Scaling up adoption and impact of agroforestry technologies:

experiences from western Kenya

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Western Kenya, a densely populated region of the country, is an example of many areas in Africa where the continued threat to the world's land resources is compounded by the need to raise food production and reduce poverty. Here, attainment of food security is intrinsically linked with reversing agricultural stagnation, safeguarding the natural resource base, slowing population growth rates, combating the negative impacts of the HIV/AIDS pandemic on the community, and reducing poverty.

Farmers in this region, with farm size typically less than 1 ha per household, have many problems. Key among these are low and declining soil fertility, which is reflected in low crop yield (maize yields being typically less than 1 tonne grain per hectare); fodder and fuelwood shortages; and low incomes from farming activities. Important consequences of these problems include widespread poverty – over half of the households in the region live in absolute poverty, below the World Bank's figure of US$1 a day; severe food insecurity – many families produce little or no food during three to nine months a year; high rural-to-urban migration; and high environmental degradation, including Lake Victoria.

Scope of the paper

Over the last seven years, the International Centre for Research in Agroforestry (ICRAF) and its national collaborators in western Kenya, the Kenya Forestry Research Institute (KEFRI), and the Kenya Agricultural Research Institute (KARI), have been evaluating and disseminating several agroforestry technologies for improving farm productivity and incomes. Farmers and communities have been key participants in this research–development continuum. Several options and adaptations for soil fertility management and conservation have

been developed. Examples include short-duration improved fallows with fast-growing leguminous trees and shrubs, and biomass transfer of *Tithonia diversfolia* – the leafy biomass cut from hedges on farm boundaries and from roadsides and spread on crop fields. These practices provide ample quantities of nitrogen to the soil. Their integration with phosphorus fertilisers (including phosphate rock found in the region) is an effective and economically feasible means to improve soil fertility and productivity (Swinkels *et al.* 1997; Jama *et al.* 1998, 2000; De Wolf *et al.* 2000). In addition to improving soil fertility, several of the species used for improved fallows provide fuelwood and stakes for supporting crops such as tomato and climbing bean. Planting *Tithonia* and *Calliandra calothyrsus* as dense hedges on contour lines has also become an attractive option for soil conservation, and *Calliandra* also has fodder value. Many species that provide fuelwood and timber, such as *Grevillea robusta*, have also been disseminated.

To disseminate the technologies available, in 1997 we initiated a pilot project for testing approaches. Key challenges to be addressed included the question of how to bridge the information and knowledge gap between research and farmers that was responsible for the low and declining agricultural productivity and increasing poverty of the farmers (Niang *et al.* 1999). Two approaches were examined: (1) establishing pilot projects and sites that promote the use of community or village-based organisations such as women's, church, and youth groups, and (2) facilitating the extension service and other development partners.

The pilot project we describe here builds on the experience of two development projects – CARE-Kenya and KWAP (Kenya Woodfuel and Agroforestry Project) – that have used community-based approaches to disseminate agroforestry technologies in western Kenya.

The KARI/KEFRI/ICRAF pilot project approach: making dissemination a community responsibility

Dissemination on a wide scale is complicated by several factors. First, much learning and interaction are required to introduce improved fallows as a biological system, because they are not simple adjustments in current or past farming practices (Place *et al.* 2000). Second, while pilot projects enhance adoption and impact, they cannot be replicated everywhere. Third, extension services are weak in many African countries because financial support for them is poor.

In Kenya, the government extension service has traditionally been the main method of disseminating agricultural technology to farmers. However, given the retrenchment programme in progress and the limited resources in funds and materials, including logistics, its impact has been small or at best very localised. Its limited transport resources mean that the extension service has focused on using contact farmers to reach other farmers. It soon became apparent, however, that the contact farmers selected are typically well off, and often do not represent the poor, which is the most important target group. This can lead to limited transfer of information and technologies to the target farmers. To mitigate these problems, several projects have attempted approaches to improve upon the existing limited extension services by engaging community-based organisations (CBOs). Here, we highlight the two major agroforestry projects upon which the pilot project was based.

