
AGRICULTURAL EXTENSION: KEY TO IMPLEMENTING THE MILLENNIUM
DEVELOPMENT GOALS IN DEVELOPING COUNTRIES.

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ABSTRACT

The Millennium Declaration was adopted to motivate the international community and provide accountability mechanisms for actions taken to enable millions of poor people to improve their livelihoods. About seventy percent of the MDG's target groups live in rural areas, particularly in Africa and Asia, and for most of the rural poor, agriculture is a critical component in the successful attainment of the Millennium Development Goals. Even though structural transformations are important in the longer term, more immediate gains in poor household welfare can be achieved through agriculture, which can help the poor overcome some of their critical constraints. Thus a necessary component in meeting the MDGs by 2015 in many parts of the developing world is effective productive agriculture-through its extension component. Agricultural extension in its broadest sense is considered an important instrument to support farmers' efforts in agricultural development and poverty reduction in a changing world. Extension supports the MDGs in at least three areas-poverty reduction, gender equality, and sustainable environmental management. Extension's role as a facilitator, broker, coach, and even a partner in local rural development platforms and value chains represents an opportunity for rural change, innovation process and rural poverty reduction through its research and empowerment component. Extension messages now consider women farmers, groups and vulnerable individuals in its approach and models to reaching people. There is also urgent need for extension to allocate more resources and effort to educating farmers how to use sustainable natural and resource management practices and to adopt these practices continuously in order to cope with the impact of climatic and environmental change. This paper thus, using mainly literature from the web- discusses how extension functions in reducing poverty, ensuring food security, balancing gender issues and providing skills for sustainable natural resource management.

KEYWORDS: MDGs, extension, poverty, sustainability, resource management, gender.

INTRODUCTION

Extension is no longer just about men from public sector agricultural agencies riding around on motorcycles talking to farmers, even though this stereotype still describes a significant proportion of extension agents. The term 'extension' conjures up images from the past and leads to inaccurate assumptions about what extension reform is all about. This paper uses 'extension' as an admittedly amorphous umbrella term for all the different activities that provide the information and advisory services that are needed and demanded by farmers and other actors in agrifood systems and rural development. The term extension, as used here, is taken to be synonymous with rural advisory services. The word 'extension' is seen by some as an old fashioned term related to one-way technology transfer. Despite these connotations, extension is used intentionally here to highlight the importance of breaking out of these past assumptions and infusing the concept of extension with new meaning (Christoplos, 2010).

Extension includes technical knowledge and involves facilitation, brokering and coaching of different actors to improve market access, dealing with changing patterns of risk and protecting the environment. This takes place within complex systems involving old and new service providers and even information and communication technologies (phones and mobile phones, internet, radio and television). They reflect the diverse priorities and accountabilities of a wide range of public, private and civil society organizations that are providing advice and information. In fact, some of these providers would not even classify themselves as "extension" but rather as community developers, innovation brokers, natural resource planners, etc. However, they are all linked by a primary focus on providing advice and information.

Furthermore, and most importantly it must be recognized that nobody controls these unruly extension systems. Regulatory and policy structures influence different extension actors in different ways and to different degrees. This paper provides guidance for considering how public and civil society international, national and local actors should engage to increase the benefits from extension accruing to the rural poor. It does not assume that any of the readers will have control over these systems, but rather that with clearer normative guidance and acknowledgement of what extension consists of today, a basis can be found for more realistic and effective investments and reform efforts.

Extension services include both public and private goods. Private goods include one-to-one advice provided to commercial farmers. Public goods involve many tasks related to natural resource management, climate change adaptation and food security. However, in countries, where development of the agricultural sector is crucial to the national economy and food production relies on huge numbers of smallholders, there is a great public interest in strengthening extension. Extension services therefore require and deserve public investment along with private investment. A complicated aspect of extension is that many tasks are in a grey area between public and private goods. For example, many extension tasks related to promoting food security can be perceived as either a task related to increasing profitability or ensuring the right to food, depending on the values of the observer, the choice of target group and the expected outcomes if public investment is provided. Extension related to food production is a public good in that experience has shown that when it is seen as a purely private matter, this may lead to exclusion of smallholders, which in turn may lead to widespread hunger, political instability or destruction of the environment.

