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# **Integrated Agricultural Development Strategies in the ANRS: Lessons from the AMAREW Project\***

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## **Abstract**

The Amhara Micro-enterprise development, Agricultural Research, Extension and Watershed management (AMAREW) Project is a USAID/Ethiopia Mission funded initiative established in July 2002 to provide technical assistance in integrated agricultural development in the Amhara National Regional State (ANRS). The Project works to strengthen agricultural research, extension, watershed management, capacity building, and micro-enterprise development in the ANRS by collaborating with its ANRS partners in strategically selected two pilot watershed sites and five pilot food-insecure woredas.

The Project is being implemented by a Virginia Tech led Consortium (Virginia Tech, Cornell University, Virginia State University and ACDI/VOCA) in collaboration with its ANRS Primary Partners consisting of the Food Security Coordination and Disaster Prevention Office (FSCDPO), Amhara Regional Agricultural Research Institute (ARARI), Bureau of Agriculture and Rural Development (BoARD), Environment Protection, Land Administration, and Utilization Authority (EPLAUA), Amhara Micro and Small Industries Development Bureau (AMSEIDB), and Amhara Credit and Saving Institution (ACSI). FSCDPO has the overall role of coordinating Project activities; ARARI is responsible for the planning and implementation of research; BoARD plans and implements agricultural extension and watershed management activities in the pilot extension woredas and watersheds; EPLAUA has the responsibility for guiding land use and certification in the pilot watersheds; AMSEIDB and ACSI share responsibilities for micro-enterprise and micro-finance issues in the target areas of the project. The technical advisors of AMAREW work with and advise their respective line department experts in all stages of project activities.

AMAREW strives to catalyze a paradigm shift in the ANRS in strengthening research extension linkage where education, research, and extension are integrated similar to the service-oriented Land Grant University Model of the USA. The Project focuses on upgrading human resource capacities and reinforcing the institutional relations between ARARI and BoARD through joint planning and implementation of on-farm research and extension programs. Our five pilot extension woredas are planned to integrate research and extension, thereby demonstrating that effective linkage of extension and research are possible in the ANRS. Our two pilot watershed management sites (Lenche Dima in Guba Lafto and Yeku in Sekota) serve as models for integrating watershed management, research, extension, and micro-enterprise development efforts. In the long run, the promising experiences and lessons learned through the activities of the AMAREW Project should be scaled up to other sites in the ANRS as well as nationally, thus contributing to the alleviation of the food security problem of the region and the nation.

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**Background:** Agriculture is the backbone of the Ethiopian economy. It is responsible for approximately 50% of the Gross Domestic Product, 90% of foreign exchange earnings, and 85% of the livelihoods of the population. Ethiopia's agricultural sector is driven by the subsistence strategies of smallholder farmers and their families. In the past, due to insufficient knowledge base, some misguided agricultural policies, coupled with a rapidly growing population, chronic poverty, and erratic rainfall, have caused severe food security challenges for farm families and natural resource degradation. Drastic new approaches that lead to improvement of food security and a lessening of the dependence on food aid are needed. Against this rationale, the Amhara National Regional State in its rural development strategy has included the need for a conservation based, watershed focused development approach regionally.

**Objectives:** One of the stated objectives of the AMAREW project is to assist the efforts of the ANRS to bring about a major change in the process of planning and implementing agricultural research and extension, in such a way that farmers and all stakeholders would play a pivotal role in defining the course of agricultural research and extension. Accordingly, the two pilot integrated watershed management areas are serving as sites for integrating research, extension, watershed management and micro-enterprise development efforts. Similarly, the five pilot extension woredas are serving as pilot woredas for functionally integrating research and extension at Woreda level. Briefly, AMAREW works to strengthen agricultural research and extension, watershed management capacity, and micro-enterprise development in the ANRS by working in targeted and selected pilot food-insecure woredas.

Over 50 percent of the 110 woredas of the ANRS are food-insecure. Poverty is widespread particularly in rural areas. Many households are only able to produce sufficient food to meet their food requirements for less than six months of the year. Agricultural production and productivity is generally very low. Land degradation, overgrazing, soil erosion, deforestation and cultivation of steep and fragile lands has resulted in the loss of productivity and biodiversity in the region. Although poverty is one of the defining characteristics of food insecurity in the region, it is exacerbated by inefficient agricultural practices, recurrent drought, inefficient access to land, and limited non- and off-farm income opportunities.

Production, productivity, and income of rural households in the region can be increased through the availability and proper use of agricultural technologies. Rural income can also be increased through participatory agricultural research, giving technology users an important say in technology development, and transforming a top-down, supply-driven technology transfer system to a bottom-up, demand-driven one.

