

What does it take to turn a good idea – a disease-resistant variety or novel approach to pest control, for instance – into a practical technology that farmers can use on their own farms to improve their lives and livelihoods? Nowhere is it more pressing to find an answer to this question than in Africa.

Improved hybrids up for adoption



The adoption of even the simplest of technologies can be challenging (D. Mowbray, Baobab productions).

Despite more than thirty years of effort invested by the international agricultural research centres and their partners, there are still disappointingly few examples of green revolution technologies transforming the lives of rural populations in sub-Saharan Africa and providing the hoped-for platform for national economic growth.

Over that period, commentators have variously tried to explain this lack of impact in terms of the 'remoteness' of agricultural scientists, the 'conservatism'

of farmers, or in terms of poor soils, harsh climates and favourable economic policies. However, in reality, this is a failure that defies a simple explanation.

Finding the right technologies

Higher-yielding, disease resistant varieties – in our case of banana and plantain – provides a starting point for INIBAP's contribution to development efforts, as they have done for most programmes of the Consultative Group on International Agricultural Research (CGIAR). Resistant varieties are often regarded as the most readily 'adoptable' of improved agricultural technologies because they can reduce farmers' needs for inputs, whether of labour or agrochemicals, and simultaneously reduce the risk of catastrophic losses from pest and disease outbreaks. However, establishing a viable 'seed system' for disseminating new varieties of vegetatively propagated crops like *Musa*, where multiplication rates can be slow and planting material is prone to pest and disease infection, presents even more of a challenge than for cereals or grain legumes.

Two major projects launched by INIBAP and its partners



have tackled this challenge head on, using tissue culture technology to put thousands of plants of new varieties directly into the hands of farmers and then using more conventional multiplication by suckers to subsequently spread the plants from farmer to farmer.

A USAID-funded 'TARGET' (Technology Applications for Rural Growth and Economic Transformation) project, initiated in November 2002 and implemented jointly by the

Left: Connie Fraser from ITSC explains to banana farmers in Mozambique how to improve planting technique (G. Blomme, INIBAP).

Right: Improved varieties receiving a warm welcome at Loum Km 99, Cameroon (A. NkakwaAttey, INIBAP).



distributed to 500 farmers in each country. Each country chose four improved hybrids in keeping with local preferences and market potential and each farmer received eight plants of each hybrid. Local nurseries were established to harden off the tender tissue culture plantlets before they were distributed to farmers for planting in their fields.

In Ghana and Cameroon, the plantlets arrived five to six

of the rainy season. Tissue culture plants have several advantages, but they are relatively demanding of water and nutrients in their first months in the field and need to be transplanted under the best conditions possible to ensure their survival. In the absence of irrigation, the plants could only be delivered to farmers once the rain had arrived.

In Tanzania, project staff put the delay in the supply of



International Institute of Tropical Agriculture (IITA) and INIBAP, works with national research organizations and NGOs in Ghana, Cameroon, Tanzania and Mozambique, while a project initiated in November 2001 and funded by the Common Fund for Commodities (CFC) is working in Guinea, the Democratic Republic of Congo (DRC) and Uganda (as well as Nicaragua, Honduras, Haiti and Ecuador on the other side of the Atlantic). Plantain and banana hybrids, mainly from the *Fundación Hondureña de Investigación Agrícola* (FHIA), but also from the *Centre africain de recherche sur les bananiers et plantains* (CARBAP), and IITA, are the major new technology on offer.

In the TARGET project some 16 000 plantlets were shipped to each of the participating countries in the first year and

months after the start of the project, which is a significant portion of time in the life of a two-year project. "Delivery delays discouraged some farmers. At the beginning they were very enthusiastic but after they were obliged to clear their plots several times, they began to lose heart" a member of the project team in Cameroon acknowledged ruefully. Moreover, the farmers were not easily convinced that they should try new banana varieties lacking the familiar characteristics of plantain.

Making the most of delays

Delivery delays also occurred in Tanzania and Mozambique, but these were intentional to make the arrival of the plantlets coincide with the beginning

tissue culture plants to good use. Drawing on the experience (and planting materials) from an earlier improved varieties project, they established demonstration plots in many villages so that farmers and consumers could get used to the appearance and taste of new varieties before they were offered plants to grow for themselves. Over all, the reaction of farmers has been cautiously positive, with most prepared to give some of the new materials the benefit of the doubt and at least try them out.

In each country, farmers have been trained on how to prepare clean suckers for multiplication – so that the planting material does not carry pests to new fields and so undermine the gains offered by the new



Farmers in West Africa watch planting techniques first-hand at CARBAP (A. NkakwaAttey, INIBAP).



Nursery plants awaiting distribution (A. NkakwaAttey, INIBAP).

varieties. In the second year of the TARGET project, each participating farmer will be giving away suckers of the new varieties to at least one other farmer. Evidently, just a few plants distributed to farmers will not change a production system overnight, but the numbers can mount up surprisingly quickly. More than 50 000 plants have so far been established in 40 TARGET villages. And over the course of five years, each of these plants could potentially give rise to at least 100 more.

