4. Market-orientation and demand-drive

4.1. Overview

The primary focus of agricultural extension today is no longer on increasing production but rather on enhancing rural incomes through market-orientation and responding to farmer demand. Perhaps the most obvious way of promoting greater demand and market-orientation is by commercializing services in order to ensure that the farmers, as clients of these services, can exert greater control. Farmers themselves are deciding if and how they want to compete in different markets and they themselves are the best judge of which extension service providers can support them in this task. This requires that male and female farmers are able or enabled to pay for these services and that a genuine market for extension services exists or can be created.

A positive outcome of the weakening of public sector extension agencies is the recognition that many commercial farmers are ready and willing to pay for at least a portion of the costs of the services that they need. This implies that publicly financed (but often privately provided) services can be targeted more directly at public goods and policy objectives related to poverty alleviation, environmental management and household food security. Financial resources can be provided via vouchers, new mobile phone payment systems, a range of funds and other financial mechanisms so that the poor can then contract those public or privately provided services that best meet their service requests.

Experience has shown that generating a demand-pull for extension involves much more than commercialization. Investments in the capacities of farmer organizations to formulate and articulate their demands and to request services can make extension service providers more accountable. Effective demand is related to power and the financial capacity to pay for services. Farmers must be represented in the decision-making structures of applied research and extension organizations and different local platforms for planning and prioritizing investments. Farmer organizations may also develop capacities to respond directly to farmer needs by managing and providing extension services themselves. This is not only important at local and national levels. Regional farmer organizations are expressing farmer demands at transnational levels as well, where policy structures such as CAADP are increasingly defining the macro-level frameworks for rural development support.

Market-orientation relates to value chain development as a whole. Markets demand new varieties, breeds and processing, but technologies are just one aspect. Value chain development may require effective communication and facilitation of linkages, coaching of interactive learning and collaboration among a broad spectrum of actors within the value chain. Extension's role in supporting market-orientation in these platforms may thus be to encourage a dialogue wherein these stakeholders can come together to negotiate and build social capital. This will often involve training in negotiation skills and contracting. Social capital is often the most important factor in market development. By increasing transparency and exchange, extension can make an important contribution to building trust, particularly with regard to including poor farmers on a more equal footing in market development.

From development cooperation to sustainable commercialization[13]

The Kerala Horticultural Development Programme (KHDP) was established as an autonomous organization in the state of Kerala (India) in 1992. The aim of KHDP was to increase and stabilise the income of small-scale fruit and vegetable farmers through the creation of a new organization with professional staff skilled in agriculture, business management and social work. Recognizing the need to develop appropriate technological solutions for farmers, KHDP initially funded research. In its early years KHDP found that it needed to organize farmers into groups, both to help promote new technology and participatory skills as well as to help farmers access credit and strengthen negotiating power through collective marketing. When external funding ended, the KHDP restructured itself by registering in 2001 as the Vegetable and Fruit Promotion Council Keralam, in order to provide continued support to growers. 50 percent of the shares of the company are held by self-help groups of farmers. The remaining 50 percent of shares are held by the state government and agencies such as banks and research institutions.

4.2. Market-oriented extension

Markets are the driving force in agricultural development. This suggests that technological and organizational changes are in most instances driven by efforts to participate in markets. This is why, in recent years, extension has been steadily moving beyond its past role in technology transfer to greater involvement in facilitation, coaching and brokerage in market chains.

Market demands are changing rapidly and becoming more stringent. Increased provision of market-oriented extension is essential if poor producers and rural entrepreneurs are to have the knowledge and information they need to respond to these challenges. Good market-oriented extension thus requires looking beyond the market opportunities that exist right now to focus more on helping farmers prepare to compete in the markets of the future. Iterative approaches are needed to help clients to adapt to the range of factors that are impacting on agricultural markets, from climate change to the expanding dominance of supermarkets and global supply chains.

Market-orientation demands a value chain orientation; which in turn implies that extension must meet the needs of a range of actors – not just farmers. Extension must be concerned with local economic development and empowerment, and not just farming itself. In effect, market-oriented extension is about making sure a range of actors are able to collaborate with one another. For example, if traders or input vendors want to invest in a particular product, they may need to provide advice to farmers about varieties and planting methods. The other value chain actors who are advising farmers about what they want to sell (inputs) or buy (farm produce) therefore also need to understand the technology themselves in order to provide such advice. These other market actors require access to extension as well. Such a broader approach to the extension agenda is controversial. It raises questions about whether extension is just about 'helping farmers' or if it requires advice to a variety of stakeholders so as to contribute to developing the rural economy (and with that, rural livelihoods). A genuine value chain approach implies the need for facilitation and brokerage efforts to address constraints and bottlenecks to market access. Merely 'helping farmers' may not provide much help if the rest of the market chain is dysfunctional.

[13] Sulaiman, R. 2008. Sector paper on knowledge generation and management. FAO New Delhi.

Training input supply dealers to improve advisory services for farmers[14]

The National Institute of Agricultural Extension Management (MANAGE) in India began a new training programme for input supply dealers in 2003 and has already trained over 1,500 dealers. The goal is to build strong public–private partnerships in India, so that farmers receive accurate and up-to-date technical advisory services from input supply dealers. Dealers receive training on current recommendations for the specific crops grown in their respective districts and they develop a working relationship with subject matter specialists and researchers that serve their district. In short, when these input supply dealers are asked about a new problem being faced by farmers, they will know who to call in extension, the state agricultural university or a nearby research center. In addition to learning about relevant technical skills, they also learn how to communicate more effectively with farmers, so they can provide up-to-date information to their clients. Finally, they learn about ethical issues and other concerns needed to run an effective business and to build a long-term 'win-win' relationship with their farmer clients.

Public sector extension service providers are currently often ill equipped to take on the challenges of market-oriented extension. It may be the input suppliers and processors that are training extension agents rather than vice versa. Supermarkets may be pressuring processors and traders to contract advisers (for themselves and the farmers they buy from) to ensure that the products they deliver meet quality and safety standards. The domination of market-oriented extension by private sector actors is perhaps inevitable, but it is important to stress that this is not a solution for all farmers or areas. Such services are generally patchy and restricted to high-potential areas with good infrastructure. Access often ends at the end of the tarmac road.

Much effort has been made over the past decade to develop more effective market-orientation within extension services, often in the form of 'pilot projects.' Many such projects are more 'marketing oriented' (consisting of direct support to bring products to markets) rather than 'market-oriented' (developing the capacities of value chain actors to deal with markets themselves). Lessons from these projects are potentially valuable, but sustainability is generally poor. Even more importantly, not enough has been done to adapt these for scaling up in ways that will convince politicians and policy-makers to invest scarce public resources in them. Advisers need steady access to advice themselves if they are to sustain quality in market-oriented extension. Ad hoc training, often referred to as 'capacity building,' is not a sufficient substitute for the ongoing back-up support that extension agents require to maintain their capacities to stay in tune with markets and standards. They need to know what they are talking about if a market collapses or if consumers develop a preference for new food products. Most importantly, they need skills in how to develop broad based capacity among farmers and local entrepreneurs to make informed judgements about whether or not to engage in markets.

The need to anchor commitments to market-oriented extension at higher levels is currently more important than ever due to the increasing attention being given internationally to capitalising on the potential of 'aid-for-trade' as a driver of development. If development is expected to be driven

[14] Swanson, B. and Rajalahti, R. 2009. Strengthening Agricultural Extension and Advisory Systems: Procedures for Assessing, Transforming, and Evaluating Extension Systems. Agriculture and Rural Development Discussion Paper 44. The World Bank, Washington, D.C.

by expanded international trade, this has implications throughout the market chain, particularly if aid-for-trade is to reduce poverty. Most poor farmers, particularly women, face massive barriers to take advantage of the opportunities provided by large markets. Extension is not a panacea for breaking down these barriers, but it is one of the few tools available to reduce the thresholds faced in greater participation in trade and markets more generally. Awareness among policy-makers of the difficulties encountered in market-oriented extension could also help in understanding if and how aid-for-trade can contribute to rural poverty alleviation.

