

Agricultural Research and Extension Network

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From the AgREN Coordinator

AgREN will be hosting its annual e-mail conference in late March on the subject of rural livelihood diversity and the implications for pro-poor agricultural research and extension. With much attention focused on the importance of non-agricultural sources of income for rural households, we need a better understanding of how diverse income strategies affect the organisation of agricultural development efforts. AgREN members are well placed to report and compare first-hand experience on this subject. We need to know if the targeting and organisation of agricultural activities should take more account of rural households' non-farm activities. We hope that as many network members as possible will participate in the discussion. Registration details are given in the announcement later in this newsletter.

The newsletter continues to attract many useful summaries of work in progress and conclusions of

recently completed activities. We urge all AgREN members to contribute items. The current newsletter includes an interesting debate regarding a recent AgREN paper on watershed management. AgREN papers often elicit interesting comments and comparisons with people's own situations, and we would be happy to use the newsletter as a forum to further this kind of discussion and debate.

This is one example of the gradual evolution of AgREN. We have been experimenting with e-mail discussions over the past few years, and the character of the newsletter is slowly changing. AgREN papers remain the heart of the network (and we are always in need of more contributions). AgREN will be contacting its members in the next few months to solicit ideas for further changes or new priorities for AgREN. In anticipation of a short survey, any ideas or suggestions will be gratefully received.

Contributions from members

Evaluating capacity development: Experiences from research and development organisations

Hundreds of evaluations are carried out in research and development organisations every year – most of them aimed to meet donors' requirements for accountability. However, very few evaluations have been carried out to assess the capacity of organisations to conduct research and development activities, capacity development processes *per se*, or the extent to which capacity development leads to an improvement in organisational performance.

In January 2000, ISNAR began an ambitious project on 'Evaluating Capacity Development' (ECD), which aims to improve capacity development efforts in research and development organisations through the use of evaluation. The project used an action-learning approach and brought together people from various countries and different types of organisations. During six evaluation studies conducted over three years, the participants learned a great deal about capacity development and its evaluation.

One of the key findings was the importance of involving staff and stakeholders in evaluation processes. A participatory approach helps gain commitment to building the future of an organisation, and it can speed up decision making. As people 'learn by doing', they

strengthen their own capacity for evaluation and are motivated to pass their knowledge on to others. When conducted in a participatory and structured way, evaluation can make a substantial contribution to improving organisational performance.

Evaluation studies

Evaluation studies were conducted in Bangladesh, Cuba, Ghana, Nicaragua, Philippines and Vietnam. The following summaries provide highlights of two of the studies.

Understanding capacity development in a plant genetic resource centre in Ghana

The Plant Genetic Resources Center coordinates plant genetic resource activities in Ghana and plays a vital role in national agricultural research and development. Collaboration with the International Plant Genetic Resources Institute (IPGRI) and the Genetic Resources Network for West and Central Africa (GRENEWCA) has helped the Center develop its infrastructure, strengthen its administrative and technical staff, improve its research methodologies, and increase its engagement with national and international stakeholders. This has

helped diversify the services and products it offers, which, in turn, has helped attract additional financial resources.

The evaluation study employed self-assessment methods and examined the complex interactions between the three organisations. It explored and addressed organisational change issues and analysed each organisation's operating environment. Using participatory approaches helped build the evaluation team's capacity to conduct evaluations and improved their understanding of capacity development concepts and issues. All three organisations are now using the results of the evaluation to guide their capacity development efforts in line with their respective organisational goals.

Strengthening participatory research capacities in a Philippines root crops centre

The Northern Philippines Root Crops Research and Training Center is an autonomous public-sector organisation with a mandate to lead research, training, and extension on root crops. In the late 1980s, the Center began collaborative activities with the Users' Perspectives with Agricultural Research and Development (UPWARD), an Asia-wide network that seeks to apply participatory research methods to enhance the contribution of root crops to sustainable agricultural livelihoods.

The evaluation study looked at how the network has supported capacity development in participatory research in the Root Crops Center and examined the role of external factors (e.g., policy and funding environment, organisational autonomy, and natural disasters) and motivational factors (e.g., organisational change and reorganisation, staff homogeneity, and external recognition). The evaluation used self-assessment methodology and involved Center staff and stakeholders in the evaluation design, data collection, and final analysis. Both partners have benefited from the process, gaining knowledge and skills that they are now applying in a wider context.

Conclusions

Participation in the evaluation studies gave the project team – and other members of their organisations – a much greater understanding of what organisational capacity development is, what it requires, and how it can be evaluated. Their involvement led them to put forward the following ideas and recommendations.

1. *Get people involved. All organisations are facing an unprecedented rate of change and have to take responsibility for their own capacity development.* Identifying organisational capacity development needs is a vital first step. Using participatory self-assessment rather than calling in outside experts ensures that managers, staff and stakeholders feel

involved and become motivated and committed to building their organisations' futures.

2. *Take a holistic view.* An organisation should lead its own capacity development effort and should focus on the needs of the organisation as a whole, rather than attempt to fill gaps at the individual or project level.
3. *Move beyond donor-recipient relationships.* All organisations can gain from working with others who have complementary resources and management capacities. Successful partnerships recognise the need for dialogue and change, seek mutual benefits, and have an appropriate balance of power.
4. *Use a learning-oriented approach to evaluation.* The main benefits of the evaluation studies stemmed from the participation of managers, staff members, and other stakeholders in planning and carrying out the evaluation. Through their involvement, they acquired new knowledge, developed new skills, and changed their attitudes – developments that are likely to influence their future decisions and actions.
5. *Plan for and actively promote use of evaluation results.* A 'utilisation-focused' approach involves identifying potential users of the evaluation results and engaging them in the evaluation process. This will foster greater awareness of capacity development concepts and practices and a better understanding of the evaluation process and findings. It will also promote acceptance and internalisation of the conclusions and recommendations.

Further information

This article is based on the book, *Evaluating Capacity Development*, published by ISNAR, CTA and IDRC in 2003. For more information contact:

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Three decades of adoption research in Nigeria: Lessons and prospects

A recent review of studies on the adoption of agricultural technology in Nigeria has revealed a number of conclusions and deficiencies that deserve further examination.

Adoption studies are often premised on the assumptions that innovations are advantageous to all adopters and thus try to explain low levels of adoption, rather than the process of developing the innovations; that cross-sectional data gathered at one point in time is sufficient for investigation of a process; and that the individual rather than a visible or invisible group make innovation decisions. Although, these assumptions may be true for many innovations, they provide incentives for further adoption and diffusion research. The general objective of this study was to conduct a survey of adoption studies in Nigeria, highlighting the key variables studied over the years; and to study the relationships established between these variables and adoption of innovations to form the basis of future research in this subject area.

The sample of adoption and diffusion studies reviewed in this study included 12 adoption and diffusion studies in Nigerian agriculture from various journals and 24 supervised students' research projects, thesis and dissertations in the Departments of Agricultural Extension of the University of Nigeria, Nsukka and the University of Agriculture, Abeokuta. Each study was subjected to content analysis to retrieve data on innovations studied, key findings were established, and relationships (positive or negative) between adoption of innovations and any other variable were identified.

The review of adoption studies in Nigeria covered the period 1970–2000. Most of the studies (64 percent) in the review were conducted between 1990 and 1999. Only 12 percent of the studies were conducted before 1980. This reflects the fact that adoption and diffusion research in agriculture bloomed in Nigeria when the extension services were revitalised with the World Bank supported Agricultural Development Programmes (ADPs). It was also found that the interest of adoption researchers in the 1970s was simply establishing clients' awareness of and interest in innovations. The focus expanded to measuring adoption rates of innovations, determining factors influencing adoption and identifying differences in the characteristics of different client groups in the 1980s. By the 1990s, other issues such as types of innovations easily adopted and the time lag in innovation adoption and diffusion were the foci of adoption and diffusion research in Nigeria.

The 38 explanatory variables for adoption considered in the studies reviewed were placed in six broad categories. These are socio-economic factors, social system factors, extension agent and agency factors, macro-economic factors, innovation characteristics and communication factors. From this analysis, it was found that socio-economic factors are the most commonly measured variables in adoption studies in Nigeria.

Among these, age, education, farm size, family size and extension contact feature more prominently than other variables. However, studies elsewhere have shown that government policy, farmers' perceptions of technology-specific characteristics, the process of technology generation and involvement of farmers in the technology development process, are important factors in the adoption of innovations.

The dynamic relationships between the independent variables and adoption of innovations were also evident in this review. Key variables like age, religion, marital status, gender, education farm size, household/family size, social position and membership of organisations may, at different times, locations and with different innovations exhibit various relationships with adoption. It was also found that macro-economic factors are a relatively under-studied set of variables. The few studies that examined these factors established significant relationships between them and adoption of innovations.

The change resulting from the process of innovation adoption is not always positive. In addition, the findings of this study suggest several challenges in data collection in the conduct of adoption and diffusion research in Nigeria. For instance, the possibility of using data from Geographic Information Systems (GIS) for data gathering purposes in adoption research needs to be explored. Smallholder situations offer a special challenge in this case because of their diversity. There is therefore a need for creating appropriate data collection methods for contextualising this diversity. Finally, there is a need for standardisation of scales for measuring several variables in adoption and diffusion research. One of the major findings of this study is the inconsistency amongst adoption and diffusion studies on the appropriate standards for measuring key variables. Such inconsistencies often influence the interpretation of the results of adoption studies. It is recommended therefore that review studies be conducted regularly, reporting the variations in the measurement of key variables in adoption research and proposing standard approaches acceptable to adoption researchers.