Kenya Woodfuel and Agroforestry Project

The Kenya Woodfuel and Agroforestry Project (KWAP) operated in Busia District of western Kenya between 1990 and 1997. KWAP used an A–B–C framework to implement its dissemination activities. The pilot area was A, which was a catchment; B was the administrative location in which the pilot area falls; and C was the intervention agro-ecological zone in which the pilot area falls. In area A, KWAP worked intensively with partners, including extension agents from government agencies and NGOs operating in that area. In areas B and C, KWAP left the work to line agencies with a mandate to offer extension services, and its role was to help these line agencies carry out their duties.

Farmer groups in A areas such as catchment committees, women's groups, youth groups, and adult educational groups, had different group activities. KWAP helped these groups consolidate into umbrella development groups (UDGs), to give them better bargaining power for acquiring information and resources. These UDGs were responsible for co-ordinating and steering the development activities of individual groups.

An umbrella development group comprised 50–60 members who represented the various groups existing in the catchment. Each group had 25–30 members, and each selected two members to represent it in the UDG. Each UDG had various subcommittees with different responsibilities, for instance the adaptive research farmers' committee,

whose role was to develop and test any promising technology on behalf of the community. All UDG members were resource persons for their respective groups in the technology transfer process. The whole programme covered six catchments, with six to eight adaptive research farmers in each catchment. Every resource person had three or four follower farmers for closer guidance in their respective groups. KWAP's role in this farmer-to-farmer information exchange was to strengthen the UDGs in their technical and managerial capacities through training and educational tours for farmers.

In these UDGs, farmers took centre stage in all their developmental activities, which initiated research. As the UDGs worked with the farmer groups, structural weaknesses emerged that needed to be addressed to make them more effective in handling their agricultural development activities. The main ones were the lack of institutional support for participating farmer organisations in knowledge, resources, and logistics once the supporting NGO wound up its activities in that district; insufficient skills in conflict resolution and record keeping; and lack of knowledge about the adaptive research process.

CARE Agroforestry Project

In adjacent Siaya District, CARE's Agroforestry Project also facilitated a community-based approach for the ten years from 1988 to 1998. In this project, CARE worked with women's groups and schools in 20 locations. In each location, every group of 15–20 members had selected four or five group resource persons (GRPs) who were knowledgeable and were able to disseminate technical messages. In each GRP was one adaptive research farmer who conducted trials on behalf of the group members. One CARE extension staff person provided technical backup for 12 GRPs. In the location, a co-ordinating committee, known as the locational agroforestry committee, comprised representatives of adaptive research farmers, GRPs, government extension staff, and the provincial administration.

Using this approach, target farms did well in tree planting, and a vital link between farmers and researchers was developed. However, the groups had little input into the choice of technologies. Disseminating information to other group members was passive and slow, leading to a insignificant multiplier effect. The approach was also top-down, and lacked the support of village groups and organisations at the grassroots.

The KARI/KEFRI/ICRAF pilot project village committee approach

Building on CARE's experiences, the KARI/KEFRI/ICRAF pilot project in Siaya District in 1997 engaged a *village approach*. Specifically, this approach aims to make all farmers in an entire village become adaptive research farmers by working with groups that are representative of village committees as a means of creating awareness and disseminating information and technologies on a wide scale.

