of the varieties. At such sites a promoted variety is grown on 250m² plot, when fully grown just before harvesting begins, farmers are invited to evaluate the performance of the variety. Normally these field days attract between 30-40 farmers from the communities where the site are located

4 Key farmer gatherings

Key farmers come together in monthly meetings under the guidance of the KTO in that area. Here they share best practices, discuss challenges and try to find joint solutions. This helps ensure the high quality of their training sites.

5 Radio programs

In both Gulu and Lira radio programs are broadcast on local radio stations in the local language. They can be sponsored by agro input dealers, or paid for by the program. A broadcast's focus is selected to coincide with topics covered during the training sessions.

6 Ongoing informal KTO support

Apart from the formal activities outlined above, the KTOs provide continuous informal support to farmers through site visits and phone calls. As they travel from one work location to another, they make sure to visit a number of farmers in-between to see how they are doing. They also respond to calls from farmers from morning to night. Such support is targeted to farmers who are adopting the practices promoted by KTOs, whether those farmers are training participants or spontaneous adopters.



Here, the population is growing very fast and there is not much land. So, I have attended the training from East-West Seed and I got impressed that, by just acquiring a small land, you can get something which can sustain you.

I learned that vegetables can, first of all, be food for the family. They can also bring money if you manage it well. I have so many grandchildren and they need to eat, but they also need to go to school, and they need to dress well.

It will also help me to improve the standard of my house. The grass is falling off, but now I can buy some corrugated iron sheets. That will improve my lifespan and lifestyle.

Not only that, but I see also other Mzeei [elderly person], they are putting on suits. I need also to buy good clothes such that when I'm going to a church, I look presentable. So, what impressed me, by just only having a very little land, you are able at least to get something. Like if you have only half an acre, you can get your two million UGX. That two million, to me, as a Mzeei is so much. It can improve my life.

Geoffrey Odyek Omara,
from Oloro village,
Nyero sub-county, Lira district



Demonstration site near Lira



Farmer couple near Lira

Reaching out to farmers: Roles

A combination of people implements the activities mentioned above. Each is necessary to create an effective outreach program. Together they ensure there is strong uptake of the techniques, inputs and advice provided through EWS-KT.

Participant farmers

The project is all about enthusiastic farmers who actively apply what is being shared. There is no clear profile of participating farmers; the impression is of people who are drawn to the possibility of emulating what they see. Most proactively ask to attend trainings or seek information directly from KTOs. As the whole program is entirely voluntary, with the only 'reward' being new knowledge, those participating are intrinsically motivated.

Knowledge transfer officer

The Knowledge Transfer teams, led by a national manager, are the motor and heart of the outreach efforts. Their many tasks are more than a simple 9-5 job and include:

- Finding good key farmers
- Establishing and ensuring ongoing quality of training sites
- Running all farmer trainings
- Preparing and running farmer field days
- Responding to farmers calling for technical backstopping, and visiting individual fields
- Receiving visitors from different backgrounds

All KTOs are experienced in horti/agricultural work, most with (I)NGOs. Nonetheless, they receive intensive training when they start as well as continuous updating of their skills by visiting EWS experts, through Webinar sessions, and e-learning materials on the East-West Seed website. Through WhatsApp groups they support each other's work.

Key farmers

The key farmers are essential for running really good training sites and responding to the interest this generates in passersby. Their role in the whole farmer outreach effort include:

- Demonstrating effective, consistent good horticulture production practice
- Mobilizing farmers to attend as many trainings as possible
- Responding to questions and ideally visiting the fields of nearby farmers who request extra help
- Attending key farmer group meetings

A good key farmer therefore not only needs to be a good farmer, they also need to be intrinsically motivated to help others and be able to explain what they are doing to others. In practice about 70% of key farmers prove to have all these qualities. What is striking is that some key farmers actively engage in training other farmers in their area. They take pleasure in guiding others in applying the promoted practices. It is not clear how many of the key farmers take this extra step of becoming 'voluntary trainers'.

Input dealers

The input dealers are essential to make sure farmers can actually get the necessary seeds and other inputs, and thus put what they learn into practice. Their role includes:

- Selling the right kinds of inputs (seeds, fertilizer, pesticides/fungicides, seedling trays, etc.)
- Providing technical information and recommendations to farmers
- For some of them: running their own training sites
- Partaking in and sponsoring radio shows

Only a few of the agro input dealers have taken part in the training programs offered by EWS-KT. Those that have are strongly motivated to continue with the collaboration. For one thing, they find it's good business. Farmers really benefit from the training, and become regular customers and a growing market for agrodealers. For another, they all expressed real pleasure in being of better value for their customers.