Mace Foods in Kenya[15]

Mace Foods is a private limited company (Kenyan-Italian-German joint venture) started in 2002 with its headquarters in Eldoret, Kenya. In addition, Mace Foods Europe Ltd. located in Wuppertal, Germany, handles all sales and marketing activities. Given this European Union (EU) connection, Mace Foods has rapidly increased its production, processing and export of chilli powder and other dried horticultural products to Germany, Italy and other European countries. To expand its exports, it has steadily increased its production base. Prior to scaling up, Mace Foods had only two extension agents who were providing advisory services to a small group of contract farmers. In order to expand their production, Mace needed an additional 1000 farmers who could produce chillies to EU standards.

The USAID-funded Kenya Horticulture Development Programme (KHDP) provided a full time extension specialist and agreed to cost-share the salaries of 20 additional agricultural technicians who, starting in 2004, were trained in the recommended production techniques. This specialist worked closely with each technician for one year and KHDP paid 50 percent of each technician's salary. At the end of this 'training' phase, Mace Foods assumed the full cost of these technicians. During this one-year start-up phase, 1000 selected farmers were organized into producer groups, and then they were trained and integrated into the Mace supplier programme. By 2008, 5000 Kenyan farmers were producing chillies and other dried horticultural export products for these EU markets. KHDP also worked closely with Kenya Seed Company to develop a sustainable source of hybrid seed for the chilli variety required by Mace Foods Europe. Kenya Seed is now the commercial supplier of this seed to Mace Foods.

4.3. Demand-drive

There has been a shift in recent years in understanding of the foundations for empowerment and demand-driven development, and with that demand-driven extension. In the past, there was a primary focus on participatory methods. While these are still very much needed, it is now largely recognized that such methods are merely tools which, to be effective, need to be part of wider institutional structures, organizational procedures and financial mechanisms that create a voice for the users of extension and that make extension service providers accountable to their clients. This voice and accountability will only emerge if there is a choice of service providers and if the clients can pay for their services. The monopoly of service provision by public sector agencies must be broken if demand is to drive extension.

[15] Swanson, B. and Rajalahti, R. 2009. Strengthening Agricultural Extension and Advisory Systems: Procedures for Assessing, Transforming, and Evaluating Extension Systems. Agriculture and Rural Development Discussion Paper 44. The World Bank, Washington, D.C.

Social capital is the foundation for empowerment. Farmer organizations have the potential to articulate demand on behalf of their members and put pressure on extension agencies and the political system. Farmer organizations may even provide or contract services directly. Even if a farmer organization recognizes that its members need continuous access to information and advice, and that they have a responsibility to ensure access to these services, they may lack appropriate structures and entry points to express these demands. Trust and understanding are needed if a constructive relationship with extension is to emerge, and this requires investment in platforms for farmer organizations and extension agents to discuss their respective roles. In order to increase the accountability of extension to farmers and their organizations, investments are also needed in developing the capacities of farmer organizations to understand how extension functions and to articulate their demands. This requires that the roles of public and private sector actors in innovation systems are clear and transparent. Such transparency, awareness and capacity development are core components of any effort to increase the ability of farmer organizations to draw down appropriate extension services.

A first step in moving towards demand-driven extension is to ensure that farmers feel that they can make their concerns heard, and this in turn requires that service providers demonstrate their readiness to listen and respond to these demands. In many countries the legacy of the past has meant that farmers are passive, indifferent or thankful for any service they receive and unprepared to express their demands. One of the reasons that farmers sometimes fail to express their demands is that they feel powerless in the face of the escalating requirements that are being placed on them by market actors. In order to become more demand oriented, extension providers must understand and respect the complex set of pressures experienced by farmers. Attitudes must change among both farmers and extension agents.

As will be discussed below, systems for extension financing are perhaps the most powerful ways to make service providers accountable to their clients and to convince farmers that they are in control. Appropriate financing structures (e.g. voucher systems and advisory funds managed by farmer organizations) can create a market for services, which is the most fundamental pillar in creating accountability between service providers and their clients.

4.4. Approaches and methods for promoting demand-drive

Farmer field schools (FFS) have pushed the frontier of participatory and demand-driven methods. FFS are a participatory approach of learning, technology development, and dissemination based on adult-learning principles. Groups of 20-25 farmers typically meet weekly in an informal setting in their own environment with a facilitator. The FFS approach is an interactive and practical method of training, and empowers farmers to be their own technical experts on major aspects of localised farming systems. It assumes that farmers already have a wealth of knowledge. Farmers are facilitated to conduct their own research, diagnose and test problems, and come up with solutions. Experience in Africa shows that FFS are particularly appropriate for increasing the social capital of groups of women farmers who are largely excluded from regular extension programming and from farmer organizations.[16]

[16] K. Davis, E. Nkonya, E. Kato, D. A. Mekonnen, M. Odendo, R. Miiro, J. Nkuba, and J. Okoth. Forthcoming. Impact of farmer field schools on agricultural productivity, poverty, and farmer empowerment in east Africa. IFPRI Monograph. Washington, DC: IFPRI.

Other examples of methodologies with potential to strengthen participation and demand for services are the Farmer Study Circles (FSC), which are implemented through farmer organizations in smaller membership groups, and the Facilitation Cycle (FC) that has been applied as a pilot in the extension service in Zambia. The FSC is based on farmer groups' self study of materials of their choice, developed for the purpose of solving specific issues of their farming systems and supplied by their farmer organization at a higher level. The FC in Zambian extension involves facilitation of demand formulation and action planning in groups, followed up with advice for households. Farmers are facilitated to do their own market research, opportunity identification, action planning, needs assessment, resource mobilization, implementation, and evaluation. The FC is supplemented by the Household Approach, which refers to the individual follow-up and involvement of the whole family, including women and youth. The Household Approach ensures that the training in the groups is actually put into practice on the farm. A gender study, moreover, found extraordinary outcomes from the methodology in terms of gender equity in ability to formulate demands and reap benefits of the learning, which were attributed to the intensive follow-up in the households involving the whole family.[17]

Approaches and methods such as these help to bring about fuller participation of farmer groups and strengthen their capacity to identify their needs, to set priorities and demand appropriate services. But international experience shows that challenges remain in scaling up these often-costly interventions and methods. Even where cost-benefit analysis has shown high return on investment, ministries of agriculture and finance have hesitated to cover recurrent costs and it has been difficult to find sufficient extension staff (public, private or NGO) with appropriate facilitation skills. These methodological innovations are thus reliant on far-reaching systemic change within both innovation and political systems.

Methods for working with family farms in West Africa[18]

In West Africa a new advisory method called Management Advice for Family Farms (MAFF) is becoming institutionalized among NGOs (Benin), farmer organizations (Benin, Guinea, Burkina Faso) and cotton companies (Cameroon, Burkina Faso). The MAFF procedure strengthens farmers' ability to manage their farm. It is based on participatory methods for self-reflection on farmers' and advisers' perceptions of the problems addressed, and decision-making tools based on technical and financial records to modify knowledge and generate learning processes. Farm management is perceived as a cycle consisting of different phases: analysis, forecasting, action, monitoring, adjustment, and evaluation. Farmers exchange experience by joint analysis of the results obtained and by field visits. The aim is to enable each farmer to analyse his or her situation, to specify objectives and improve decision-making. MAFF mostly uses group methods. However, more individualised, complementary advice is often needed, in particular on subjects requiring confidentiality and/or to solve specific questions such as choice of investments or decisions related to major changes in the farming system.

[17] Bishop-Sambrook, C. and Wonani, C.; 2008; The Household approach as an effective Tool for Gender Empowerment. A review of the Policy, Process and Impact of Gender Mainstreaming in the Agricultural Support programme in Zambia.