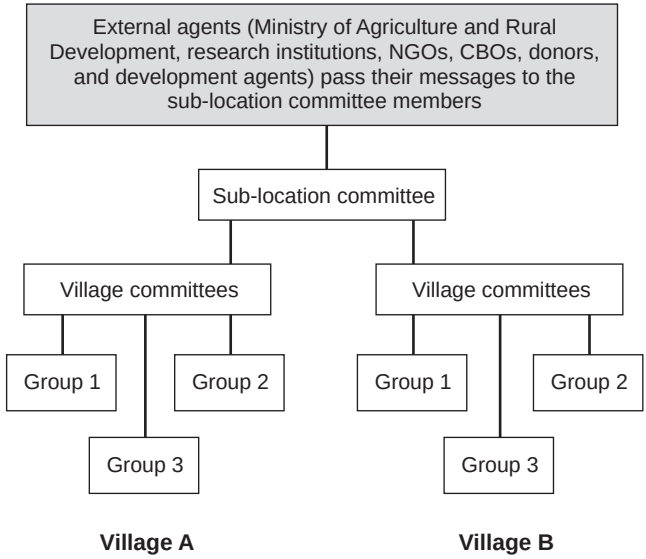
The purpose of the village committee was, therefore, to disseminate technologies to all farmers. This is intended to lead to the active and full participation of all community members to ensure that use of a technology would continue after a project ended. The method relies on using existing village organisational structures. In most villages in western Kenya, organised groups formed for various purposes exist – commonly church groups, women's and youth self-help groups, and clan and sub-clan organisations. Groups include a mix of farmers, including men and women of all ages, ethnicities, and degrees of wealth with different needs, constraints, and opportunities. Groups vary in size from 15 or 20 members to entire clans in a village. Though membership may spread to other villages, it is usually contained within the village in question.

Typically, a village contains between 80 and 140 households, a sub-location contains 240–320 households, and a location contains 680–750 households or 4–5000 people. Extension agents, who are based in the location, can pass information to farmers through the sub-location and village committees, who pass it to the farmers through village groups and social organisations (see Figure 1).

The way in which the village committees are formed in the project is described in detail in Niang *et al.* (1999) and Noordin *et al.* (2000). In brief, the main task was to determine, through consultative meetings with groups of farmers, a structure that would facilitate widespread dissemination of the technologies to all farmers in a participatory manner. One approach that looks promising is to form committees in the village, the sub-location, and the location.

Forming the village committees starts with identifying all the groups that exist in a given village. All such groups, large or small, are represented equally. Members of each group use their own criteria to select a delegate to a village committee, which is made up of the farmers thus selected. The village committee selects two delegates to represent their village in the sub-location.

Figure 1: Community-based dissemination methodology



Using this process, we formed over 28 village committees and five sub-locational committees in a short period, the latter being made up of farmers from between two and five villages.

We adopted this approach for all villages in the pilot area. Through the committees, external facilitators or development agents now have entry points to understand village problems. Likewise, the committees provide a way to communicate beyond the village and to disseminate new ideas to village households. Existing informal organisations provide great potential for building on what works rather than creating new structures that lack proper foundation, and which are bound to collapse. Groups also help in changing attitudes of members, especially in dispelling taboos and myths that might relate to certain trees or farming practices. The poor also belong to groups, particularly church-related ones. According to one study in the pilot villages, over 80 per cent of the members of church groups belong to the poorest category of the village community (Mary Nyasimi 2000, unpublished data). Working with such groups ensures that women-led households and the poor in the villages are effectively reached.

Once formed, the committees were trained in several areas necessary to improve their performance. Key among these were:

- technical aspects of agroforestry – seed production, handling, and storage; nursery establishment and management; soil conservation and soil fertility replenishment innovations; management of high-value trees;
- group dynamics and team building;
- record keeping;
- leadership skills, since members represent fellow farmers in meetings;
- monitoring and evaluation of projects; and
- proposal writing.

Achievements and impacts made with the village approach

The village committees helped to mobilise collective action for activities such as soil and water conservation that were agreed upon by all as the starting point for a sound soil fertility management programme. Farmers made contour bunds of *Tithonia* hedges on their farms and villages and occasionally across villages. This activity required the input of the extension staff and the co-operation of the farmers. The village committees ensured that this happened. The extension staff needed assistance, particularly for transport; through re-training, they gained the necessary skills to facilitate farmer participation.

