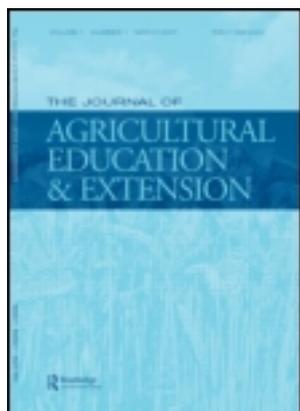


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A Review of Community Extension Approaches to Innovation for Improved Livelihoods in Ghana, Uganda and Malawi

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ABSTRACT Purpose: *Farmer-to-farmer extension offers a potentially low-cost and wide-reach alternative in supporting agricultural innovation. Various approaches are being promoted but information on their impact and sustainability is sparse. This study examines experiences of Self Help Africa and partners in Ghana, Uganda and Malawi. It asks: What is good practice in community extension for agriculture? What has been the impact of community extension on food security for smallholder farmers? What is the potential for scale-up and policy influence?*

Design/methodology/approach: *Findings are based on a three-country mixed methods study of 240 households, farmer groups and community, government and NGO extensionists.*

Findings: *Models of good practice include: community selection of extensionists, a twin technical and community development focus, and mutual learning. Impact of community based extension approaches on uptake of technologies, food security and livelihoods of poor groups was found to be broadly positive.*

Practical implications: *Community based approaches appear sustainable where: communities provide support for their extensionists; community extensionists have marketable skills; communities and extensionists are developing Community Based Organisations (CBOs); and linkages are maintained with research and extension bodies. Community based extension approaches are being scaled-up in Malawi and elsewhere. To achieve sustainable pro-poor impacts, support will be needed for continued technical and community development training and back-stopping for community extensionists, and evaluation of different approaches.*

Originality/value: *The study provides important evidence that community extensionists can help facilitate innovation in sustainable agriculture and reach the poor in a cost-effective way. They should be seen by policy-makers as part of pluralistic demand-driven extension, complementing over-stretched extension services.*

KEY WORDS: Smallholders, Africa, Knowledge, Innovation, Farmer-to-farmer, Extension

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Introduction

Smallholder agriculture is the main contributor to agricultural production in Africa and vital in increasing food and nutrition security and improving livelihoods. Yet agricultural productivity is generally very low. Extension can play a critical role in organising and developing capacities for farmer innovation, and linking farmers and other actors in the innovation process, including researchers, private companies, non-governmental organisations (NGOs), product and credit markets (Poncet et al., 2010). While ‘national funding for agricultural extension and advisory services remains low and variable ... renewed national, regional and global interest and commitments provide a momentous opportunity to deliver services that are farmer-centred, participatory, well funded, demand-driven and performance oriented’ (Nairobi Declaration on Agricultural Extension and Advisory Services, 2011: 2).

Farmer-to-farmer extension places farmers at the centre of knowledge generation and dissemination processes. Farmers’ abilities to spread innovation (perhaps more effectively than professional extensionists), due to their comprehensive local knowledge and location, make them potentially better able to communicate with fellow farmers, and at lower cost (Tripp, 2005). There has been a burgeoning of farmer-to-farmer extension—including farmer field schools, local agricultural research committees and community based (CB) farmer extension agents—but limited evidence of their impact at household level, sustainability and potential for scaling-up.

This article presents findings from a review of Self-Help Africa (SHA) (a UK/Irish-based NGO), and Southern partners’ experiences of community based extension over the last decade. The review sought to characterise different community extension approaches to delivering rural advisory services and to assess their impact on smallholder livelihoods. It asked: What is current practice in community extension for agriculture? What has been the impact of community extension on food security for smallholder farmers in the programmes studied? What is the potential for scale-up and policy influence?

Methodology

The study used several approaches to assess CB extension programmes in Ghana, Uganda and Malawi. Current practice was looked at in terms of selection and profiles of CB extensionists and their followers, roles played by CB extensionists, training and support received. Qualitative tools were used to characterise these, including document analysis, semi-structured interviews with key informants, and focus group discussions with participating communities.

Impact of CB extension programmes was examined through a small-scale survey of 240 households: 40 participating and 40 non-participating households in project areas in each of the three countries. Multi-stage random sampling was used to select villages and male and female-headed households for interview from lists of households obtained from project staff and village leaders. Control groups with similar observable characteristics as the participants’ were randomly selected from the same or neighbouring communities. A questionnaire was administered to the selected households by trained researchers. Data was entered and analysed in SPSS.