Inspired by the service-oriented USA land-grant university model of integrated extension, research and education, AMAREW also promotes the adoption of peer-to-peer collaboration between Ethiopian and USA counterparts. Besides, AMAREW upgrades

human resource capacities and reinforces the institutional relations between ARARI and BoA through joint planning and implementation of on-farm research and extension programs. AMAREW has been working with ACSI to establish a Management Information System for its banking services. It has been aiming also at working with the Amhara Micro and Small Enterprises and Industries Development Bureau (AMSEIDB,) to develop public and private sector Business Development Services practitioners at the woreda level.

The Virginia Tech led Consortium (Virginia Tech, Cornell University, Virginia State University, and ACDI/VOCA) implements the AMAREW Project. Project implementation started at the beginning of July 2002. A Kick-off Workshop was conducted on September 19 and 20 to announce the launching of the Project, and to introduce the project personnel, partners, and stakeholders to each other. During this workshop, the Virginia Tech Consortium and the then Primary Partners of the Consortium in the ANRS, namely Food Security Program Coordination Office (FSPCO), Amhara Regional Agricultural Research Institute (ARARI), Bureau of Agriculture (BoA), Amhara Credit and Saving Institution (ACSI), and the Regional Micro and Small Enterprises Development Agency (ReMSEDA, now MSEIDB, Micro and Small Industries Development Bureau) were all present. ARARI is responsible for the planning and implementation of research while BoA plans and implements agricultural extension and watershed development activities in the selected watersheds and pilot extension woredas, respectively. Similar arrangements govern AMAREW's relationships with other ANRS partners. The technical advisors of AMAREW advise and assist their respective line department experts in planning and follow up of activities. The experts are assigned not to plan and implement activities by their own but to advise and assist implementing institutions of the ANRS in the planning and monitoring processes. Accordingly, the annual work plan is designed and implemented by the concerned institutions of the ANRS.

**Modalities of Implementation:** The overall work of AMAREW is being coordinated and overseen by a Regional Implementation Team (RIT), chaired by the Head of the Food Security Coordination and Disaster Prevention Office (FSCDPO). The RIT meets regularly, at least once in three months to monitor project progress. The RIT members are Heads (or their representatives) of FSCDPO, ARARI, BoA, ACSI, AMSEIDB, EPLAUA, CPB, AMAREW, USAID, BoFED, and MoFED. Concerned institutions of the ANRS, in consultation with technical advisors of AMAREW, prepare their plans and reports and submit to the RIT. The RIT reviews and recommends plans and reports, before sending them to USAID-Ethiopia for approval. The RIT has also been actively involved in the selection and recruitment of locally hired project associate advisors. As a result, the understanding by the project staff is that the concerned bureaus of the ANRS own AMAREW.

**Integration of Project Components:** The integration of on-farm research, extension, and watershed activities addressed by the AMAREW project are demonstrated through joint planning and implementation of pre-extension trials and popularization of improved technologies at our five pilot extension woredas, seed multiplication at the center sites

and farmers' fields, as well as integrated activities at our two pilot watersheds. The selection of participating farm households, trial sites, and execution of on-farm verification and demonstration in each target woreda are conducted with the full participation of researchers, woreda extension staff (DAs), and the local farmers. At the pilot watershed levels, researchers at ARARI's Sirinka and Sekota Research Centers are involved in the joint planning and implementation in Lenche Dima and Sekota watersheds, respectively.

**Research Component:** One of the objectives of the AMAREW project is to build the capacity of ARARI to carry out on-farm research through a) strengthening the on-farm research program; and b) modernization and upgrading of the research facilities. AMAREW works with ARARI to strengthen its research program based on the Amhara Research Master Plan, and the Three-year Strategic Plan. The ARARI research centers have the mandate to serve the chronically food-insecure woredas in the region.

In the five pilot woredas, the research and extension components of the Project are integrating their activities both at the planning and the implementation phases. There is an understanding that farmers who have been taking trainings in some technical areas such as fishery, beekeeping and poultry have benefited in the areas of marketing, business development, credit and savings.

### **Research and Extension**

The core objective of the research component of the AMAREW Project is to build the capacity of ARARI to carry out on-farm research through a) strengthening the on-farm research program in the target woredas of the Project b) upgrading of research facilities of the ARARI centers c) upgrading of researchers skills through long and short-term trainings.