Within a short period, community participation led to wide-scale on-farm testing and uptake of improved fallows and biomass transfer. This was partly because farmers found the technology attractive. Fertilisers are expensive, and many farmers cannot afford them. But they needed no money for improved fallow seeds or for harvesting the *Tithonia* already present in their villages. Consequently, an impressive feature of the technologies is that they are being used by the poor and by women. A recent study using quantitative (logit) analysis of over 1100 households found that while wealth was positively related to the use of fertiliser, compost, and manure, it was not related to the use of improved fallows or biomass transfer (Place *et al.* 2000). Similarly, female-headed households are less likely than male-headed ones to use fertiliser, but they are equally likely to use the agroforestry systems. Within the pilot project area, monitoring and evaluation exercises

indicate that farmers using improved fallows have increased the average size of fallow from 134 to 247 m^2 between 1997 and 1999 (Pisanelli and Franzel 1999).

Within communities, initial results from interviews with participating farmers and village elders indicate that improvement has been marked in food availability during traditional food-deficit periods (the period following the short rains when very little maize is produced because of erratic rainfall and associated high incidence of crop pests and diseases). The elders and farmers also report that pilferage of maize in the field has lessened drastically because villagers have an adequate supply of food. Some farmers have also shifted to growing higher-value crops like kale, carrot, tomato, and onion, which they can do because the fertility of their soil has improved.

To support income-generation initiatives of farmers, the project introduced several high-value timber, fruit, and medicinal tree species. The community identified individuals and groups that could undertake the task of multiplying the seed and planting materials required. For example, over 50 farmers established bulking plots and mother blocks of high-value mango and avocado trees on behalf on their villages. Also, volunteer farmers established over 30 community seed stands of improved fallow. Unfortunately, although the entire village is supposed to manage the seed stands through the various social groups, often only a few farmers or only the farmer on whose farm the seed stand is located end up performing this task.

Integrating inorganic phosphorus with organic options such as improved fallows and biomass transfer is essential for enhancing yields and adoption of the agroforestry technologies. In addition to commercially available phosphorus fertilisers, we promoted use of a reactive phosphate rock. This was facilitated through a pilot credit scheme run by women's and youth groups in 19 villages. Over two consecutive years, repayment rates from farmers to village committees (and then back to the project) have been encouraging – on average, 64 per cent after three seasons, and similar for both men and women.

The pilot villages are now acting as focal training points for farmers in other Kenyan villages, and also in Ugandan and Tanzanian villages. They have become a valuable way of linking up with development partners who are also involved in scaling up agroforestry and other agricultural innovations.

Lessons learned and challenges ahead

Village committees can be an effective means of disseminating technology through creating awareness and following up with their members. Groups create cohesiveness and togetherness among community members. Using existing groups (rather than forming new ones) accelerates and enhances impact. It empowers the groups and gives them a sense of ownership over the development process. Mama Dorcas, chairperson of a women's group of Vihiga District, emphasises the value and gains to be made by using existing groups. Group members will follow up and disseminate the technology both to other members and to non-members. Awareness creation should take the form of mass campaigns, using all avenues possible – churches, schools, public gatherings, farm-to-farm visits, and so on. Mama Dorcas says that this is how the family planning campaigns succeeded in her area in the mid-1980s and that we have to do the same for agroforestry for it to succeed also. She emphasises the need to focus on women since women perform nearly all the farm work in her area.

In general, individual groups (particularly women's groups) were more active than the groups forming the village committees. Many groups, however, remain inactive. This is particularly true of those whose formation was associated with gains to be made from political events such as national or local elections.

The lack of adequate funds to conduct activities is another reason for group inactivity. The expectation of groups and farmers in general is that they will receive some financial support from the project. We have avoided this situation and consequently have ended up with active, self-supporting groups. In the process, we have helped some groups to develop proposals and get funding. However, when we work more with certain groups, this can generate a wider perception of partiality on our part.