Attributing outcomes to interventions such as CB extension programmes is difficult since many other factors could affect these outcomes. The ideal approach is

to use panel data, with baseline data measuring the outcome before the intervention and follow-up data measuring outcomes after a period of time (Davis et al., 2009). In the current study, baseline data for the programme areas were not available. The researchers therefore established with participating communities benchmark years representing 'before the project started' (three–six years previously). The programmes under study were either on-going (Malawi) or recently completed (Ghana and Uganda) so an intermediate impact approach had to be adopted.

Criteria used for the assessment were: effectiveness—how CB extension approaches have contributed to improved food security and livelihoods of smallholders; equity—the extent to which poor and vulnerable groups have participated in and benefited from the approach; efficiency—estimated economic costs and benefits of the programmes; likely financial, institutional and environmental sustainability of the approaches; replicability—the potential for scaling-up the approaches. Detailed indicators are presented below. Pathways for scaling-up CB extension approaches were explored through interviews with programme staff and partners in government and NGOs, and workshops for CB extension stakeholders (Malawi).

The study focused on four CB extension programmes supported by SHA and NGO and government partners in three African countries:

- (1) *Ghana*: TRAX Ghana, a local NGO based in Bolgatanga, Upper East Region, supports Community Trainers (CTs) and groups to carry out sustainable agriculture and community empowerment activities in Ghana's northern savannah zone. TRAX developed the CT concept to strengthen local development and promote low external input sustainable agriculture (LEISA) techniques, including soil and water conservation, tree planting, composting and energy-saving stoves. TRAX has 15 project areas and 6,350 group members in Ghana's Northern and Upper East Regions: four areas have ongoing activities. CTs and groups are supported by four TRAX field staff. The research focused on Duusi and Zuarungu Moshie project areas (active 2004–2008).
- (2) *Uganda*: SHA Uganda works through Community Development Agents (CDAs) and groups in Rural Development Programmes (RDP) in four districts with around 17,000 members. Activities cover food security and livestock—with provision of planting materials and animals on a revolving basis—water development and sanitation, natural resource management, income-generating activities, support for People Living with HIV and AIDS (PLWHA) and community organisations. Programmes are implemented by SHA staff and extension staff from the Ministry of Agriculture. The recently completed Kamuli RDP (2004–2008), eastern Uganda, was the focus of the research.
- (3) *Malawi*: Lead Farmers (LFs) underpin two SHA partner programmes in the Northern Region of Malawi (under the former FAIR partnership with Find Your Feet and Development Fund of Norway): (1) The Mzuzu Agricultural Development Division (MZADD) Lead Farmers Project (2002–2011) led by and implemented under the Ministry of Agriculture, Irrigation and Water Development (MAIWD) in Mzimba, Rumphi and Nkhata Bay districts. MZADD LFs have focused on promotion of sustainable agriculture technologies—including composting, pit planting and tree growing. (2) Rumphi Food Security Project (Rumphi FS) (2007–2011) is operated by the

NGO Find Your Feet, in partnership with MAIWD and local NGOs, RUFA and MACRO, in Rumphu District. The Rumphu FS project has activities in small-scale irrigation, provision of planting material for drought tolerant crops, grain stores, natural resource management, livestock, microenterprises, HIV and AIDS awareness and community organisation development—led by LFs. LFs under the MZADD Lead Farmer and Rumphu FS projects have around 9,900 followers and 4,600 members respectively.

CB extension approaches: current practice

Community selection of CB extensionists was an important principle in strengthening ownership as well as enhancing communication and accountability in each of the programmes under study. The selection process was facilitated by programme or partner field staff at village meetings, with criteria suggested by community members and staff, and election of candidates by the community. Interviews with communities and programme staff indicate that hard work, a commitment to development and volunteering spirit were common criteria, together with general personal qualities such as honesty, approachability, respect and patience. Leadership, mobilisation and organisation skills were also widely cited.