For better or for worse, extension agents do not just do extension, Extension service providers, particularly public sector agencies, are often treated as all-purpose rural development agencies, implementing anything from seed multiplication to distribution of disaster relief. Such tasks may have little directly to do with advice and information and can be a serious distraction from core tasks, but they are a fact of life and it is often important that extension agencies provide these services in an effective manner to retain the confidence of their clients and funders. It is, however, highly problematic when extension agencies are primarily seen by farmers as channels to access free or highly subsidized inputs, especially if these inputs are being distributed as part of political campaigns (as occurs far too often). It is even more problematic when extension agencies are sometimes tasked with responsibilities for collecting taxes or loans, or when they are expected to enforce regulations. In order to perform core tasks, extension agencies must retain the trust of their clients. Policing, politics and advice do not mix (Christoplos, 2010).

Thus, extension agencies may undertake non-extension tasks and organizations that are not normally categorized as 'extension agencies' are currently providing some of the most innovative and relevant extension services. To understand extension it is therefore essential to look beyond those organizations that are normally seen as 'extension agencies', to instead focus on farmers' and entrepreneurs' demands and needs for information and advice, rather than fixed notions 'on standardized, top down diffusion processes. Mobilizing the potential of agricultural, extension requires an open mind about what needs to be done and who is likely to do it. This should be informed by experience regarding the different roles of public, private and civil society actors in a variety of extension service tasks and the importance of capacity development investments among all service providers. The old debate about what to do with the traditional government extension agency, starts at the wrong end.

Importance and Role of Extension in Rural Development

Increasing food production, stimulating economic growth, increasing the welfare of farm families and rural people, reducing poverty and social inequalities, sustainable use of natural resources, and participatory development, as summarized in the Millennium Development Goals are all governmental goals to which agricultural and extension policies and activities can make a significant contribution. So extension and its role and function must be seen in relation to a country's overall socio-economic situation, the situation of different population groups, and the government policies adopted by a country for (rural) development and agriculture.

Agricultural extension in its broadest sense is considered an important instrument to support farmers' efforts in agricultural development in a changing environment (VAN Den Ban & Hawkins, 1996), According to World Bank figures, worldwide agricultural extension in 1997 employed at least 800,000 extension workers and hundreds of thousands more farmer technicians or farmer leaders, amounting to about 1.200 million people (Feder, *et al.*, 1999).

It is estimated that 6 billion US\$ are spent every year on agricultural extension activities. These figures may have decreased in the past fifteen years, but still give an impression of the enormity of this institution. At all times - and even more so these days - there have always been different understandings about the objectives of extension and extension services, the roles and tasks of extension staff. and especially how these services can be organized and financed (Knorr *et al.*, 2007).

Extension is classified as an accelerator for rural and agricultural development. Following MOSHER'S classification from 1966 which talks about accelerators and essentials for agricultural development, we can enlarge the list and formulate elements favoring rural development. The essentials must be in place. If any are missing or inadequate, the whole development process will become stuck or will be hampered. Accelerators are additional factors that aid and enhance the development process to anticipate and avoid problems or to minimize the negative effects of development on certain categories of actors in rural development.

Food and nutrition security specifically in the so-called LDCs (least developed countries) is often a problem for the rural poor, particularly since a large proportion of them depend on agriculture for their livelihood. Food security in towns and the fate of natural resources depends on their work. So by helping to improve farming and farm yields, agricultural extension can be a very powerful tool for personal development and the organization of community life.

Farming has traditionally been a way of life and is now turning more and more into a business. Nobody can just start farming without at least a minimum of assets and knowledge. In traditional settings basic farming knowledge is common and even non-farming professionals, such as teachers, priests and craftsmen, continue some basic farming for self-sufficiency in food. Until 100 years ago, this could also be observed in industrializing countries. Nowadays farming in post-modern societies is a highly sophisticated and commercialized activity based on high amounts of investment capital and specialized knowledge. It is also supported by a network of input and service providers and upstream partners and institutions in value chains producing and marketing food, drinks, feed, fiber, fuel, medicinal plants, and other raw materials gained from land use, often in combination with specialized service provision, including land care, communal work and services for tourism.

Farming and living in rural areas occurs in extremely diverse settings worldwide, and this creates some difficulties if we want to deal with topics like rural development and assistance to farmers. A first differentiation we make, then, is between assistance to small farmers and assistance to commercial farmers and assistance to commercial farmers. An initial starting point is the recognition that small farmers are rational and act purposefully, even if they are illiterate. Small farmers work to achieve their goals, which also change along with development. Where subsistence dominates, risk aversion and reducing vulnerability dictates farmers' decision-making in resource allocation. In stagnating or declining economies, agriculture provides a safety net for survival for all those who cannot find work or who lose their jobs outside agriculture. This explains the paradoxical phenomenon that the majority of poor people suffering from hunger and malnutrition are rural poor (Hoffman *et al.*,2009). They do not have access to a sufficient amount of cropping land, are casual laborers inside and outside agriculture, migrate to find temporary work and struggle for survival as best they can. Such people in Europe, for example, have never been regarded as or known as farmers they belonged to different classes of poor people in the villages, classified according to their assets as cottager, day laborer, manservant or maidservant, herder for other peoples geese, goats, sheep or cattle, mouser, knacker or gravedigger and so on. At the lowest level were the shamed inhabitants of the poorhouse who were no longer able to support themselves; these people did work at home and were fed and clothed by the community. Small farms belonged to families with their own house and farm buildings and at least the basic farm implements as well as two cows for towing. Better-off farmers had oxen or horses for towing. Whereas it was always possible to rent land in exceptional cases whole farms could be rented, including the buildings and some basic machinery, but only by well-trained professionals who were able to pay the rent and make a living from the remaining farm income.