[18] Faure G., Dugué P., Beauval V. (2004) Conseil à l'exploitation familiale, Expériences en Afrique de l'Ouest et du Centre, GRET-CIRAD, France, 127 pp.

4.5. Extension financing

In the past, extension was seen to be a public good, delivered by public sector agencies and financed by public resources. This is no longer the case.

- Extension systems are now recognized as encompassing an assortment of public and private goods.
- Public agencies are but one channel by which farmers and other value chain actors access information.
- Readiness to finance extension from public resources had (until recently) decreased.
- It has been recognized that the willingness of the clients of extension to pay for services was underestimated in the past.

Grand declarations are common in the heated debate on extension financing about whether or not farmers are capable or willing to pay for extension. It is clear that farmers are usually much more prepared to pay for tangible services (veterinary services, inputs, etc.) than they are ready to pay for information, which was often provided free in the past. The ability and willingness to finance service provision varies according to location, target group, commodity and institutional framework. Different mechanisms are needed in different contexts. Certain key principles are, however, universal for effective reform of extension financing.

The first is that extension financing and extension delivery must be seen as separate. Regardless of whether extension services are financed by farmers, the government or commercial actors, it is essential to retain an open mind about which service provider should then be contracted to deliver the service. Extension activities can be one hundred percent financed by the government and entirely delivered by private extension agents. There are also many examples of public extension agencies being 'contracted in' by non-state actors when, for example, NGOs have received contracts to provide services but have been unable to scale up to meet their responsibilities.

A major obstacle to objective analysis of how to improve extension provision has been the tendency to assume that privatization of delivery must be accompanied by a reduction in levels of state financing. This causes confusion as it mixes two very different issues - flows of financing and sources of financing. Reforms to the flow of financing, where resources are put at the disposal of farmers, are above all else a means to empower farmers. The primary goal is not to reduce public expenditure. An important role of GFRAS, AFAAS, GCARD and other fora for promoting advisory service reform will be to disentangle this common misperception by exploring and testing new mechanisms of public financing for non-state delivery of extension services.

The second central aspect of reform in extension financing is the need to concentrate on understanding how the flow of resources can be used to enhance empowerment and accountability. The ways that extension agencies receive payment for their services have profound impact on their accountability to their clients and incentives for providing quality services. If resources are provided to individual farmers or their organizations in the form of vouchers or other mechanisms, they can then contract the service providers that they choose, thereby increasing their power over the rural innovation system.

The choice of financing structure is as much about demand-drive as it is about covering the costs of services. Indeed, many schemes for token payments for services by the poor are unlikely to generate significant financial flows from the farmers themselves. The objective is rather to ensure ownership of the services through redirecting financial accountability. The extension agent needs to feel that the client is the farmer and not the donor or the ministry.

Farmers contracting service providers - the IFAD-funded CORREDOR Puno-Cusco project in Peru[19]

The overall objective of the Proyecto de Desarrollo del Corredor Puno-Cusco was to increase rural incomes in the Puno-Cusco area by supporting the development of micro and small-scale enterprises, and stimulating markets for local goods and services. Public competitions (concursos) were organized in which communities and groups presented their proposals to compete for funding. The adoption of clear and transparent 'rules of the game' ensured social control and instilled confidence and motivation in vulnerable and excluded groups to participate. Through this mechanism, public funding was transferred directly to local stakeholders, who could use these resources to contract technical assistance. However, local groups were also required to invest a matching sum from their own resources, to ensure ownership of the activities and motivate them to maximize the impact of technical assistance.

The concurso also became a big event in the life of people, especially the women, who have to learn how to express their views, ideas and projects in public. In addition, the concurso was an occasion to learn from the others about the ways they explain their action plans, the type of projects they present, and their plans for the future. The winners of the competition received the money to contract a technical assistant, whose selection was done through a public competition. The fact that people themselves selected the experts was seen as a fundamental innovation, as it was seen to reverse traditional societal hierarchies and power relations.

A third principle regarding extension financing is to acknowledge that sweeping claims that individual farmers (especially poor farmers) are likely to pay cash to cover the full costs of extension have been repeatedly proven false. Subsidies are needed for service provision for the poor and for public goods, such as environmental management. Public investment in extension related to public goods is fully justified. At the same time, the assumption that the poor cannot make any contribution to the cost of services has also been proven to be a myth. All farmers, rich or poor, are ready to pay for at least a portion of the cost of services they receive if they really value those services. Indeed, many poor farmers pay the full costs of extension services when these costs are embedded in service packages and contract farming arrangements. Dogmatic and inaccurate claims about the helplessness of the poor or the 'unsustainable' nature of subsidies have stood in the way of the search for practical solutions that empower while recognizing where there are limits in capacity and willingness to pay for services.

A fourth finding about financing is that embedding the costs of extension in wider service packages and relationships is a way to reduce transaction costs and to sidestep the common refusal of farmers to accept to pay for a service which has been traditionally provided free of charge. Various types of information and advice are often embedded in contract farming arrangements wherein actors higher in the value chain utilize this information to manage production risks for themselves and the farmers whom they are contracting. Although frowned on in the past due to fears that benefits would not reach the poor, there is a realization that contract farming can be a relatively sustainable structure wherein extension becomes part of wider structures that share costs and risks among actors in the value chain. Farmer organizations and civil society (through, for example, fairtrade and organic certification support) are able to address some of the power differences that could skew

[19] Proyecto de Desarrollo del Corredor Puno-Cusco - Republica del Peru: Evaluacion intermedia.

benefits towards better-off commercial actors. Indeed, farmer organizations themselves may be involved in contracting and other related arrangements among their members and can proactively design value chain arrangements that reflect the risks facing the poor.

Advisory Services Provided by HJS Condiments in Sri Lanka[20]

HJS Condiments Limited in Sri Lanka, an example of how private-sector firms can provide effective extension services to small-scale farmers. In 1988, the Hayley's Group began to produce gherkins and semi-processed pickles for overseas markets. Originally, the firm itself attempted to produce gherkins on a large commercial farm but they found it more efficient to contract with small-scale farmers to produce these products. In 1993, after increasing the export of gherkins to several international markets, the Hayley Group created a new organization (HJS Condiments) to increase value-addition processing of pickles and to diversify into other fruit and vegetable crops. By 2007, HJS Condiments was working with 8000 small-scale farmers under a guaranteed buyback scheme and a comparable number of full-time employees who were producing and processing products, which accounted for 22 percent of Sri Lanka's total fruit and vegetable exports. Given the success of this model, HJS Condiments plans to continue increasing its export of horticultural crops, and it will further expand this highly effective private extension system.

HJS Condiments has one agricultural field extension agent for every 100 farmers. During the first year that small-scale farmers start producing one of these export crops, these farmers receive, on average, about two farm visits per week. After the farmers have become skilled in how to produce these high-value export crops, then the field visits continue to monitor product quality, but they are less frequent. These advisory services are provided free of charge to all participating farmers. In addition, HJS Condiments guarantees to purchase all products at a set price and provides all inputs to farmers on a credit basis. Cost recovery occurs at the time of settlement, when the products are delivered to the processing facility.

Finally, it is important to stress that financing issues are driving the move to programme approaches and away from project solutions. The tendency to provide extension services through heavily subsidized donor-funded projects is starting to be recognized as doing more harm than good, as it creates unrealistic expectations on the part of farmers and the creation of extension structures that require unrealistic levels of public funding for recurrent costs. In addition to the examples described above, there are a growing number of ways that extension systems are being mobilized in more sustainable ways through financing reform. These include:

- Financing cash crop extension by farmers through levies on crops that are then earmarked for reinvestment in research and extension.
- Levies on food crop import taxes to be used for extension funds managed by farmer organizations.
- Performance bonuses for extension agents, paid by small groups of farmers receiving a specific service.