Meanwhile two years into the CFC project, 14 demonstration plots have been set up to introduce farmers to the hybrids and cultivars offered for evaluation in their fields. However, the farmers will not all be evaluating the same material, partly because the multiplication techniques are different. In DRC and Guinea, rapid corm multiplication techniques are used. As this is, despite its name, a relatively slow process, the multiplication had to be started before the farmers had viewed the plants in the demonstration plots. In this

case, farmers will be evaluating the same assortment of improved hybrids (between 10 and 14) as are planted in the demonstration plots.

In Uganda, on the other hand, tissue culture is used to multiply the planting material and only the varieties selected by farmers and technicians – FHIA-17, FHIA-18, FHIA-23, FHIA-25 and the local cultivars ‘Nakitembe’ and ‘Mpologoma’ – will be multiplied.

“Comparing the logistics and costs of these methods will be a central component of the second half of the project”, says Charles Staver, the INIBAP project coordinator based in Montpellier, France. “The challenge is to find the right supply approach for large-scale planting of the appropriate hybrids and cultivars, while ensuring that the planting material is affordable for smallholders and guaranteed free of diseases and pests. It is important because we should apply the lessons we learn to other projects undertaking the dissemination of new *Musa* germplasm.”

Developing markets and business skills

Establishing a reliable, cost-effective supply of planting materials of new varieties, though challenging enough in itself, is only an initial step in the adoption process. For many farmers, the prohibitive cost of credit and the problem of raising collateral for a loan is a major constraint to investing in new technology. The CFC project includes a loan component, intended to provide credit to farmers wishing to purchase extra planting material and other inputs to increase production.

But with new varieties and new production skills in place what will farmers do with the

“We should apply the lessons we learn to other projects”

increased supply of fruit? In areas of food scarcity, communities may be glad to absorb increased production, even if the taste and texture of the new varieties differ from what they are used to. But if new varieties are to translate into increased incomes this may imply identifying new and different markets. The TARGET project includes a component to assess market opportunities for the new fruit but within the short timeframe of the project, farmers will have little chance to put these to the test. The CFC, however, has a four-year run and should be able to go further down the road to market-oriented production.

Scaling up production to meet the needs of the nascent food processing industry is certainly an option for enterprising farmers. Indeed a number of individual experiences point in this direction. Mrs Olomi for instance, a former school teacher from Arusha in Tanzania, produces a banana wine that competes with the cereal-based beers produced by industrial breweries (see 'Mrs Olomi's banana wine'). At the beginning she relied on 'back kitchen' methods, but she has since developed a sizeable brewing and bottling plant. "We can use bananas of any variety", she explained to a meeting of the Banana Research Network for Eastern and Southern Africa (BARNESA), "Our main constraint is to secure a reliable supply of banana". This is surely where the new high yielding varieties really come into their own.

Although the regional research organization, ASARECA, under whose umbrella BARNESA operates, has for some time had an explicitly market-oriented perspective, many of its networks have tended to

bring together mainly researchers from national organizations. This is beginning to change and a significant proportion of the participants in this year's BARNESA planning meeting came from the private sector – from tissue culture labs and farms, from food processing businesses and enterprise development consultancy firms. This new focus on promoting enterprise is reflected in the workplans of BARNESA and of INIBAP's regional offices for the year ahead; and brings with it the promise of providing an economic stimulus to technology adoption.

With the real value of traditional export crops declining, African countries are increasingly looking to non-traditional options to rebuild their economies and encourage the development of local commercial and business enterprises. The new banana and plantain hybrids offer opportunities for farmers to break into the potentially lucrative markets for processed products such as banana juice, beer and snack foods like chips.

By stimulating farmers to reflect on how they can market improved hybrids and encouraging researchers to engage broadly in the adoption process, the TARGET and CFC projects should contribute to the generation and uptake of technologies that really can improve livelihoods.

Mrs Olomi's banana wine



From the humble beginnings of learning how to make banana wine from a family relative, Mrs Olomi has created a business with 70 full-time employees. Banana Investments Ltd., based in Arusha, Tanzania, makes three brews: a golden, sweet 9% wine called Malkia, a similar dry wine called Meru and Raha, a 7% beer. The beer and the wines are cheaper than regular commercial beers on the market, and offer a more refined taste than local home-brews. The company's current market is still relatively restricted, geographically speaking. But the growth of the operation in the eleven years since it was launched suggests that Mrs Olomi has found a niche in the market; a niche that could be exploited in other parts of Tanzania and East Africa too. The banana is an attractive ingredient because of its availability year-round. The company gets through nearly 700 metric tonnes of peeled bananas annually, mainly from the farmers in the neighbourhood. However when local supply runs dry the Banana Investment trucks run the gauntlet of the many poorly maintained roads to scout for excess production on the slopes of Mount Meru and Kilimanjaro and even to the coast at Tanga. Increased local production of banana would, no doubt, help save time, cut costs and reduce the wear and tear on the vehicles. But there are other constraints too: the challenges of finding sources of capital to invest in the expensive bottling machinery and building up marketing expertise in the staff, especially the truck drivers who work as the salesman too. Improved agricultural production can help power the development of businesses like Banana Investments but the socioeconomic environment needs to be accommodating too.

New planting material is distributed in the rainy season to provide favourable conditions for establishment (A. NkakwaAttey, INIBAP).