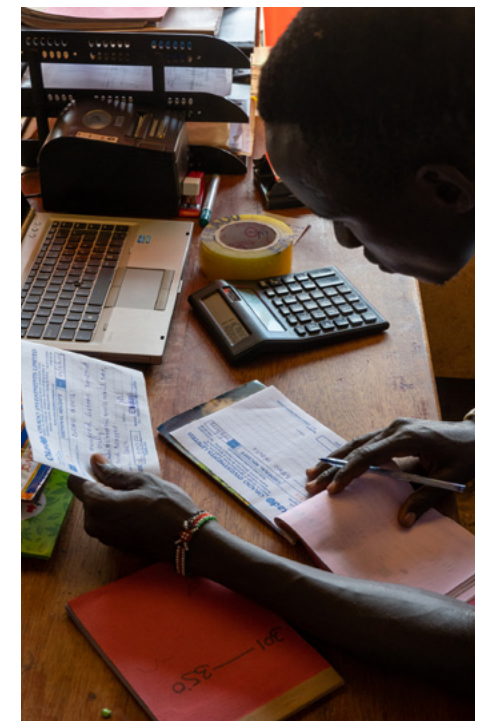
Farmers during training



KTO



Key farmer



Input dealer

Knowledge Transfer Routes



Interview KTO

Omea Emmanuel Eme Knowledge Transfer Officer, Gulu

The EWS approach

I've been doing extension work for ten years. Before EWS I worked for different NGOs, where we were implementing the farmer field school approach. We were working with groups and not training individual farmers who were supposed to host other farmers. If we were having an activity, say, for instance, we were going to clear land today, it was mandatory that everyone in the group comes and participates. But here, a farmer mobilizes other farmers to come and attend the training. There is no forcing. If we were supposed to follow the other approach, I think we'd really have more farmers. But now farmers come willingly. If you try to compare, this one is more relevant because farmers come and attend the training out of their own will. They are not in a group, but they take their time, they come and get the ideas, then go and implement them in their gardens.



Pesticide training near Gulu

Based on the training that I've got, I can never fail to earn a living out of what I'm giving to the farmers. I also feel like a farmer, not like an officer. And with experience, it keeps on adding up. As I also train, as I share with the farmers, I get experience from them also. It's all about sharing.

Time

If you look at the five trainings that we offer, the time that we have is not sufficient. I have 22 key farmers, of which in every training site like this, I'm supposed to offer five trainings. That means a total of around 100-something trainings that I'm supposed to offer, plus supporting the adopting farmers. So I really find the time is not sufficient enough. If we would zero down on the basic trainings, that would be better. I would consider seedling production, crop rotation, and safe use of pesticides. Those three. If a person doesn't attend a training he cannot get the basic knowledge on those trainings. Other things, like raised beds and trellising are visible, they can be learned from another farmer. If someone comes and sees, that person can easily go and practice it.

FAQs

Seeds

Questions I get a lot from farmers are: 'what is the variety of the crop on the demo plot?' And 'where can I access these seeds?' I always refer them to the input dealers to go and access the seeds because I don't sell seeds. I also encourage them because next time I will not be here, but they need to continue with their production. If they over-rely on me that I bring them seeds and they buy from me, next time I'm not there, they will not be able

"If we would zero down on the basic trainings, that would be better. I would consider seedling production, crop rotation, and safe use of pesticides"

to access the seeds. So it's better to show them where to get, not just bring them here to them.

Pesticides

And some of them would just ask, "What are the right pesticides that I can be using to protect my crops?" It's not very easy to recommend to someone to go buy this or that pesticide until you come and diagnose what is the real problem. Maybe for the start, as protection starts, I can just advise them, "you can go and buy such a pesticide". But in a situation whereby there is already an infestation or there is already a disease attack, I need to come and first make the diagnosis, then I recommend based on what I'm seeing.

Market Challenges

The other question would be, "Can you find me the market if I start to engage in production?" On that issue, I'm always frank with them, I always tell them, if you already know that in this period there's a lot of product in the market, you shouldn't go into producing such crops. During off-season, you can fetch good prices, you can have a good market when you sell your product. The quality of the product also matters a lot because your product will fetch a higher price when it is very clean and attractive compared to someone who has a lot of insect damage. So the quality of the products also helps you to address the challenge of the market.

Adoption

Farmers in this region are, most for the first time in their lives, being shown quite an extensive package of practices and inputs that is far removed from what they usually do. What then, do they seem to be adopting?

Easy adopts

There is a clear distinction between the 'easy' and 'hard' adopts. The easier things to put into practice are the more physical practices that are less knowledge intensive and have a fairly immediate return for farmers. These include ridging, trellising, mulching and the use of seedling trays and seedling beds. Farmers indicate that ridging, while requiring a fair bit of hard work, makes it easier to work in the field and easier to ensure plants are sufficiently watered; trellising with poles and wires is cheaper than the common practice of staking each plant; and careful seedling preparation gives a better return on expensive seeds.