Programme staff in SHA Uganda and Mzuzu ADD, as well as communities interviewed in northern Malawi, looked for a basic level of education (basic literacy and numeracy) for CB extensionists to implement their activities effectively. However, TRAX Ghana staff and group members in Ghana and Uganda felt that education was not as important as community spirit. Farming ability and knowledge was cited as important by groups in Malawi and Uganda. In the past, these were the principal criteria for selection of LFs in Malawi, where Mzuzu ADD organised compost and tree-planting competitions (2002–2004). These ‘old’ LFs may be more akin to ‘Master Farmers’, intended to transmit improved farming techniques to their followers by example. It has been argued (Holt-Gimenez, 1997) that if promoters advance too far ahead of their neighbours technologically, their farming system will appear too complex for the latter to adopt. Similar arguments can be advanced for differences in social and economic standing. Group members in Uganda and Mzuzu ADD (Malawi) Lead Farmer followers cited a gap between themselves and the CB extensionists.

Gender balance amongst CB extensionists was cited as a selection criterion by communities and actively encouraged by SHA and partners. Table 1 shows the breakdown of male and female CB extensionists across the programmes, ranging from three to one in the Rumphu FS Project, two to one in TRAX Ghana, and Mzuzu Lead Farmers Project now achieving a ratio of 1.5 to 1.

Working through farmer groups is well established extension practice. Potential benefits of groups include mutual support around common interests, joint activities such as group labour and providing a voice for members. Groups also provide a means for extensionists to reach greater numbers of farmers. Most CB extensionists work with formal groups established under SHA and partner programmes, except in the MZADD Lead Farmers Project where there are more loosely organised ‘followers’. Group profiles vary, reflecting local factors such as demography and culture, as well as group formation processes and partner priorities. In Ghana,

Table 1. Community based extensionists and project members/followers, 2010.

	TRAX— Ghana	SHA— Uganda	Rumphu FS— Malawi	MZADD LF— Malawi
CBEs: Total	118	620	200	51
Male	77	na	152	30
Female	41	na	48	21
<i>Ratio CBEs Male:Female</i>	2:1	—	3:1	1.5:1
Project members/followers:	6,349	17,000	9,879	4,600
Total				
Male	2,796	na	4,756	2,750
Female	3,553	na	5,123	1,850
Ratio members Male:Female	1:1.3	—	1:1.1	1:0.7
<i>Ratio CBE:followers</i>	1:54	1:37	1:49	1:90

Source: Project records.

women-only groups are quite common and women make up 56% of total membership (1 male to 1.3 female members). In northern Malawi, under the Rumphu FS Project there are almost equal numbers of men and women (1 to 1.1), whilst in the MZADD Lead Farmers Project currently only 40% of followers are women (1 to 0.7).

CB extensionists in Ghana and Uganda usually cover one or two communities; in Malawi, LFs cover two–five villages. Ratios of CB extensionists to group members range from 1:37 in SHA Uganda programmes to approximately 1:50 for TRAX Ghana and the Rumphu FS Project, with an estimated 90 followers to each LF under the MZADD Lead Farmers Project. These are considerably more favourable than government extension worker ratios (estimated at 1:1,500 households in Malawi, for example).

CB extensionists were found to play a range of roles within the programmes (cf. Leeuwis and Van den Ban, 2004, communication roles; Faure and Kleene, 2004):

- (1) Mobilisation: SHA and partners in Uganda and Malawi (particularly the Ministry of Agriculture through Mzuzu ADD) highlighted CB extensionists' role in organising and mobilising communities for meetings and development activities.
- (2) Liaison: Implementing partners and communities (especially in SHA Uganda and Rumphu FS projects) stressed the two-way transfer of information from extension to farmer, and feedback from communities to development organisations via CB extensionists, articulating local demand for technologies.
- (3) Training: CB extensionists' training of fellow farmers in sustainable agriculture and natural resource management was seen by all programmes as central. CB extensionists gather information on technologies to practise on their own farms and share with other farmers through group training, demonstrations and individual farm visits (though the process of transforming information into knowledge is complex).
- (4) Role models: The positive influence of an 'ordinary' community member who has managed to achieve food security, income and status through farming was

highlighted by TRAX Ghana members and the MZADD Lead Farmers Project. Several MZADD LFs have received national and local awards for composting innovations and tree planting and now train visiting programmes as well as their local followers.

- (5) Facilitating development: Building capacity of communities to plan for their own development and access services effectively is a central tenet of many of the programmes. CB extensionists in TRAX Ghana, SHA Uganda and Rumphu FS have assumed wider roles including supporting people living with HIV and AIDS, leading community natural resource management initiatives, and as office bearers in community based organisations. LFs under the MZADD Lead Farmers Project are agriculture-focused, in line with the ADD's mandate but some also participate in community development processes.