Further information

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Vermicompost in rural hills of Nepal

The Nepal Swiss Community Forestry Project (NSCFP), a bi-lateral project of Nepal and Swiss Governments, has been in operation since 1990. The fourth phase of the project is now being implemented in the three hill districts of Nepal – Dolakha, Ramechhap and Okhaldhunga. This project is presently managed by Intercooperation, a Swiss-based non-profit development foundation. These three hill districts have an estimated forest area of 238,422 ha, of which 30% (72,517 ha) has been handed over to the local communities as community forest (CF). Up until June 2003, a total of 102,484 household members had been organised in 763 Forest User Groups (FUGs). These households participate in a range of activities organised by different intermediary organisations supported by this project and are the target populations for livelihood improvements. Their livelihood options are very limited, but potentialities are not fully explored and utilised.

The long-term objective of the project is to see that strengthened community forestry contributes sustainably to the equitable improvement of rural livelihoods. To achieve this objective, the project has identified four major themes: forest governance; equity and livelihoods; sustainable forest management; and community forestry policy. For the better administration, execution, and monitoring of the project's activities, there are four components viz.; support to programmes implemented by the Government's District Forest Offices, support to micro-projects implemented by the NGO sector, Human Resource Development and Participatory Action Research, and CF Advocacy. The latter two components are directly implemented and/or coordinated by the project unit.

The major activities under the project are group formation; human and institutional development of forest user groups and the partner organisations; forest management; income generation and enterprise development; policy advocacy; and CF extension and dissemination of successful practices. Although this project had initiated income generation activities for the past several years, significant achievement has not yet been obtained. So far the major areas of income generation related activities are cultivation, processing and marketing of non-timber forest products, mushroom cultivation, etc. In addition to these, the

NSCFP has started to test vermicompost technology in its project area.

Vermicompost is a recently introduced technology in Nepal. So far this technology has been tested and brought into practice only in some of the urban areas and their peripheries. The Nepal Agriculture Research Council has tested vermicompost in some cereal crops. Some positive results have been obtained and a few extension materials have been produced.

In the past year, NSCFP has initiated testing of vermicompost preparation technology in the rural remote hills (Dolakha District). The main intention of exploring this technology is the hope of better utilisation of forest products and/or agricultural composting materials (crop residues) in the context of their reduced availability. It is also hoped that this technology will increase the overall yield of agricultural crops and some farmers will generate income by selling earthworms and vermicompost in the area.

As a verification trial, NSCFP has tested this technology in four sites with four different treatments (vermicompost from broad leaf litters, pine needles, mixed type of litters, different ratio of forest litters and cow dung etc.).

In general the result obtained so far is very encouraging. The decomposition rate is very fast (about two months at an altitude of about 2000 masl), where normal decomposition period exceeds six months. Similarly, the multiplication rate for the earthworms is also fast, encouraging farmers to consider this technology positively. As with previous research results, the vermicompost produced in this case has good quality (see table below).

One of the collaborating farmers had already started to sell vermicompost and earthworms. Some of the collaborating farmers have now planned to see the effect of vermicompost in vegetable (cauliflower, cabbage, broad leaf mustard etc.) production.

Further information

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Table 1. Major soil nutrients content in vermicompost

Sample Type	PH	Nitrogen	Phosphorous	Potassium	Organic Matter*
Vermicompost-1 (broad leaf litters with cow dung)	7.12	2.32	0.79	3.20	44.00
Vermicompost-2 (mixed type litters with cow dung)	6.60	0.92	0.83	3.25	28.00
Compost (traditional mixed litters, crop residues and cow dung)	6.60	0.50	0.50	1.5	12.00

*= Farmers had unknowingly applied comparatively more cow dung in the case of vermicompost.

IFAD / FAO collaborative programme to promote Farmer Field Schools in East Africa

Over the past four years, IFAD and FAO have been collaborating on a programme to examine whether Farmer Field Schools (FFS) can have an impact on rural poverty reduction in the conditions of East Africa. The programme, implemented through the ministries of agriculture in Kenya, Uganda and Tanzania, and supported by FAO's Global IPM Facility, has played an important role in developing a region-specific model for FFS.

A Farmer Field School is an externally-facilitated, time-bound activity (generally one agricultural season). The FFS brings together a group of 20–30 farmers to learn, using practical, hands-on methods of discovery learning. Although Field Schools are time-bound, many groups formalise their relations and continue working and studying together after the syllabus is finished.

Instead of using Integrated Pest Management as the principal entry point for the Field Schools, the programme developed more holistic and responsive approach – Integrated Production and Pest Management (IPPM), which enables group members to choose any priority production-related issue as the Field School's entry point. Second, to ensure the Field Schools' relevance in the complex and diverse farming systems of East Africa, the programme introduced a syllabus which includes both a 'focus topic' (generally based around a key crop or farm enterprise), studied for the entire 30 week duration of the Field School, and a variety of 'special topics', studied over one or two sessions. Both sets of topics are selected by the groups themselves. A third important, farmer-led initiative was the establishment of local 'FFS networks', made up of a paying membership of FFS groups. These networks are now starting to take over the role – formerly played by the FFS facilitators – of assisting the groups to identify and access external service providers and inputs/produce markets. They represent a significant development in terms of organisations owned and controlled by poor farmers, and augur well for the sustainability of the groups. And fourth, in an effort both to reduce the cost of the Field Schools, and encourage farmer ownership of, and commitment to them, the programme has moved away from grant financing the Schools to instead provide loans to enable the members themselves to finance the Field School activities.

The programme worked with some 25,000 farmers. A greater part were women (in Kenya 70%), and the vast majority were drawn from the middle and poorer strata of their communities. Assessments show that, as a result of what they learned in the Schools, group members were able to immediately realise significant yield increases and/or cost reductions, resulting in increased incomes levels. The Field School experience also bonded the farmers' groups and gave the members

greater confidence in their ability to deal with government staff and market intermediaries. In short, the FFS experience has been a means for enabling small farmers to create their own cohesive economic empowerment groups. Some 80–90% of the groups remain together beyond the Field School, engaging in a range of collective commercial activities and conducting further field trials. Today, there are waiting lists of farmers' groups seeking to join the FFS Programme.

Through the programme, the development of a locally-applied replicable model for FFS has begun to emerge, and there is significant support for the Field Schools in all three countries. In all three, Field Schools are being set up independently of the programme, in some cases using national budgets; and policy makers are increasingly interested in the FFS approach, as an element within the framework of national extension systems. However, there remain elements of the model to be further tested and developed. This will be done under an expansion phase of the collaborative programme, expected to start up in early 2004. Particular priorities under the new phase will be to:

- refine the piloted self-financing mechanisms, and particularly in those areas where the FFS approach is well-established and its value recognised by farmers, build the capacity of the networks to manage loan funds for financing the Field Schools;
- go beyond IPPM and respond to other areas of farmer demand – especially in the areas of marketing, and savings and credit, as well as train the facilitators to become increasingly focused on issues of HIV/AIDS and appropriate mitigation measures;
- work with the networks to strengthen their capacity to provide a range of services to their membership; and
- respond to the rapidly growing farmer demand for Field Schools, by refocusing on becoming a provider of training for facilitators – farmers, government and NGO staff; and it will particularly promote farmer facilitation of the Field Schools as a proven means for rapidly up-scaling coverage.

Further information

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The spread of schistosomiasis by dam and irrigation development can be prevented with the soapberry *endod*

Schistosomiasis (bilharzia) is a debilitating parasitic disease affecting more than 200 million people in the tropics and sub-tropics. Humans are directly infected through skin contact with water inhabited by vector snails. The disease has spread rapidly as a consequence of the development of dams and irrigation schemes. Control of the disease is normally based on a combination of treatment of human infection (praziquantel), hygienic measures and snail control. Snail control has been shown to be essential in order to prevent re-infection after treatment of humans.

Endod is the Ethiopian name of the soapberry plant *Phytolacca dodecandra*, which occurs throughout sub-Saharan Africa and parts of South America and Asia. The plant is a rapidly growing climber with hanging branches and an average height of 2–3 m. It bears fruit twice a year. The small berries have traditionally been used as laundry soap in Ethiopia. Dried and ground berries mixed with water develop a foaming detergent solution. The plant has long been recognised for its various medicinal uses.

The molluscicidal property of *endod* was discovered in northern Ethiopia in 1964. Dead snails were observed in a river immediately downstream from where local people were washing clothes with locally available *endod*, whereas upstream and further downstream from these laundry sites live snails were abundant. Subsequent studies in Ethiopia by the Institute of Pathobiology have established *endod* as a potent plant molluscicide, killing schistosomal snail vectors at concentrations similar to those of synthetic compounds.

Detailed investigations of the agronomic aspects of *endod* to select and breed plants with favourable growth characteristics and molluscicidal effects have been going on in Ethiopia since 1974. Three strains have been selected for exceptional growth, molluscicidal potency, yield and resistance to insects and drought. The E44 strain has proven to be the most favorable genetic material. Unripe berries contain more active saponins than the pink ripe berries, thus reducing the time before harvest and the damage by birds eating the sweet, ripe berries. New shoots can be damaged by the larva of the *Gitona* (sp.) fly. Agronomic studies have recently been conducted in Ethiopia, Uganda, Zambia, Zimbabwe and Swaziland to investigate the potentials of local varieties of *endod* versus the best Ethiopian strain (E44) under different agroclimatic conditions. The cost effectiveness of *endod* has also been studied. In Ethiopia, the best strain (E44) has produced 3,000 kg per hectare and year. To treat the water needed for 1,000 hectare of irrigated sugarcane, only 0.4 hectare of *endod* would be required. *Endod* might thus be cost-effective as a molluscicide compared to the expensive – and environmentally harmful – synthetic pesticides recommended by WHO.