Hard adopts

The harder practices to adopt are those that are more knowledge intensive. In particular, proper use of fertilizers and plant protection agents is not usually immediately followed by most farmers. It requires careful, correct and consistent application to see the benefits. And there is a time lag between applying the practices and seeing the effects, for example with using the right kind of fertilizer depending on which stage a tomato plant is. It is not clear which kinds of farmers adopt the complete recommended production package, and which don't.

A key indicator of success of the program would be the adoption rate. How many farmers in a particular sub-district actually apply what is being shown and taught? How many of those who attended training sessions adopt practices? Do they adopt more if they attend more sessions? How much spontaneous adoption is there, of what kinds of practices? Currently the data collected does not allow these questions to be answered clearly.



KTO explaining the correct use of pesticide at a agro shop

Why farmers might be adopting

An important part of the motivation for farmers in this region to invest is, of course, the clear financial return. Possibly the following reasons further contribute to farmer uptake. Several years more experience and careful research will be able to validate or adjust these preliminary insights. This will help future decisions on what reasons to invest in.

1 Seeing and believing "the impossible"

The core paradigm of the whole training approach is that farmers will be convinced by real-life demonstration: "believing what they see". In northern Uganda this seems to be more powerful due to widespread disastrous experiences with the spread of blight and bacterial wilt, and lack of water in the dry season. Tomatoes and other Solanaceae crops, including potato, eggplant, peppers, were grown throughout both districts until disease wiped out production. Farmers had come to think that it was impossible to grow such crops any longer: too much disease, too little water. Seeing tomatoes



being grown successfully, both in the dry and the wet seasons, is considered almost unbelievable.

2 Consistent, high quality training

Getting a good crop in horticulture demands good, consistent growing practices. The well-thought out training program, carried out on high quality training sites, is a second likely contributor to success. Farmers learn all the details that make the difference between a good and a failed crop. They also learn from good examples and careful explanation.

3 Access to continuous support

The intensive support provided by the KTOs is crucial. The officers are impressively willing to be called from 6 in the morning to 10 at night to answer questions, provide names of suppliers, or arrange a visit. Such continuous support gives the farmers confidence that the advice given is for real. It also helps ensure that farmers get those important details right as they start learning very new ways of growing vegetables.



4 It's the only option

Every single farmer came with same message: there are virtually no other options nearby to get out of poverty. Apart from migrating to earn income elsewhere, the only options are other lower-value crops such as cassava, okra and rice in wetlands in the rainy season and some brick-making and construction work. This lack of opportunity seems to be a strong motivator to grasp this unique chance.

5 Collaboration

Without hard data on how many farmers work with their neighbors on new horti initiatives, there were multiple anecdotes of such collaboration. Sharing labor seems to be a cultural norm that stimulates the spread and application of new knowledge.

6 The attraction of something new

What should not be underestimated is that this is the start-up, "honeymoon" phase. As with all new things, there is initial enthusiasm and energy. It will be important to keep monitoring the continuity of adoption among farmers after several years and several failures as well.



The value for farmers

The work of the EWS knowledge transfer team brings tangible and intangible value for the farmer. Both are essential for farmers to want to take on the risk of trying new ways of working, using new products, for unknown crops and varieties. Let's start with the intangible, as we think that is part of the power of this program

Hope

This program brings hope to farmers that it is possible to earn a decent income from what they own, namely their land, their labor and their competence. Time and again the stories center around the absence of any kind of opportunity to improve their situation. Until they saw what seemed to be impossible happening before their eyes, and were shown how they could achieve that too.

Self-respect

We were deeply impressed by the thoughtful, well spoken manner in which everyone we spoke to - farmers, KTOs, agro input dealers - described what they were doing and why. There is a rightful respect for what they are achieving through their own efforts. Hope and self-respect seem to interact in a powerful manner. It is early days, and hope will also hit the harsh reality of inevitable failure at times. The self-respect generated will hopefully pull most farmers through these kind of disappointments.

Table 1: Costs and returns for tomato production

District	Total Production	Area (m ²)	No. of Plants	Cost (UGX)	Gross sales (UGX)	Gross profit (UGX)	Return on investment
Gulu	616 kg	250	660	233,000	1,328,400	1,103,000	5
Lira	520 kg	250	620	133,000	839,900	704,202	6
% difference Gulu vs Lira	18	0	6	75	58	57	-21
Absolute difference Gulu vs Lira	96	0	40	100,000	488,500	398,798	-1

Costs and Returns

Some striking things to note about the figures below. Firstly, for both districts farmers have the possibility to get 5-6 return on their season's investments. Even if 1 in 5 seasons fails, this still means that farmers could get 4 or more times their investments back.

