# Challenges Facing Agricultural Extension Agents: A Case Study from South-western Ethiopia

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***Abstract:*** This article examines the working conditions of extension workers and constraints to the adoption of modern agricultural technologies/practices in south-western Ethiopia. Data collected from 85 extension workers form the empirical basis for the study. The empirical results indicate that extension work in the study area has not been participatory in its nature, little consideration was given to farmers' experiences and knowledge, and extension workers lack practical skills. In addition to deciding on who should take part in the extension programme, extension agents are found to supply more services to those farmers who are financially sound and show interest in the programme. The study reveals that apart from the fact that the number of extension workers in the study area is very small, their qualification and communication skills leave a lot to be desired. The study makes it also clear that a host of factors obstructs the promotion/adoption of modern agricultural technologies/practices in the study area.

***Résumé:*** Cet article analyse les conditions de travail des agents de vulgarisation et les obstacles à l'adoption de techniques/pratiques agricoles modernes dans la région sud-ouest de l'Ethiopie. Des données recueillies auprès de 85 agents de vulgarisation constituent le fondement empirique de l'étude. Les résultats empiriques indiquent que, dans la zone étudiée, le travail de vulgarisation ne revêt pas un caractère participatif, l'expérience et les connaissances des exploitants ne sont pas tellement prises en compte, et les agents de vulgarisation manquent de compétences pratiques. Ces agents décident non seulement des exploitants appelés à participer au programme de formation, mais offrent également davantage de services aux exploitants financièrement mieux nantis et montrant de l'intérêt pour ledit programme. L'étude révèle que le nombre d'agents de vulgarisation dans la région concernée est très

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faible et que leurs qualifications et techniques de communication laissent beaucoup à désirer. Il ressort également de l'étude qu'un certain nombre de facteurs entravent la promotion/adoption de techniques/pratiques agricoles modernes dans la zone étudiée.

## 1. Introduction

Ethiopia is one of the largest countries in Africa both in terms of land area (1.1 million $km^2$) and human population (65 million). Agriculture is the basis of the Ethiopian economy. It accounts for a little over 50 per cent of the GDP and 90 per cent of the total export revenue and employs 85 per cent of the country's labour force. The average share of crop production, livestock production and forestry and other sub-sectors in the total agricultural value added is estimated to be about 60, 27 and 13 per cent, respectively (MEDaC, 1999). Low productivity characterizes Ethiopian agriculture. The average grain yield for various crops is less than one metric ton per hectare (CSA). Available evidence shows that yields of major crops under farmers' management are still far lower than what can be obtained under research managed plots. In this regard, Getenet *et al.* (1996), noted that under Ethiopian conditions, the potential yields of improved varieties of teff (*Eragrostis Abyssinica*), maize, barley, sorghum and wheat are 2.0, 4.5, 2.3, 2.5 and 3.2 metric tons per hectare, respectively. This is a clear indication of the gap, which exists between researchers and farmers.

The livestock sub-sector plays an important role in the Ethiopian economy. The majority of smallholder farms depend on animals for draught power, cultivation and transport of goods. The sub-sector also makes significant contribution to the food supply in terms of meat and dairy products as well as to export in terms of hides and skins, which make up the second major export category. However, the productivity of the sub-sector is decreasing as a result of poor management systems, shortage of feed and inadequate healthcare services.

Despite the importance of agriculture in its economy, Ethiopia has been a food-deficit country since the early 1970s. A closer look at the performance of the Ethiopian agriculture reveals that over the last three decades it has been unable to produce sufficient quantities to feed the country's rapidly growing human population. Even worse, the country has experienced recurrent droughts that claimed the lives of several thousands of people. It is noteworthy that food aid has been accounting for a significant proportion of the total food supply in the country. For instance, Ethiopia received 726,640 metric tons of food aid yearly over the 1985–2000 period (FDRE, 2002). This represents about 10 per cent of the national food grain production.

One of the principal causes of the prevailing structural food insecurity in the country is the low level of utilization of output-enhancing inputs. On this point, MEDaC (1999) pointed out that the Ethiopian farmer continues to use low fertilizer rates which are estimated to be an average of 7 kg of nutrients per hectare of arable land as compared to a sub-Saharan average of about 9 kg nutrients per hectare of arable land. The world average stood at 65 kg per hectare. Befekadu and Berhanu (1999/2000) reported that only less than 2 per cent of the cultivated area in the country were covered with improved seeds in the 1996/97 cropping season.

In addition to the low rate of adoption of modern agricultural inputs, the decreasing size of farms, which resulted in shorter fallow periods and even continuous cropping, contributed to the low productivity of the agricultural sector. Ethiopian agriculture is virtually small-scale, subsistence-oriented and crucially dependent on rainfall. More precisely, more than 95 per cent of the country's agricultural output is generated by subsistence farmers who use traditional tools and farming practices. The population pressure in rural areas has contributed to the decreasing size of farms and cultivation of impoverished soils on sloppy and marginal lands that are generally highly susceptible to soil erosion and other degrading forces. It may be of interest to note that the average size of holdings in the country is one hectare (Befekadu and Berhanu, 1999/2000). In the 1999/2000 production year, about 69 per cent of the households owned farms of less than or equal to one hectare in size whereas only 0.5 per cent of the agricultural households possessed a farm size of greater than 5 hectares (CSA, 2002).

Partly as a response to the widening gap between food supply and food demand and the chronic problem of food insecurity in the country, the Sasakawa Global 2000 initiated a collaborative agricultural project (extension approach) with the Government of Ethiopia, in 1993. The Sasakawa Global 2000 extension approach consisted of promoting a credit-supported package of seeds and fertilizers in some selected areas. The success registered by the Sasakawa Global 2000 extension approach led policymakers, public authorities and researchers to believe that the widespread adoption of green revolution technologies was the solution to improve smallholders' productivity and thereby achieve food self-sufficiency at a national level. Consequently, the Participatory Demonstration and Training Extension System (PADETES) was launched in 1995. Initially, PADETES concentrated on promoting the use of input packages (usually fertilizers and improved seeds) in high-rainfall areas. However, very recently technology packages were developed for the arid and semi-arid areas of the country.

The objectives of this paper are: to assess the educational and professional background of extension workers; to assess the working conditions

of extension workers; and to identify the principal factors which affect the promotion/adoption of modern agricultural technologies/practices.

The rest of this paper is organized in five sections. Section 2 presents a review of literature. Section 3 presents the current status of agricultural extension in Ethiopia. Section 4 provides a brief discussion on the method of data collection and the subjects of the study. Section 5 presents the results of the study. The final section summarizes the main empirical findings and draws appropriate conclusions.

