

### Combining research and rural extension to the benefit of small farmers

# From lab to field to market

“There is plenty of innovation. The trick is to get it to the farmers,” it is often said when technology transfer to farmers, and smallholders in particular, is referred to. In addition to the financial resources, they often lack the knowledge needed to be able to benefit from the new technologies. The ‘whole value chain approach’ of the Africa Harvest organisation shows how technology transfer can work.

Africa is witnessing economic growth of unprecedented proportions, but it is also the only continent in the world where the total number of hungry people has gone up since 1990. The challenge to transform the vision of a food-secure Africa into reality is a daunting one. The continent will need to invest more in agriculture, create safety nets and social protection for the poor, guarantee the right of access to land and water resources and target smallholder farmers and young people.

Africa Harvest, whose vision is to be a lead contributor in freeing Africa from hunger, poverty and malnutrition (see Box on page 32), believes the “game changer” will be the provision of seeds and clean planting material to farmers. However, when people talk about seeds in international and regional meetings, the focus is on grain, especially maize. Few think of food security crops such as vegetatively propagated crops like banana, sweet potato or cassava. Africa Harvest is convinced that in order to achieve the vision of a food-secure Africa, we will need to focus attention on the provision of clean planting seeds of these crops to farmers.

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#### ■ A strong research network ...

Africa Harvest relies on laboratories in Kenya, South Africa, Israel and India to provide farmers with a large number of plantlets. In the labs, these plantlets are produced from single shoot tips in a relatively short time. This removes the bottleneck of large-scale field multiplication. Tissue culture (TC) or micro-propagation technology is applied in this context. It is a tool that is simple to use in producing clean and massive amounts of plantlets from meristems and tiny shoot-tips or other plant parts through sterile in-vitro techniques on artificial growth media. This is done in growth chambers or growth rooms.

The technology can be used for vegetatively propagated crops (VPCs) such as sweet potatoes, cassava, yams, flowers and vegetables. Unlike seeds, the TC produced plantlets are uniform and grow vigorously as they come from carefully selected plants. The TC technology has the added advantage of eliminating many diseases and pests from the produced plantlets because of its sterile nature, with the exception of viruses. The viruses are eliminated by selecting and propagating clean healthy plant stocks that have been virus-indexed.

Tissue culture plant growth is synchronous, enabling the exact timing of flowering, harvesting and marketing

to maximise opportunities, especially for the banana sub-sector. TC planting materials can be disseminated rapidly, and crop yields are uniform and higher when compared with conventional planting material. Africa Harvest only supplies farmers with TC material that is indexed for diseases as part of quality control and genetic integrity.

#### ■ ... combined with a comprehensive value chain approach

The success of Africa Harvest is primarily linked to using the whole value chain (WVC) approach in project implementation. The overall focus is to remove barriers and bottlenecks, improve and increase productivity, enhance farmers’ access to products and services (including microcredit) and link them to reliable markets. The



rationale behind this is to depart from a common practice where development programmes introduce improved technologies to increase production, neglecting the rest of the value chain activities where many constraints and barriers slow down or prevent technology adoption.

**Awareness creation.** The WVC approach begins with awareness creation and farmers' aggregation into functional groups. At the heart of this are demonstration plots which enable the farmers to understand the improved innovation. A concerted effort is made involving the use of local administrators, government extension agencies and the mass media, especially the local FM radio stations that broadcast in the local vernacular.

Africa Harvest's experience with farmer group mobilisation is that groups that come together because of common interests are more sustainable. Those that tend to have short-term goals may not be compatible with long-term project goals. In the mobilisation phase, it is therefore important to ensure the messaging on what, how and why. Especially the *why* needs to be very clear to have a buy-in to the project. During capacity building, the duration of training, start time and venue need to be well considered to ensure gender inclusion; there is a place or time that makes it difficult for men, or women, to participate.

*Nursery entrepreneurs are supported with technical training and materials such as shade nets, potting bags etc.*

**Accessibility.** Once the innovation has been introduced and accepted by the target community, the next step is to ensure that it is accessible to the potential beneficiaries. Africa Harvest works with the private sector to ensure the communities access the innovation at an affordable price. Wherever possible, mechanisms for subsidies are put in place to support the most vulnerable households, while cost sharing is given due focus as well, particularly with regard to long-term sustainability. Micro-credit institutions are also brought on board at this juncture to diversify sources of capital and to increase financial literacy and use at the community level.