Secondly, there is quite a difference between Gulu and Lira for both costs, production and profitability levels. While Gulu costs were higher, their yields far outweighed these costs. According to the KTO coordinator, this is because in Gulu farmers were very precise in following fertilization advice in particular while in Lira there was less attention to this. If this is correct, then it makes it even more concerning that only such a small percentage of farmers adopt the more difficult practices such as fertilization.

The higher overall profitability in Gulu is apparently also due to the generally higher market prices in Gulu. While the return on investment is lower in Gulu, for farmers the absolute profit levels are far more important.

Thirdly, these figures are for the most productive crop – tomatoes – in the most profitable season. It will be important to collect more complete figures for other crops and other seasons. Over the coming years farmers can then make more informed choices about what risks they are willing to take and what return they can expect.

Finally, the spread between those with the highest gross profit and those with the lowest is quite

astonishing. While in both Gulu and Lira cost levels are not very different, gross profit levels are 3-4 times higher. From current data it is not clear why this is, but it would certainly be worth trying to understand this better. In particular, what is the contribution of the farmer training to these profitability differences.

Priority expenditures

A realistically manageable plot for those starting up seems to be 500m² or approximately 1/8 of an acre. The figures below give an indication of what the profit that can be generated from such a plot means in terms of priority expenditures.

Table 2: Costs of expenditures

Costs of expenditures (UGX)		
Goat	40,000	
Pig	70,000	
Sheep	70,000	
Cow	100,000	
Bicycle	250,000	
Motorbike	5M	
Brick House	1M	
Labour	10,000/day/p.p.	
Schooling	<i>primary/term</i>	<i>secondary/term</i>
Gov	15,000	60,000
Private	80,000	350,000



The value for farmers

Business case

Data collected by the KTO from farmer plots allows an initial indication of the kinds of costs and returns that are possible. For Lira there is data from 67 farmers, while for Gulu figures were collected from 27 farmers. Together they represent just over 6% of all farmers who adopted improved seeds (all farmers for which data was collected grew Padma F1 tomatoes) Figures are for the dry season, when market prices are 2-3 higher than in the wet season. A comparison is made between tomatoes only as these are what farmers adopt first due to their high profitability. Our analysis is based on median figures, not averages. This is done to dampen the effect of positive outliers and come to a more realistic sense of what most farmers can achieve.

Overall, it is clear that there is an enormous financial potential for farmers. In Gulu median gross profit for a farmer is UGX 1.1 million (USD 298), in Lira this is about UGX 700,000 (USD 190). Figures provided are for 250 m2 of production, which is the typical starting plot size for participating farmers. It is very realistic that a farmer can manage twice this area at the same level of care and thus should be able to double gross profits.

These figures should be considered in both the national and regional context. According to [Gapminder](#) the current average income for Uganda is USD 1880. The World Bank Uganda poverty map from 2018 shows that in Lira and Gulu 40-60% of the population is below the national poverty line. In such a context, the possibility to earn the equivalent of USD 45-75 per month during the dry season – often the hungriest season – is of great significance.

Table 3: Number of farmers

Number of farmers	Total	Female	Male
Trained farmers	6836	54%	46%
Adopting farmers (1 or more technologies)	2229	42%	58%

Adoption rates

In total 6836 farmers attended one or more trainings in either Lira and surroundings, or Gulu. Over half of all training participants are women 54%, with 46% male.

Of all participants, 2229 or exactly one-third adopted 1 or more technologies. Interestingly, while more women attended the trainings, less women actually adopted the technologies. Of all the adoption farmers (those adopting one or more technologies), 42% are women and 58% are men. At this point it isn't clear why this is. Do women have less land on which to apply what they learn, less assets or time to invest in new possibilities, are they more hesitant? This certainly seems worth exploring. Table 3 gives an overview of what percentage of all adoption farmers adopted a particular technology.

Clearly there are two categories of technologies: those that are easily and therefore widely adopted, and those which are more difficult. Trellising, raised beds and the use of improved seeds are widely adopted. However, fertilization, seedling production and transplanting, (safe) crop protection and mulching are only adopted by 15% or less of farmers. Record keeping is so low, it is not clear if this is a reliable figure or if this is a topic that needs to be tackled in a very different manner or at a much later stage.