Training for CB extensionists varies across the programmes. All CB extensionists receive training in both sustainable agriculture and development skills. TRAX Ghana operates an in-house five-year training plan with 14 development modules and four detailed modules on sustainable agriculture. Mzuzu ADD (government) staff train their own and Rumphu FS Project's LFs for a week, followed by specialist workshops in sustainable agriculture, livelihoods activities, leadership, group formation and gender. SHA Uganda CDAs are trained by District Administration Community Based Services Departments (CBS) with specialist courses from government research stations and National Agricultural Advisory Service (NAADS). SHA and partners have supported development of training materials for CB extensionists in northern Ghana and all LF projects in Mzuzu ADD, Malawi.

Material and financial support for CB extensionists is hotly debated in the literature and on the ground: proponents arguing that without incentives there will be little action; critics insisting that a volunteering spirit is vital to sustainable community development (Bhuktan et al., 1997; Holt-Gimenez, 1997). There is agreement on provision of material support, particularly transport: all programmes initially supplied CB extensionists with bicycles for visiting farmers, attending meetings, etc. Maintenance is generally the responsibility of CB extensionists: TRAX Ghana groups and some SHA Uganda communities assisted with spare parts or lending bicycles in cases of disrepair. Gumboots, T-shirts, tools for use by groups and stationery have been provided by various programmes from time to time. Programmes also cover costs of transport to meetings outside their home area. Only SHA Uganda provides financial support in the form of a small cash meeting allowance of 5000/- (US\$2) per quarter.

Support is also provided to some CB extensionists by their communities as an appreciation of their work. In northern Ghana, TRAX members often give food, a chicken or groundnuts to the CT following a visit to their farm (measuring out contour bunds, for example); or they may decide to work on the CT's field as a group. In Malawi, communities said they supported LFs by following what they had been taught and thanking them verbally. In Uganda, some farmers reported giving groundnuts, seeds, milk or cash to the CDAs for animal health and other services. Other communities gave nothing, claiming 'SHA rewards them' (SHA group members, Kamuli RDP).

Impact on agricultural practices

Effectiveness of CB extension approaches was looked at on several levels including training, farmers using technologies and impact on livelihoods. A high proportion of followers and group members surveyed (80–100%) were found to have participated in training in soil conservation, tree planting, composting, crop storage and livestock production technologies (Table 2). In most cases group members appear significantly more likely than non-group members to have participated in training (using χ^2 test of independence), even though training is (in theory) offered by several extension providers in an area. Group members were also more likely than non-members to have participated in development training such as group management, HIV and AIDS awareness and business/income-generating activities (except in the more agriculture/natural resource-focused MZADD Lead Farmers programme).

In Malawi, where both Mzuzu ADD and Rumphi FS projects are promoting LFs as frontline trainers for the community (complementing Ministry of Agriculture extension staff), almost all followers surveyed have received training from LFs, compared to 15% or less from government extension staff. In Ghana and Uganda, group members receive training directly from TRAX and SHA programme staff as well as from the CB extensionists in their communities. In both countries training received from government extension staff was reported as low.

A high proportion of members and followers in the three countries reported that they are using sustainable agriculture technologies and improved livestock management on their farms (Table 3). Use of group management and HIV and AIDS prevention and management skills is also high amongst TRAX Ghana, SHA Uganda and Rumphi FS members (development training is not currently emphasised in the MZADD Lead Farmers Project). It is difficult to attribute technology uptake to a particular programme, given other sources of training and ideas and external factors influencing uptake. Differences in terms of provision of inputs (for example, planting materials by SHA Uganda) and timing (how recently started/completed) are likely to affect prevailing uptake rates. Nevertheless, in Ghana and Uganda use of many 'improved' practices by members was found to be significantly higher than by non-members. In Malawi, a high proportion of non-followers report using improved

Table 2. Participation in training by CBE group members and non-members (%).