[20] Swanson, B. and Rajalahti, R. 2009. Strengthening Agricultural Extension and Advisory Systems: Procedures for Assessing, Transforming, and Evaluating Extension Systems. Agriculture and Rural Development Discussion Paper 44. The World Bank, Washington, D.C.

- Small in-kind contributions to paraprofessional community extension workers.
- Financial contributions by farmer organizations to access to extension services.
- Embedding of costs of extension within indexed-based insurance schemes that are being subsidized as part of climate change adaptation measures – based on the assumption that farmers who are able to lower their production risks should receive lower insurance premiums.

Public funding for a private extension system for the hillside farmers of Honduras[21]

The Hillside Farmers Fund (FPPL) is a publicly funded, private delivery extension system that works with small farmers in hillside agriculture. FPPL is under the responsibility of the Honduran Ministry of Agriculture and started as a pilot project in 1999. The implementation of FPPL is outsourced in two ways. The Tropical Agriculture Research and Higher Education Centre (CATIE), based in Costa Rica and with a sub-office in Honduras, has been contracted for administering the project. CATIE then contracts out the implementation of extension services to local private companies, which hire their own agricultural technicians to work directly with farmers. CATIE's professional team promotes the programme, evaluates project proposals developed jointly by private companies and community groups, monitors and evaluates the implementation of projects in the field, supervises contractual aspects and verifies results. During the first two years, the fund contracted 25 private companies to implement 89 projects, reaching some 15 500 families. Projects are limited to eight villages of approximately 20 families each. There are two technicians for each project; each technician works with four villages, or 80 families (visiting a village at least one day a week). The private company is paid approximately USD 27 per family to write a proposal and, if the proposal is accepted, USD 216 per family to implement the proposal for one year. Results of the FPPL pilot during the first two years were very positive.

Payments for services in China[22]

The Chinese government has tested several different approaches to recovering the cost of public extension services from farmers. In terms of crop extension services, under the Agricultural Support Services Project, each county and township extension office established a commercial agricultural service center (CASC), essentially an input supply store, adjacent to the agro-technical extension office. At the CASC, farmers get one-on-one technical advisory services about issues such as which crop varieties are most suitable for local growing conditions, as well as fertilizer, pest management, and other technical recommendations. It is not mandatory that farmers purchase their inputs from this CASC, but nearly everyone does, since the quality of these inputs is guaranteed. In the past, many small-scale retail stores sold diluted or defective inputs, which encouraged many farmers to purchase their inputs at these CASCs. Most of these advisory service costs are recovered through the sale

[21] World Bank. 2006. Institutional innovation in agricultural research and extension systems in Latin America and the Caribbean. World Bank.

[22] Swanson, B. and Rajalahti, R. 2009. Strengthening Agricultural Extension and Advisory Systems: Procedures for Assessing, Transforming, and Evaluating Extension Systems. Agriculture and Rural Development Discussion Paper 44. The World Bank, Washington, D.C.

of the production inputs, and the number of local crop advisers actually increased to about 370 000 nationwide, after this new funding arrangement was initiated during the 1990s.

In the case of livestock, Chinese farmers are also expected to pay for specific services (i.e. artificial insemination and vaccinations). Again, the cost of extension services is largely recovered through the sale of these services. It should be noted that this public–private extension arrangement would not be acceptable in most countries where private-sector firms are already supplying inputs. Nevertheless, it does confirm that the cost of providing one-on-one advisory services to farmers can be successfully recovered from the sale of production inputs, as demonstrated by private-sector firms worldwide. However, the cost of other extension activities that deal with other information and educational services (e.g. sustainable natural resource management practices taught through FFS or demonstrating how different types of farm households can intensify and/or diversify their farming systems) are more difficult to recover from small-scale men and women farmers.

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5. Extension and the climate change – food security nexus

5.1. Overview

Climate change is an area where extension currently has little involvement but where needs and expectations for the future are great. Increased flow of information and communication among farmers and other stakeholders in agrifood systems are required if farmers are to adapt to the changes in climatic conditions that are already inevitable and if they are to become part of the low-carbon farming systems that will be needed to mitigate future climate change. Strong extension is essential to ensure that the national, regional and global policies on climate change adaptation and mitigation are appropriately communicated and adapted to farmers and reflect their conditions and concerns. Extension must be a central actor if synergies between climate change adaptation and mitigation are to be achieved since extension can become a platform for finding out how to bring together global and national policies related to carbon emissions with the decision-making of farmers trying to earn a living and feed their families. In order to contribute to this, extension needs to engage with different actors, promote new forms of institutional development, and provide a different array of services than in the past. In many instances (but not all) the providers of extension services for climate initiatives will be different from those involved in other aspects of agricultural extension.

A central aspect of the changes required for climate-aware extension will be an increased understanding and focus on risk. In some ways, extension has already been drawn into efforts to address climate and food security risk through seed provision in agricultural rehabilitation programmes. A key factor in these efforts is to ensure that extension is not just an 'implementing partner.' The direct contact that extension agencies have with farmers can provide a feedback loop regarding how well seed and other programming actually relates to the conditions and perceived needs of the beneficiaries of this support. Analysis of how food security related extension programmes are received can also provide information about how farmers are combining new technologies with efforts to maintain agro-biodiversity within their farming systems, as biodiversity is widely recognized as central to the development of local adaptive capacity for dealing with climate variability.

Through facilitation and brokerage activities extension can bring together local actors in negotiating and building trust for sustainable use of individual farm-level and common natural resources, such as water, grazing and non-timber forest products. In so doing, extension can contribute to food security and reduce climate risk. Extension can also help manage the conflicts that are likely to intensify in the wake of global demographic and environmental change. These, however, are skills that are rare in advisory services today. NGO experience has shown that new skills in communication, dialogue and conflict management can be developed within extension organizations, but also that this has been difficult to maintain and scale up given prevailing human resource constraints.

If it is to provide these services, extension will need to develop strong collaboration with a different array of actors than it worked with in the past, such as meteorological services and

the environmental agencies that have a central role in climate change mitigation and adaptation efforts. Extension can act as a channel to provide information about weather, new payments for environmental services, project and grant related carbon credit programmes, low-carbon production options and drought/flood resistant varieties, while also ensuring that there is a feedback loop to the climate change community about how climate change is impacting on local micro-climates, diverse production systems, markets and ultimately on livelihoods. Further, extension agents, as innovation brokers, can use facilitation for negotiating with the array of new actors that small holders will face as massive climate change adaptation and mitigation efforts get underway (e.g. organizations monitoring, reporting and verifying carbon sequestration schemes such as Reducing Emissions from Deforestation and Forest Degradation, and Enhancing Forest Carbon Stocks in Developing Countries (REDD+), meteorological services, etc.). Diversified communication methods, collaboration with new and different media, expanded use of ICTs, and innovative partnerships are all required. This may even involve working with insurance companies and other private financial service providers, which require increased awareness of risk and ways to respond to extreme events as a precondition for provision of crop insurance and other weather-indexed risk transfer products.

From seeds to markets and food security after Hurricane Mitch[23]

After Hurricane Mitch hit Central America in 1998, grand declarations were made that rural recovery should not just be a matter of rebuilding the structures that existed in the past, but should instead consist of a 'transformation' related to poverty and reduction of risk. In Nicaragua the immediate response consisted largely of seed distributions, some through the public extension service and some by humanitarian agencies. Neither had an impact that could be described as transformational. More effective programming took a few years to be started. These efforts have primarily consisted of supporting the capacities of farmer organizations, particularly in terms of reaching niche markets for coffee and other products. Methods to reduce risks of landslides, erosion and pollution were introduced, but have not been widely adopted. The market-oriented programmes have not reached many poorer farmers, who lack the resources to enter these markets, but they have effectively strengthened the capacities of the better off members of farmer organizations to deal with both climate and market volatility. The readiness of aid donors to contribute to these programmes was related to the Mitch response, but the inspiration for the content came more from the collapse of coffee prices that came afterwards.