The sub-location and location committees are the weakest group in this chain of grassroots organisations. Developing village action plans is one of the key functions the village committees were expected to perform but in most villages they have not done so. Village committee elders held on to elective offices but rarely called village meetings. This situation created disillusionment and tension among members. The perception arose that the roles and responsibilities of the village committee were not clear, though it should be involved in planning and co-ordinating soil conservation activities, supplying inputs if collective

action is needed, and organising study tours. Such activities require frequent follow-up.

We found that project field officers needed to follow up and encourage the village committees and farmers persistently. Where follow-up was weak, so were the uptake of the technologies and the performance of the group. Surprisingly, this was so even after three years of interaction with some of the groups. Farmers always requested exchange and study tours and benefited from them. But key challenges with the study tours concerned the questions of who got to go, how they were selected, and how to ensure that information and materials such as seeds obtained on the study tour reached those who did not participate. Often this sharing did not happen, creating envy and enmity among village members and between villagers and the project field officers.

Farmers often describe field exchange visits as a real eye-opener and an inspiration to those who participate. The exchange visits create networking among farmers. The main limitation is that visits can be expensive, depending on the distance travelled and the number of farmers involved. Typically only one tour is conducted per village, and farmers reckon this is not enough. A tour also requires follow-up to see if what was learned is being used and whether the message spread beyond those who took part in the tour. Often it does not, and so the gains made from the visit are few and remain virtually unknown beyond the fortunate few who toured.

To facilitate the scaling-up efforts by CBOs, NGOs, and farmers, KARI in 2000 initiated the Agricultural Technology and Information Response Initiative (ATIRI). This initiative is a competitive grant mechanism that aims to strengthen the link between research and extension. Already some of the groups involved in the KARI/KEFRI/ICRAF pilot project have received funding from ATIRI after writing successful proposals.

Scaling up through the activities of other development partners

Collaborating with many organisations, specifically those focusing on issues of soil fertility management, provided us with the opportunity to scale up the lessons learned from the pilot project. The main institutions and projects with which we collaborated, and the way in which we scaled up, are described below.

Government ministries and projects

We worked with government extension services at the catchment level within the framework of the government Soil and Water Conservation Programme, and with the National Agricultural and Livestock Extension Programme (NALEP), whose focus is on farmer contact groups.

In this approach, extension staff are trained in participatory approaches, agroforestry interventions, tree propagation, and seed production techniques. Activities include making field visits, planning meetings, and providing extension materials. The extension staff pass information to farmers through various methods that include training-and-visit, demonstrations, and farmer field schools.

A farmer field school is a group extension method based on adult education methods. It is a 'school without walls' that teaches basic crop and livestock agro-ecology and management, making farmers experts on their own farms. It comprises groups of farmers who meet regularly during the growing season to experiment with new production options. After the training period the farmers continue to meet and share information but with less contact with extension agents. After taking part in a farmer field school, participants are able to train others in improved crop and animal husbandry, leaving extension staff free to cover other areas. A drawback is that the process can be tedious, especially when used for slow-maturing crops, as farmers must meet weekly (Kibisu and Khisa 2000).

Adaptive research farmers – the KARI–Kisii approach

The Kisii station of KARI also employs a farmer participatory approach to test and disseminate technologies (Okoko *et al.* 2000). Farmers select whom they want to participate in both research and demonstration activities. These farmers, each representing a village, then establish a farmer research committee that assists in implementing, monitoring, and evaluating the technologies. Committee members share information they acquire with the farmers of their villages through a farmer planning and evaluation workshop, demonstration and field days, and farmer exchange visits.

A Participatory Learning Action Research village project

To integrate and institutionalise participatory technology development and dissemination skills among the government extension services, we collaborated with a KARI-led, Dutch-funded pilot project, Participatory

Learning Action Research (PLAR). Through government extension, the project established seven PLAR villages in seven districts. These villages are now regarded as 'learning points'. Working with extension staff, these communities drive their own development process to identify, implement, and evaluate their development initiatives. The approach is similar to that being used in the pilot project villages – participatory decision-making, where the pilot project plays a facilitation role. The seven villages are now important satellites for training and for disseminating soil fertility management options (Gacheru *et al*. 2000).