	Ghana		Uganda		Malawi		
	TRAX	Non-group	SHA	Non-group	MZADD	RLP	Non-group
Training	n = 41	n = 39	n = 45	n = 35	n = 21	n = 20	n = 40
Soil conservation	100*	85	94*	46	95	100	90
Tree planting	100*	69	87*	49	100	100	83
Composting	100	97	94*	54	100	100	85
Livestock	100*	62	94*	51	80	100	83
Groups	85	21	78*	34	5	85	8*
HIV AIDS	100	100	94*	69	5	95	3*
Business/IGA	51*	13	85*	20	40	85	8*

Source: Own survey.

Notes: *Difference significant ($p < 0.01$).

Table 3. Farmers using improved practices (% farmers surveyed).

Practice	Ghana		Uganda		Malawi		
	TRAX n = 41	Non-group n = 39	SHA n = 45	Non-group n = 35	MZADD n = 21	RFS n = 20	Non-follower n = 40
Soil conservation	73*	18	89*	43	95	100	90
Tree planting	90	49	85*	43	100	100	83
Composting	95	67	94*	54	100	100	83
Livestock	95*	62	85*	49	85	100	83
Groups	59*	5	72*	34	45	55	8
HIV AIDS	95	92	96*	69	5	100	3
IGAs	34	3	65	17	5	95	8

Source: Own survey.

Notes: *Difference significant ($p < 0.01$).

sustainable agricultural practices: this may partly be due to the more informal grouping of LF followers enabling wider participation in training. There is also evidence of LFs fostering innovation on their farms and within their communities, experimenting with different types of composting and establishing farmer field schools.

Impact on food security and livelihoods

Assessing impact of programmes at household level is tricky, as discussed above. The study used several indicators of change in food availability and livelihoods. Farmer estimates of staple crop production show significant increases since programme inception in millet, as reported by TRAX Ghana members, and in maize according to MZADD Lead Farmers and Rumphu FS Project followers (70kg, 680kg and 450kg average per household per annum respectively) compared to non-members. In Uganda, SHA group members' cassava production increased but not significantly compared to non-members.

Before the start of the project there were very high levels of household food insecurity in both TRAX Ghana and SHA Uganda programme areas (Table 4). In Malawi, some households had already seen increases in food production as beneficiaries of the Farm Input Subsidy Programme. By the time of the study, almost all households reported increases in the number of months food was available from their own stores. For TRAX Ghana members this increase was significantly higher than for non-group members, although members still only have food available from their own production for six months of the year. In Uganda and Malawi non-group members also saw increases, suggesting external factors were also important (such as government input policy and good rains).

Farmers were also asked to assess changes in their livelihoods and assets over the programme period using a simple scoring system (Table 5). Group members and followers in all countries appear significantly more likely to have seen improvements in food security than non-members, whilst members in Uganda and Malawi have also seen increased income and improved drought-coping strategies. In the drylands of northern Ghana, TRAX members and non-members alike reported no change in their ability to cope with drought over the CB extension programme period. Women's

Table 4. Number of months food available from own production (average).

	Ghana		Uganda		Malawi		
	TRAX	Non-group	SHA	Non-group	MZADD	RFS	Non-follower
Time period	n = 41	n = 39	n = 45	n = 35	n = 21	n = 20	n = 40
Before project	2.9	4.3	7.0	6.8	9.8	11.0	10.1
Now	5.9	4.9	11.5	10.7	15.6	15.6	13.6
Change	+3.0*	+0.6	+4.5	+3.9	+5.8	+4.6	+3.5

Source: Own survey.

Notes: *Difference significant ($p < 0.01$).

participation in community and household decision-making was reported to have improved by both participating and non-participating households, suggesting some general improvement over the period. Overall household economic status was scored as low or very low before the start of the programmes. By the time of the survey both member and non-member households stated they had experienced improvements: in Ghana and Uganda this was significantly greater for households supported by CB extensionists.

Equity

The programmes aimed to reach the poorest and most vulnerable community members, who are identified variously as households headed by women and children and those affected by HIV and AIDS. Women's participation in TRAX Ghana and Rumphi FS groups exceeds that of men (Table 1). In the MZADD Lead Farmers Project the picture is reversed: the project is trying to address this by training more women as CB extensionists. All of the programmes carry out gender awareness as part of their development training: SHA Uganda and the Rumphi FS Project also have HIV and AIDS components. Women appear equally likely to have participated in training and to be practising new technologies as men. Food self-sufficiency has increased for women group members as well as men.

Table 5. Farmer scoring of changes in livelihoods since project inception.