In recent years, there has been a renewed interest in food security, with the public extension agency involved in distributing livestock and inputs to farmers. It is too early to judge whether these new types of distributions will have a greater impact than the distributions of the early Mitch response. Some NGOs report that the poorer farmers are again being excluded as they lack the resources to manage livestock and may not have the political clout to access these programmes.

[23] Christoplos, Ian, Tomás Rodríguez, E. Lisa Schipper, Eddy Alberto Narvaez, Karla Maria Bayres Mejia, Rolando Buitrago, Ligia Gómez and Francisco J. Pérez, 2010 (forthcoming), Learning from recovery after Hurricane Mitch, Disasters.

5.2. Extension and climate risk

It is likely that extension will be more involved in adaptation to climate change than in reducing greenhouse gas emissions. The simple reason for this is that farmer demands will be greater for the former since it affects their immediate livelihoods and even their survival. Mitigation interventions are (regrettably) likely to be primarily related to monitoring, reporting and verification of various payments for environmental services, rather than directly responding to farmer demands. It must be stressed that extension has always had a role to play in helping farmers adapt to changing and extreme climatic conditions. FFS and study circles are extension approaches that have proven effective platforms for farmers and other rural stakeholders to come together to 'talk about the weather' and what it implies for their farming and livelihoods. These discussions need to be scaled up and better informed through increased attention to uncertainty and vulnerability wherein unusual and extreme weather patterns must begin to be treated as normal. This needs to be paired with more effective ways of 'downscaling' climate forecasts so as to be useful to specific agro-meteorological zones.

This has profound implications for the modus operandi of many extension providers. Instead of supplying farmers with information and standard protocols about production based on average conditions, extension needs to provide a menu of options and relate this to information about seasonal weather forecasts and probabilities. Extension agents need to change their approaches from teaching to promotion of joint learning. Instead of just encouraging farmers to specialize their production methods to be able to enter commercial markets, extension needs to provide advice on the different market and climate risks that may suggest retaining or modifying traditional production diversification strategies that had previously been dismissed as irrational 'risk aversion.' In the past, for example, extension agencies have been tasked with discouraging agro-biodiversity in favour of greater specialization and adoption of high yielding varieties. A more climate aware extension agenda will likely recognize that agro-biodiversity can be an effective climate adaptation strategy. Production maximization strategies based on producing a single variety which is expected to perform well in average weather conditions can bankrupt smallholders where increasing climate variability means that average years occur less frequently.

These choices between production strategies need to be informed and supported by better seasonal weather forecasts and advice on how to combine strategies to adapt to probable weather patterns with adaptation to probable market opportunities and risks. This is a new and complex area of work for extension, which will require links with a wide range of actors and institutions. There are examples of how relatively wealthy farmers are already accessing and integrating these types of advice, but as yet little experience in downscaling this discussion within extension efforts directed at smallholders. In the near future it is likely that there will be large investments in increasing the quality and quantity of weather information, but less attention has been given to if and how these investments can support farmers in their decision-making. Information about expected weather patterns must be combined with advice about what crops and varieties are appropriate in these new and uncertain conditions, and a dialogue among farmers, traders, processors and consumers about whether or not there will be markets for these new foodstuffs. For this information to be useful, there will be an important brokerage function for extension since meteorologists are generally unaware of the timeframes that farmers and input suppliers need to access and plant alternative varieties (or perhaps decide not to plant at all if risks are expected to be very high).

Climate information, a new challenge for extension

A range of initiatives are underway to scale up the quantity and quality of climate and weather information and to downscale the nature of this information to be more relevant to the decision-making of farmers. The World Meteorological Organization has called for the creation of a Global Framework for Climate Services. This will include initiatives such as Weather Info for All

*(*http://www.ghf-geneva.org/OurWork/PracticalAction/WeatherInfoforAll/tabid/359/Default.aspx*), managed by the Global Humanitarian Forum under Kofi Annan's leadership, which is bringing together scientists, private sector actors involved in weather and mobile phone technologies and national meteorological services to provide better information to African farmers about what weather to expect during the coming days and the coming season.*

But what is 'better' weather information? There are enormous challenges in ensuring that the information provided gets to farmers, input suppliers and extension early enough for farmers to make better decisions, to support a range of value chain actors to interpret the complex probabilities within these forecasts, and to consider how to respond in terms of what varieties to plant, when to plant, how to apply fertilizer, etc. There are examples of climate information efforts being effective among wealthy farmers in the U.S., Australia and Argentina, but apart from small researcher-led pilot projects there is little proven experience in sustainably providing such services for smallholders. Successful examples have primarily been found within broader community-based climate adaptation projects. These have highlighted the importance of extension, but also the challenges of finding sustainable ways to engage service providers in these tasks in the long-term.[24] *The role of extension and communication (as well as applied research) in climate change adaptation and the question of capacity development of extension organizations and agents to manage these new tasks is largely uncharted territory.*

5.3. Extension and low-carbon futures

It is in some respects too early to define the role of extension in climate change mitigation. There are strong signals that farmers may begin to receive significant levels of payments for the environmental services that they provide. Indeed, they may even be paid for maintaining low-external input farming systems that were in the past discouraged. Low carbon agriculture may also mean modifications to existing production systems through, for example, minimum tillage methods and organic farming. It is now generally recognized that society has a debt to farmers to pay for (and presumably subsidize) these activities. There is as yet little consensus about how to undertake such payments on the massive scale that is required, nor of how to address national and global food security where mitigation measures reduce overall production levels.

Concerns about greenhouse gas emissions may have a direct negative impact on agricultural trade. Farmers in low and middle income countries are losing access to markets due to climate change mitigation efforts as consumers in wealthier countries are being encouraged to shun products that require long-distance transport. Extension cannot change this, but through providing advice

[24] Ensor, J. and Berger, G. 2009. Understanding Climate Change Adaptation. Practical Action Publishing. Rugby.

related to different forms of certification, extension agencies can help farmers to demonstrate the environmentally friendly qualities of their products and thereby mitigate some of the negative impacts of mitigation efforts.

Another area where strong extension activities are needed to contribute to climate change mitigation is in informing farmers about new regulatory and certification structures related to organic production, payments related to REDD+, and other future mechanisms that have yet to be created. Extension can increase awareness about how to minimize environmental impacts, maximize carbon sequestration and thereby reduce the costs that farmers have in complying with new regulatory frameworks. It is important to note, however, that there are dangers that extension may be tasked with inappropriate responsibilities to monitor and even enforce these regulations. This could severely damage the trust that must exist between service providers and their clients.

Finally, there are potential synergies between climate change adaptation and mitigation. Agricultural extension can play a role in achieving these synergies. Low carbon alternatives for agriculture can reduce risk by reducing dependence on capital inputs in the form of agrochemicals and may also reduce demands on increasingly strained water resources. Some minimum tillage farming methods and measures to restore degraded lands can both reduce emissions and reduce run-off, flooding, erosion and landslide risks in the event of heavy rains or drought. Farming methods that increase carbon storage can also enhance moisture retention. Certification may provide an extra price premium on products that are more adaptable to climate variability, but which would otherwise be unattractive due to lower productivity. In all of these areas, extension has a role to play in informing farmers about the changing sets of incentives for different choices in agricultural production.

5.4. Extension and food security

Extension efforts related to food security essentially fall into two categories. The first is to promote food production increase and reduce food losses to ensure food availability at reasonable prices. The second is to encourage the creation of more livelihood opportunities to ensure entitlements and access to food. The sudden attention to food security and food supplies that appeared in 2008 was due primarily to concerns about overall availability and stabilisation of prices. It is important to note, however, that the food production challenge is in many respects the tip of the iceberg in relation to the underlying need for extension to contribute to an enabling environment for the livelihoods that will provide entitlements to food for the rural poor.