People of all ages in Ethiopia are familiar with the plant and its various uses. Some people have planted *endod* bushes along fences near their houses, but the plant has largely disappeared from unprotected areas due to land clearing. Regional differences in the distribution and use of the plant are apparent. Berries are used as soap in rural areas whenever available, but very little is traded at markets due to the low social status of the *endod* soap. Common medicinal uses of the plant are treatment of skin itching (ringworm), gonorrhoea, leeches, intestinal worms, anthrax and rabies, and to induce abortion.

Endod plants grow best under direct sunlight in its natural habitat. In areas where the evapotranspiration is very high, partial shade by other bushes or trees is necessary to avoid sunburn. Unfortunately, wilting of leaves is the main limitation for cultivation of *endod* below 1,600 m elevation in Ethiopia, where schistosomiasis is endemic.

The discovery of the effect of the *endod* soap on the vector snail for the schistosome parasite, has spurred our effort to find ways to reintroduce *endod* as soap and promote its direct application in the locations where people get infected. Cultivation of *endod* and the use of berries for washing or direct application to streams have been shown to be feasible if information about schistosomiasis and its control is promoted among rural people. Direct application of *endod* by local government agencies has been the easiest application method to promote. Preference for commercial soap and lack of land for cultivation are major obstacles in the reintroduction of *endod* as soap in Ethiopia.

The genetic variation that is still available should be preserved, and a breeding programme should be launched to develop cultivars with high berry and saponin yields, pest resistance, and ability to grow in the lowlands. The genetic variation of *endod* and genetic markers for important plant characteristics have recently been investigated.

Further information

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Comments on AgREN Paper 129 “Improving Watershed Management...”¹

A recent AgREN Paper “Improving watershed management in developing counties: A framework for prioritising sites and practices” (Perez and Tschinkel, 2003) presents a number of principles for watershed management. Experience in India with a wide range of watershed development activities challenges several of the ideas presented in the paper.

The paper questions the primacy of ‘working with the poor’ in watershed development. In the Indian context, the original focus of the watershed programmes was the development of agriculture in dryland areas, rather than poverty alleviation. The experience showed that conservation efforts cannot succeed without paying heed to the livelihood needs and concerns of the poor and marginalised. Only very recently equity and sustainability have become part of the watershed agenda. There is no reason to use public money to subsidise the rich, and the watershed programme provides an opportunity for developing the resources of small and marginal farmers. Ironically, experiences in India suggest that watershed development, a land-based activity, has in-built inequities unless conscious and meticulously planned efforts are made for addressing the poorest farmers.

The paper suggests the following criteria for watershed selection:

- a) greatest risk of watershed degradation in immediate future;
- b) highest probability of showing sustainable success quickly; and
- c) where the highest benefits for the expended cost and effort.

While the authors have recommended a conservation approach for effective watershed development, they end up recommending market responsiveness and cost effectiveness as two of the three defining criteria. But market-based strategies rarely support conservation. On the other hand there is increasing evidence to suggest that conservation can be better achieved with the support of communities in general and the poorest amongst them specifically.

In India, as in most of the developing societies, issues of livelihood security are intertwined with the health of the ecosystems. Any approach that focuses on textbook ecological aspects stands to fail, as a large segment of population is dependent on natural resources for their survival. Alienation of traditional rights of access to these resources will in all probability harm the ecology.

The paper suggests that watershed interventions may often better focus on large farmers who have a higher potential of contributing to both degradation as well as regeneration. But large farmers are often endowed with surplus resources and are the last to pay heed to limits to the carrying capacity of the ecosystem. In conditions of scarcity, they will be the last to be affected. The paper suggests that many soil and water conservation technologies are likely to be viable only in the most intensive farming systems. Obviously, we need to expand the horizons of research on soil and

water conservation technologies to develop technologies that work for the poor, difficult though it may be.

The success or failure of watershed interventions is not linked to the scale of the project but rather to the quality of community participation and approaches adopted by implementing agencies. Working on public land, forest and commons is important as these lands often form the upper catchments of the watersheds.

Seriously degraded areas are unlikely to demonstrate high probabilities of success. The Indian experience suggests that resource-rich areas, which were selected for some watershed interventions based on the risk of watershed degradation, were initially successful but the trend was then reversed due to increased rate of exploitation. In fact, the tendency to jump quickly to conclusions of success at such interventions has been responsible for poor sustainability of many of the development interventions. On the other hand, seriously degraded areas are inhabited by economically, socially and politically weaker communities. If such areas are not taken up on a priority basis degradation advances in geometrical progression. Regarding the high cost of development of degraded areas and its relevance for weaker sections, we need to ponder whether the efforts for sustainable development need to be weighed in terms of narrow confines of economic cost-benefit analysis.

The authors also suggest that concentrating on raising productivity of staples provides limited leverage for substantially improving small farmers’ economy and environment. This sounds reasonable in theory, but recent trends indicate an increasing level of helplessness on the part of small farmers to sell the cash crops that have often been promoted by outside agencies on similar grounds. The promotion of other income generation enterprises needs to ensure that small farmers can stand their ground in increasingly globalised markets.

Lastly, the paper sees watershed development only as an economic intervention dominated by physical and market based measures. But watershed development has increasingly come to be seen as an integrated approach to resource development. Its long-term success hinges on the formation of community-based institutions that may negotiate resource use and regulate resource abuse in the best interest of the communities.

The paper has proposed a decision tree for screening of practices (technology). The focus is mainly to understand local practice and also see its benefits at a larger level. The suggested framework can be very helpful for selecting technologies.

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¹ The views in this note are those of the authors and not necessarily that of their organisations of affiliation.

Response to comments from Singh and Kashwan.

We appreciate the thoughtful reading of our paper by Singh and Kashwan and the opportunity to clarify the points we raised.

The main message of our paper is that sustainable watershed management requires a complex combination of efforts to effectively support both poverty alleviation and resource conservation. Yet most implementing organizations rarely acknowledge the need to be strategic in defining how to meet both of those goals, as they may be antithetic and their combination beset with trade-offs.

It may be that in some countries like India, “the original focus of the watershed programmes was the development of agriculture in dryland areas, rather than poverty alleviation.” Most watershed management projects we have analyzed in 10 developing countries, however, have rather been poverty alleviation projects that happened to be located in watersheds. In those cases, poverty alleviation has not resulted in conservation or restoration of watersheds because the focus has not been holistic. The poverty alleviation projects have focused on individual farmers’ plots as the main planning units – rather than on the whole catchment area. Project activities have centered on poor farmers exclusively, rather than all land resource users including rich farmers, town dwellers and government agencies (who, paradoxically, often benefit from and/or impact on the watershed more than poor farmers). By seeking to address as many constraints affecting poor farmers as possible, projects have ended up with a long list of dispersed activities and non-complementary practices that have not contributed to the economic or ecological health of the whole catchment area.

We agree with Singh and Kashwan that conservation efforts must frontally address livelihood needs and concerns of the poor and marginalized, and that equity must be part of the watershed management goal. All too often, however, the economic benefit for farmers is not given sufficient importance in conservation projects. In our experience, very few farmers are fully self-sufficient without a need for cash. Conservation has to make good financial sense, else farmers will not continue it. The challenge for research and for project experimentation is not to develop new conservation technologies but to come up with good land management practices that pay, for the poor as well as the rich. We argue that subsidized programs are only justified as catalysts to get a reaction going. If “an increasing level of helplessness on the part of small farmers to sell the cash crops that have often been promoted by outside agencies” exists, this more likely reflects the agencies’ practice rather than invalidates the need for and desire of farmers to improve their income.

We endorse ‘working with the poor’ in watershed development but also with other stakeholders in the catchment. In fact, projects should not merely support farmers to adopt desirable practices but increasingly serve as tools to create changes in policies and markets that will cause lasting positive effects on the behavior

of land managers. We realize that working with all groups in a watershed is not easy due to differential and often conflicting visions and interests in watershed management among social groups and institutions. We agree on the need to form (or more likely strengthen) “community-based institutions that may negotiate resource use and regulate resource abuse in the best interest of the communities.” Yet if projects work exclusively with the poor, or seek to measure results only from the perspective of the poor, any proposed solution will be insufficient for either watershed conservation or economic development in the area, as a whole.

We do not say that the only way to do watershed management is large-scale. One must start small and carefully build up, learning from mistakes and opportunities in the project as well as in similar projects elsewhere, guided by the feedback from producers and market forces. But, the challenge to economic or ecological sustainability is in scaling up. It is not enough to contribute to the improvement of a few farmers, fields or micro-catchments. Much more attention is needed in successfully identifying where to work and what to do so that financially productive, good land use practices proliferate spontaneously throughout the watershed. For that we need explicit selection criteria, some of which we propose in our paper. We believe, however, that “poverty” is not a good criterion for selecting where in a watershed to work or what practices to promote. To begin with, poor people are not an undifferentiated mass. Not all poor (or rich) farmers have the same ability, financial or human resources, willingness, savvy or interest in trying new production or conservation practices. Projects need to be much more sophisticated in understanding social differentiation and the space it affords for development and conservation.

For watershed management to work, farmers need economic incentives for conservation, and empowerment to experiment with and dictate what is best for them. Ironically, all the poverty alleviation watershed management projects we have reviewed have promoted a nominal form of “participation” that has not capitalized on the farmers’ creativity and rights to choose. Most projects have used participatory assessment methodologies but ultimately the projects are still top-down and rigid in the services they provide. They have promoted a long-list of off-the-shelf technologies, without adjusting the latter to what farmers want or the market bears. Those projects are more likely to pay attention to what private or public donors want than what farmers want and need. It is not enough to promote farmer participation. We ardently advocate the projects’ accountability to farmers.