## 2. Literature Review

### *2.1 Evolution of Agricultural Extension Approaches in Sub-Saharan Africa*

In sub-Saharan Africa agricultural extension work started during the early years of the 20th century by the European colonial powers. The principal objective of the extension services during the colonial era was to generate revenue from and meet the colonial demands for a steady supply of exportable tropical agricultural products, such as coffee, cocoa, tea, cotton, sugar and rubber. Accordingly, the extension system was commodity-oriented. In evaluating the commodity-based extension system, Birmingham (1999), noted that it often neglected the needs of food crops and livestock, and overlooked the effects of cash crop labour demands on household members, particularly women and children. Moreover, it paid little attention to the production constraints faced by subsistence farmers. In the early 1960s, when many of the countries of sub-Saharan Africa gained their independence, the financing and management of agricultural extension work became a largely national, often government responsibility.

The main focus of agricultural extension work in the post-independence period was to increase agricultural (mainly food) production and spread the benefits of improved farming techniques more widely (Picciotto and Anderson, 1997). According to Nagel (1997), in many developing countries the transfer of technology (TOT) model has been the prevalent practice for developing and spreading innovations. Chambers (1993) defines the TOT model as the basic paradigm of agricultural research and extension in which priorities are decided by scientists and funding agencies, and new technologies are developed on research stations and in laboratories and then handed over to extension agencies to be transferred to farmers. The TOT model was based on the assumption that new agricultural technologies and knowledge are typically

developed and validated by research scientists, and that the task of extension agencies is to promote the adoption of these technologies by farmers, thereby increasing agricultural productivity.

In terms of institutional arrangements and relationships, the TOT model creates a rigid hierarchy, which discourages feedback from the users of the technology. Put another way, the TOT model was predominantly a one-way communication process in which messages were channelled from top to bottom through the hierarchical structure, most often from government sources to the farmers. Message intent was to 'inform' and 'persuade' farmers to adopt technologies and practices, which had been developed by the 'experts' (Botha and Stevens, 1999). Researchers work independently of farmers and extension workers, resulting in a poor understanding of farmers and the opportunities and constraints they face. The TOT approach is fragmented, both institutionally and in terms of disciplines. Research concentrates on technology and researchers and extensionists are seen as technical agents. Social competence is not required as complex socio-organizational issues (e.g. land-use regulations, power structures, conflict resolution mechanisms) are neglected or reduced to a technical level (Hagmann *et al.*, 1999). Under the TOT model, it is believed that the most innovative farmers adopt the technology first and the remaining farmers eventually follow. The approach reduces the farmers to simple adopters of technologies developed by others. The role of the extension agents is limited to teaching farmers, via various extension methods such as farm visits, demonstrations, group training sessions etc., and putting the ready-made technologies into practice.

Available evidence shows that in many of the sub-Saharan African countries, smallholders are characterized by poor adoption of technologies. According to Lipton (1988), this is partly explained by the absence of 'smallholder-friendly' research findings to extend. In analysing the roles and challenges of agricultural extension in Africa, Opio-Odongo (2000) argued that extension workers in sub-Saharan Africa have behaved as if the farmers can only benefit from innovations that are external to their farming systems. He further noted that extension workers have tended to treat farmers as if they were empty vessels to be filled with knowledge and expertise. Similarly, Wiggins (1986) argued that research stations in Africa have tended to develop ideas with too little attention to smallholder labour supplies, to the riskiness of the innovations, to the likely availability of inputs, or to the presence of markets and to the economic attractiveness of recommendations.

The conventional extension system that is heavily influenced by the transfer of technology paradigm considered farmers as a homogeneous mass and thus failed to categorize them into different groups with different resources, problems, opportunities and requirements. As a result,

it could not select appropriate technologies and tailor them to the specific groups of farming populations. Rather, extension agents promoted blank recommendations that may at best be worthy but in need of adaptation to local conditions, and at worst are useless. Roling (1988) made the point that the application of top-down adoption/diffusion approach has tended to reinforce existing social inequalities within the farming population, since the producers benefiting most from the adoption process have generally been those better endowed than others in material, intellectual and social resources.

In the late 1960s, the TOT model came under careful scrutiny and criticism. The notion that extension means 'to advise' farmers was seriously challenged, implying the need to shift away from the TOT approach. According to Anderson and Feder (2002), extension helps to reduce the differential between potential and actual yields in farmers' fields by accelerating technology transfer (i.e., to reduce the technology gap) and helping farmers become better farm managers (i.e., to reduce the management gap). It also has an important role to play in helping the research establishment tailor technology to the agro-ecological and resource circumstances of farmers. Extension thus has a dual function in bridging blocked channels between scientists and farmers: it facilitates both the adoption of technology and the adaptation of technology to local conditions. The first involves translating information from the store of knowledge and from new research to farmers, and the second by helping to articulate for research systems the problems and constraints faced by farmers.

In the 1970s and the early 1980s, a reorientation of agricultural extension took place in the form of the Training and Visit (T&V) system of extension. It was first used by the World Bank in its development project in Turkey in 1967 and subsequently spread to South Asia and Africa in the 1970s and 1980s. T&V aims at closing the gap between the yields attainable using best-practice technologies and the yields that farmers actually achieve. The key aspects of the T&V system are: a specialization of extension staff to deliver only technical information and advice; a clear definition of responsibilities, notably between subject matter specialists and village extension workers; a clearly defined fortnightly schedule whereby extension workers visit identified contact farmers and meet for training by subject matter specialists; a clearly defined link between agricultural research and extension via the subject matter specialists (Benor and Baxter, 1984).

The T&V system shares many of the deficiencies with top-down technology transfer models (Kaimowitz, 1991). In practice, T&V has a top-down approach leaving little possibility for participation and initiative both for farmers and village extension workers. Too little emphasis has

been put on critical feedback based on self-evaluation. As a result, rigidity rather than flexibility characterized local fieldwork (Nagel, 1997). The secondary transfer of the technical messages, from contact farmers to community, has been much less successful than predicted, and adoption rates have been commonly very low among non-contact farmers (Roling and Pretty, 1997). Although the system was intended to incorporate the feedback from farmers, this has not always been accomplished. In addition, there have been a number of problems implementing the links envisioned in the system. However, it is widely believed that the T&V system has helped to increase extension agents' contacts with farmers, thanks to staff mobility and the programming discipline associated with the approach, and to highlight the importance of extension-research links (Kaimowitz, 1991; Picciotto and Anderson, 1997).

On the basis of lessons learnt from past experience in agricultural development work, in recent years agricultural specialists increasingly recognize the need for coupling modern scientific knowledge with indigenous technical knowledge to enhance technology generation and dissemination. Participatory approaches emerged in the late 1980s as a response to continued failure. It was realized that most technologies developed by researchers alone were inappropriate for smallholder farmers. Given this state of affairs, what was increasingly required was an approach that could generate custom-made environmentally friendly solutions based on farmers' involvement (Axinn, 1991). Consequently, farmers' participatory research became the approach to adapt technologies to farmers' conditions and by the 1990s to develop technologies with farmers. In this approach farmers are seen as partners in research and extension, and the key players in the innovation process (Hagmann *et al*., 1999).