Table 4: Adoption numbers and rates for different technologies

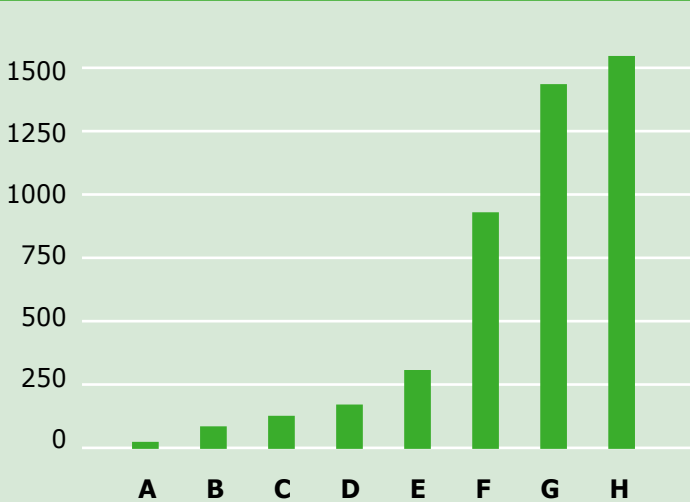
1 = Farmers adopting
2 = % of adoption farmers
3 = % of participants

Technologies adopted	1	2	3
A record keeping	16	1%	0%
B mulching	113	5%	2%
C seedlings	128	6%	2%
D crop protection	161	7%	2%
E fertilization	327	15%	5%
F trellising	926	42%	14%
G improved seeds	1470	66%	22%
H raised beds	1558	70%	23%

The overall adoption rate is certainly encouraging. At the same time, for the more difficult technologies results are not encouraging. With only 5% or less of all farmers adopting this group of technologies this certainly requires more thought. Why are farmers so slow to adopt? Does it have to do with the way the trainings are set up, do they need more repetition during the training cycle, is it less obvious for farmers why they should invest the time and money, and with that higher risk?

Another reason to be concerned about these figures is that the effect of improved (hybrid) seeds generally depends on farmers adopting as complete a package of technologies as possible. While 22% of all participating farmers now invest in improved seeds, but only 2% invest in proper crop protection or seedling production and transplanting, there may be a real risk that farmers will not enjoy the benefits that they expect and that are needed to justify their investments and higher risks. The figures on the profitability of improved horticulture practice are certainly encouraging (see above/below). However, the data does not reveal which technologies were adopted by farmers. It is always tempting to present the best possible case to farmers. Given the limited assets most farmers have, in particular their limited capital and time, it is better to work with more realistic figures so they can make well informed choices.

Technologies adopted by farmers



I saw the demo field and got interested. I asked the KTO to buy me seeds and I planted them and he came and advised me. But I was not a member of his group.

Professionally I'm a painter, but I wasn't progressing. I saw my friends growing vegetables, so I got in as well. Now I made 4.6 million UGX in 4 months, I didn't make that as a painter in a year.

I rented 1.5 acre land in a wetland area. The first time I bought 8 packets of seeds, but they were all wiped out by a storm. I retried with 10 packets, and that went well. I earned 4.6M UGX from tomatoes, the cost were about 1.5M, so profit about 3M UGX. In the dry season I can get 30,000 UGX per crate, in the wet season 8,000-12,000 UGX.

My neighbour has also started growing tomatoes in the dry season, he has seen it from me. With the new techniques we can grow in the dry season, we have partially dammed the water to ensure year-round water supply. In the dry season we water with cans in the morning and in the evening.

Now I'm building a house with the money I earned with the tomatoes; a 'Padma' house.

Sam Ogwang, Farmer



I attended the training from East-West. They trained me to grow vegetables. The vegetables they introduced to me are cabbages, tomatoes and watermelon, but I grow tomatoes and cabbage. It just needs a little land to grow. Even a quarter acre can be enough to grow them. The tomatoes I'm growing are doing very, very well. They don't need a lot of work. Though the materials to use are expensive. It takes only three months, and they give a lot of fruits. If I sell these tomatoes, I can earn even 2 million in one season, that is why I do it.

So my dear women, my sisters, I advise you to attend this training very well. If you attend, you will change your living, you will earn something. You don't need to beg money from your husband to buy cooking oil, you just buy. If you want to change diet, you just use your own money. If you change diet, you are not attacked with some of the diseases. Your children also grow very well and they also grow very talented.

Among Joyce, Farmer in Oloro A village, Anyomerem parish, Nyero sub-county, Lira district



Pesticide training near Gulu

Interview agro-input retailer

William Ogwok Farmer's Key Company

We make sure the person who is selling inside the shop is someone who has knowledge of agriculture and the products. By doing that, we are making a lot of business because farmers already know, "When I go there, I will get knowledge, and I'll get the right thing".

In most cases when there is a field day, we also become part of the field day – they introduce us, we also talk to the farmers, and we direct them where our business is located and automatically they will come. If you train a farmer, you "own" that farmer, and he becomes part of the family, part of the business because he will bring you money. So we do follow ups, checking how the product is doing in the field and train them. You see what their problem is, you advise them which chemical to use when you see a certain pest and disease, which is very good. So when this project ends we are going to continue doing the training with farmers both inside and outside in the field.