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Revival of India's traditional water conservation and harvesting system: A necessity to combat water scarcity

Life poses so many contradictions. Despite being one of the wettest countries in the world, India's growing water shortage has reached alarming proportions because water is not harvested efficiently. Water harvesting means capturing the rain where it falls, or capturing the run-off in one's own village or town. Experts suggest various ways of doing this: capturing run-off from rooftops or from local catchments; capturing seasonal flood water from local streams; and conserving water through watershed management.

Water has been harvested in India since antiquity. Evidence of the tradition can be found in many age-old texts, scriptures, inscriptions, local tradition and archaeological remains. Traditional systems have been specific responses to the ecology and culture in which they have evolved, they are durable and have satisfied certain needs of local people in an environmentally friendly manner. Such systems emphasise ecological conservation in contrast to environmental exploitation by modern systems. They have benefited from collective human experience since time immemorial, and in that lies their biggest strength. Traditional systems have transformed some areas from places of economic backwardness to areas of abundance. They are low-cost, user-friendly techniques and community-based systems, which contribute to social cohesion and self-reliance, since the responsibility for running them is often taken by individuals, groups and local communities working together. This encourages economic independence and optimisation of local resources at micro level.

The irrigation bureaucracy has had a very bad effect on traditional water harvesting systems in India. No effort has been made to review traditional methods or build new systems that would complement them. At the same time the modern water system and its distribution network have many failures and shortcomings, leading local indigenous populations to think of innovative alternative solutions to water problems, based on a revival of traditional rain harvesting systems.

Some of the factors responsible for the decline of the traditional systems are given below:

- Growth in population and water demand, which could not be met through traditional technology and systems, accompanied by the increasing availability of a modern and more convenient water supply through centralised storage systems such as reservoirs and canals. Official emphasis on the latter has led not only to a halt in the expansion of traditional systems but also to their disuse and consequent deterioration.
- The centralised modern systems were initially installed in good faith to provide water conveniently and abundantly. However, despite the fact that they have proven to be both complex and costly, over

the years the government has developed an open bias in their favour.

- Dependence on the state even for maintenance of existing systems and the complete control over water distribution that government agencies have acquired through existing water and land resources laws have lead to large-scale misuse.
- Commercialisation of agriculture and the large-scale cultivation of cash crops.
- Changes in distribution and concentration of ownership of land and community resources in fewer hands.
- Unchanged state investment patterns that were developed during the colonial regime and neglected small water-harvesting irrigation systems.
- Inability of government agencies to take a holistic view of water as a product of larger environmental management.

The advantages of traditional methods of water harvesting are numerous. They have the potential to provide a solution to rural poverty and unemployment, resulting in an overall improvement of the economy. They can give high agricultural returns and their installation and maintenance are cost effective. They are also highly sustainable. Apart from increasing the availability of water, local water harvesting systems developed by local communities and households can reduce the pressure on the state to provide all the financial resources needed for water supply. Also, involving people will give them a sense of ownership and reduce the burden on government funds.

As we advance into the new century, further growth and urbanisation will go hand-in-hand with environmental crises. We must rejuvenate our 'dying wisdom' and tap the traditional systems of resource management to suit our present day needs. This basic simple wisdom is underlined by the continued success of traditional methods of managing earth's resources in India as well as in other parts of the world. Modern communities the world over should be encouraged to look at time-honoured traditional methods of resource management. Water is a major force in economic growth. If development of water resources is to be sustainable, equitable and community-based, traditional systems have to be rejuvenated and developed.

Further information

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Institutional learning and change: A pilot CGIAR initiative

Rationale

Throughout the world, the pace of environmental, social and technological change is accelerating, and this in turn has major implications for the poor and their development prospects. Traditional transfer-of-technology approaches to agricultural research can no longer keep pace with the complex, diverse, risk-prone and dynamic realities of poor farmers. If agricultural research organisations are to be more successful in reducing poverty and increasing the sustainability of agricultural production systems, they must become less isolated, more interconnected and more responsive. In so doing, they must transform themselves into learning organisations, more in touch with field realities and better able to learn and to change. Recent research on the poverty alleviating impacts of technology associated with the Consultative Group on International Agricultural Research (CGIAR) has identified institutional learning and change (ILAC) as a key area for intervention if research is to be more efficient and effective in serving the poor.

What is ILAC?

Problem-solving agricultural research, by its very nature, is a risky enterprise. Outputs and outcomes cannot be predicted with certainty. It involves a degree of trial and error in which not all – and probably not even a majority of – research paths achieve their intended goals and impact positively on the livelihoods of the poor. ILAC can be described as a ‘process of reflection, reframing and use of lessons learned during the research and development processes that results in changed behaviour and improved performance.’ Within the framework of ILAC, a set of interventions is emerging that seeks to encourage new modes of professional behaviour associated with continuous learning and change and thus to enhance the performance of research and development programmes. ILAC is concerned with the rules, norms, and conventions that frame decision-making in agricultural research organisations. ILAC is driven by the premise that improved performance requires a spirit of deliberate and critical self-awareness among professionals and an open culture of reflective learning within organisations – a culture that encourages the identification and examination of less successful research paths to chart changes in objectives, strategies, and methods. In such an environment, errors and dead ends are recognised as opportunities for both individual and institutional learning that can lead to improved performance.

Entry points for ILAC

Learning and change can occur at the level of complex systems, organisations, groups, teams and individuals. The ability of an organisation and the people within it

to learn and change is affected by the external operating environment, the internal environment, and organisational capacity. Both top-down and bottom-up approaches to ILAC are needed: top-down for support, legitimisation, and protection, and bottom-up to allow for individual encounters and learning, augmented by monitoring and evaluation by field staff and farmers.

At the system level, operational paradigms may need to be examined and networks expanded or reconfigured. At the organisational and program levels, strategic planning exercises may be useful to explore new frontiers and to assess what revisions in strategy or tactics may be needed to identify and correct less successful research paths and to address changes in the external environment. It may also be necessary to move away from formal hierarchies towards more decentralised decision-making and operations. At the individual level, both researchers and managers need to be more open to learning and change, since ultimately, institutional change can only occur through changes in behavior, attitudes, mindsets, relationships and activities, all of which depend on individual insights and decisions.

Ways forward

Four complementary, synergistic approaches are proposed for fostering institutional learning and change and for developing learning organisations:

- *Developing a supportive external environment.* Donors can play a key role in encouraging and rewarding more explicit, transparent, and self-critical learning and change in research centers. The process can be further facilitated through networking and building alliances with others, both outside and inside the CGIAR.
- *Fostering a culture of innovation, learning and change.* This can be achieved by promoting values, beliefs, norms, and traditions that positively influence behavior and performance. Examples include seeking out new partners who offer diverse perspectives on development challenges, fostering open, enabling and nonhierarchical relationships, and supporting and facilitating critical review and reflection.
- *Reorienting management systems.* Management procedures should be reviewed, including approaches to planning, recruitment, training, monitoring and evaluation, and reward systems: all should encourage and celebrate risk-taking, innovation, and learning.
- *Developing and enhancing awareness, knowledge, and individual capabilities.*

Ways to introduce ILAC include pilot initiatives to study innovation processes and to introduce action

learning in ongoing work, training to develop new process-oriented skills, and the provision of support services to allow CGIAR staff and partners to design and implement learning-oriented activities.

The proposed activities are exploratory, pilot activities, which include learning within existing projects, documenting innovation histories, and exploiting opportunities to learn from both successes and failures. The focus will be on providing support to enable CG centres and their partners to introduce an ILAC orientation in their work.

It is envisaged that successful ILAC initiatives will – indeed, must – connect with real work goals and processes. They will be focused on improving performance and will engage people who have the power to promote and nurture ILAC initiatives. By balancing and combining action and learning with review and critical reflection, these initiatives will enhance and reward people’s capabilities, both individually and collectively.

A critical element of ILAC is reflection on the process of learning and change itself. This is a vital part of an iterative process of improvement: ILAC has no predetermined blueprint. An evolving approach is needed with processes that themselves demand learning and change. Embracing ILAC will help to

develop a more transparent, productive, and efficient CG system that can more effectively contribute to the sustainable reduction of poverty.

The ILAC initiative getting underway in the CGIAR is currently being coordinated by IPGRI and involves the active participation of CIAT, CIMMYT, ICRISAT, IFPRI and ISNAR. The ILAC initiative has been supported by the Rockefeller Foundation and IFAD.

Further information

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Erratum

An error was printed in Figure 1 of AgREN Network Paper No. 132: Chapman, R. and Tripp, R. “Changing incentives for agricultural extension – a review of privatised extension in practice”. The left hand column of Figure 1 was incorrect in the printed copy of the paper. The correct version of this figure is given below.

Figure 1 Public and private characteristics of agricultural information

		Excludability	
		Low	High
Rivalry/Subtractability	Low	Public Goods <ul style="list-style-type: none"> • Mass media information • Time-insensitive production, marketing and management information of wide applicability 	Toll Goods <ul style="list-style-type: none"> • Time-sensitive production, marketing, or management information
	High	Common Pool Goods <ul style="list-style-type: none"> • Information embodied in locally available resources or inputs • Information on organisational development 	Private Goods <ul style="list-style-type: none"> • Information embodied in commercially available inputs • Client-specific information or advice

Source: Alex, G., Zijp, W. Byerlee, D. (2002) ‘Rural extension and advisory services: New Directions’. *Rural Strategy Background Paper*, No. 9. Washington, D.C.: AKIS Thematic Team, World Bank.