**Communication.** During this phase, Africa Harvest actively uses a combination of communication technologies. We have built a Short Message Service (SMS) platform to communicate critical information in local language. Information such as where to find inputs, upcoming events and market opportunities is sent to farmers in our database. Community radio is also used extensively to communicate information to the farmers during the beginning of planting/rainy seasons. Over time, this has become a very interactive medium as farmers call in to ask questions or participate in various quizzes and competitions.

**Training.** After recruitment, farmers undergo comprehensive training that is geared towards equipping them with skills and knowledge to successfully exploit the potential of the new, clean



Photo: Africa Harvest

planting material. This is a demanding phase requiring constant engagement with the target community to ensure that they go through one complete cycle. Those who do so successfully become trainers for new entrants, and this continues to create a positive snowball effect.

**Community leadership.** The success factors at this phase are often related to getting the right, dynamic and forward-looking community leadership. If the right skill is imparted and received, then success is almost guaranteed. Appreciating the architecture of local institutions and the individual leaders is also critical. Africa Harvest works with partners such as Kenya Agricultural Research Institute (KARI) and the Ministry of Agriculture; individuals from these institutions are held in high regard by the farmers. Information or projects backed by the two institutions are likely to be well received and successfully implemented by the target communities.

**Marketing.** The final step in implementing Africa Harvest projects is to support marketing activities. Success in engagement with smallholder farmers can only be achieved if the surplus produced by a household can be used to generate income. Different marketing approaches have been adopted, depending on the unique situation facing farmers. Generally, Africa Harvest has focused on trying to unlock more



Photo: Africa Harvest

*Africa Harvest is helping farmers to bulk large volumes of bananas for marketing and linking them to potential traders.*





Photo: Africa Harvest

*Farmers learn how to apply good agronomic practices in their banana orchards.*

ing lessons learnt. For example, we have learnt not to give handouts to farmers. Where farmers make a contribution – even in kind – there is a higher

chance of success. We have also learnt that after mobilisation, it is critical to identify the most promising groups. The energy levels and dynamism of these groups requires disproportionate attention, so they become pockets of excellence that other groups can learn from.

returns to banana farmers by tackling the inefficiencies inherent in the supply and distribution system. Africa Harvest's communications programme complements each of these activities by empowering people through education and facilitating knowledge transfer.

### ■ Challenges and lessons learnt

Africa Harvest has also faced many challenges in the implementation of its projects. Some of these challenges relate to low acceptability of agricultural-related activities among the youth. Most look at agriculture as all drudgery that has little pay. Often, groups are mostly composed of the elderly and recent retirees who are looking for something to keep them busy. Some do not have the energy to complete the projects. To have fully functional value chains, the government needs to lend its support by creating an enabling environment; the quality and inspection of tissue culture labs has not really been put into place, and there are no policy frameworks to guide quality issues. Other challenges relate to groups being established as self-help groups whose legal and operational systems are weak or non-existent. Though membership is voluntary, it becomes difficult to work with errant members of the group, especially when the by-laws are not followed.

Overall, Africa Harvest has continued to tweak its approaches by incorporat-

### Africa Harvest

Africa Harvest was founded in 2002. Its aim is to improve the livelihoods of rural communities in Africa by the application of innovative technologies, combined with imparting knowledge and disseminating information as well as better access to markets. Its focus is on the banana sub-sector. In partnership with the Kenya Agricultural Research Institute (KARI) and other stakeholders, Africa Harvest has in the last ten years successfully introduced the tissue culture (TC) banana technology at the commercial level in Kenya by facilitating smallholder farmers to access over 6 million TC plantlets. More than 250,000 farmers have benefitted directly from Africa Harvest's projects, funded by, among others, the Rockefeller Foundation, DuPont-Pioneer, and the Alliance for a Green Revolution in Africa (AGRA) and US Agency for International Development (USAID).

As a publicly-funded organisation, Africa Harvest's role is to identify and unblock value chain challenges to ensure maximum value is unlocked for farmers. The foundation facilitates technology transfer through learning visits for both public and private sector entities. This has resulted with a thriving private sector business in the provision of clean planting material. Some of the TC banana plantlets are also imported from South Africa and Israel through public/private sector partnerships.

### ■ Obstacles

Despite all the advantages of tissue culture (TC) technology, its commercial application is still very limited in Africa. Several CGIAR Consortium institutions have mandates for the improvement of vegetatively propagated crops (VPCs). The International Institute for Tropical Agriculture (IITA) has the global mandate for cassava, banana, plantains and yams. Bioversity International focuses on bananas, while the International Potato Centre (CIP) has a mandate for potato and sweet potato, roots and tuber crops. The institutions have invested significant efforts designed to introduce new, improved crop germplasm to target countries for evaluation and testing on a rather small scale through partnerships with National Agricultural Research Systems (NARS).

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