In many countries, agricultural extension is being reoriented to provide more demand-based and sustainable services, taking into account the diversity, perceptions, knowledge and resources of users. The new farmer-centred approach to extension, the participatory extension approach (PEA), calls for a bottom-up approach of planning, implementation and evaluation of extension activities.

PEA is based on the premise that the effectiveness of agricultural extension work can be improved if local knowledge and resources are tapped to both diagnose problems and experiment with solutions (when researchers, extension staff and farmers become like partners in technology generation and dissemination). In participatory extension, it is assumed that farming people have much wisdom regarding their environment, but their living standards could be improved by learning more of what is known outside (which they do not normally know), that effective extension cannot be achieved without the active participation of the

farmers themselves as well as of research and related services, that there is a reinforcing effect in group learning and group action, and that extension efficiency is gained by focusing on important points based on expressed needs of farmers through their groups or organizations instead of through individualized approaches (Axinn, 1988).

PEA requires attitudinal change and role reversal concerning the relationships between farmers and extension workers. This approach requires a major shift in roles of agricultural extension worker from teacher to facilitator. Participatory extension aims at giving farmers a maximum role in developing technologies that work and in spreading successfully tested technologies to other interested farmers. PEA uses participatory methods that are based on flexible use and continual adaptation to the situation of participatory tools and techniques to initiate and guide the process of joint learning as well as communal planning and execution of extension activities. Plans and methods are semi-structured and are revised, adapted and modified as fieldwork in participatory extension proceeds. To this end, participatory extension requires a conducive institutionalization of extension that permits participation to be put in practice (Carney, 1998). PEA takes different forms to fit the varying and often specific situations. For instance, Black (2000) listed 32 participatory approaches practised in the 1980s and 1990s.

In the 1980s and 1990s many countries in sub-Saharan Africa have been increasingly committed to implement economic reform programmes, create a trade and investment environment and remove the obstacles to free market operation. These policy reforms have resulted, among others, in the removal of subsidies on agricultural inputs and reduced public sector funding. In this connection, some authors underlined the fact that reduced state budgets curtailed the activity of a government-run extension service in some African countries (Amanor and Farrington, 1991; Woodhouse, 1994).

At present, there is consensus in the literature that, with reduced public sector funding, the PEA is proving to be the best means to improve sustainability — both of the benefits of investment in new technology and the extension service itself (Woodhouse, 1994; Hagmann *et al*., 1999; Opio-Odongo, 2000). Roling and Pretty (1997) argued that the PEA was effective in disseminating improved technologies in many developing countries. Similarly, Picciotto and Anderson (1997) noted that in both more and less developed countries, farmer-led approaches to extension are spreading, while farmers' associations, co-operatives and self-help agencies are contributing handsomely to the diffusion of modern technologies. A cursory survey of the implementation of the PEA, as a pilot project, in the African continent shows that it was used in the development and spreading of soil conservation practices in Zimbabwe

(Hagmann *et al.*, 1999); in pasture management technology generation and dissemination in South Africa (Botha and Stevens, 1999); in integrated soil fertility management in Kenya (Baltissen *et al.*, 2000); in irrigation and water use projects in Zambia (Rivera, 2001); and in an FAO special programme for food security in Tanzania (Rivera, 2001).

## *2.2 Review of Similar Studies*

A review of literature on the working conditions of extension agents reveals that in developing countries most extension personnel are working under difficult and disadvantageous conditions. Fieldwork in many developing countries is characterized by conditions that foster low morale: lack of mobility, virtually no equipment and extremely low salaries. For many extension workers, tapping additional income sources is a question of physical survival (Nagel, 1997). These difficulties contribute to a high turnover rate; those who remain in extension are typically people with few employment opportunities elsewhere (Kaimowitz, 1991).

In the majority of countries of sub-Saharan Africa, farmers show lack of confidence in extension workers (Opio-Odongo, 2000). This is partly because agents are often instructed to transmit recommendations from research stations, which are formulated with little regard for smallholders or for the specifics of the extension agents' areas. Extension fieldwork, on the other hand, demands location specific, flexible and often quick decisions and actions.

In sub-Saharan Africa extension tends to lose its sense of mission. As one of the few government institutions with the broad coverage of the rural areas, extension agents are liable to be engaged in performing any task which fulfils ministerial policy at village level, be it supplying inputs and credit, transferring technology, feeding back information to research workers, mobilizing local communities for group action to solve community-wide problems, or dealing with specific farmer problems and referring them to specialists. Because policy objectives tend to outstrip the resources available to achieve them, this leads to overload on the agents. Moreover, it also leads to them trying to do jobs for which they have neither the training nor the experience. The resultant pressure of being expected to do more than they are able both quantitatively and qualitatively demoralizes the extension staff (Wiggins, 1986).

The effectiveness of agricultural extension work highly depends on the availability of extension professionals who are qualified, motivated, committed and responsive to the ever-changing social, economic and political environment. In this respect, Anderson and Feder (2002) note that adoption of technology by farmers can be influenced by educating

farmers about such things as improved varieties, cropping techniques, optimal input use, prices and market conditions, more efficient methods of production management, storage, nutrition, etc. To do so, extension agents must be capable of more than just communicating messages to farmers. They must be able to comprehend an often complex situation, have the technical ability to spot and possibly diagnose problems, and possess insightful economic management skills in order to advise on more efficient use of resources. However, many front-line extension staff in Africa lack the competences (skills, knowledge, attitude and resulting behaviour) they need to be effective in their work with farmers (Lindley, 2000). In the same line, a worldwide analysis of the status of agricultural extension reveals the low level of formal education and training of field extension agents in developing countries (Swanson *et al.*, 1990). It is obvious that the poor educational background of extension personnel and the rapid changes occurring in the extension environment necessitate regular in-service training to help extensionists develop the knowledge, skills and attitudes necessary to meet an increasing set of diverse demands. Although in-service training cannot compensate for poor training received prior to entry into the extension service, in many countries in-service training is often irregular, remains too theoretical and suffers from a lack of co-ordination.

One of the serious problems of extension organizations in developing countries is the absence of clearly defined systems of reward and penalty. In a large number of countries, reward and incentive systems which will attract, retain and motivate extension personnel, as well as provide training and promotional opportunities are either poor or totally lacking. Many countries do not have provisions for rewarding superior performance or for a wage system based on merit. Rather, promotion criteria are based on seniority and length of service (Vijayaragavan and Singh, 1997).