Urban agriculture and poverty alleviation in the eastern cone of Lima, Peru

In the last decade several public and private development efforts have increasingly recognised the importance of studying the livelihoods of poor marginalised communities in order to have a more realistic view of the complex activities and networks these communities are engaged in, at individual and household level, to maintain a minimum level of sustenance for themselves and their direct dependants. Research with a livelihood focus not only helps to make external interventions better informed and adapted to the 'real' needs of the targeted communities, but also destroys the image of 'the poor' that has been portrayed so often by the media – a homogenous group of passive, helpless and often voiceless people. This type of research, instead, highlights the poor as a diverse group of people, many of whom are involved in multiple socio-economic activities, and who want to participate in development initiatives concerning them.

Urban Harvest is the name of the CGIAR systemwide programme on urban and peri-urban agriculture which started in 1999, and which recognises and calls attention to the livelihood strategy of crop- and livestock-raising, and small urban agro-enterprises, that increasing numbers of city dwellers are involved in to generate food and income for themselves and their families.

A new research project of Urban Harvest on the theme of peri-urban agriculture and livelihoods has recently started in the shantytown region of Cono Este in Lima, Peru. It is funded by the Government of Spain, and will evaluate the contribution of urban agriculture to poverty alleviation among families with monthly incomes that average less than a hundred dollars. The project will address animal and crop production issues, marketing constraints and environmental concerns, as well as include nutrition research on the use of local crops and livestock products as components of cheap and nutritious infant foods. As part of the livelihood focus, cooperating scientists and local producers will evaluate improved pest management strategies, better marketing options, and ways to recycle organic and animal residues.

Emphasising the importance of understanding the larger picture within which urban and peri-urban agriculture takes place in Lima, the project has started by analysing and visualising how agricultural plots are physically distributed within the project site with the help of geographic information systems (GIS) technology. Through satellite imagery and the use of tools such as GPS (Global Positioning Systems), it will be possible to obtain an identification/classification of agricultural areas, and to visualise zones of urban growth. This kind of information is essential to consider for inclusion in local city plans so that urban and peri-urban agriculture can be integrated in sustainable city planning attempts, and therefore will be made available to diverse local government and local organisations involved in city planning.

One of the main problems confronting the practice of urban and peri-urban agriculture (UPA) in Lima is its absence in local policymaking and planning procedures, which means that poor city farmers often farm illegally on marginal plots of land using polluted water sources. This is because city planners, so far removed from the realities of the poor urban residents, do not recognise agriculture as being a viable urban activity, and instead consider it a public nuisance. An important element of the project in Lima will thus be to educate local municipal agencies and planning bodies about the positive benefits of urban and peri-urban agriculture for human health, the city environment, and in the recycling of urban waste products. For this purpose an upcoming workshop will be conducted involving city mayors, local city officials and researchers on how to integrate UPA into city plans. The successful experience of Havana, Cuba in the sustainable integration of urban agriculture into their city planning and development will be a good opportunity for other participants to learn how urban agriculture can become a motor of sustainable economic development while combating poverty and hunger.

Another major problem faced by urban and peri-urban farmers is their lack of access to knowledge and technologies for safe and sustainable agricultural development. Uneducated and excessive use of pesticides by peri-urban farmers in the Cono Este region often results in dwindling profits as well as health problems. In this regard the Urban Harvest project aims to adapt the Farmer Field School methodology (conventionally used to educate rural farmers) for teaching improved, organic pest-management strategies to peri-urban farmers in Lima. For this the conventional methodology will be adapted to the socio-economic needs of the (peri)urban farmers, and to the (peri)urban environment. In this learning-by-doing process of education, extensionists and researchers act as catalysts in the social learning process of the farmers, and the emphasis will be laid on improving and enhancing the already existing knowledge of the farmers with practical experiments carried out in their own fields.

Further information

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Urban Harvest aims, through a joint research and planning agenda involving local governments and research institutions, to contribute to the livelihoods of small urban farmers and to the diet of all classes of the urban populations, as well as contribute to human and environmental health. To read more about our work please consult the Urban Harvest website www.cipotato.org/urbanharvest

The World Summit on the Information Society (WSIS): Information and Communication for Development (ICT4D) Platform

The first phase of the WSIS took place on 10–12 December in Geneva and will be followed by a second phase in Tunis in November 2005. The first ever global summit on the information society concluded with a Declaration of Principles and Plan of Action (www.itu.int/wsis/documents/doc_multi-en-1161|1160.asp) with the emphasis on coordinating action to improve equality of access to information and communication technologies (ICTs). Representatives from 176 countries endorsed the Declaration of Principles expressing their 'commitment to build a people-centred, inclusive and development-oriented Information Society, where everyone can create, access, utilize and share information and knowledge.' There was acknowledgement of the uneven distribution of the benefits of the information and technology revolution between and within developed and developing countries and a commitment to turn this 'digital divide into a digital opportunity.' The Plan of Action addressed agriculture from two perspectives. First, to provide more knowledge and information especially in rural areas through the 'systematic dissemination of information using ICTs on agriculture, animal husbandry, fisheries, forestry and food.' Second, to 'maximise the use of ICTs as an instrument to improve production (quantity and quality) through public-private partnerships.'

ICT4D Platform

A side event to the summit provided the basis for the largest ever forum on ICT for development. There were over 200 exhibitors ranging from international development agencies to private sector companies, national governments and NGOs. A series of conferences and workshops took place over a period of five days to present the results of ICT implementation projects, discuss future policy directions and to develop partnerships for future collaboration. The UN Food and Agriculture Organisation (FAO) presented its 'Bridging the rural digital divide' activities (www.fao.org/gil/rdd/) including:

- AgroWeb: A network of Central and Eastern European farmers share online information on issues such as European Union integration, marketing food and nutrition, veterinary medicine, forestry and fisheries.
- VERCON: The Virtual Extension, Research and Communication Network (VERCON) to improve information exchange and communication between and within agricultural research and extension organisations. VERCON has been piloted in Egypt by providing computers and Internet access to government institutions in 50 locations from the capital to village level. It will now be extended to cover the whole country.
- FarmNets: Farmer Information Networks provide information to farmers through intermediary

organisations on crops, inputs, prices, markets, weather conditions and credit facilities. FarmNets are now operating in Latin America, Africa and Asia using ICTs and conventional media to help farmers communicate and access useful services.

- FAO/DFID/ODI study: A joint study on 'Livelihoods approaches to information and communication in support of rural poverty elimination and food security' helped to identify the key issues to be addressed by efforts to bridge the rural digital divide (www.odi.org.uk/).

Other international agencies presented their programmes on their stands and through seminars on themes such as capacity building, local content development, and empowerment. UNESCO presented a wide range of initiatives from its Communication and Information programmes such as the Community Multimedia Centres and Education in and for the Information Society (www.unesco.org/wsis). A number of private sector organisations also attended. Nokia presented the results of a collaborative project in the Philippines with UNDP to provide teachers in remote villages with educational content via specially adapted satellite technology. Hewlett Packard's laboratories in Bangalore, India showcased a number of innovative solutions to providing low cost ICT solutions. The Kuppam i-community programme, in collaboration with the Government of Andhra Pradesh, aims to improve ICT infrastructure and access to ICTs in the community. A farming information system is to be developed to improve farmer access to expert advice, the flow of market information and facilitate training. The concept of developing 'Multi-stakeholder Partnerships' such as these was the focus of the Global Knowledge Partnership issue paper and workshop in order to develop further innovative collaboration between public and private sector organisations that harness ICT for development objectives (see www.odi.org.uk/PPPG/activities/country_level/odpci/msp/sector3.html).

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Farmer Field School as a platform for delivering extension messages

The Farmer Field School (FFS) approach to disseminating Integrated Pest Management (IPM) information was originally developed by the UN's Food and Agriculture Organisation in Indonesia. Before 1985, the World Bank's Training and Visit system, under which farmers learned very little and had many of their decisions made for them, was the dominant model of agricultural extension. The FSS constituted a new approach. With some adjustments to suit local conditions, it is now used by the Bangladesh Department of Agricultural Extension in the DANIDA-funded Strengthening Plant Protection Services (SPPS) project.

The FFS are taught by facilitators who undergo a 112-day residential, season-long (seed to seed) practical training course on IPM for rice and vegetables. The participants spend most of their course in the fields undergoing participatory and discovery-based learning. They learn various aspects of crop husbandry, such as seed selection, land preparation, nursery, fertiliser and water management, pest and disease management, harvesting, storage, etc. and develop additional income for farmers by culturing fish and prawns in rice fields and growing *ail* (dike) crops.

An FFS is conducted by two facilitators and consists of a group of 25 male and female farmers, their fields and some training materials. The class meets 14 times during the cropping season, the participants learning by doing small experiments in their own fields. Adult learning principles, such as valuing farmers' field experiences, collaborative activities, encouraging group interactions, etc. are used. The farmers are encouraged to monitor their crops continuously, a process called agro-ecosystem analysis, and the pest management training is only one part of a holistic crop management process.

The IPM curriculum has 14 sessions to cover the duration of crops from seed to seed. The sessions generally last about three hours and are normally held once a week. However, in the case of crops of more than 14 weeks duration, they may be held fortnightly so that these crops can be studied within the 14-session framework.

Questions and discussions are very important in all aspects of the course. Questions are rarely answered directly; instead the trainers try to guide the participants to explore possible solutions to their problems and resolve them themselves. Participants have to justify any decisions they make to the rest of the class, and they have to take part in group reporting of agro-ecosystem analysis.