	Ghana		Uganda		Malawi		
	TRAX	Non-group	SHA	Non-group	MZADD	RFS	Non-follower
Livelihoods change	n = 41	n = 39	n = 45	n = 35	n = 21	n = 20	n = 40
Food security ^a	3.0*	2.3	3.0*	2.8	2.3	2.3	1.7*
Income ^a	3.0	2.2	3.0*	2.7	2.6	2.3	1.7*
Drought-coping ^a	2.0	2.0	2.9*	2.5	2.9	2.9	2.0*
Women's status ^a	3.0	2.9	3.0	2.9	2.9	3.0	na
HH status before ^b	2.4	2.6	2.3	2.0	1.4	1.4	1.5
HH status now ^b	3.2*	2.7	3.9*	3.5	4.0	4.1	3.1

Source: Own survey.

Notes: *Difference significant ($p < 0.01$). ^a3 = positive change, 1 = negative change. ^bHousehold status 1 = very low (not meeting needs), 5 = well off.

Membership of groups is open to all farmers in an area but time and other constraints as well as expected benefits are likely to affect participation. In Ghana, group members appear more likely to have been highly food insecure at the beginning of the project than non-members. The situation has now reversed, indicating some success for the programme's pro-poor strategy. In Malawi and Uganda there appear to have been no major differences in status of member and non-member households at the start of the programmes.

Efficiency

Supporters of community based extension approaches claim a major benefit is their ability to deliver messages at relatively low cost to a large number of beneficiaries. Attempts to test this assertion face challenges in specifying, quantifying and valuing costs and benefits of the approaches. Indicative benefit–cost ratios have been estimated using the assumptions set out below.

The major costs of community based extension programmes are training of CB extensionists (payment of resource people, transport and accommodation, development of training materials), equipment for CB extensionists (bicycles and sometimes protective clothing and tools, stationery), supervision by project or Ministry staff (salary costs, transport, stationery) and other back-stopping costs (planning, coordination and reporting by district, country, regional offices).

Benefits of the programmes were measured in terms of incremental change in production of staple crops over the project period, over and above that which might have been obtained without the project (net change in average production by members/followers less change in average production by non-members). Only maize, millet and cassava production figures are used due to data limitations. These are valued using 2009/10 average farm gate prices. Input costs are not deducted for Ghana and Uganda since the majority of farmers were not using purchased inputs. In Malawi fertiliser was used by 95% of farmers interviewed (in combination with compost); these costs are netted from revenue (assuming 50% of followers receive subsidies). Large increases in production attained by members mean that benefits under all projects are quite large. Other long-term benefits from composting and tree planting were not estimated but likely to be broadly positive.

Costs and benefits were extrapolated over the project period and discounted (Table 6). Four years was taken as the minimum project period and a discount rate of 15% was used. The resultant estimated costs per CB extensionist are around £510–£3,160 whilst benefits range from around £3,600 in Ghana to £13,760 in Malawi's MZADD programme for the four-year period. Resultant benefit–cost ratios are high at 7.7:1, 14.2:1, 11.6:1 and 6.8:1 for Ghana, Uganda, Malawi Rumphu FS and MZADD Lead Farmer programmes respectively. Even with considerable changes in assumptions on costs (adding in back-stopping project costs and increasing farmer input costs) and benefits (declines in production) the benefit–cost ratios are still positive. This suggests that investing in CB extensionists and related support to smallholder farmers gives very good returns.

Table 6. Benefit–cost analysis of CBE programme (discounted GB£).

	TRAX Ghana	SHA Uganda	Rumphi Food Security	MZADD Lead Farmers
Benefit: cost ratio	7.7: 1	14.2: 1	11.6: 1	6.8:1
Cost per CBE	640	510	720	3,160
Benefit per CBE	3,620	4,460	5,490	13,760

Source: Project records; own calculation.

Sustainability

Sustainability of community based extension approaches was looked at in environmental, financial and economic and institutional terms. The programmes promote increased food production by smallholder farmers through use of improved sustainable farming practices and agroecological approaches. The focus is on technologies which revitalise soils, and judicious use of scarce water at farm and catchment level. Farmer take-up of improved practices promoted by CB extensionists and the project, including soil and water conservation and composting is high. These have contributed to improved yields of food crops by around 50% without the use of inorganic fertiliser (except in Malawi where many followers/group members combine basal compost with fertiliser top-dressing). Group members observed their soils have improved, whilst non-members reported no change (Ghana) or declining soil fertility (Malawi). Fuel efficient stoves promoted by programmes use one-third less firewood than conventional stoves and have had a positive impact on the fuel situation of half of member households interviewed in Ghana and Uganda (not part of programmes in Malawi).