## 3. Current Status of Agricultural Extension in Ethiopia

Agricultural research and extension work started in Ethiopia with the establishment of the Imperial Ethiopian College of Agriculture and Mechanical Arts (IECAMA, now Alemaya University) following a bilateral agreement signed on 15 May 1952 between the Imperial Ethiopian Government and the Government of the United States of America. In the decade following its establishment, IECAMA was active in building the national agricultural research and extension systems. In 1963, the national agricultural extension work was transferred from IECAMA to the Ministry of Agriculture. Likewise, in 1966 the responsibility for agricultural research was transferred to the newly established Institute

of Agricultural Research (IAR). Since the establishment of IAR, Ethiopia has a national agricultural research system with an autonomous management and with major and minor stations covering the major ecological zones, and the major commodity and discipline groups.[1]

As discussed earlier, since 1963, the Ministry of Agriculture has been the sole authority responsible for the national agricultural extension system. Over the years the Ministry has implemented different extension approaches, such as the comprehensive package programme, the minimum package programme, the peasant agriculture development extension programme, and since 1995, the participatory demonstration and training extension system. However, their contributions in terms of bringing perceptible changes in the agricultural sector leave a lot to be desired. A closer look at the different extension approaches reveals that they have been planned and implemented without the participation of the very people for whom they have been designed. Apart from being biased against the livestock sub-sector, these approaches have captured farmers located only a few kilometres from both sides of all-weather roads (Belay, 2003).

Following the change in government in 1991, the T&V extension approach was adopted as a national extension system with major government financing until its replacement by the Participatory Demonstration and Training Extension System in 1995.[2] The latter was adopted from the Sasakawa Global 2000 (SG 2000) extension strategy, initiated in Ethiopia in 1993 by the Sasakawa Africa Association and Global 2000 of the Carter Centre.

According to Takele (1997), the centrepiece of the SG 2000 technology transfer method is the Extension Management Training Plot (EMTP). EMTPs are on-farm technology demonstration plots established and managed by participating farmers who are selected by the local extension workers and SG 2000 personnel. The extension agents play a facilitating role in the management of the plots. The agents also use the EMTPs to train both participating and neighbouring farmers so that they can put into practice the entire package of recommended practices. The size of each EMTP is usually half a hectare and adjacent farmers can pool their plots to form an EMTP if they cannot meet the half-hectare requirement individually.

The SG 2000 extension activities started by assessing available agricultural technologies in the country with the support of the national research and extension bodies. On the basis of the availability of improved varieties and recommendations of the research and extension experts, in 1993 technology packages for maize and wheat production were defined and demonstrated to 160 farmers residing in seven districts of the Oromia National Regional State and the Southern Nations,

Nationalities and Peoples Regional State. In 1994 the SG 2000 extension programme expanded its extension activities both in terms of area coverage and technology packages. More specifically, sorghum and teff technology packages were included in the programme, the number of participating farmers rose to 1600 and the programme was expanded to some districts of the Amhara National Regional State and the Tigray National Regional State. In 1995 good weather conditions, coupled with the material and technical support that participating farmers received from SG 2000, resulted in substantial yield increments. The impressive yield increments obtained by the participating farmers persuaded the Ethiopian government that self-sufficiency in food production could be achieved by adopting the SG 2000 extension approach. Consequently, in 1995 the government took the initiative to run the programme on its own and launched the Participatory Demonstration and Training Extension System (PADETES) as the national agricultural extension system.

PADETES was developed after a critical evaluation of the past extension approaches and the experience of SG 2000. Its major objectives include increasing production and productivity of small-scale farmers through research-generated information and technologies; empowering farmers to participate actively in the development process; increasing the level of food self-sufficiency; increasing the supply of industrial and export crops and ensuring the rehabilitation and conservation of the natural resource base of the country (Task Force on Agricultural Extension, 1994).[3] The system gives special consideration to the package approach to agricultural development. Initially, PADETES promoted cereal production packages and the beneficiaries were mainly those farmers who live in high rainfall areas of the country. Over the years, however, the packages have been diversified to address the needs of farmers who live in different agro-ecological zones of the country. Currently, PADETES promotes packages on cereals, livestock (dairy, fattening and poultry), high economic value crops (oil crops, pulses, vegetables and spices), improved post-harvest technologies (handling, transport and storage), agro-forestry, soil and water conservation and beekeeping developed for different agro-ecological zones (highland mixed farming system, highland-degraded and low moisture, lowland agro-pastoralist and lowland pastoralist zones).

The major elements of the extension package are fertilizer, improved seeds, pesticides and better cultural practices mainly for cereal crops (teff or *Eragrostis Abyssinica*, wheat, maize, barley, sorghum and millet). PADETES uses EMTPs and a technology transfer model which, in principle, nurtures linkages between research, extension, input and credit distribution. Under PADETES the major tasks of extension agents include organizing demonstration trials, assisting farmers in obtaining

agricultural inputs and channelling farmers' problems to the relevant organizations, particularly to the District Agricultural Office. The PADETES approach is meant to improve access to inputs by providing credit in kind. As farmers cannot borrow from banks due to collateral problems, extension credit is guaranteed by the regional governments and administered jointly by them and the two government banks (the Development Bank of Ethiopia and the Commercial Bank of Ethiopia). Loans are taken up by the regional governments and channelled into the District Administration Offices.[4] Farmers participating in PADETES then receive credit, in kind, via the District Agricultural and Finance Offices. Participants agree to allocate land for a demonstration plot and pay a 25 per cent down payment on the input package at the time of planting, with the balance due after harvest. The participants pay a 10.5 per cent interest rate on the input loan.

In 1995–96, the Ethiopian government sponsored the establishment of about 36,000 half-hectare on-farm demonstrations. In the 1996–97, 1997–98 and 1998–99 production years, the number of government-sponsored demonstration plots was 600,000, 2.9 million and 3.8 million, respectively (MOA 1997, 1998b, 1999). The trend is for this number to keep growing. Likewise, the number of farmers participating in the new extension programme increased from 35,000 in 1995–96 to 3.7 million in 1998–99.[5]

As to the number of extension personnel in the country, the authors' discussion with a senior extension expert in the Ministry of Agriculture in September 2001 revealed that it is estimated to be a little more than 14,000. The majority of these hold certificates and diplomas but lack adequate and appropriate technical and communication skills. This figure is too small, even by the standards of sub-Saharan Africa, when viewed in relation to the number of farmers the extension personnel have to serve.

## 4. Methodology

The empirical analysis of this paper is based on the findings of the opinion survey made in south-western Ethiopia between March and May 2001. The survey employed a structured questionnaire with both open-ended and pre-coded types of questions. The data for this study were collected from a total of 85 extension agents (74 males and 11 females). The survey covered extension agents working in four districts of the Jimma zone. The districts were randomly selected from the 13 districts of the Jimma zone. The Jimma zone is one of the 12 administrative zones of the Oromia Regional State.[6] The respondents constitute

90 per cent of extension workers in the study districts. Even though the original plan was to interview all extension workers in the study districts, due to different reasons, ten extension workers were not in their places of duty at the time of the survey. The geographical distribution of the respondents is presented in Table 1.