There are only general guidelines for conducting the FFS. Topics for discussion and class activities are determined jointly by the farmers and facilitators, based on local crop management problems, field situations, etc.

A field day is organised towards the end of the course, at a time convenient to the participants. These are attended by about 250 neighbouring farmers, each

FFS farmer inviting 10 guests. *Upazila*-level agricultural officers, the Chairman and members of the union *parishad*, and members of the local elite are also invited.

Graduates of an FFS are confident IPM farmers, willing and able to take their own crop management decisions. They grow healthy crops in which beneficial insects are conserved. They are able to reduce inputs and, due to better management practices, even increase yields. Consequently their profit is higher and environmental pollution is reduced.

During the first phase of the SPPS project (July 1997 to September 2002) a total of 4534 FFS were held across the country, in which 113,239 farmers were trained and 1,220,803 farmers exposed to IPM practices through field days.

During the second phase (September 2002 to June 2006) 7800 FFS are planned to train another 195,000 farmers, with ten times that number exposed to IPM activities through the accompanying field days. To promote sustainability of IPM in Bangladesh, 7800 IPM clubs are planned in 200 *upazilas*.

Impact assessment studies show IPM training has had a positive impact. Trained farmers understand that not all insects in their crops are harmful. Compared with their untrained neighbours trained rice farmers use 90% less pesticide and have increased yields by 10%. Similarly, trained vegetable farmers have reduced pesticide use by 75% with a yield increase of 12%.

The FFS model has been shown to be a solid and practical mechanism to communicate new ideas to farming communities where the literacy rate is very low. The extension service and the Bangladesh government are convinced that it can be used to transfer a variety of extension messages to a large number and many types of farming groups.

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The *Kamayq*: Farmer-to-farmer extension services in the Andes

Background

The Andean region is beset by low endowments of 'geographic capital' (natural, social, human and physical capital) and rural poverty is endemic. Farmers often need technical advice and training in order to achieve some degree of livelihood security. The Peruvian government used to be largely responsible for the provision of agricultural extension services. During the 1990s, however, structural adjustments and cuts in fiscal deficits led to a reduction in the provision of government extension services. Private extension provision has grown but few resource-poor farmers are able to pay for this private extension. As a result it has generally been directed at larger commercial farmers.

Training the *Kamayq*

Since 1997, ITDG, a non-governmental development organisation, has been working in farming communities in the Peruvian Andes and exploring approaches to extension service provision that complement smallholder farmers' needs and ability to pay. The farming communities are located at over 3,500 metres above sea level. Farm households have one or two head of cattle, some sheep and a number of guinea pigs (a food staple in the Andes). The most common crops are maize, potatoes and beans. The defining characteristic of the extension initiatives is the training of local farmer-to-farmer extension agents known as *Kamayq*. ITDG established a *Kamayq* School and to date over 140 *Kamayq* have been trained of whom 20% are women. Training at the *Kamayq* School is characterised as follows:

- Trainees come from and are selected by the communities. One of the key criteria in the selection process is the willingness of the trained farmers to work subsequently in their communities.
- Training is provided in Quechua, the local language. Instructors include ITDG staff, long-serving *Kamayq* and experts from regional universities.
- The course lasts eight months and involves attendance for one day per week. The emphasis is on practical learning and training occurs at different field locations and only periodically in a classroom.
- The course focuses on local farmers' veterinary and agricultural needs including: identification and treatment of pests and diseases of agricultural crops and farm animals; improved irrigation via the use of a network of drainage channels; and improved breeding of farm animals such as guinea pigs.

Kamayq who have received training at the school are subsequently able to address farmers' veterinary and agricultural needs. Farmers pay the *Kamayq* for their services in cash or in kind. They are able and willing to do so because the advice and technical assistance they receive has led to an increase in family income of 10–40%. This has come about through increased production and sales of animals and crops. For example, the technical advice that farmers have

received on irrigation and improved pasture has led to increases in milk production of up to 50%.

One of the most sought after services is the diagnosis and treatment of various animal diseases. In each of the 33 communities where the *Kamayq* are active, mortality rates among cattle have fallen dramatically. This has partly come about through the *Kamayq* working with local farmers to find solutions to veterinary problems. A good example of this process of Participatory Technology Development has been the discovery of a natural medicine to treat the parasitic disease *Fasciola hepatica*. Over a three-year period, the *Kamayq* and local villagers experimented with a range of natural medicines until they discovered a particularly effective treatment that is also cheaper than conventional medicines.

Broadening the work of the *Kamayq*

The *Kamayq* is largely an unsubsidised farmer-to-farmer extension service with ITDG only covering the cost of the training provided at the *Kamayq* School. The success of the *Kamayq* demonstrate that in the context of debilitated or non-existent government extension programmes it is possible to provide extension advice in a way that complements smallholder farmers' needs and resources.

Having worked principally with farming communities in highland valleys, ITDG is now extending the *Kamayq* scheme to communities in the higher reaches of the Andes where livelihood security is linked to the husbandry of alpacas. A group of 32 *Kamayq* has recently been trained to address the veterinary needs of alpaca herders. There is also a need to broaden the focus of the *Kamayqs'* work. Like most conventional agricultural extension provision, the *Kamayq* have worked predominantly on improving and increasing production at the farm level. ITDG is investigating whether the *Kamayq* model is one that can be adapted so as to provide farmers with the business services they need in order to benefit from emerging market opportunities.

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Development of animal drawn tools for conservation agriculture

Draught animals play an important role in agriculture in developing countries. In Africa draught animals were mainly introduced by missionaries or colonial administrators with tools developed for their home countries. At that time there were large numbers of animals, abundant land and few farmers, and the simple hand tools could only assist in cultivating limited areas. However, constantly ploughing to the same depth created a hard pan hindering water and plant root penetration and thus limiting yields. A large number of tools, often of poor quality have been imported into Africa, whose main wearing parts usually did not conform to local standards. Replacing even a plough share became a problem.

The African continent has suffered a general reduction in soil fertility and decline in yields over a period of three to four decades leading to food shortages and urban migration. The concept of Conservation Agriculture, long known and practised by some needs to be expanded and modified to be attractive to a wide range of farmers in Africa. Keeping the soil surface covered at all times with crop residue or cover crops and planting seeds with a minimum disturbance has been shown to stabilise the soil and improve its fertility and subsequent yields.

The Kenya Agricultural Research Institute (KARI) has offered to assist farmers particularly in semi-arid areas to plant early and fully use the limited rainfall, where crop failure in two out of five rainy seasons is normal. The soils are too hard for conventional draught tools and the farmers need to wait with land preparation until after the first rains resulting in substantial yield losses. Earlier research had shown that breaking of the hard crusts and planting early by hand while allowing for sufficient drainage of excess water improves yields, but suitable tools for draught animals were lacking.

With assistance from the private sector KARI developed an animal drawn tool, which can penetrate, loosen the soil and break the hard pan in dry soils without inverting them. Several prototypes of the so-called dry planter (see photograph) were developed for a variety of soils. These dry planters are basically soil-loosening tools fitted with a hand-fed seed planting tube to enable both operations to be carried out with one pass of the animals. The tool cultivates and plants in narrow strips, covering the seeds with loose soil and surface trash that is scraped over it. The design, partly based on research carried out for larger earth moving equipment, reduces the amount of energy needed from the animals and speeds up the planting

operation. Only 7.5 person hours/ha are required versus 45 person hours/ha with the traditional system.

Where large amounts of surface trash exist as cover crops or crop residues, the planter is fitted with a disc in front of the chisel set just deep enough to cut the trash. This disc adds to the cost of the tool since it needs to be imported. If the soil is dry, weights may be needed to assist the tool's penetration. This increases the draught force needed. However, the draught force required is relatively low and can be delivered by a pair of oxen even at the end of the dry season when they are weakened from poor fodder.

Where little surface mulch is present due to the activity of animals and termites, weeds can be removed mechanically using 'A' or 'L' blades on the tool frame.

However, where surface trash is dense weeding is difficult and further experiments are being conducted to solve the problem.

These new conservation tools have been designed to be manufactured by village level informal sector artisans using simple facilities and locally available material. Apart from generating employment this avoids the previous long and costly distribution chains from importer to farmer. The artisans

can make the version most suited to the area and sell directly to the farmers. This ensures quality control by the artisans due to direct contact.

The part of the tool which penetrates the soil and loosens it, must be able to resist shock loads and the abrasive wear of sandy soils. The most suitable steels are costly and unavailable at this level but old car springs, generally abundantly available, serve perfectly well and can be cheaply and easily replaced when worn.

The use of animal drawn tools for Conservation Agriculture is in its early stages on the African continent. There are many problems to overcome but early results are promising, not only by increasing yields but also by reducing the human and animal hours and forces needed for cultivation, planting and weeding.



Dry planter

Further information

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Use of an indigenous board game, 'bao', for assessing farmers' preferences among alternative agricultural technologies

Introduction

Participatory research has helped scientists to work together with farmers to develop new technology. But a major weakness of this approach is that few tools exist that both scientists and farmers can use together. In fact, scientists often view participatory research approaches, such as informal surveys, as subjective and inimical to quantitative data analysis. Participatory researchers, in turn, often view conventional tools, such as questionnaires, as incompatible with farmers' investigative processes. This note presents a method for obtaining data on farmers' preferences that is of use and is user-friendly to both farmers and researchers. This involves the use of the game board from 'bao', a traditional game found throughout Africa, Indonesia, and the Caribbean. The method facilitates the collection of quantitative data in a manner that allows the farmer to actively participate and benefit.