It is surely misleading to regard all rural poor people in developing countries as small farmers. And assistance must differentiate between the rural poor, small farmers, emerging farmers with the potential to branch out into commercial farming, and finally commercial farmers.

Small farms as systems

Small farmers operate their Farms as systems (Snapp and Pound, 2008). Farmers do not seek results from a single activity; instead, they seek to best satisfy their priorities from a combination of activities. These activities compete for limited resources such as land, labor, inputs, credit, etc. The farmer also faces a set of local economic, institutional, natural, social and cultural circumstances, which he cannot significantly influence. And scarcity dominates all aspects of life. Even time is scarce, at least in those parts of the year when income generating activities are possible. To replace purchased inputs by on-farm resources and labor in so-called "low external input agriculture" easily overlooks the fact that, especially for poorer people, labor has rather high opportunity costs, determined by wage levels inside and outside agriculture.

As there is no insurance against risks and no capital reserve to balance losses, any risk must be prevented or avoided. "Always have another iron in the fire" is a saying that describes risk avoiding behavior quite well. Mixing income from agriculture, and outside agriculture, having local sources of income as well as remittances from migrant family members, doing several small scale cropping activities instead of concentrating on larger specialized fields, doing mixed cropping inside the plot instead of mono-cropping, emphasizing subsistence and not becoming dependent upon unpredictable and fluctuating market prices - all this creates more security and helps overcome risks that might otherwise lead to existential threats. In addition to economic activities, creating, maintaining and improving social relations - "social networking" in modern terms - is a way of increasing social security through safety nets. But the reverse side of this risk avoidance coin is production at a very low level of intensity, low productivity, and, in the end, not being able to make substantial gains, savings or investments, the precondition for escaping from poverty (Roling, 1988).

EXTENSION: KEY TO IMPLEMENTING THE MDGs

Smallholder agriculture in developing and transition countries is increasingly being driven into ecologically and economically marginal regions where productivity is low. Depending on the region, smallholder farmers account for 60 to 95% of the total population. In terms of rural development, then, it is obvious that particular attention must be given to this population group and its specific problems. One of the causes of the recent food crisis was the fact that the focus of development efforts undertaken by governments in developing and transition countries and also by international development agencies are increasingly shifting to market-oriented sectors that promise better value added. The 600 million smallholder farms engaged largely in subsistence agriculture worldwide are being neglected - despite the fact that 70% of the people living in poverty depend on small-scale farming for a livelihood. The recent food crisis has once again brought attention to this economic sector and its strategic significance with respect to attaining the Millennium Development goals (MDGs).

It is unrealistic to expect that the MDGs can be attained only through global, regional and national strategies that are frequently devised far from the local conditions under which they are applied. We must not forget that smallholder farmers are decision-makers who ultimately decide for themselves whether to act or not to act - even under authoritarian governments - and in which activities they will invest the production resources available to them. It is clear that, in the final analysis, millions of smallholder farmers will also help decide whether the MDGs can be attained or not (Gabathuler *et al.*, 2011)

Smallholder farmers frequently possess comprehensive knowledge and a great deal of experience in dealing with locally available resources and how to use the potential of these resources to ensure their existence. But it must be admitted that indigenous knowledge cannot keep pace with increasing complexity and rapid economic, ecological, political and social change and must therefore be revitalized. Any new problems and opportunities such as climate change, increasing population pressure, or global markets for capital, labour and goods can only be tackled to a limited extent with conventional knowledge and skills.