## 5. Results and Discussion

The mean age of the extension agents is 28.6 years but ranges between 21 and 39 years, inclusive. Eighty per cent of the respondents are less than 33 years old. On average, respondents have worked for 7 years as an extension agent. Of course, the length of the experience varied from one person to another, the longest being 15 years and the shortest two years. But about 74 per cent of the respondents served for more than 5 years. As to the educational background of the respondents, all of them completed the 4 years at high school where they studied agriculture as a subject. With respect to post-high school education, one respondent reported having a diploma or two years of post-high school college education in agriculture. Whereas 45 respondents had certificates from Development Agents' Training Centres, where they attended tailor-made courses in agriculture, the remaining (39 respondents) reported having received no post-high school training that would prepare them for their job. Of the 45 respondents who reported having received tailor-made training in Development Agents' Training Centres, about 46 per cent and 54 per cent reported that the duration of their training was 6 months and 9 months, respectively. In response to a question that asked the position of the respondents at the time of the survey, 72 replied that they worked in the capacity of development agent, 8 stated that they worked as supervisors and 5 indicated working both as development agents and experts. One important factor in extension work is the agents' background in farming. In this connection, 72.2 per cent and 27.8 per cent of the respondents had rural and urban backgrounds, respectively. As the majority of the

**Table 1: Geographical distribution of respondents**

| Districts | Respondents | | Total number of respondents |
|---|---|---|---|
| | Male | Female | |
| Dedo | 16 | 2 | 18 |
| Kersa | 16 | 6 | 22 |
| Limu Kosa | 24 | 0 | 24 |
| Manna | 18 | 3 | 21 |
| Total | 74 | 11 | 85 |

respondents have a rural background, it is believed that they have first-hand experience and understanding of farmers' problems and management constraints.

The survey results indicate that extension agents tend to work very closely with middle income farmers and pay little attention to the resource-poor farmers (Table 2). A closer look at the extension packages promoted in the country over the last 50 years shows that the national extension system has been promoting uniform packages throughout the country and for all groups of farmers. According to MOA (1998c), the country is divided into 18 major agro-ecological and 49 sub-agro-ecological zones. The nature of the varied ecological diversities and the fact that within the same agro-ecology farmers differ in terms of resource endowments, constraints, opportunities and managerial abilities, call for the development and promotion of appropriate packages that are suitable to the diverse agro-ecology and heterogeneous preferences of the farmers in the country. It is also noteworthy that the promotion of uniform packages of technologies/practices to heterogeneous groups of farmers will tend to marginalize resource-poor farmers who lack financial resources to pay for the newly introduced technologies and associated inputs.

The respondents were asked to point out how the farmers who participated in PADETES were selected in their command areas and their responses are set out in Table 3. As shown in Table 3, the great majority of the respondents (86.3 per cent) reported that they selected the farmers to participate in PADETES. This suggests that extension agents are the crucial stakeholders in identifying clients and supplying technical inputs to them. Chairpersons of peasant associations and extension supervisors played a marginal role in getting farmers involved in PADETES in the study areas.[7] The number of farmers participating in the extension programme by either their own initiatives or by their local leaders' initiation was found to be very minimal. The big role was given to be played by the extension agents. This is understandable because one of the criteria used

**Table 2: Distribution of respondents by their judgement about status of farmers whom they work with, by district**

| Status | Percentage of sample respondents | | | | |
|---|---|---|---|---|---|
| | Dedo | Kersa | Limu Kosa | Manna | Total |
| Poor | 22.2 | 0.0 | 4.2 | 4.8 | 7.1 |
| Middle income | 72.2 | 90.5 | 91.7 | 95.2 | 88.1 |
| Rich | 5.6 | 9.5 | 4.2 | 0.0 | 4.8 |
| Total | 100 | 100 | 100 | 100 | 100 |

**Table 3: Distribution of respondents by their judgement about who selects farmers to participate in PADETES, by district**

| Participants are selected by | Percentage of sample respondents* | | | | |
|---|---|---|---|---|---|
| | Dedo | Kersa | Limu Kosa | Manna | Total |
| Farmers | 25.0 | 0.0 | 8.7 | 9.5 | 10.0 |
| Chairperson of Peasant Association | 18.8 | 10.0 | 0.0 | 0.0 | 6.3 |
| Development agent | 62.5 | 90.0 | 87.0 | 100.0 | 86.3 |
| Supervisors | 0.0 | 0.0 | 4.3 | 0.0 | 1.3 |

* The percentages do not add up to 100 per cent because of multiple responses.

to evaluate the performance of extension agents is the number of farmers adopting the technology packages in their mandate area. More precisely, quotas (the minimum number of farmers who should take up the technology packages) are imposed on extension agents. As a result, extension agents use whatever means available to persuade farmers who are able to adopt the packages to take part in PADETES and thereby meet their quotas.

Extension agents were asked to report the potential role that could be played by the farmers to solve local agricultural problems. Interestingly enough, responses by the extension agents were mixed at best (see Table 4). For instance, whereas about 29 per cent of them reported that farmers be given a leading role in the search for appropriate solutions to their agricultural problems, about 51 per cent of them are of the opinion that the key role should be allocated to extension agents. Given this reality, it seems that farmers' empowerment, which is one of the basic objectives of PADETES, is far from being attained, in that extension agents decide who should participate in PADETES and have the firm belief that they have the right solutions to farmers' problems. More precisely, the majority of the respondents seem not to consider farmers' knowledge and experience as an important component that determines the success of extension work.

The survey results reveal also that even though extension agents are expected to provide extension services to all farmers in their mandate areas, they were inclined to work very closely with those farmers who participate in PADETES. This is due to the fact that extension agents are required to supervise the demonstration plots of all the farmers participating in PADETES in their mandate areas. Given this state of affairs, extension agents find it impossible to provide the minimum required service to those farmers not involved in PADETES. This seems to suggest that poor farmers and their problems are given marginal attention. In fact, about 80 per cent of the respondents pointed out that they

**Table 4: Distribution of respondents by their opinion on who should be responsible to suggest solutions to agricultural problems in the study area, by district**

| Responsible body | Percentage of sample respondents* | | | | |
|---|---|---|---|---|---|
| | Dedo | Kersa | Limu Kosa | Manna | Total |
| Farmers | 6.7 | 27.8 | 52.2 | 14.3 | 28.6 |
| Chairperson of Peasant Association | 6.7 | 0.0 | 4.3 | 28.6 | 8.6 |
| Development agents | 73.3 | 61.1 | 26.1 | 57.1 | 51.4 |
| Supervisors | 6.7 | 11.1 | 17.4 | 0.0 | 10.0 |
| Others (Administrators and cadres) | 6.7 | 0.0 | 8.7 | 0.0 | 4.3 |

* The percentages may not add up to 100 per cent because of multiple responses.

visited the demonstration plots of farmers who participated in PADETES at least once in a two-week period (Table 5). The extension agents' supply of technical advice and consultation to farmers participating in PADETES seem to vary from village to village and from one extension agent to the other (Table 5).