Radio

I have a radio talk show – we have a radio station here called Voice of Lango, they have a program called Farmers' Basket. It's the same radio where East-West Seed is also doing their training program. They paid for radio adverts, in which they have involved our company. They mention my name and contact, so time and again, farmers are calling from Amolatar district, Oyam district, Otuke district seeking for advice, asking whether there's seeds.



"If you train a farmer he becomes part of the family, part of the business because he will bring you money"

East-West Seed

People turned to East-West Seed products, because East-West is doing a lot of training. In demonstration gardens, where farmers go in field days – farmers can see what is there with their own eyes. They really appreciate that, because other companies are not doing that.

Before East-West Seed came in, we had a lot of problems with fake seeds, even if they were from genuine companies, that would not germinate. And they were not engaging themselves with training farmers.

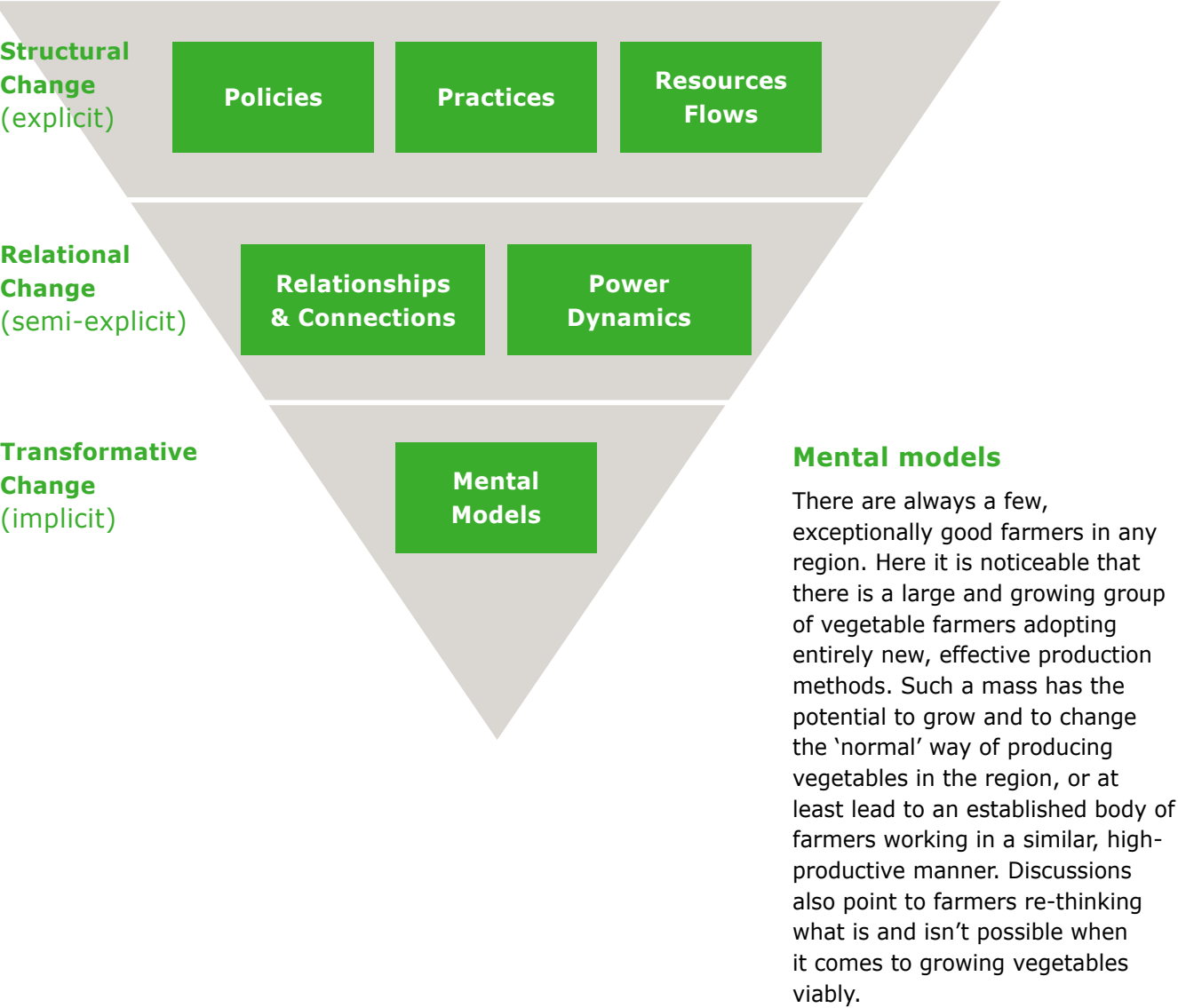
Supply problems

Actually, as I talk, the only vegetable seeds we are selling now is the East-West Seed product. The problem is that we don't have enough supply for our farmers right now because farmers have run away from these other products, they have come for East-West Seed. You'll find farmers coming around, giving calls, but the product is not there. So there is demand but supply is lacking.