Agricultural extension must go beyond simple technology transfer between extensionists and farmers. Smallholder farmers must be put in a position to use their own know-how, skills, and organization to recognize problems, potentials and opportunities independently and respond to them appropriately in order to lay the foundations for a future that will ensure their existence. A different understanding of smallholder operations and household planning and management is needed in order to shape smallholder strategies in a way that will ensure their existence:

- More than ever, smallholder farms need to assure their access to important natural resources and learn to use these resources sustainably under changed conditions,
- Smallholders can reduce risks by diversifying their activities and exploiting potential synergies.
- Smallholder strategies must correlate with regional and national development goals so that they do not contradict but rather complement each other.
- And not least of all, new sources of income must be found for young people who can no longer earn a livelihood on their parents' farm, where they become a heavy burden.

Extension that confronts these challenges must increasingly invest in communication between the actors involved, in intense learning processes, and in extension themes that deal with all the important aspects of smallholder farming. This significantly increases the demands on extension services -with respect to their organization, the themes they deal with, and the training of extensionists.

The following goals are important for extension services working with a view to achieving the MDGs:

- i) **Enhancing the social status of smallholder farming:** In Burkina Faso parents were asked about their hopes for their children. 90% of them expressed the hope that their children would not have to earn a livelihood from small-scale farming as they did. The hardship and the low social status associated with smallholder farming make it unattractive. Despite their hopes, most young people are forced to take up this undesirable occupation for lack of alternatives.

Smallholder farming must be enhanced as an occupation by means of training and further education. The essential task of extension in this respect is to familiarize smallholder farmers with changes in the ecological, economic and social environment they live in. Important information must be conveyed and interconnections must be demonstrated and made comprehensible. Efforts to this end will make it possible for farmers to recognize problems, risks, potentials and opportunities more rapidly, respond to them appropriately, and develop greater self-confidence and self-esteem. Extension services should hence expand their activities to include experience-oriented on-the-job training that covers all the important core concerns of smallholder farming. Agricultural extension alone, however, will hardly be able to make sustainable improvements in the circumstances of the smallholder farmer. Of utmost importance in addition is clear recognition by governments of the status of smallholder farming and its vital economic, social and ecological importance for the entire country.

- ii) **Developing successful livelihood and community development strategies:** Deeper understanding of prevailing conditions will put smallholder farmers in a position to develop successful livelihood strategies. In concrete terms, this involves enabling farmers to assess competently in which activities they should invest their labour and their modest resources. For instance, they may need to decide between investing in productive activities that allow them to earn a temporary increase in income or in reproductive activities that help to secure their medium- and long-term existence. At the same time, both the beneficiaries of extension and local communities must be supported in organizational development and institution building. This is an important prerequisite for making resource use more sustainable, improving the productivity of smallholder farms, raising the standard of living of rural populations, and guaranteeing smallholder farmers a chance to make their voices heard in important decision-making processes.
- iii) **Mastering methods and technologies and fostering innovation:** Conventional agricultural extension focuses its efforts on this area in particular by testing and disseminating familiar methods and technologies or demonstrating the use of new production resources. The methods of dissemination, however, are frequently characterized by a top-down approach with the result that while farmers master the technologies, they adapt them inadequately to the social, economic and ecological circumstances that prevail on their farms and are hence unable to implement them with much success. This often leads to situations where extension themes are either not taken up or are dropped. Learning-oriented extension built on social learning processes is thus an important core concern (Gabathuler, *et al.*,2011).
- iv) **Developing alternative sources of income:** Alternative sources of income in the secondary and tertiary economic sectors must be developed for the coming generations, particularly in areas with high population

- v) growth, severely limited resources, and a high proportion of smallholder farmers. This will require greater school enrolment and better education for young people. Agricultural extension for smallholder farms can stimulate the development of new areas of economic activity by expanding the themes it deals with to include such things as farm management (e.g. simple accounting, rationalization measures), investing and budgetary advice, and development of alternative sources of income (e.g. processing of farm products).
- vi) Establishing conditions for implementation of extension themes through common plans and better cooperation: We have frequently observed that the livelihood strategies pursued by smallholder farmers and the development efforts made by governments or donors are inadequately coordinated. Examples include promoting the cultivation of cash crops in areas with continuing staple food deficits or the construction of prestigious structures where irrigation infrastructure is collapsing. Appropriate framework conditions that are planned and developed with the participation of all actors concerned are required if successful livelihood strategies are to be implemented. Close cooperation and regular exchange of experience among smallholders is another important element in strengthening livelihood strategies.

SUPPORTING THE MILLENNIUM DEVELOPMENT GOALS (MDGS)

Increased extension support is needed to achieve the MDGs, especially as they relate to poverty reduction, gender equality, and environmental conservation.