As noted earlier, extension agents pay little attention to farmers who do not participate in PADETES. In this respect, about 22 per cent and 71 per cent of the respondents reported visiting the non-participating farmers only once in four months and once every year, respectively. About 4 per cent of the respondents indicated that they never visited the non-participating farmers. Close to 3 per cent of the respondents did not express their opinion on the issue.

Table 6 summarizes the responses to an open-ended question on the most important factors, which affect the promotion and adoption of new agricultural technologies in the study area.

It can be seen from Table 6 that about 76 per cent of the respondents perceived the high price of inputs as an important barrier to the adoption of modern agricultural inputs. This is not surprising given the fact that most of the modern inputs (especially fertilizers and agro-chemicals) are

**Table 5: Distribution of respondents by frequency of their visit to farmers selected for the extension package programme, by district**

| Frequency of visit | Percentage of sample respondents | | | | |
|---|---|---|---|---|---|
| | Dedo | Kersa | Limu Kosa | Manna | Total |
| Weekly | 46.7 | 36.8 | 41.7 | 11.1 | 34.2 |
| Fortnightly | 40.0 | 42.1 | 45.8 | 55.6 | 46.1 |
| Monthly | 6.7 | 21.1 | 4.2 | 33.3 | 15.8 |
| Others (not specified) | 6.7 | 0.0 | 8.3 | 0.0 | 3.9 |
| Total | 100 | 100 | 100 | 100 | 100 |

**Table 6: Principal constraints to the promotion and adoption of new technologies as perceived by the respondents, by district**

| Constraints | Percentage of sample respondents | | | | |
|---|---|---|---|---|---|
| | Dedo | Kersa | Limu Kosa | Manna | Total |
| High price of inputs | 41.2 | 95.0 | 87.5 | 71.4 | 75.6 |
| Lack of appropriate manuals and extension materials | 76.5 | 55.0 | 62.5 | 81.0 | 68.3 |
| Transportation problem | 58.8 | 60.0 | 79.2 | 52.4 | 63.4 |
| Late delivery of inputs | 64.7 | 55.0 | 45.8 | 66.7 | 57.3 |
| Shortage/lack of inputs (seeds, fertilizers and chemicals) | 52.9 | 85.0 | 37.5 | 38.1 | 52.4 |
| Development agents lack practical skills | 52.9 | 60.0 | 41.7 | 57.1 | 52.4 |
| Shortage of time to teach farmers properly | 70.6 | 40.0 | 25.0 | 66.7 | 48.8 |
| Limited experience in the use of extension methods and materials | 41.2 | 80.0 | 25.0 | 42.9 | 46.3 |
| Lack of effective monitoring (reporting and supervision) | 52.9 | 50.0 | 25.0 | 4.8 | 31.7 |
| Shortage of working capital (credit) to purchase modern inputs | 35.3 | 60.0 | 8.3 | 23.8 | 30.5 |
| Some extension packages are not suitable to the farmers' real situations | 35.3 | 60.0 | 12.5 | 19.0 | 30.5 |
| Resistance of farmers to adopt new technologies | 41.2 | 25.0 | 20.8 | 28.6 | 28.0 |

imported and the national currency has been losing its value over the past ten years, their prices have been increasing year after year. In fact, up to 1997 fertilizer prices had been subsidized and farmers had to pay relatively lower prices even after the national currency was devalued in 1992. When the government subsidy was lifted in January 1997, the free market prices became so exorbitant that they put fertilizer beyond the reach of many peasant farmers in the country.

Table 6 also indicates that the majority of the respondents (68.3 per cent) cited lack of appropriate extension materials as another important factor hampering the promotion and adoption of new agricultural technologies in the areas where they worked. This implies that proper guidelines and teaching aids had not been given to the extension agents to effectively work and communicate with the local farmers. In this respect, it is interesting to note that only about 46 per cent of the sample respondents reported having received at least one type of extension material (like posters, booklets, leaflets or handouts) about extension packages or new technologies over a period of five years until the time of the survey. This average, however, masks differences among the study districts. In fact, the proportion of respondents who reported to have received extension materials over the same period was about 17 per cent, 33 per cent, 58 per cent and 70 per cent for Dedo, Kersa, Limu Kosa and

Manna districts, respectively. Some of the respondents reported that they prepared visual aids to make up for the shortage of extension materials. More precisely, 36 per cent of the sample respondents indicated that they prepared visual aids by themselves. The corresponding figures for respondents from Dedo, Kersa, Limu Kosa and Manna districts were 27.8 per cent, 21.1 per cent, 58.3 per cent and 35.0 per cent, respectively.

About 63 per cent of the respondents pointed out that inadequate transportation facilities pose a major hindrance to their efforts to popularize modern agricultural technologies. This problem should be seen in the context of the country's poor road network. Ethiopia's road transport system cannot support an efficient and market-based production and distribution system. Nearly 75 per cent of farms are more than half a day's walk from all-weather roads. The development of the country's road network has been seriously impeded by wide topographical variations, extremely rugged terrain, severe climatic conditions and a widely dispersed population. It is currently estimated that about 70 per cent of the country's land area is not served by a modern transport system (MOFED, 2002).

The respondents reported that they have to travel up to 8.5 km to visit some of their target farmers. They were also asked to indicate their mode of transportation to reach the local farmers. About 50 per cent of them indicated that they travelled on foot and about 36 per cent reported that they travelled on horse/mule back. Close to 12 per cent and 1 per cent reported using bicycles and motor bikes, respectively.

Late delivery of inputs and lack/shortage of inputs were cited as being important barriers to the adoption of modern agricultural inputs in the study area by 57.3 per cent and 52.4 per cent of the respondents, respectively. As noted earlier, smallholders produce crops under rain-fed conditions. Therefore, farm operations need to be performed at the right time in order to get the highest production level. This implies that necessary farm inputs be made available at the right time and in sufficient quantities. However, this study reveals that late delivery and an inadequate amount of inputs are important factors negatively influencing the adoption of modern agricultural inputs in the study area. The problem of late delivery of inputs is related to the late arrival of the inputs from abroad (in the absence of domestic production, fertilizers and agro-chemicals are imported). The delay has also to do with long drawn-out procedures of making bids, a lengthy decision-making process at different administrative levels and poor infrastructure.