Extension has been a missing link in many food security initiatives. It is an essential component in efforts to promote both household and national food security, but plans for extension activities within food security programmes have tended to pay insufficient attention to what has been learnt regarding demand-driven, pluralistic systems. In many food security initiatives public sector extension agencies are expected to push new technologies to farmers on a massive scale, without due attention to the capacities of services to undertake these tasks or the impact of such approaches on efforts to make extension more accountable to farmers and more relevant in a market perspective. These programmes generally use extension agencies to distribute externally chosen inputs with insufficient attention to the need to verify their appropriateness for different microclimates, farming systems, gender roles and markets. There are also dangers that these projects may undermine the need to maintain agro-biodiversity that is central to household food security in an increasingly

variable and uncertain climate. All of this may have negative impacts on farmers and negative impacts on trust between extension agents and their clients.

This is not to say that extension should not be involved in food security efforts. On the contrary, extension is needed both to help manage these efforts and to provide a reality check on the coherence of food security modalities in the perspective of farmers' perceived needs and the impacts on commercialization, risk and the livelihoods of the rural poor. Support to new food security initiatives needs to be informed by the lessons learnt in recent decades regarding the sustainability of rural development efforts more generally. Extension's role in dealing with food security is a combination of the following:

- Addressing long-term chronic insecurity through productivity improvement.
- Addressing food losses due to lack of proper storage technologies and facilities.
- Increasing resilience to extreme climatic events and conflict through support to agricultural rehabilitation and risk reduction efforts.
- Increasing rural employment and incomes to make food more affordable.
- Responding to 'tipping points' where climatic, demographic or market shifts render past agricultural systems untenable.

Considerable attention has been paid to the first four aspects, but the issue of responding to 'tipping points' has not yet been in focus. It is now recognized that many traditional staples and cash crops will no longer be viable in the future in the areas they are currently grown due to climate change. Consumer preferences, protectionism and strict quality and food safety requirements are drastically impeding access to traditional markets. Many areas will need to shift to totally different production systems and livelihoods. This is a new and challenging area where research and extension must work together to be effective. Comprehensive systemic changes will be needed, which will require collaboration across scales and sectors. Extension must be part of this as an actor with unique perspectives and capacities to contribute to meeting these seemingly overwhelming challenges.

Perhaps the most important lesson is that without extension (and even more importantly, without well-designed policies and programming) food security initiatives may not reach the most food insecure. Paradoxically, the chronically food insecure may not have the land, water, labour and capital resources to benefit from food security support designed with a primary aim of boosting national food production. This is particularly true with regard to many food security efforts built around seed programming.

What is best for the food insecure - food security efforts or diversification?[25]

In India, prior to the institutionalisation of ATMAs at the district level, the agriculture extension system primarily focused on technology transfer to increase the productivity and overall production of staple food crops for national food security. Issues relating to increasing farm income through the production and marketing of high value horticultural crops, livestock, fish and other food products were not considered part of their extension duties. However, a major objective of the NATP project was to increase farm income and improve rural livelihoods,

[25] Singh, J. P., Swanson, B. E., & Singh, K. M. (2006). Developing a decentralized, market-driven extension system in India: The ATMA model. Good Practice Paper. Washington, DC: The World Bank.

especially among small-scale and women farmers. Therefore, establishment of the ATMAs at district level, using a bottom-up planning process and integrating both research and the line departments was designed to help refocus extension activities on the livelihood-related interests of small-scale and women farmers. The move from a policy of food security to a strategy that focuses on agricultural diversification aimed at increasing farm income and rural employment carries with it implicit risks for the small-scale farm households that are expected to benefit from this approach. The ATMA director and other agricultural leaders within each district need to continually assess their comparative and competitive advantage in producing different high-value crops and products. There will be continuing instances of over-production of different commodities and falling prices. These problems cannot be avoided, but they can be mitigated by maintaining a diversified portfolio of commodities, products and enterprises within each district and continuing to seek out new markets and opportunities. The most critical output of this strategy will be that the current generation of farmers will learn new technical, management and organizational skills that will be passed on to the next generation as they seek employment outside of production agriculture.

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6. Extension in research for development

6.1. Overview

The extension agenda presented here is predicated on a new and different relation with research. This relationship will need to be based on a rethink of the role of extension (and implicitly research as well) within innovation systems. Extension reform has long been plagued by out-dated notions about extension merely being a channel for transfer of technologies from national and international agricultural research institutes to farmers. There is a growing awareness that this is not how innovation systems actually work. Weakened linkages with research have meant that, even if it was desirable, this one-way technology transfer role is no longer viable. Furthermore, extension agencies and agents are now accessing and sharing knowledge from a multitude of sources (including smallholder farmers). Their work goes beyond technology dissemination to include production and processing knowledge and skills, farm management, access to credit and subsidies, income generation, nutrition, etc.-all of which may be undertaken through facilitation, empowerment, and strengthening of organizational capacities. Extension is no longer reliant on a vertical and linear technology transfer structure. Rural innovation is the result of new combinations of different sources of knowledge, which means that interactive learning within localities, market chains and national innovation platforms are crucial. Extension agents at the field level and extension policy-makers at the national level can both play a role in the facilitation of such linkages and the coaching of such processes. Interactive learning is not only needed between farmers and technical knowledge service providers, but also between farmers and those providing market and climate information and financial service providers. Interactive learning for innovation requires combined technological, organizational and institutional change. This includes, but is not limited to, the relationship between research and extension.

A new relationship with agricultural research for development is starting to emerge, even if the contours of this new system are not yet clear. Within new approaches more attention is being given to farmers' own innovation processes and the need to understand and respect these aspects of innovation in the ways that research and extension interact through: (a) joint multistakeholder problem identification; (b) Interactive learning; (c) multiple entry points for assessments; and (d) wider processes for increased impact. This needs to be based on an open assessment of the different skills and competencies that are required for research and for extension.

More effective pathways and partnerships with smallholders and their organizations need to be developed by extension agencies and research institutions in order to have impact on the livelihoods of the poor. The growth of FFS shows that this is beginning to happen. Research institutions are using participatory methods far more than in the past, but the accountability of research to farmers is still very weak. Researchers are becoming better at talking to small farmers, but there are few mechanisms in place that force researchers to listen to what the farmers, particularly small farmers have to say. Redressing this balance will require more than just linking research and extension, as it requires forceful farmer representation and influence within the fora where decisions about research priorities are being made.

An active, close and respectful relationship between research and extension is needed if the two institutions are to come together to achieve sustainability and wide-scale impact. The pilot projects that dominated research-extension linkages in the past need to be replaced by institutionalized cooperation linked to the decentralized, market-oriented, risk aware and farmer owned extension networks of the future. This means building upon and ultimately transcending the so-called 'research-extension-farmer triangle.' Extension can create opportunities to bring together a far broader array of actors in agricultural innovation. Its roles to facilitate coordinate and advocate so that the challenges of smallholders and poor farmers in taking part in the new innovation systems are not overlooked. Extension can help research to engage with and learn from processes under way in rural development and within value chains. It can provide researchers with an essential reality check for understanding how farmers and other market actors are searching for and using new technologies amid changing climate and market risks and uncertainty. Extension, together with research, can inform policy-makers about how food security initiatives are impacting on different target groups and how male and female farmers themselves are struggling with their own household food security at the same time as they are looking for ways to enter new markets.

Agricultural research reform in Latin America and the Caribbean and impacts on extension[26]

Starting in the 1990s, many Latin American and Caribbean countries undertook to reform their national agricultural research systems (NARS) to become less bureaucratic and more responsive to need by establishing competitive funds, ostensibly within an innovation systems structure. While these structures have helped in internally reinvigorating scientific bureaucracies, and breaking down monopolies within the research system, there are still few examples of these NARS becoming more accountable to farmers or demonstrating ability to learn from extension and markets. Some programmes are beginning to develop new methods for monitoring and evaluation that include reviews by farmers, extension staff and market actors. Even where progress has been made in farmer representation on research boards, these representatives are almost always from better-off groups. While this is a step forward, it does not constitute full accountability or evidence of a genuine transformation from linear technology transfer approaches to a multistakeholder innovation systems structure.