Tools for obtaining farmers' evaluations

Questionnaires are usually unsatisfactory for getting farmers' ratings of alternative technologies. First, asking farmers to rate alternatives on a 1 (poor) to x (excellent) basis is problematic because such exercises are not easily understood. Second, where terms such as good, fair, and poor are substituted for numerical scores, there are considerable translation problems. Third, farmers quickly become bored with questionnaires, because their involvement is passive.

Participatory researchers, on the other hand, use visual tools for obtaining farmers evaluation. For example in matrix ranking, farmers draw a matrix on the ground and place alternative technologies (e.g., crop varieties) along each row, and symbols to denote criteria (e.g., taste or drought resistance) over each column. Farmers then rank the technologies on each criterion, using one stone to designate first place, two for second place, etc. The tool is commonly used but rarely are statistical methods applied to analyse the results. In fact, participatory research emphasises working with groups of farmers and achieving consensus rather than collecting data from individuals.

The Bao game

Bao players move seeds among carved-out pockets of the board, which are laid out in a matrix. To use the game board in evaluating technological alternatives, such as trees or crop varieties, researchers and farmers first need to identify the criteria farmers use in assessing alternatives. This is done by touring the farm, viewing the different alternatives in question (e.g., trees), and discussing their performance, uses, advantages and

disadvantages. During the discussions, researchers note the different criteria that farmers use in evaluating and comparing the alternatives. For example farmers may compare trees on different end uses (straightness for timber or heat production for fuelwood) or different growth characteristics (speed of growth or compatibility with crops). Next, researchers and farmers find a comfortable place, and, in the case of trees, put a twig of each important tree next to each row of the game. Then, for each criterion the farmer mentioned during the tour, he/she rates each tree from one seed (performing poorly) to five seeds (performing well). Both farmers and researchers may add criteria if they wish. The exercise often ends by asking farmers to

give overall scores for the tree, taking into account all criteria. Scores are preferable to ranks because scores give interval data, whereas ranks give only ordinal data. The method is also useful for scoring alternative benefits from using a specified practice.

Case study

In Burundi, 25 farmers used the bao game to evaluate different trees on their farms. They rated eight wood producing trees across seven criteria that were important

to them, focusing on management, growth, and uses for timber and firewood. There were intriguing discrepancies between farmers' ratings and the prevalence of the trees. *Eucalyptus* spp. and *Grevillea robusta* were the most common trees and were highly rated by farmers; eucalyptus for fast growth and firewood and grevillea for fast growth and compatibility with crops. *Maesopsis eminii* and *Cedrela serrata*, were also highly rated but were not common. They were relatively new in the area and lack of information and planting material were the biggest constraints to their adoption. The assessment was also useful in revealing other criteria that farmers use, e.g., males and females appeared to have similar interests in the various trees, with the exception of *Markhamia lutea* which women rated higher than men, because they use the leaves for preparing a medicine to treat diarrhoea in children.

Discussion

Using the bao game combines the strengths of conventional tools for scoring, such as questionnaires, with those of participatory techniques, such as matrix ranking. Like questionnaires, the bao game is useful for generating quantitative data useful for testing hypotheses and statistical analysis. It is also a participatory tool that the farmer finds engaging. Moreover, because farmers control the scoring process, they take the exercise more seriously than in



The bao game

responding to questionnaires. Finally, because the bao game board is a visual tool, respondents can check their responses and members of a group can discuss differences in scores. The bao game can thus be used for conducting technology evaluations in an accurate, entertaining, yet statistically rigorous manner.

Further information

A longer paper on this topic is available electronically from the author:

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Centre for Alternative Agricultural Media (CAAM): Connecting the farmer and the media

CAAM came into existence on December 3, 2000 in Dharwad, India, with an objective to strengthen farmer-friendly communication systems. Dr. Shivaram Pailoor a journalist with a farming background founded this forum along with several like-minded people. The CAAM team consists of experts from various walks of life, who have contributed towards this objective. Since its inception, CAAM has been working successfully towards accomplishing its goals through several activities.

Networking for a cause

CAAM has compiled a directory of farm-environment journalists in *Kannada*, the state language of Karnataka, India. Sixty well-known writers have responded to a CAAM questionnaire, providing details including their experience, interest, concern and related activities. The list has been made available to different media.

In the last 33 months CAAM has released 39 issue-based articles through its e-bulletin, CAAM-Net. These bulletins reach over 10,000 people across the world, and to boost its activities the centre has designed a website called 'www.farmedia.org' which has received a good response. The website acts as a platform for expressing views and ideas related to the field and has helped to spread the concept.

Two important issues of water and organic farming have been addressed extensively in CAAM's website. Two separate sections have been created for the purpose.

• Water Network

In recent years, people have started considering rainwater harvesting as a solution to the looming water crisis. Finally the theory of soil and water conservation has been put to practice. This change is not immediate. During the transformation from using water to utilising it, many questions may arise. To make one understand the concept better and to answer practical doubts CAAM provides information on authoritative sources on rainwater harvesting.

• Organic Bytes

The organic movement is on the rise. A considerable number of farmers have realised the dangers of chemical farming and have started practicing eco-friendly farming. The demand for organically grown food is also increasing, as the consumers are becoming more health conscious. The concept of 'organic shops' is becoming popular among the urban consumers. The 'Organic Bytes' section on

the website contains articles on eco-friendly farming and related efforts.

CAAM conducted a study in June 2002 on the organic farming movement in Hassan and Mysore districts, Karnataka. The team visited several successful organic farmers and documented their efforts in sustainable agriculture. The stories are being released through CAAM bulletins and also published on its website.

In order to encourage organic farming CAAM has also opened a new section on its website wherein organic farmers (from India) can publish details about their farm produce available for sale. A farmer sends the details of the produce, availability during the year, quantity as well as contact information, to be displayed on the website. CAAM hopes that this free service enables buyers to contact organic farmers directly.

Activities to strengthen farm journalism

CAAM has been giving state level annual awards for the best farm writing in Kannada. The awards are given in two sections (farmer and general categories). This has received an overwhelming response from writers across the state.

CAAM organised a two-day farm journalism workshop at Hulakoti in Gadag in Karnataka on its first anniversary. Twenty-six enthusiasts from across the state participated in the workshop. Both participants and the centre found that a two-day workshop is not enough to inspire and train them on farmer-friendly journalism and to encourage them to take up this area of journalism.

With this in mind, CAAM has introduced a unique farm journalism diploma course in Kannada. This is a one-year correspondence course, which was launched in November 2003. Topics such as the nature and importance of farmer-friendly farm journalism, types of farm writing, techniques of writing, and photo journalism will be covered during the course.

Though CAAM is not funded by any external agency, the enthusiasm and the determination of its team has kept it going successfully.

Further information

Shivaram Pailoor

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Websites

Smallholder Irrigation Market Initiative (www.siminet.org)

Access to irrigation is a limiting factor to the productivity and profitability of small farms in many parts of the world. Low-cost micro-irrigation and a series of other low-cost technologies related to small-scale irrigation like treadle, rope and similar pumps, small-scale water storage technologies etc. have a good potential to allow a large number of small farm households to escape the most severe poverty by producing high value cash crops for local and more distant markets, or food during the dry season, and thus to increase household incomes and improve livelihood security. However, smallholders can only exploit the potential that these technologies offer if they have access to the technologies themselves including spare parts, and to adequate means of production, know-how and markets. Only technologies that are commonly available in local markets have a real chance of being widely and sustainably accessible to smallholders. This requires an economically viable, profitable supply chain in the private sector, which covers all the steps from raw materials over manufacturing and assembly to distributors and spare part dealers who sell the equipment to the users. For low-cost technologies such supply chains often do not develop by themselves, but their establishment can be fostered through market creation approaches. Information, resources and links related to smallholder irrigation technologies as well as market creation for their large scale dissemination are now available on the new website of the SIMI network.

Virtual Academy for the Semi-Arid Tropics (VASAT) (www.vusat.org)

The International Crops Research Institute for the Semi Arid Tropics has launched the Virtual Academy for the Semi-Arid Tropics (VASAT). The academy has been set up to share information on dryland agriculture between partners and provide a resource for distance learning on issues such as drought preparedness and climate. A range of partners such as the Commonwealth of Learning and the M S Swaminathan Foundation are collaborating on the project which was launched for India in June 2003 and for West and Central Africa in September. The website contains learning resources

such as a module on 'coping with drought' and background documents on the approaches being taken in India and West and Central Africa

Agricultural Research and Extension Network (www.odi.org.uk/agren)

The AgREN website contains a full list of network papers together with details of how to join, the benefits of membership, how to submit material for publication, and contact details for network personnel. Back issues of papers dating back to July 1999 and the current newsletter are also available. The AgREN website contains links to other related organisations and projects, and we welcome suggestions from members regarding other useful links that you would like to see included. Members may now update their details online in preparation for the Register of Members to be published in 2004.

Rural livelihoods and the younger generation (www.ileia.org)

The LEISA Magazine – on Low External Input and Sustainable Agriculture will be considering the topic 'rural livelihoods and the younger generation' in its next issue including issues such as:

- What livelihood opportunities are available to the younger generation.
- Are they being adequately prepared to make the best use of the natural and cultural resources available to them?
- Are the communities in which they grow up still able to transmit the knowledge and values they will need to build up a livelihood in agriculture?
- Do farmer training schemes and other developmental projects aimed at increasing the resilience and productivity of small-scale agriculture include an assessment of the needs of the younger generation?
- What are young people themselves doing with the resources available to them within their communities and what effect do their initiatives have on the natural resources, productivity and sustainability of the agricultural communities to which they belong?