- *Poverty targeting of investments:* Poverty reduction and environmental objectives are often best met through extension investments that increase overall agricultural productivity growth that generates employment opportunities and reduces food costs. In most cases, additional poverty-targeted interventions (for example, targeted by geographic area, commodity, or production system) will be needed to reach poor people, women, and indigenous and minority groups. Poverty targeting requires priority setting for allocation of public resources, designing and evaluating programs to meet different client needs with emphasis on empowering the rural poor, building individual and institutional capacity, and developing demand for services where there has been little in the past. Services frequently, need to address social and organizational constraints to innovation, facilitating rural financial services, obtaining secure land tenure, improving management of community resources, and focusing on issues formerly considered outside the ambit of extension, such as HIV/AIDS education and access to health, education, and social programs.

Poverty and vulnerability reduction

Agricultural services are only useful for poor people if they offer services which help in improving their income and livelihoods. A key requirement for making extension relevant for the poor is an understanding of the poverty situation and livelihoods of the poor. Extension needs to include elements of pro-poor growth and vulnerability reduction. Reducing vulnerability means increasing resilience to livelihood shocks, protecting the environment, providing access to safety nets, and supporting better health and nutrition.

Agriculture is important for pro-poor growth and has leverage on growth in other areas through rising incomes in rural areas, which foster growth in the rural non-farm economy as well as employment and income opportunities. Pro-poor growth means growth in sectors in which the poor are involved, in regions where the poor live, and which makes use of the resources they possess (Katz, 2006). Creating markets for domestic agriculture is a major challenge for pro-poor agricultural growth. Developing profitable opportunities that benefit poor rural producers is a big challenge in developing countries. Public policy is very important for pro-poor growth.

These changes and trends require redefinition of the public role of extension. There is little scope for extension to contribute to poverty reduction unless agricultural and rural development policies adequately address global economic, political and social changes. Extension must be embedded within a broader reorientation of agricultural and rural development policies. Agricultural services are a crucial resource for improving the livelihoods of rural people. Agricultural services extend far beyond what is commonly understood as extension services. They include a set of institutions or actors that are essential to make agricultural production profitable for the poor rural producer. along with a range of services, from access to knowledge and information through to marketing of agricultural products, which have to be synchronized. A value chain approach may be a good way of conceptualizing this

integration of services at different levels; Building a functioning agricultural service system is an important function of public policy.

Public investment in weakly integrated areas should focus on supporting the identification and development of economic opportunities, building knowledge, input and market links between these areas and relevant actors in more accessible places, and capacity building on the service demand and supply side as well as within the local government (Katz 2006). Building up a pool of public service providers is necessary for reaching the poor effectively. Public efforts must concentrate on promoting village-level service providers who form the link between the dispersed village community and the formal agricultural knowledge and information system. Para-vets are a good example of animal health services.

As economies of scale acquire increasing importance in globalized world, there are thresholds of viability and profit making that poor people cannot reach, and grouping them together creates high transaction costs. Therefore better-off farmers, larger holdings and companies should not be excluded from development programs: their capacities are urgently needed to more rapidly achieve profitability and sustainability with economic activities and projects. Public and private partnerships are urgently needed to start new economic initiatives and to satisfy the rapidly growing demand for land use products in the future. The spirit of entrepreneurship must be developed further in the rural population in parallel with economic development.

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 stabilization 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 (Singh *et al.*, 2006; Christoplos, 2010).

This 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.

- *Promoting gender equity* There is an increasingly better understanding and appreciation of the roles, rights, and responsibilities of both men and women in agricultural production and of the greater constraints faced by women. Many examples of extension programs designed with a gender focus now exist, and the gender message has been widely disseminated. However, greater attention still needs to be given to gender analysis, gender-sensitivity training, the targeting of women farmers, increasing the number of women extension staff, and gender-sensitive monitoring and evaluation.

Gender bias in extension, beyond shooting the messenger

Over the past two decades much attention has been given to the need to overcome gender biases in extension, but complaints about extension may be merely ‘shooting the messenger’ when these biases are grounded in the wider policy environment and rural development norms. Overcoming gender bias requires attention to what stands in the way of equitable service provision, rather than just complaints that extension agents do not talk to women. Gender inequality persists in the agricultural sector because it is deeply rooted in gender relations in several areas that are crucial for farming: Gender relations at household level, land and property rights, access to agricultural inputs, extension services, credit and financial services, business development services, agro-processing, just to name some of the most significant areas. Extension is in many countries tasked with promoting agriculture for cash crops, either for export or to achieve national grain self-sufficiency. These goals may clash with objectives of reaching female farmers as they may have little or no incentive to adopt or plant cash crops because they will not control the income resulting from this production. They often prefer to concentrate on subsistence crops and/or petty trade or casual labour because these are sources of income that they can more easily control. Gender equity in access to extension services requires attention to gender roles in households, society, agriculture and rural development more generally.