From prescription to counselling: strengthening farmer decision-making in northern Cameroon[27]

In the cotton-growing area of northern Cameroon, the Cotton Development Company and the National Programme for Agricultural Research and Development had followed the traditional linear research-extension-farmer approach for many years. Starting in 1999, both became engaged with the Organization of Cotton Producers of Cameroon to pilot a new Management Advice for Family Farms' (MAFF) strategy that would identify new

[26] World Bank. 2006. Institutional innovation in agricultural research and extension systems in Latin America and the Caribbean. World Bank.

[27] Swanson, B. and Rajalahti, R. 2009. Strengthening Agricultural Extension and Advisory Systems: Procedures for Assessing, Transforming, and Evaluating Extension Systems. Agriculture and Rural Development Discussion Paper 44. The World Bank, Washington, D.C.

technical and organizational innovations reflecting the needs of different farm households.

This new partnership between researchers, extension agents and farmers has created a process of mutual learning, so that they now listen to, exchange opinions with, and better understand each other. Farmers who participate in these new MAFF operations now have a different attitude towards work; they have achieved better labour productivity; they are now concerned about food safety, and they are all engaged in new enterprises. They now give careful consideration to the technical and economic advice they receive from extension.

The MAFF strategy has proven its effectiveness, but scaling up this new approach is not widespread, in part, due to the higher operational costs as well as other governance issues. In particular, the implementation of the MAFF strategy requires strengthening the conceptual and theoretical backgrounds of researchers and extension agents. Specifically, it requires the transformation of the roles and attitudes of researchers and extension workers in working with farmers and their other partners. These difficulties highlight the need for schools and universities to begin introducing future researchers, extension agents and farmers to new conceptual frameworks, such as MAFF, to guide their cooperation.

6.2. Challenges to achieving the potential of extension in research for development

Effective extension is crucial to ensuring the sustainability, scale and impact of research investments. There are simply too few researchers and research institutions to expect that direct links can be established between researchers and a sufficient number of farmers to manage a widespread dialogue or spark rapid and widespread diffusion of technological and organizational innovations. Furthermore, most researchers lack the skills and contextual understanding to be able to interact effectively with farmers. Core competencies required by researchers are significantly different from core competencies required to carry out extension, hence they are complementary in their roles and tasks, but not interchangeable. Despite these seemingly self-evident statements, researchers often prefer bypass solutions where they undertake their own small-scale extension activities that may demonstrate some limited 'impact,' but which they know to be unsustainable and impossible to scale up.

Linkages between research and extension are currently extremely weak and there are insufficient signs that this state of affairs is changing. Pressures to find 'quick impact' solutions for complex food security and climate challenges may even be encouraging a return to mistakes of the past. The GCARD process notwithstanding, the supply-side pressures in a large proportion of climate change and food security programming have led to a tendency to ignore the difficult and seemingly intractable problem of building research – extension relationships and the broader innovation system partnerships that are required. Business as usual in supply-driven programming continues. The calls for 'more' research and extension that are being made in climate meetings and food security plans are often not anchored in an analysis of 'what' research and extension should be doing together in a value chain and risk aware perspective.

A major task for GFRAS, AFAAS and other extension platforms is to increase awareness among researchers about the learning and reform process that has been underway for the past two decades. Unpleasant recollection of the collapse of the T&V System need to be replaced by greater awareness of what has been done since to make extension more effective. A drive to increase researchers'

awareness about extension reform is more important than ever since NARS, which are usually accountable to central level ministries, are often unaware of what is happening within new forms of relations between extension and local actors.

With decentralization of extension and the continued management of agricultural research systems at national and increasingly at international levels, opportunities for researchers to learn about what is going on in extension have diminished. If extension is being driven by farmer demand and structured by value chain partnerships, this puts into question common assumptions in the research community that extension should 'implement' diffusion efforts on their behalf. Extension today is increasingly linked to decentralized rural development structures that have little contact and no accountability to national agricultural research institutes. This embedded set of relations at decentralized levels could provide a new and stronger basis for scientists to learn about how their research can become more developmental, but this is predicated on acceptance of a very different relationship with extension agencies and a willingness to learn from (rather than just teach) extension agents based on a recognition of the roles that extension plays in non-linear innovation systems.

Part of the role of the new decentralized extension structures is to work with farmers to test and adapt new technologies from a range of research institutions to see which best fits local conditions and demands. Research is being generated by a variety of public and private institutions, some with strong vested interests in selling the new technologies that they have developed. An important aspect of the new relationship between research and extension is that extension is helping farmers to make an independent judgement of what technology best suits their needs.

Extension must therefore have the mandate to help farmers (and agribusinesses, cooperatives, and others) access information and advice about technological innovations from various sources. Research agencies need to look closer at the range of uptake pathways that have largely shifted from public to private services and dissemination channels that may need to come into play if the results of their research are to be accessed. Research institutions need to have their own strategies for relating to extension, not by serving farmers directly, but rather in thinking through how to reach them together with a range of stakeholders in innovation systems.

Decentralising the research – extension relationship[28]

In India, the most critical institution providing technical support to ATMAs at the district level is the Krishi Vigyan Kendra (KVK) or multidisciplinary Farm Science Centers. KVKs began to be established in the mid-1970s and are funded by the Indian Council of Agricultural Research (ICAR). Most districts in the country now have a KVK, although many have weak human, physical and financial resources. Most KVKs are affiliated with state agricultural universities, but some are affiliated with ICAR institutes or operated by NGOs. Each of the established KVKs has staff trained in field crop production, horticulture, livestock, agricultural mechanisation and home sciences, plus additional technical expertise as needed within a particular district, such as fisheries, agro-forestry, soil science, or plant protection. This broad expertise enables these Kendras to take a farming systems approach. Also, the KVKs are expected to undertake on-farm testing of technologies developed by the ICAR institutions, and then for training the extension staff and farmers in these new technologies.

[28] Singh, J. P., Swanson, B. E., & Singh, K. M. (2006). Developing a decentralized, market-driven extension system in India: The ATMA model. Good Practice Paper. Washington, DC: The World Bank.

ICTs can revitalise research – extension interaction in ways that respond to farmer demands[29]

The Virtual Extension and Research Communication Network (VERCON) is a FAO project that aims to strengthen communication and the creation, sharing, storage, retrieval and dissemination of information between agricultural research and extension, as well as other stakeholders. The approach seeks to increase farm income through improving agricultural technologies and productivity by the establishment of a virtual extension and research communication network. Two fully-integrated and interdependent concepts comprise the VERCON approach:

- *The Human Component: A network of policy-makers, researchers, extensionists, academics, NGOs and farmers committed to collaboration, communication and supporting agricultural producers. The network is flexible and can expand to include more stakeholders or focus on specific actors and their information or communication requirements and functions.*
- *The Technological Component: VERCON has created an internet portal to provide specialized agricultural services, such as access to agricultural information, and an interactive farmer problem solving service. News is presented of recent development in agriculture on research, extension, business markets and policy issues. Links are provided to ongoing activities for individuals in participating organizations, and a discussion forum provides a range of electronic conferences and discussions groups.*

After initial piloting the VERCON approach was expanded along three dimensions: a) to provide access to ICTs services and appropriate content at the rural village level; b) to introduce the concept of 'village facilitators' (male and female) who would use participatory communication methodologies to identify farmers information needs, design extension training sessions and encourage the generation and sharing of local knowledge; and c) inclusion of additional organizations involved in rural development.