The contact and submission details are available on the website and articles should be submitted by the first of March. For further information contact ileia@ileia.org

Announcements

AgREN Register of Members 2004

A new edition of the AgREN Register of Members will be published in 2004, and we therefore ask members to confirm their details to ensure that the information contained in the new Register is useful to those who receive it. If you have not received a reminder, either by post or email, please contact us to confirm that you are still interested in receiving mailings from AgREN. In addition please indicate your four main areas of interest from the list below:

- 01 Farming systems
- 02 Agroforestry
- 03 Institutional strengthening
- 04 Farmer participation
- 05 Agricultural extension
- 06 Community based organisations and farmers' groups
- 07 Agricultural research policy
- 08 Project management, monitoring and evaluation
- 09 Seed supply and biodiversity
- 10 Livestock and animal traction
- 11 Conservation and environmental management
- 12 Gender issues
- 13 Agricultural marketing
- 14 Rural livelihoods

Members with access to the internet can now update their membership details online at www.odi.org.uk/agren. Alternatively details may be sent by email to agren@odi.org.uk, or to the mailing address given on the cover of this newsletter.

AgREN e-discussion on the implications of rural livelihood diversity for pro-poor agricultural initiatives

The next AgREN e-mail discussion will be on the subject of rural livelihood diversity. It will take place between 22 March and 2 April, 2004.

The past several years have seen an increasing amount of attention focussed on the diversity of livelihood strategies employed by rural households. In particular, there is strong evidence that many so-called 'farming households' derive a significant proportion of their incomes from activities that take place off-farm and/or that are not related to agriculture. There is also evidence of differences in the importance of farming income between regions and often of significant variation within villages. In addition, there is evidence that in many cases farming is not offering a pathway out of poverty (even for households with significant farming assets) and that many 'success stories' are based on non-farm income.

This evidence on rural livelihood diversity needs to be addressed by those interested in agricultural development. The AgREN e-discussion will examine the implications of rural livelihood diversity for the plans, targets, and activities of individuals and organisations that work on pro-poor agricultural projects and programmes. As usual, we hope that the discussion will be based largely on the first-hand experience of discussion participants. Among the issues we hope to address are:

- How important are diverse livelihoods for agricultural development strategies? Does the evidence justify a major reconsideration of programmes for agriculture, or is this diversity something that has been apparent for many years and is already accommodated in agricultural development strategies?
- How does (or should) rural livelihood diversity affect the targeting of agricultural programmes? Should more attention be given to distinguishing among households with varying agricultural assets and aspirations?
- If certain household members are engaged in non-agricultural activities, what are the skills and capacities of those left on the farm, and what are the implications for agricultural technologies and extension?
- What does rural livelihood diversity tell us about the types of technologies that should be developed? For instance, should they save labour (to allow further diversification) or generate labour (to draw in household members currently engaged in poorly remunerated off-farm tasks); should they focus on the market (for farmers with commercial aspirations) or subsistence; should they develop new farming skills or rely on unskilled labour?

Although there is now a great deal written about rural livelihood diversity, there is very little information available on the implications for agricultural development. We hope that the discussion will represent a step forward.

We invite your participation in the discussion. Registration is straightforward. Please send a message to majordomo@rimisp.cl with ONLY the following text:

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subscribe agren email-address  
end
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The website to accompany this e-discussion will be accessible via www.odi.org.uk/agren.

Free books for AgREN members

The results of a research project on soil and water conservation are available on the ODI website at www.odi.org.uk/rpeg/soil_degradation/index.html and

have been published as books in three volumes. A limited number of copies will be sent free (first come, first served basis) to AgREN members who would like to receive them:

- Slaymaker, T. and Blench, R. (2002) *Rethinking Natural Resource Degradation in Sub-Saharan Africa: policies to support sustainable soil fertility management, soil and water conservation among resource poor farmers in semi-arid areas*. Volumes I & II. ODI/University of Tamale, Ghana.

These two books provide country overviews (Volume 1) and case studies (Volume 2) for Burkina Faso, Ghana, Nigeria, Senegal, Tanzania, Uganda.

- Slaymaker, T. and Blench, R. (eds) (2002) *Pour une nouvelle approche de la lutte contre la dégradation des ressources naturelles en Afrique subsaharienne: Etudes de cas menées en Afrique de l'Ouest*. ODI/ENDA Pronat, Senegal.

This book provides both the country overviews and the case studies for Burkina Faso, Ghana, Nigeria and Senegal in French.

If you are interested in receiving a copy (limited numbers available) please contact the AgREN Administrator at agren@odi.org.uk.

New Book on Rural China

Sustainable Development in Rural China: Farmer Innovation and Self-Organisation in Marginal Areas by Bin Wu

Routledge-Curzon, 2003

Sustainable development in marginal areas, especially in those where rural poverty and environmental degradation are interwoven, is a great concern of development agencies worldwide, and much effort is

put into development programmes, technology transfer schemes and so on. The problem is particularly acute in China, where increasing regional differences and inequality are eroding governmental poverty reduction efforts and exacerbating ecological crises. This book, based on extensive original research, examines the situation in China, especially in the Loess Plateau of Shaanxi Province. It explores in particular how farmers have organised themselves to initiate technical innovation, and considers communication networks and co-operative mechanisms. It discusses successful self-organisation, and how interfaces with external development agencies and with institutional innovation might be handled, highlighting the potential of farmer innovation initiatives, especially when they are linked with external development and environmental improvement programmes.

For further information please contact Bin Wu at Wub@cardiff.ac.uk

Agriculture and poverty reduction

The UK's Department for International Development (DFID) has recently published a policy paper entitled 'Agriculture and poverty reduction: unlocking the potential.' The paper briefly describes the extent of current DFID support to agriculture and introduces the need for new approaches. The paper also announces an increase in support to the Consultative Group on International Agriculture (CGIAR) amounting to £30m over three years from 2004–5. The paper is intended to initiate a period of open consultation to inform DFID policy on agriculture and poverty reduction. Comments are invited to agriculture@dfid.gov.uk and the paper is available to download at: www.dfid.gov.uk/Pubs/files/agri_poverty_reduction.pdf

Guidelines for contributions to AgREN publications

AgREN members and others are encouraged to submit material for publication in both the Newsletter and as Network Papers. The type of material that is most suitable for submission is described below. Articles submitted as potential Network Papers will be assessed by an Editorial Committee and, where necessary, guidance will be given to authors in revising their papers for publication.

a) Newsletter Contributions: AgREN welcomes news from members that describes their work relating to the development of small-scale agriculture and sustainable rural livelihoods. AgREN would particularly like to hear about specific, on-going projects which are particularly innovative or other activities of interest to AgREN members. Contributions to the newsletter should be no more than 800 words, and may include photographs or illustrations. Shorter contributions are also appropriate. Please note that articles may be edited prior to publication.

b) Network Papers: AgREN Papers are broadly concerned with the design and promotion of appropriate agricultural technologies, with specific attention focused on the methods, processes, institutions and policies that promote pro-poor technical change and support equitable improvements in agriculture for developing countries. The principal focus of AgREN Papers should be adaptive research, extension or supporting mechanisms such as credit, marketing and producer organisations. Network Papers should seek to explore and promote the role of increasing agricultural productivity, resource conservation and farmer empowerment in the context of diversified rural livelihoods.

Content:

- Papers should focus on practical experience in research and extension methods as well as innovations in the public or private provision of other agricultural services.
- Papers may make reference to current theoretical issues in the field of rural development, but their principal focus should be on the provision of well-written descriptions of practical and innovative experience that will be of use to other practitioners.
- Although AgREN has an interest in novel diagnostic and evaluation methods that help practitioners understand farmers' priorities and contexts, papers that follow through on such diagnosis and illustrate applications and outcomes are particularly welcome.
- Papers may be based on a broad range of sectors relating to agriculture, e.g. crop and livestock production, aquaculture, agroforestry, extension, natural resource use, environmental management, credit supply and marketing.
- Most AgREN papers describe an experience from a particular time and location, but they are written in such a way that practitioners on other areas can draw useful implications.

Word length and referencing:

Network Papers should be between 6,000 and 12,000 words long, and include an abstract of 500–750 words highlighting research findings and policy implications. References should follow the examples below.

Books:

Carney, D. (1998) *Sustainable rural livelihoods: What contribution can we make?* London: DFID.

Journal articles:

Sanchez, P.A. (1995) 'Science in agroforestry'. *Agroforestry Systems*, No. 30, pp. 5–55.

Other information:

- Material submitted to the Network will be considered for publication on the understanding that it has not been submitted elsewhere.
- Material published by AgREN may, with acknowledgement to ODI, subsequently be published elsewhere.
- Contributors will be asked to sign a form transferring copyright for published material to ODI. This enables us to give others permission to photocopy Network material.
- Newsletter items may be submitted to the Network at any time. If it is not possible to include an item in the next newsletter it may be held over for use in a subsequent edition.
- Photographs may be submitted to accompany newsletter items. These should have a minimum resolution of 200 dpi.
- Papers should be submitted both in hard copy and on 3½" disk or by email, in one of the widely used word-processing packages.
- All material should be submitted to the Network Coordinator at the address given below:

Agricultural Research and Extension Network, ODI,
111 Westminster Bridge Road, London SE1 7JD, UK. Email: agren@odi.org.uk

Papers with this issue

133. **Participatory technology development with resource-poor farmers: Maximising impact through the use of recommendation domains.** Czech Conroy and Alistair Sutherland
134. **Strengthening poverty reduction programmes using an actor oriented approach: Examples from natural resources innovation systems.** Stephen Biggs and Harriet Mutsaers
135. **Information and communication technology in agricultural development: A comparative analysis of three projects from India.** Shaik.N.Meera, Anita Jhamtani and D.U.M. Rao