Extension agents were also asked to self-judge their own level of practical extension skills. About 52 per cent of the respondents agreed on the point that their practical extension skill was less than adequate. It should be noted that this response is a kind of confession on the part of

the respondents that they did not feel confident and professionally competent to demonstrate new technologies and practices to their clients. As agricultural extension is essentially a process of learning by doing, extension agents' apparent lack of practical skills limits the success of technology dissemination efforts in the study area. Under PADETES, an extension agent is basically a supervisor, whose main task is to ensure that farmers selected for demonstration are applying the package according to blanket recommendations issued by authorities. With only a few months' training, extension agents often lack the capacity to modify recommendations to local conditions. The extension system operates on recommendations that show little variation across different environments. Intuitively, such recommendations hamper the extension agents' need to learn and dynamically adapt the contents of the technologies transferred to the local conditions and farmers' situations.

The survey results show also that in-service training, which takes the form of induction/orientation training for new staff, routine refresher training and specialized training to meet extension work requirements and career development training, is rarely carried out. As many of the extension agents in the country are certificate holders with very limited technical and communication skills, it is expected that their participation in in-service training programmes will help them upgrade their skills and build confidence in what they are supposed to accomplish. However, this does not seem to be a priority area to the authorities because 52 per cent of those surveyed pointed out that they had not received any in-service training since they had started working as extension agents. It should be noted that in-service training must not be designed to make up for deficiencies in pre-service training. Much as in-service training is important for the efficiency of the extension system, pre-service training which prepares people to work as front-line extension workers must properly and adequately address important issues such as technical training, extension methods, management training and communications skills.

Extension agents in Ethiopia in general and in the study areas in particular, face heavy workloads for at least two reasons. First, they are expected to serve a large number of farmers. Secondly, they are often required to be involved in various non-extension activities. In the same vein, about 49 per cent of the respondents report that they are subject to heavy workloads. Under PADETES, development agents are under pressure to work with as many farmers as possible. In this respect, the survey results reveal that the sample respondents indicated that they served on average 1090 farm households. The average number of farm households that each agent has to serve in Dedo, Kersa, Limu Kosa and Manna districts was reported to be 969, 1179, 1176 and 961, respectively. Available evidence shows that extension agents are often overloaded with

different assignments, such as tax collection, mobilizing farmers for public work, collecting loan repayments, and agitating farmers to become members of co-operatives, which are, in most cases, not related to their normal duties (Belay, 2002). Over the years, the involvement of extension agents in non-extension activities has played against their reputation as development workers. Many people in rural areas consider extension agents as government spokesmen rather than facilitators in the rural development endeavour (Belay, 2003).

About 46 per cent and 32 per cent of the respondents pointed out respectively extension agents' lack of experience in using extension methods and lack of effective monitoring system as being responsible for the low rate of adoption of improved agricultural technologies in the study area. About 31 per cent of the respondents cited shortage of working capital as an important barrier to the adoption of modern agricultural inputs. This result is consistent with the findings of previous studies which underlined that, because of their low level of incomes, smallholders in Ethiopia cannot pay for modern agricultural inputs out of their own savings (Belay, 2002; Quinones and Takele, 1996; Takele, 1997; Degnet and Belay, 2001). About 31 per cent of the respondents reported that some extension packages were not suitable to the farmers' real conditions. This could be partly explained by the fact that, in many parts of the country, extension agents promote technologies as 'blanket recommendations'. In other words, these technologies are developed outside the users' system and are extended to farmers without prior adaptability trials. Needless to say, such a practice imperils the whole effort of extension work in the country.

It is to be noted that a considerable percentage of the respondents (28 per cent) identified farmers' resistance to adopt new technologies as an important problem in their mandate areas. There could be various explanations for farmers' lack of interest in modern inputs. One possible reason could be that the inadequate and unreliable rainfall forces farmers not to take additional risks by experimenting with new technologies. Another reason could be previous bad experience with new technologies. Given that modern agricultural inputs and practices have been popularized in different locations without proper adaptability trials, their outcomes have been far below expectations in many areas of the country. It is the authors' belief that the identification of the real causes of farmers' lack of interest in new technologies calls for a separate research.

The respondents reported that they used both group and individual methods in communicating new technologies/practices to farmers. Regarding the most frequently used methods in communicating new ideas, respondents were made to choose from different methods that they employed frequently and the responses are summarized in Table 7.

**Table 7: Distribution of respondents by most frequently used methods to introduce new technologies/practices to farmers, by district**

| Methods | Percentage of sample respondents | | | | |
|---|---|---|---|---|---|
| | Dedo | Kersa | Limu Kosa | Manna | Total |
| Contacting farmers individually | 16.7 | 4.8 | 20.8 | 14.3 | 14.3 |
| By arranging public meetings at a specified day and time | 11.1 | 76.2 | 66.7 | 23.8 | 46.4 |
| Through Peasant Association officials | 11.1 | 9.5 | 8.3 | 28.6 | 14.3 |
| Through local leaders (religious leaders, leaders of local organizations and elders) | 55.6 | 9.5 | 4.3 | 33.3 | 23.8 |
| Other (not specified) | 5.6 | 0.0 | 0.0 | 0.0 | 1.2 |
| Total | 100 | 100 | 100 | 100 | 100 |

Table 7 shows that about 46 per cent of the respondents arranged public meetings to introduce new technologies/practices to the farming communities and about 24 per cent introduced new technologies/practices through local leaders. Whereas about 14 per cent contacted farmers individually and about 14 per cent used peasant association officials to introduce new technologies/practices in their mandate areas.

Table 7 indicates clearly that the respondents tend to introduce new technologies/practices through community leaders (peasant association officials and local leaders) and by arranging public meetings. Though these methods may help reach a large number of farmers in a relatively short time, their impact in terms of getting the technologies/practices adopted by the target beneficiaries leaves a lot to be desired. The possible explanation for the utilization of these extension methods by the majority of the respondents is the relatively large number of farmers that agents have to serve, which makes the utilization of individual methods practically impossible. Available evidence shows that higher rates of technology adoption are achieved when extension agents possess adequate knowledge and work closely with few farmers. Moreover, field demonstrations, farmers' days, field days and farm visits are expected to enhance adoption of new technologies/practices through creation of awareness, exchange of ideas and skill acquisition. As mentioned earlier, the majority of the respondents pointed out that their practical skills were very limited. This could be also another possible reason why they resorted to very simple and rather theoretical methods of popularizing new technologies/practices in their mandate areas.