CB extensionists in Malawi and Ghana train followers in low-cost irrigation techniques (gravity-fed systems and treadle pumps) which have enabled them to irrigate larger areas, produce dry season crops for food and sale and contribute to drought adaptation strategies by reducing dependency on rainfall. Other strategies to mitigate the effects of, and improve adaptation to, climate variability are crop diversification, tree planting and nursery management. In Malawi, the Rumphi FS Project is carrying out afforestation activities through the Rural Foundation for Afforestation, training LFs and farmers in the establishment of nurseries which are then managed by specialist forestry LFs. However, numbers of natural, fruit and exotic trees on farms have not increased significantly and remain low. Overall, group members in Uganda and Malawi perceive their ability to cope with drought to have improved significantly, but in northern Ghana—a drought prone area—farmers have experienced no significant change.

Community based extension is intended to be low cost and thus financially sustainable for communities. SHA and partners have borne almost the entire financial costs of setting up CB extension systems (with contributions from government through MZADD in Malawi) and have supported them for 4–10 years. Recurrent costs are those which would need to be covered on a continuing basis, after the withdrawal of project support. These are relatively small sums: for bicycle maintenance, stationery, travel costs for CB extensionists to district headquarters, etc., which in theory could be met by communities. Some CB extension groups have

informal and formal processes in place to cover these costs, ranging from members loaning bicycles to CB extensionists to subscriptions levied by community based organisations: signs of growing financial independence.

Incentives and rewards to CB extensionists are likely to become increasingly important in the longer term. Where no support has been provided by the project, communities provide informal support and CB extensionists have a high social status, CB extensionists appear to be keeping up their activities after the project has phased out: no TRAX Ghana CTs from phased out areas or LFs from the 2002 MZADD recruitment have dropped out. In Uganda drop-out rates have been higher: around 25% in Kamuli RDP. One reason may be the small allowances paid for attending meetings, which apparently acted as a disincentive both to communities to support CDAs and for CDAs to continue in their role once the allowances were withdrawn.

Frequency of meetings and visits to farmers after the end of programme were used as indicators of sustainability. In Ghana all CTs are continuing meeting groups and visiting members. In Malawi, the 'old' LFs continue to give demonstrations and training on their farms, visiting farmers if requested. In Uganda some CDAs are involved in development activities with NAADS and NGOs: some communities recognise the skills of CDAs and are keen to re-elect them, others believe 'they have eaten already' and others should be given a chance.

Institutional structures and processes initiated by both programmes and communities to support CB extension activities on a long-term basis were identified:

- (1) Linkages with government. The programmes recognise the key role of government in ensuring service provision to farmers. SHA Uganda has Memorandums of Understanding (MoUs) with District Assemblies, culminating in handing over support to community based services through CBAs at the end of the project. However, collaboration has apparently been hampered by frequent government staff transfers, poor buy-in to the programme and lack of transport (none of the groups or CTs interviewed had ever been visited by CBS). Projects are now working in partnership with local government with Field Officers seconded from the Ministry of Agriculture. The Rumphi FS Project follows a similar model. The MZADD Lead Farmers Project is government-managed and LFs are semi-integrated into regular ADD extension activities, with meetings at local and district offices, depending on availability of transport funds. TRAX Ghana has not been able to develop a relationship with the Ministry of Agriculture, and has experienced particular challenges of district and municipality bureaucracy and their focus on intensive agriculture. However, TRAX has provided training for government staff.
- (2) Maintaining links with parent organisation. Access to professional and moral support appears to be one factor keeping CB extensionists active after projects phase out their direct support. In the short and medium term, when projects are active in neighbouring areas, CB extensionists are able to meet programme staff in the field. TRAX Ghana has a fairly stable presence with an office and resource centre in the regional capital and continues to assist CTs and CBOs in phased out areas. In Uganda and Malawi CDAs and LFs are intended to be linked in with local government bodies.