The factors that make women poor and limit access to extension

A study from Uganda on strengthening linkages between poverty and gender analysis noted the following issues affecting extension in reaching women:

- Women have limited opportunities to access extension services in situations where culture dictates restrictions in movements outside the domestic sphere.
- Lack of access to and control of land result in women having far less interest than men in investing in expanded or intensive agricultural production and hence in the extension messages related to such topics.
- Women daily workload leaves no time to seek services that are only available in the public sphere.
- Extension messages are not responsive to strategic agricultural activities, interests and responsibilities of female small-scale farmer (Mukasa *et al.*, 2004).

Extension is an arena where the underlying goal conflicts in rural development, economic growth, household and national food security and poverty alleviation come to the fore in concrete decisions about extension targets. Rather than 'shooting the messenger,' the failures of extension in supporting gender equity should be seen as an indicator of the importance of more closely analyzing how approaches to agricultural knowledge and information systems and overall policies fail to equitably address gender.

Context is key, but this does not mean that extension is powerless to overcome its biases. Extension actors can choose to be pro-active and challenge key constraints to gender equity, for example by including legal advice in their services or directly challenging gender relations at household levels through facilitating discussions iii farmer organizations or cooperative(Crouch and Chamala,1981).

Extension for women: Addressing power more than production

An organization of Ugandan women lawyers, FIFA- Uganda have had good results in providing legal aid services through legal aid clinics, to women, responding to gender issues of property rights. They provide advice on legalizing business operations and other forms of commercial justice. This improves women incentives to develop farming and agribusiness enterprises and at the same time improves their access to financial services.

The Uganda Coffee Association (NUCAFE,.) showed that it was possible through facilitating inter household negotiations of fairer gender relations among their members to increase family income and welfare, a' well as overall productivity and quality of the coffee supply to the association.

Moreover, significant progress has been made in methodological innovations that have proven effective in increasing inclusiveness. Gender issues can be addressed through innovations related to women and men as different clients, which in turn means adapting extension methods to relate to social networks, mobility constraints and farming systems. Other approaches have been developed through critical reflection on how different extension methods are received within different cultures.

Choice of advisory methods and approaches can make an enormous difference in terms of who can access extension services. In Benin, the African Rice Center (Africa Rice) found that the use of farmer-to-farmer video was accessible to women from all socio-economic strata and was therefore a way to avoid the skewing of access to services that was inevitable when using traditional extension methods, relying on village leaders as a go-between. Everyone could observe and comment on a video, which meant that traditional communication channels were no longer necessary to reach farmers. Pre-existing notions about the need to go through 'progressive farmers or 'village leaders 'may lead to extension planners ignoring the ways that these categories are socio-cultural constructions that must be understood, but not necessarily adhered to (Danida, 2008; Zosson et al., 2009).

Extension and rural women

Agricultural extension services often relate more specifically to farmers (who are usually assumed to be men) and their various problems in the utilization and management of farm resources. Conversely, non-agricultural extension programmes are frequently directed toward women and seek to improve the use of resources within the home and family, or the care of the family's children. This common division, however, is not always appropriate. Many women are farmers in their own right, either because there is no man living with the family throughout the year or because women in some societies have their own land and their own crops for which they are responsible. Even where the head of the household is a man, women may do more than half the farm work.

In addition, therefore, to any agricultural extension programmes designed for rural women, it is important for agricultural extension to work with women, as well as men, to bring them the support, knowledge and skills they need to improve their activities. In fact, over the past decade there has been an increasing concern to examine the role of women in rural development, to understand the particular contribution that women can and do make to this development, and to implement programmes and projects designed to improve women's lives. Until recently rural women have been neglected both in terms of our understanding of the particular kinds of problems that they face and also in extension action directed toward their problems. Most extension agents are men, and they perhaps lack a

basic understanding of a woman's position in rural society. This position can be understood better by first considering the three basic roles of rural women.

- Economic, as producers of food and other goods for the family economy, and as a labour force for economic activities.
- Domestic, with responsibilities as wives and housekeepers to care for and manage the household economy.
- Reproductive, as mothers with responsibilities to reproduce family labour, care for children and look after their upbringing.

It is important for an extension agent to be aware of these three main roles which rural women have to assume, since they influence women's ability to participate in extension activities. They also indicate the kinds of extension support which would be of use. In rural areas, women often do a lot of work producing the family's main food crops. They are also responsible for storing and cooking the family's food, managing the domestic economy and supervising other economic activities, such as vegetable gardening or raising chickens, which are designed to increase the family's food resources. Moreover, they bear children and often have almost total responsibility for their care and upbringing. Rural women work very hard for long hours, usually for little reward, and are often neglected by extension services (Oakley and Garforth, 1997).