As part of the start-up process, farmers went on study tours to villages where the technologies had been in practice for at least three years. Farmers and the extension staff gained trust in each other and mixed and discussed freely. Farmers say that PLAR has let them get acquainted with each other and see what is happening on other farms, and it has helped them understand technical messages behind the results they see. By the end of one season, farmers felt more confident in themselves because of their expanded knowledge, and their demands were for more knowledge – not inputs.

One of the important PLAR steps is to develop village action plans. These plans help farmers to set priorities and to decide how to execute them in a manner that is participatory and that involves all in the village. The plans create community ownership of the activities. Experience from several villages shows that enthusiasm is high when planning begins, but that many farmers drop out of the village action plan meetings once they realise that they will not get free inputs. Also, farmers detested keeping records of farm activities – reasoning that they could keep records in their heads. Where records were kept, they were kept by young people and schoolchildren.

To accelerate scaling up, farmers suggested that improved fallows be planted on farms near the road so that people could observe them and learn from them as they passed by, and might then want to emulate them. They also wanted to bring the fertiliser and seed input dealers closer to their village.

The African Highlands Initiative approach

The African Highlands Initiative programme in western Kenya is testing an approach in participatory technology dissemination in which five pilot villages form farmer committees to extend the adaptive research findings of trial farmers that the village community selects.

Within a village committee is a sub-committee of resource persons who work with adaptive research farmers and train other farmers in technologies already tried in the pilot villages. These sub-committees have representatives in a farmer research committee who are responsible for co-ordinating research and dissemination activities in all pilot villages. The farmer research committee links resource persons in various sub-committees in the pilot village to those in other villages so that they can train the new village committees in both the adaptive research process and the technologies. Communities outside pilot areas get their information from the farmer research committees. Through these farmer networks, we can diffuse information about the technologies and their sustainability more widely.

With this community-based system, farmers play a central role in exchanging information geared towards solving their perceived farming problems, and they help break down community-related barriers that hinder the free flow of information.

After only two years on the ground, the initiative has already achieved a lot. Five pilot villages (approximately 10,000 people) have established demonstration plots. Each village has a village committee for adaptive research and dissemination.

The Tropical Soil Biology and Fertility interactive learning project

In the same villages in which the African Highland Initiative is working, the Tropical Soil Biology and Fertility programme is testing a community-based interactive learning approach that aims to improve agricultural productivity by incorporating scientific principles into farmers' ecological and practical knowledge. It is a strategy geared towards strengthening farmers' knowledge base. Specifically, this approach aims to achieve the following:

- to identify and document farmers' existing agro-ecological knowledge (folk ecology) and their knowledge gaps;
- to communicate new scientific knowledge to farmers to strengthen their understanding of agro-ecological and soil biological processes, including nitrogen fixation, soil organisms and decomposition, organic resource quality, and fertiliser equivalencies;
- to use innovative tools to communicate required scientific knowledge to farmers, including community laboratories, microscopes, pot experiments, nutrient test strips, posters, video, drama;

- to use different platforms of communication to reach different categories of people within communities, including churches, schools, women's groups, clan groups;
- to use appropriate forums and media to communicate farmers' agro-ecological knowledge to scientists and extension agents with the view to incorporating this local knowledge into scientific debate and research.

Little can be said at this point about the efficacy of these community-based approaches. However, they do have strong links and backup from both national and international research and development programmes working together in an integrated manner.

Non-governmental organisations

Many NGOs are operating in western Kenya, in agriculture, energy, food security, water, credit systems, farm input supplies, and forestry. Their field extension workers are trained in various technologies, and they are able to transfer the information to the farmers with whom they work in their particular mandate areas.