- (3) CB extensionist peer support. Opportunities for interaction with other CB extensionists to exchange ideas, get up-to-date information and receive peer support were perceived by CB extensionists as important in maintaining their knowledge and motivation. LFs in Mzuzu have drawn up plans for a Lead Farmers Association. Similar associations have been proposed for CDAs in Uganda to facilitate mutual support and voice demands for extension and other development services.
- (4) Building capacity to access services. Community based organisations are promoted by the programmes to provide services for members and articulate demands for government, civil society and private sector services. CB extensionists play a key role as trainers, facilitators and board members in CBOs and other community groups. In northern Ghana, five CBOs have been formed with some success in sourcing support for facilities for their communities. In Uganda, 20 parish crop associations and 10 credit associations have been formed from SHA groups under Kamuli RDP: eight have formed cooperatives for value addition, and two processing plants for cassava and maize have been constructed. The Rumphu FS programme also has plans to establish associations and train LFs as office bearers.
- (5) Developing viable services. CB extensionists need to keep their services up to date and relevant and look for new ways to bring business benefits to their farmer clients (see Moumouni et al., 2009). Linking CB extensionists in informal support networks where they can share ideas and knowledge and access services such as new information and products is part of this process. CB extensionists also need to feed back to the training facility on the particular services in demand and what further training they need.
- (6) Linkages with technology generation. Sustaining improvements in agricultural production requires constant updating of technologies. In Uganda, for example, high incremental returns from cassava were achieved through the introduction of improved varieties and disease resistant cultivars, but maintaining this resistance requires continuous monitoring and collaboration with research stations to acquire new releases.

Scaling-up

Farmer to farmer scaling-up occurs when technologies gain acceptability within the community, and enabling knowledge and inputs are available. There are signs of this occurring in Ghana and Uganda, where two-thirds of group members surveyed had passed on knowledge on sustainable agriculture technologies to two–three farmers in their community, and half had passed on similar information to someone outside their area. Development skills appear less transferable.

Programmes are pursuing a number of strategies to scale-up their activities to other organisations within their project areas and at national level. TRAX Ghana's expertise in sustainable agriculture is widely recognised. TRAX has conducted 20 training courses for NGOs and CBOs in northern Ghana and the region and for government staff, including the Ministry of Food and Agriculture. Training has mainly focused on technologies, but wider development topics are also covered. TRAX is also working with the Environment Protection Agency (EPA) and school

environmental clubs across the region, following a similar model to the CT approach, with children as future educators and peer leaders. In Uganda NAADS is adopting a similar approach to CDAs to overcome staff shortages in the government extension system. Some NAADS field staff are recognising the strengths of CDAs in community mobilisation and working with CDAs and SHA groups.

The Malawi programme has achieved considerable successes around institutionalising and scaling-up LF approaches. FAIR (formerly Harvest Help/Find Your Feet) have supported Mzuzu Agricultural Development Division in training and providing follow-up for LFs since 2004 and the concept is now being taken up by the Ministry of Agriculture and scaled-up across all ADDs. However, there are notable differences in the scaled-up programme, including specialised technical LFs (with less emphasis on development concepts). FAIR has also supported the development of training materials for LFs which can be used on a wide scale. Within Rumphi District alone 10 organisations are using the LF concept, including the Rumphi FS programme.

Conclusion

This review provides important evidence that community based extension can help facilitate innovation in sustainable agriculture and reach the poor, complementing existing services in a cost-effective way. Findings from four CB extension programmes on good practice and sustaining CB extensionists can inform policy-makers in developing demand-driven extension approaches.

Aspects of 'good practice' include: community selection of CB extensionists to ensure wide ownership; working through groups which the poor can access; and a dual focus on technologies and community development, to sustain development initiatives and articulate local demand for technologies and services. Sustaining CB extension approaches is likely to involve: local communities providing support for their extensionists; community extensionists developing marketable skills; communities and extensionists establishing CBOs and associations; and increasing linkages between CB extensionists and research and extension organisations.

Community based extension approaches are being scaled-up across Malawi where 3,000 LFs have been selected by communities and trained by the Department of Agricultural Extension Services—as a response to high extensionist vacancy rates. To achieve sustained pro-poor impacts, support will be needed for continued training in agricultural innovation and community development, and back-stopping for community extensionists; monitoring and assessment of aspects of different CB approaches by all stakeholders, and discussion of findings with policy-makers in government, NGOs and the international community.

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