It is important for the extension agent to try to understand why there is often so little contact between his service and rural women. He should begin by analyzing the situation and understanding the obstacles which prevent women becoming more involved in extension activities, and should take them into consideration when planning these activities. Recent studies on rural women have suggested a whole range of obstacles which rural women confront and which impede their greater involvement. These obstacles can be summarized as follows:

- *Cultural*: Cultural obstacles are bound up in local customs and religious practice. In some societies, women are prohibited from conversing directly with non-family men. In others, custom forbids them to meet in public places, while in many, women are openly discouraged from participating in non-domestic activities.
- *Domestic*: Domestic burdens are a severe handicap to women getting more involved in extension. Women have a full-time job contributing to the domestic economy and caring for and managing the family household.
- *Status*: Women are generally accorded a lower status than men and are not encouraged or expected to play an active role in extension activities. Poor rural women find it almost impossible to break out from their ascribed status in order to have some voice in development.

Agent faces a difficult task in trying to incorporate women effectively into extension activities. But such is the importance of women's contribution to rural development that an extension service must work with women as much as possible. The agent must never consider rural women as inferior to men. They are not, but they do possess a different range of skills and abilities. Where possible, the agent should try to deal with both women and men at the same time. For example, he should encourage women to attend meetings and demonstrations, but women have different areas of responsibility and the agent should direct his extension activities toward these responsibilities. It is imperative, however, that the agent study and understand the position of women in his extension area, and be sensitive to their particular needs and problems before embarking on any projects.

Although the agent should incorporate women as much as possible in his general extension activities, there will also be a need for projects formulated especially to support women's roles in rural society. Such projects could include:

- *Organization* projects to build up and support local organizations representing women's interests and to encourage their activities, e.g., women's clubs or groups.
- *Production* projects directly designed to assist those agricultural activities which are the responsibility of women, e.g., food crop production.
- *Health* care projects to train the women and provide the facilities required for family health care, e.g. nutrition.
- *Income* projects designed to help women to supplement their income, e.g., vegetable growing or handicrafts.

It is true that to date, men, as heads of families, have received the greater part of extension support, while women have benefited less and have been rarely encouraged to play an equal part in extension activities. But it is widely recognized that women do make a vital contribution to rural development that extension should support this

contribution. The real obstacles that women face must be understood, and extension agents, where possible, should seek out ways of channeling extension resources into activities which directly involve women.

Expanding Extension Services for Sustainable Natural Resource Management

During the past two or more decades, the worldwide expansion of arable cropland has diminished considerably and the available arable land is now being used more intensively. In effect, the world's land resources are shrinking on a per capita basis, so the amount of land per capita is about one-quarter of what it was a century ago (1 hectare/person), and it is expected to fall to less than one-fifth of the 1900 level by 2050 (i.e., 0.18 hectare/person). In addition, food consumption has been growing faster than population growth, but unequally across and among different countries (Swason, 2008).

Given that the world's population is projected to reach nearly 9 billion by 2050, world food production, at a minimum, must continue to increase significantly over the next 40 years to achieve and maintain the food needs of the world's population. The combination of economic growth and changing consumption patterns also means that farming systems, especially in developing countries, must begin changing. In addition, unsustainable land-use practices are contributing directly to land degradation, and this factor is as serious a threat to world food production as climate change and biodiversity loss (UNDP, 2007). This problem affects food production in many ways, including soil erosion, nutrient depletion, water scarcity, salinity, pollution, and the disruption of biological cycles. Moreover, poor people suffer disproportionately from the effects of land degradation, especially in the drylands. Some other factors to consider vis-à-vis sustainable natural resource management practices include these: damaged soils release organic carbon; land-use change has caused about one-third of the increase in atmospheric CO₂ over the past 150 years; loss of nutrients means less-productive soils, further endangering food security; food security for two-thirds of the world's people depends on fertilizers, especially nitrogenous, but fertilizer prices are increasing, due to rising energy costs and other factors (UNEP 2007). In short, land degradation and poverty reinforce each other (Swanson and Rajalaht, 2010).

Potential Role of Extension Systems in Addressing Natural Resource Management Issues

Many industrially developed countries, such as the Australia, New Zealand, and the United States, are increasingly shifting the focus of their public agricultural extension systems toward training and educating farmers about utilizing sustainable natural resource management practices. However, these developments are still at an early stage of policy evolution, and cogent evaluations of these emerging approaches are scarce. There is a need in most developing countries to create increased awareness about these issues and then to begin training all categories of farmers about sustainable natural resource management practices. For example, farmers need to learn about the long-term consequences of land degradation and the overuse of water resources for both themselves and the next generation. Second, they need to learn how to utilize sustainable land- and water-use management practices to correct these problems (Swanson and Rajalaht, 2010).