6.3. Learning from extension

Extension's role as a facilitator, broker, coach and even a partner in local rural development platforms and value chains represents an opportunity for a new relationship with research. Extension can provide a window for learning about rural change and innovation processes through the dialogue among extension agents, farmers and other value chain actors about the relevance of different innovations in their livelihoods, the risks that arise in different farming systems, market preferences, power and gender aspects and a myriad of factors that appear in processes of technological change, adaptation to climate risks and market development.

Researchers can learn much from simply observing what is happening in these complex innovation systems, or they can even conduct research into the processes that emerge from extension efforts. Extension research is a way to unpack prevailing assumptions about the role of technology transfer amid markets, risk and uncertainty. Research about extension can provide useful insights to both

[29] FAO 2010. VERCON Website (http://km.fao.org/vercon). FAO Office of Knowledge Exchange, Research and Extension, Rome, Italy.

researchers and policy-makers on the kinds of policies and institutions that are needed and viable based on the tacit and intimate understanding that public, private and civil society extension agents have of local innovation processes. They may know far more than outsiders do about which technologies, markets, support structures and institutions farmers perceive to be useful and, most importantly, why they see these are relevant or not.

Examples of entry points for extension related research include:

- Identification of pathways by which extension can provide a 'reality check' on the research agenda.
- Obtaining a deeper understanding of the nature of research – extension – linkages.
- Observation of who benefits and why in different extension processes.
- Assessing how the potential of ICT is playing out in technology dissemination and for communicating research results to farmers.

It is not just researchers that need to learn from extension. Policy- and decision-makers also need to learn about the effectiveness of extension for two reasons. The first is that analyses of how extension is performing can provide a deeper understanding about whether overall rural development policies and investment strategies are perceived by the ultimate target groups as being relevant to their situation and needs. If extension is failing or is rejected by male, female, young or old farmers, or by different ethnic groups, it may be an indicator that research is on the wrong track or that there are gaps in the wider service provision structures of which extension is just one element. Learning from extension should not lead us back to 'shooting the messenger,' but should provide a reality check on rural development efforts more generally.

Second, there is insufficient convincing knowledge and evidence about what constitutes effective extension systems. Many studies and evaluations have been done on the impacts of specific extension approaches, but in a wider perspective, policy-makers have seldom been sufficiently convinced about the value of extension services. There is currently an upswing in these investments, but to be sustained better evaluation is required to assess what these investments have achieved. This is more difficult than it sounds. Clear attribution between extension inputs and development outcomes and impacts is rarely possible due to the range of factors that impinge on these results. Furthermore, the lack of clarity between public and private goods in many extension tasks makes it hard to explicitly identify the role of public finance in extension (and indeed in agricultural development in general). For these reasons, more efforts are needed to develop evaluation approaches that reflect the pluralistic aims, concepts and structures outlined in this report. Extension specialists, professional evaluators, researchers and decision-makers need to come together to consider how to learn from extension.

A major responsibility of GFRAS, AFAAS and other global and regional fora will be to enable researchers and policy-makers to learn from extension. The first step is to break out of old discussions about the failures of past research-extension technology transfer efforts and T&V to instead look at what extension is doing today to empower rural people to engage in markets, to draw on knowledge from a range of sources and to utilize ICT and other new technologies. This will not just be a matter of collecting best practice reviews, but also taking a critical look at the gaps in current structures related to agricultural education, weak gender analysis and pressures to attain quick fixes at the expense of investment on core institutions, social capital and human capacities among both farmers and extension agents.

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7. Conclusion

Extension needs to be extended in a range of different directions. Although fragile, extension is a strategically important link for ensuring that smallholder farmer demands are at the centre of rural development efforts. Experience has shown that there is no alternative to reinforcing this link if productivity and food security are to be sustainably improved, but also that the ways in which extension can contribute to this improvement are varied and complex and require pluralistic systems and a range of methods. Extension consists of both public and private goods, and many tasks fall into a grey area in between. Public investment is an absolute requirement if the private needs of the rural poor are to be met. This requires deeper analysis about how to achieve policy objectives with limited public resources. If extension is to be mobilized to provide a solid structure for addressing the demands of the rural poor, it is essential to promote a broader perspective on what extension systems consist of, among governmental, private, civil society and NGO structures. This must be first coupled with acknowledgement of the range of strategies, structures, organizations and methods that are needed to manage a diversity of roles and to reach different groups of stakeholders. Furthermore, farmer organizations must be supported to drive this process through an active and central role in setting the agenda for extension and research institutions, and perhaps even taking over the management of these tasks themselves.

This new context for extension consists of new demands, opportunities, and challenges. Linear models of technology transfer need to be replaced by acknowledgement of a more complex and dynamic set of relationships and innovation systems. These challenges are characterized by uncertainty, unpredictability and uncontrollability.

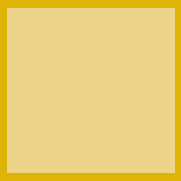
- Developing capacities to manage uncertainty: Extension agencies must transcend their image as an 'expert' provider of knowledge from research. Uncertainty regarding markets, climate and technological change require a shift to roles related to provision of information, facilitation of discussions and advice regarding probabilities and trends by which farmers, researchers and other value chain actors consider how best to manage the uncertainties they face.
- Responding to change and unpredictability: Rapid and volatile change has meant that extension is involved in helping clients live with risk and take advantage of new opportunities. Information about regulatory frameworks, markets and weather must be up-to-date to be relevant. Some farmers will need support to abandon collapsing farming systems by either adopting new crops or leaving agriculture altogether in favour of more sustainable livelihoods. Others will need advice related to new markets and production methods that appear from unexpected sources. Linear assumptions about a fixed set of research institutions linked to a public sector extension agency are an obstacle to living with unpredictability.
- Creating platforms for collaboration rather than trying to control farming systems: The pluralistic extension 'systems' called for in this report are highly unsystematic. There is nobody who can tell them what to do (nor should there be) because they act based on their own social, political and economic motivations and incentives. Some are oriented

towards market development. Others are oriented towards directly responding to farmer demands. Public sector agencies try to respond (as best they can) to government policies and bureaucratic incentives. All of these actors can be influenced, but none can be controlled. Therefore, an innovation systems perspective can provide normative direction, but strategies need to be informed by a wider perspective on the political economy of technological and rural development.

In order to provide services in an environment of uncertainty, unpredictability and uncontrollability there is a need to better link upstream (research and policy) reforms with downstream (extension) organizational and human resource development. The result will be better coherence among the myriad of poverty alleviation, market-orientation, food security and climate change goals that are being pursued in rural development.

The tasks presented in this paper for future extension systems are admittedly far beyond the capacities of today's public, private and civil society service providers. Both farmers and extension agents need better education if they are to deal with growing complexity and uncertainty. If upstream and downstream thinking are better aligned, this will lead to greater and more appropriate public investment in basic institutional and human resource capacities. These investments will then feed into the ability of the private sector to strengthen value chains, the capacities of public agencies to advise farmers about how to respond to changing weather patterns, and the awareness of researchers regarding how to adapt their work to innovation processes underway at different levels. In order to make use of strengthened human resources, greater capacities are needed in organizations that are genuinely accountable to farmers and the rural poor. These organizations will need to be exceptionally flexible and responsive to market signals, climate information and emerging risks related to the combination of these factors, and must be able to communicate with a wider range of actors in the innovation system.

Finally, if extension is to provide appropriate services, public and private investment will be needed for a range of institutional learning support functions. This includes monitoring, evaluation and multistakeholder analysis of extension effectiveness. It means creating incentives for the media to provide agricultural-related information, and ensuring that appropriate ICT infrastructure is in place in rural areas. These tasks may involve support to the changing set of intermediaries that are bridging divides in our increasingly information-driven society. Better awareness among political leaders, farmer organizations and researchers about what 'good extension' consists of, from their disparate goals and perspectives, must provide the basis for sustainable commitments to developing relevant extension systems.



http://www.fao.org/nr/ext/ext_en.htm

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