Among our NGO partners are CARE, the On-Farm Productivity Enhancement Programme, PLAN International, Action Aid, Hortiequip Ltd., the Organic Matter Management Network, the Rural Energy and Food Security Programme, the Vi-Agroforestry Programme, Africa Now, Care for the Earth, Community Mobilization Against Desertification, Ideas Research Management Consultants, and the Sustainable Community Oriented Development Project. Most of these NGOs, however, lack staff who are well-trained in disseminating information. Also, NGO presence often ends with their project, thus creating a lack of long-term commitment and sustainability.

CARE is an exception in that it has had long-term presence in the region. As mentioned previously, it has had a successful programme for ten years in Siaya District, north of Lake Victoria, where it has developed a community-based dissemination system using groups within administrative locations. Over the last three years, CARE has moved the programme into new districts to the south of Lake Victoria, where it now uses a participatory extension method referred to as Training Resource Persons in Agriculture for Community Extension (TRACE).

Often, farmers learn best from their peers and neighbours, adopting many agricultural innovations by learning from fellow farmers.

The TRACE process aims to establish a functional and sustainable community extension process based on resource persons; to build the capability within the community to assess and manage agricultural information and services with the aim of improving agricultural productivity; and to establish a community-based adaptive research process through which farmers are able to manage and make their own assessment of the technologies they try. The starting point is to create awareness, and then to select members of the community who will participate in the various village, sub-location, and locational institutions. This is done after the chiefs and leaders have been given orientation training.

A number of benefits are associated with TRACE:

- Community participation in decision making is ensured; decisions are reached by consensus.
- The community has a sense of ownership of the process because locational management committees take responsibility for the processes involved.
- Sustainability is ensured through building the capacity of community resource persons and management committees.
- Community involvement in monitoring and evaluation ensures improvement in the methodology.
- The process allows for close links with the government administrative system, given that the locational management committees are sub-committees of the locational development committees of districts and therefore receive some funding from the government.
- Geographical coverage is wide – the unit of operation is a location with many villages and people instead of individual villages; and the groups and villages within a location are evenly distributed, ensuring that a large proportion of the people are reached.

The success of this and other hierarchical organisational schemes depends on the rate of information from the top (that is, from the locational development committees) to the villages and the groups within them. Because the committees lose motivation and sense of purpose if there is no new injection of information and innovations, they must establish external links with other agencies to ensure that the process continues.

Community-based organisations

A number of CBOs also work in the area. They include the Community Organic Farming Development Organisation, Ugunja Community Resource Centre, Rachuonyo Youth Skills Development Programme, the Locational Agroforestry Committee – Kanyaluo, Sacred-Africa, Sustainable Community Environmental Programme, and the Maseno Inter-Christian Child Welfare Programme. Such CBOs can be particularly effective in building capacity within the community, achieving wider geographical coverage, and ensuring continuity and sustainability of activities after donor-funded projects end. They afford larger organisations the opportunity to reach farmers more easily. They also provide effective feedback. Most, however, lack adequate operating resources, skilled staff, and good leadership.

Educational institutions

Schools provide a good forum for passing urgent messages to community members within a short time (Noordin 1996). Schools not only act as an effective medium of communication but also function as facilitators for a given intervention. Through demonstrations at the schools, we aim to reach the community directly or indirectly, and parents are able to discuss and evaluate these demonstrations during parents' days and even in normal school days. The community uses the school for bulking plots, particularly for producing improved fallow seed. Clubs within the school may raise seedlings of high-value trees, which are planted either in the school compound or at club members' homes. This approach effectively prepares the children as future farmers who will put what they have learned into practice.

Churches and social groups

Churches and social groups have been found to be better than individual or contact farmers as entry points to extension in a community (Mungala and Chavangi 1996) and have been used by many organisations. At Maseno, group contacts for women's and youth groups interested in agroforestry innovations disseminate information and, through them, more farmers are reached. In total, 23 youth and women's groups are working directly with the researchers to disseminate agroforestry messages. However, illiteracy and socio-cultural barriers are hurdles that at times prove difficult to surmount.