One of the determinants of the success of extension work is the existence of a well-organized feedback system. Such a system ensures that extension programmes match the preferences, resources and specific

**Table 8: Distribution of respondents by their reporting methods, by district**

| Respondents who | Percentage of sample respondents | | | | |
|---|---|---|---|---|---|
| | Dedo | Kersa | Limu Kosa | Manna | Total |
| Keep a diary about their activities | 77.8 | 90.5 | 95.8 | 76.2 | 85.7 |
| Report farmers' opinions and statements without any change | 100.0 | 85.7 | 91.7 | 95.2 | 92.8 |
| Include problems faced in the report | 94.1 | 100.0 | 95.8 | 85.7 | 94.0 |
| Incorporate own comments and suggestions in the report | 88.2 | 95.2 | 95.8 | 95.0 | 93.9 |

conditions of the beneficiaries and the programmes utilize local skills and knowledge. The system is equally important for extension organizations in that they will be able to shift away from the traditional top-down approach and concentrate on the participatory approach to information dissemination. The latter ensures the promotion of improved agricultural technologies adapted to the realities of the target population. The respondents pointed out that they prepared and submitted written reports about their activities to their superiors on a regular basis. With respect to the frequency of reporting, the majority of the respondents (51 per cent) indicated that they reported weekly, whereas about 19 per cent, 29 per cent and 1 per cent of the respondents stated that they reported to their superiors fortnightly, monthly and biannually, respectively.

Table 8 shows that about 86 per cent of the respondents kept diaries about their day-to-day activities. With regard to the content of their report, the vast majority of the respondents (92.8 per cent) indicated that they reported farmers' opinions and suggestions, without any alteration, to their superiors. Similarly, about 94 per cent of the respondents stated that their report incorporated the problems they encountered as well as personal comments and suggestions about their work.

A closer look at Table 8 leads one to believe that farmers have the possibility to make their voices heard and influence the extension system to be more responsive to their real needs and specific conditions. However, the findings of recent studies on the Ethiopian extension system reveal that farmers have a very marginal contribution in designing and formulating extension activities (Belay, 2002, 2003).

## 6. Conclusion

Extension agents are the critical stakeholders in the agricultural development strategy of the Ethiopian Government in the sense that they are the immediate advisers of the peasant farmers in the country. Various

technical inputs are also channelled through the extension agents to the farmers. This paper has examined the working conditions of extension workers in four districts of south-western Ethiopia and identified the principal barriers to the adoption of modern agricultural technologies/practices.

The survey results reveal that extension work in the study area has not been participatory in its nature. As such, extension workers decide on who should take part in PADETES and with whom to work very closely. The study also pointed out that extension service coverage has been inadequate in that extension agents are expected to work with a large number of farmers. Due to a shortage of extension agents, each agent has to serve on average 1090 farmers. This is a very high number even by the standards of sub-Saharan Africa. In practice, the extension system has concentrated on working very closely with those farmers who participate in PADETES. As a result, farmers who do not participate in PADETES are relegated to the second rank and receive assistance from extension agents occasionally.

The empirical results indicate also that high input prices, shortage and late delivery of inputs, lack of extension materials, a transportation problem, extension agents' limited practical skills and experience in using extension materials, shortage of working capital, shortage of extension personnel, unsuitability of some technologies to the farmers' conditions and heavy workload of extension agents were identified as important barriers to the adoption of modern agricultural technologies/practices in the study area.

In the light of these results it is imperative that policymakers pay utmost attention to the constraints that beset peasant agriculture. The issues that need immediate attention include, among others, increasing farmers' access to appropriate and improved technologies suitable to their conditions. Given the diverse ecological conditions of the country, there cannot be a 'one-size-fits-all' strategy. It is therefore imperative to undertake adaptability trials before popularizing extension packages, giving special consideration to the farmers' indigenous and experience-based knowledge system in research and extension work. There is also a need to move away from the present top-down approach of extension work and embrace a bottom-up approach in which people take increasing responsibility in identifying problems, establishing priorities and carrying out on-farm research and extension activities.

If agricultural extension is to contribute significantly to the agricultural development endeavour of the country in general and the study area in particular, it must provide timely and competent services. This calls for strengthening the contact between extension agents and farmers through, among others, hiring professional extension workers who have adequate

training in extension methods and communication skills and technical, marketing and management issues. Similarly, in-service training programmes must be organized on a regular basis to help extension agents develop knowledge, skills and attitudes necessary to meet increasingly diverse demands. It is also important that the extension system be flexible to respond to new challenges such as undertaking adaptive research, working with different client groups, and developing appropriate extension materials.

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## Notes

1. In 1993, some IAR centres were decentralized to create independent research centres run by the respective regional governments, and became the Regional Agricultural Research Centres generally under their respective regional bureaux of agriculture.
2. With the change in government in 1991, the country was divided into nine semi-autonomous administrative regions on the basis of ethnic, linguistic and cultural identity, one federal capital (Addis Ababa) and one special administrative division (Dire Dawa). At present, extension activities are the entire responsibility of regional agricultural bureaux. The extension division of the Federal Ministry of Agriculture is charged with the task of co-ordinating inter-regional extension work, providing policy advice on nationwide agricultural extension issues, advising regional bureaux of agriculture in the areas of extension management and administration, developing extension training materials and organizing training programmes in agricultural extension for regional extension personnel. The regions are given full autonomy in the planning, execution, monitoring and evaluation of extension programmes.

3. According to government officials, an important element of the PADETES approach is the promotion of the active participation of rural communities in problem identification, analysis, planning, implementation and evaluation.

4. In the new extension system, input supply and credit are dealt with in one transaction. The procedures involved in input loan disbursement are as follows. The regional government borrows directly from the banks and relies on its administrative machinery and peasant organizations to disburse and collect the loan. Farmers have to apply via the service co-operatives, which submit applications for credit to the District Agricultural Office. The District Finance Office is also involved. The service co-operative collects a 25 per cent down payment of the input prices. An agreement is signed between the Finance Office and the Co-operative. The down payment and signing result in a delivery order by the Finance Office, which the co-operatives use to collect their stock from the designated supplier.

5. Quinones and Takele (1996) and MOA (1997, 1998a, 1998b, 1999) reported that the average yields of different crops obtained from EMTPs are much higher than the traditional averages. For instance, according to MOA (1999), in the 1998–99 production year, the average maize, sorghum, teff, wheat and barley yields of EMTPs farmers in the Oromia National Regional State were 247 per cent, 67 per cent, 100 per cent, 225 per cent and 129 per cent above the traditional averages respectively. The corresponding figures for the Southern Nations, Nationalities and Peoples Regional State were 205 per cent, 71 per cent, 64 per cent, 207 per cent and 141 per cent respectively.

6. According to the Ethiopian Federal Democratic Republic administrative hierarchy, the regional states are divided into zones, districts and *kebeles* (local administration units), in that order.

7. A Peasant Association (PA) is a territorial organization with broad administrative and legal powers encompassing 800 hectares or more. The average PA membership is 250–270 families (households).

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