Part of the problem is that many small-scale, subsistence farmers cannot afford to adopt many of the available technologies, ranging from fertilizers to solve soil nutrient problems, to drip irrigation systems to increase water-use efficiency. Poor farmers cannot utilize most of these technologies until they can increase their farm incomes or unless these inputs are subsidized (a major issue in countries like Malawi). This dilemma suggests other important reasons for moving toward more diversified farming systems that use, for example, more water-efficient, higher-value crops that will increase farm income while reducing the use of water. However, for small-scale farmers to adopt new diversified crop and/or livestock systems, they will need to learn about the markets; they will need to get organized into groups; and then they will need to learn what, how, and when to produce for these expanding markets.

The most successful approach of training farmers to incorporate different types of sustainable natural resource management practices into their farming systems is the extension methodology known as Farmer Field Schools (FFS). The Food and Agricultural Organization (FAO) of the United Nations initiated this approach during the early 1980s to introduce integrated pest management practices for rice in Indonesia. This methodology has now been introduced into many other countries worldwide, especially in Sub-Saharan Africa, by the FAO, with donor support. In addition, this approach has been expanded to focus on all production management practices associated with

specific crops, including sustainable NRM practices. For example, a recent study by Amudavi, *et al.*,(2007) illustrates how FFS can successfully introduce sustainable pest management procedures for maize production in East Africa and that also helps small-scale farm households increase their farm income and maintain household food security.

It should be noted, however, that given the intensity of this extension approach, it can reach only a limited number of small-scale and women farmers each year. Therefore, the cost of scaling up this (donor-financed) strategy to the vast majority of small-scale and women farmers in most developing countries would require major increases in operational resources for extension personnel on the part of national governments and/or donors. In most cases, these FFSs continue to be donor financed because most governments do not have or are unable to invest sufficient operational resources to scale up this approach across the country on a continuing basis.

In short, in most countries there is an urgent need for public extension and advisory organizations to allocate more resources and effort to educating farmers how to use sustainable natural resource management practices and to adopt these practices continuously in order to cope with the impact of climate change. Such skills include knowledge of the following.

Production and Post-Harvest Handling of High-Value Crop, Livestock Fishery and Other Products (especially the technical and management skills and knowledge that farmers and/or farm women will need to diversify from primarily producing food staple crops to beginning to produce high-value crop, livestock and fishery products):

- Diversification into selected higher-value crop, livestock and fisheries production systems;
- Post-harvest handling, including grading, packaging, value-added processing, storage and transportation systems for these higher-value products;
- Meeting product quality and traceability standards for high-value food products, especially for export;
- Agricultural mechanization, water management and protective cover systems gaining access to and learning how to use market information;
- Information technology skills and knowledge, such as precision farming and traceability.

Natural Resource Management Skills and Knowledge

- Sustainable land management and conservation practices;
- Sustainable water management and conservation practices:
 - Use of different water-efficient technologies, such as drip irrigation, water efficient crops, deficit irrigation and water harvesting techniques;
 - River and watershed management practices;
 - Maintaining the sustainability of underground aquifers;
- Sustainable forestry, agroforestry and wildlife management practices;
- Biological management and biodiversity conservation practices;
- Climate change and its implications for agricultural production systems.
- *Family Nutrition, Health and Hygiene*
 - Food processing and preservation
 - Family nutrition, especially for infants and young children;
 - Family hygiene, including safe water handling and waste management;
 - Family household management.

CONCLUSION

Agricultural Extension must go beyond simple technology transfer between extensionists and farmers to support smallholder farmers in facing and dealing with their challenges. These farmers must be put in a position to use their own know-how, skills, and organization to recognize problems, potential and opportunities, independently and respond to them appropriately in order to lay the foundation for a future that will ensure their existence. This is necessary for smallholder farmers to be food secure and be out of the clutches of poverty and inequality. Extension has the role of education, advisory and rural livelihood services to farmers and creates messages and framework for reaching all sorts of individuals including women. Farmers also need skills to manage their environment and

conserve natural resources in a way that will be satisfactory now, and in future without damage to the ecosystem in any way. Extension therefore is used in reducing poverty, ensuring equality for all sexes and the same time manage the environment.

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Received for Publication: 14/08/2011

Accepted for Publication: 12/10/2011

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