Lessons learned and challenges ahead using development partners

The challenges have been many in leading and maintaining a large number of development partners to scale up agroforestry. Key among them have been:

- high transaction costs (staff time and operational funds);
- lack of commitment in the absence of joint resources and memoranda of understanding;
- obstacles in pooling resources, leading to competition and duplication of effort;
- weak links in the researcher–extension–farmer continuum;
- weak documentation of the research activities conducted in the region, hence little exchange of information among the various stakeholders;
- lack of sustainability among NGOs, with short-lived projects leading to lack of continuity or long-term commitment; and
- lack of operational funds for the mainstream extension services of the government and unexpected transfers of field staff, leading to interruption of planned activities.

Institutionalising and strengthening partnerships

The main task ahead of the programme now is scaling up and spreading the benefits of agroforestry out beyond the pilot villages to the six million or so potential smallholder farmers in western Kenya. Towards this, a Consortium for Increasing Farm Productivity in Western Kenya was launched in January 2001.

This consortium contains over 40 organisations involved in agriculture, including agroforestry research and development, research and development organisations such as KARI and KEFRI, the extension branch of the Ministry of Agriculture and Rural Development, NGOs, CBOs, the Regional Land Management Unit (RELMA) of the Swedish International Development Co-operation Agency (SIDA), and farmer groups and associations. Its co-ordination committee represents ten institutions, including local councils, local representatives of the HIV/AIDS programme of the Ministry of Health, and the Forest Department. This arrangement will allow the pilot project to operate in a larger number of locations and effectively cover the 20 districts in western Kenya.

The consortium will create a forum for greater commitment, complementarity, and networking among partners. As a starting point, the first workshop in 2000 documented the various technological options and the methods that different partners use to disseminate them (Nyasimi *et al.* 2000).

To back up the consortium, the KARI/KEFRI/ICRAF pilot project in western Kenya will strengthen and continue to provide the following services:

- Training of development agents in participatory methods and technical aspects. At the same time, training farmers in the partners' mandate areas.
- Creating awareness through field days, visits, and tours for the partners.
- Attendance at the annual agricultural shows in various locations.
- Production of extension and training materials for partners and farmers.
- Establishment of seed production stands with partners.
- Organisation of regular joint planning meetings.
- Production of the quarterly newsletter *Miti Ni Maendeleo*, meaning 'Trees for Development', presently published jointly with the GTZ-supported project Integration of Trees into Farming Systems.

The challenge that now remains is to put the plan into operation to achieve the desired objectives.

Conclusions and future needs

Scaling up agroforestry technologies means creating awareness, training farmers, and encouraging participation of the community at large. Towards this objective, the projects and partnership existing in western Kenya have engaged in slightly different approaches but all with a common theme and a strong focus on CBOs, such as women's, youth, and church groups. These approaches present strong evidence that CBOs have great potential to empower community members to become their own agents of change and that they can bring farmers closer to government institutions and other service providers such as microcredit institutions and research and development organisations.

To achieve reasonable community development, community members should articulate their problems well and even suggest home-grown solutions. Enlightened farmers can make their own

decisions when they are well informed. Such a scenario can be attained when communication is a two-way channel between the farmers and the researchers and extension agents. For farmers to handle community developmental activities effectively, their leaders need to be equipped with both leadership and management skills.

Consistent follow-up and support from projects and development agencies seems crucial to the performance of CBOs. We found that where follow-up was weak, uptake of the technologies and performance of the group was also generally weak. A key challenge, then, is in sustaining this follow-up, and particularly in addressing how either the mainstream extension service or NGOs and CBOs can do this once the project ends.

To scale up beyond pilot sites into larger geographical regions, it is essential for partners engaged in similar activities to collaborate and co-operate. Doing so minimises duplication and competition. It creates synergy, adds value, and enhances impact. It is for this reason that we have invested energy and resources in forming the Agroforestry Consortium for Western Kenya. The remaining challenge is to make it deliver in a cost-effective manner that is also sustainable after project resources are withdrawn.

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