Signs of systemic change

It is still early days, but it is interesting to consider whether the current work might contribute to conditions for deeper system change. A reflection is made of necessary conditions for systems change formulated by FSG model (Figure 1, Kania et al 2018). Most of these changes are too young to tell if they can become structural change. Nonetheless, it is important to think from the start whether things could change if current efforts are continued.

Figure 1: Six Conditions of Systems Change



Selling locally sourced cabbage on the market in Gulu



Resource flows

The agro-input retailers that are linked to the program are starting to offer a new package of inputs, tailored to the promoted practices. This enables farmers to apply what they learn, gain the benefits and create a growing demand for improved products. This could lead to a virtuous cycle of better inputs leading to better vegetables, leading to more demand. The current figures are based on only a few dealers changing what they stock, and only for one or two seasons so far, so it's uncertain if this will become structural.

Relationships and connections

Local sourcing of tomatoes, onion and cabbage is picking up again. Where almost all vegetables used to come for the east and south-west, some traders are starting to see renewed opportunities to source locally.

The quality criteria for vegetables is shifting somewhat. Some traders are starting to appreciate and prefer the quality of dense cabbages and tomatoes with better shelf-life from new varieties.

Power dynamics and policies

There is no indication yet of government policies and actions in place to promote horticulture production. Nor is there any mention of vegetable farmers having a collective voice that gives them a stronger bargaining or lobbying position.

Issues

While early results seen are indeed impressive, in reality the farmer outreach work is still very young in this area. It also faces a number of issues that need to be considered to consolidate the excellent start to this work.

KTO targets

An immediate question is: how much can the KTO's take on structurally? It's clear much depends on the competencies and motivation of the KTOs. The enthusiasm with which the whole team carries out its work is impressive. Current targets are a compromise between demands set by ISSD Plus and the experience of EWS-KT. Going forward, it will be important to make sure targets are ambitious but also realistic for the long run. Funders need to be aware of their role in setting such targets. Further joint reflection is needed on which targets are critical.



East-West Seed's KTO team in Lira

Consolidation

How much work will it take to consolidate the excellent first efforts? There seems to be the sense that farmers can acquire sufficient skills in 2 seasons. It is then possible to move on. It will be important to consider experiences in other regions with the time it takes to lock in such fundamentally different, new ways of producing vegetables. What happens when ISSD Plus ends in 2020? In the absence of government extension services for horticulture, continuity will not come from that corner.



'Poor man's sauce'

Culturally, vegetables need to get a better reputation. Top of the list is the association between poverty and vegetables. As people say, "Vegetables are a poor man's sauce". Growing and trading in vegetables does not have a profitable reputation. The bulk markets seem only to have tomatoes, cabbage, onions and some eggplant. Traditional leafy vegetables do not seem to be widely traded.



Seed availability

Difficulties with the availability of seeds was mentioned by farmers as well as agro dealers. Ensuring enough seeds at the right time - a small window of opportunity - should be the easiest bottleneck to solve.



Lack of transport

A final issue is beyond the program's control: travel. For many farmers, travelling is difficult, due to lack of good roads and transport. This impacts farmers taking their produce to markets, or getting inputs from agrodealers, as well as key farmers travelling to the location of their monthly meetings.

Ideas worth considering

With all the good results, the focus for the future is to consolidate what is already being done. Some suggestions are mentioned for this and similar programs for when there is space to consider next steps.

Monitoring adoption processes and rates more carefully

The joint approach is to help farmers get on a path of positive change. Initial steps can be small, but they are often the necessarily cautious first changes farmers try out. Noting such change, and following where it goes, is a challenge for anyone.

M&E capacities are limited in being able to capture first changes. Current monitoring focuses on tracking training activities. A next step up would be to monitor the adoption of promoted practices more deliberately. Who adopts what where is not yet recorded in a consistent manner. It is therefore not yet possible to say precisely how and where the trainings are effective.

Such monitoring could build on existing habits of photographing what's happening in the field. If every photograph had geodata, they can be mapped onto a digital map. KTOs could then photograph adoption farmers, upload this to a central database and have it mapped on to a central 'Adoption Map'. Such a map could help analyze the spread and concentration of adoption and where to focus future efforts. Further collaboration with 'voluntary trainers'.

'Voluntary trainer' farmers are a group worth exploring more carefully. They are a potential resource for amplifying the effect of the farmer outreach in a low-cost manner. Understanding what they do, and why, and where they get stuck, would make it possible to help them do that better. For example, running 'voluntary trainer' groups as done with the key farmers could build that community of practice.

Setting up mobile phone/ WhatsApp groups per training

The current WhatsApp group among EWS-KT KTOs in Uganda is a valuable communication tool. It allows people to share experiences and inspiration, ask questions, and build the sense of doing this together. A similar effect could be sought for each training group. Setting up a dedicated mobile phone group could enhance the value of 'working with neighbors' mentioned above, in a low-cost manner.

Training all agrodealers

Ensuring the agrodealers are well-informed means indirectly reaching large numbers of farmers. Some way of getting larger numbers of agrodealers to attend trainings could be worth thinking through. An exclusive agrodealer training, some kind of discount system for those who attend, a quality seal; this requires area specific creativity.

Consolidating vs moving on

Funder pressure and appealing stories of reaching large numbers of new farmers can stimulate moving on quickly. However, A few bad seasons due to bad weather, conflict, inconsistent production practices, etc. could undo a good start. Careful consolidation is therefore just as legitimate a future effort as introducing good horticulture to new areas. Careful monitoring of adoption and quality of horticulture practice several years after the program stops will help make it clear where a good balance has been achieved.

Tracking change and good data

Collecting good data is certainly costly in terms of time, and therefore expenses. However, the above makes it clear that it is money well spent. Good data will help this program understand better how effective farmer training is at reaching farmers, and how effective that is in getting farmers to grow more, better crops. Some of the questions that could be answered include:

- How does the outreach help women to adopt practices more effectively?
- What parts of the trainings have most impact on ensuring reliable as well as high yields?
- Why do farmers adopt certain, why not others? How important is that for overall production?
- Where is the potential for large-scale change, with larger numbers of farmers adopting the most important practices and ways of thinking?
- What is the most effective return on investment for East-West Seed, and for any other seed company helping to create a brighter future for the rural poor in Northern Uganda?

Hopefully this case study will stimulate future efforts to both collect better data and make better use of them.



I work for East-West Seed International as a knowledge transfer officer in Lira. I am happy that through our intervention in the vegetable sector, we have been able to realize changes in the industry in the area. You know, just when we came, farmers were facing it rough in the vegetable sector. But I think our coming raised hope in them. With the training that we give them, they were able to get back into production.

Most of the varieties that we are promoting are improved varieties which have specific characteristics - could be of disease resistance, could be of high yield, could be early maturing. This has actually made farmers sharpen up their appetites again, to resume the cultivation of vegetables.

Farmers have a potential market for vegetables, especially tomatoes, within the region. We used to have tomatoes coming from Mbale, Kapchorwa, etc, but now local farmers step in. Alongside tomatoes, cabbages are also coming up, sweet pepper is also coming up, and also eggplant is seriously coming up.

Sometimes you have good varieties, but farmers lack knowledge and they cannot perform. So, if knowledge is there, then we have the superior varieties in the market, then our farmers will get money. That is what I know. Farmers will get money.

Omedi Bosco, KTO

Case study approach

Each inclusive agribusiness case study has its unique features, this is no exception. Here we considered a young initiative with little quantitative data to work with. We therefore chose for a more journalistic approach: trying to identify which storylines seem worth exploring, and following a number of these to build an overall story.

We gratefully received excellent input from the entire EWS-KT team and ISSD Plus vegetable coordinator on their experiences, and their understanding of what is driving change.

We then visited different kinds of farmers and farms throughout the region to hear first-hand how people learnt about the vegetable production program, what they were using, the benefits and what motivated them to do what they do. Continuous checking with the experiences of the KTO, who together have worked with thousands of farmers and farms, provided essential observational ‘evidence’.

The descriptions and conclusions presented in this case study are still tentative. They do give angles of thinking worth exploring further through regular team evaluations and collaborative research. Other practitioners will no doubt recognise the experiences shared, and translate them to their own work with small-scale farmers elsewhere. All errors in thinking and writing remain the responsibility of the authors.



Persons spoken with

We were impressed and grateful for the thoughtful and open manner in which everyone we spoke with so willingly shared their stories. Apwoyo!

In alphabetical order: Abila, Martin (agro-input retailer); Adilu, Cate (ISSD Plus coordinator); Alangy, Geoffrey (farmer); Kizza, Annet (EWS-KT Uganda manager); Lumumba, Patrick Oola (agro-input retailer); Ogwang, Nathan (key farmer); Odyeny, Bonicci (farmer); Okabu, Isaac and Among, Joyce (farmers); Omara, Geoffrey (farmer); Ogwang, Sam (farmer); Okai, Bosco (farmer); Farmer group, Gulu; Pasca, Ajok, Ayengo Jennifer and Adong Joyce (market traders); Stuart Morris (EWS-KT director)

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EWS KT team Gulu

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Atim Suzan
Dukan Denis
Omia Emmanuel Emmy
Abalo Solome

Resources

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