**Focus Woredas:** The Project has been mandated to work on five selected pilot woredas for research and extension activities in order to enhance synergy and maximize activity integration in terms of technology generation and testing, information and technology dissemination, provision of resources, and market access. The list of the pilot woredas (by zone) selected for these interventions are given below in Table 1 for each Project component:

**Table 1. Selected pilot target woredas by zone and major activity components of the AMAREW Project**

<i>Target Area</i>	<b>Research</b>	<b>Extension</b>	<b>Watershed Management</b>	<b>Safety Net Activities</b>
<b>Wag Hamra Zone</b>				
Sekota Woreda	X	X	X	X
<b>North Wello Zone</b>				
Gubalafto Woreda	X	X	X	X
<b>South Wello Zone</b>				
Tehuledere Woreda	X	X		
<b>South Gonder Zone</b>				
Lay Gayint Woreda	X	X		
<b>North Gonder Zone</b>				
E. Belassa Woreda	X	X		

**Technology generation and demonstration through on-farm research:** ARARI research centers have been handling with the support of the AMAREW Project a number of on-farm trails in the targeted food-insecure and drought-prone woredas of the ANRS. The primary objective of the on-farm research is to generate improved and adaptable agricultural technologies in the areas of crops, livestock, and natural resources and enhance production and productivity, thereby contributing to solving the food security problem in the ANRS. On-farm research enhances the relevance of research by directly involving farmers in a participatory manner in developing and identifying new technologies. Technologies generated and/or demonstrated by the research centers employing this approach have been many and diverse. Some examples in crops research are improved varieties of wheat, barley, sorghum tef, faba bean, sesame, groundnut, cotton, and potato. Other examples of improved technologies are poultry breeds, different types of beehives, appropriate and improved farm implements, rope and washer pump, and drip irrigation.

**Research and Development on *Vernonia*:** *Vernonia galamensis* is a widely distributed weed in Eastern Africa, including Ethiopia, but a potential oil crop of industrial use such as plasticizers and paint additives. AMAREW works with ARARI's Adet Agricultural Research Center (AARC) and Sirinka Agricultural Research Center (SARC) to promote this potential export oil crop. For potential release by the National Variety Release Committee, the ARC has identified two high yielding *Vernonia* varieties. The AMAREW project encourages and assists ARARI in strengthening national and international (particularly the USA) collaboration among *Vernonia* stakeholders.

**Participatory seed multiplication:** Shortage of seeds of improved varieties in adequate quantity is one of the major problems faced by farmers in the target woredas. Without the provision of adequate seeds, released varieties by themselves do not bring about the needed food security to farmers. In response to the dire need of farmers in the target woredas, the Adet and Sirinka Research Centers have been engaged in seed

multiplication of improved varieties of field and horticultural crops on farmers' plots through participatory seed multiplication.

**Tissue Culture Laboratory:** To assist the ARARI efforts of upgrading and modernizing its laboratories, AMAREW has actively assisted the institute in equipping and strengthening its tissue culture laboratory at the Adet Research Center. Among other things, the tissue culture laboratory will assist in rapid potato seed multiplication. Released potato varieties by ARARI Research Centers could not reach farmers in adequate quantity and quality due to the lack of rapid potato seed multiplication facilities.

**The Small Grant and Mentorship Program (SGMP):** The purpose of the SGMP is to establish a collaborative linkage between young researchers of ARARI and BoARD with senior scientists in the Collaborative Research Support Program (CRSP) universities of the USA and encourage young researchers to develop and implement sound research projects with the associated element of professional competition. In response to the call for proposals AMAREW issued, a number of researchers of ARARI and BoARD submitted research proposals some of which have been funded and are being implemented.

**Research and Extension Linkage:** The paradigm shift in strengthened research-extension linkage envisaged at the initiation of the AMAREW project is slowly taking hold at the pilot watersheds as researchers, extension agents, farmers, and AMAREW Project staff repeatedly participate in joint planning, program implementation, evaluation, monitoring, and applying results. The ultimate objective of the Project is to institutionalize the strengthened research-extension linkage and scale it up to wider areas in the ANRS.

The most potential for a strong and exemplary linkage is at the level of the two pilot watersheds. The two pilot watershed sites, Yeku in Sekota and Lenche Dima in Guba Lafto primarily are the geographical sites for the integration of the various components of the AMAREW Project. At these two pilot watersheds, the project components (research and extension) converge to run an integrated watershed management program. Formal planning at both sites is conducted with most of the partners present during the annual planning, and taking an active role in deciding on interventions. Implementation requires also interaction and linkage.

AMAREW project fosters a close cooperation and integration of research and extension in on-farm activities in its mandate areas. The functional integration involves jointly planning and implementing activities by research and extension. The needs and priorities of the farming communities can be addressed through integrated approach and a strong research-extension linkage. The first level of integration of research and extension activities is focused on the woreda level. AMAREW is making concrete efforts to engage all components of the project at the level of each target woreda. Through Woreda level joint research-extension planning workshops, representatives from the Woreda Agricultural offices meet and review the on-farm research plans of their local research centers. These workshops bring together research and extension staff not only to review

on-going research activities but also to jointly plan and share responsibilities in implementing on-farm research and extension activities in the pilot woredas. In the conduct of on-farm research, for instance, site and farmer selection is made the responsibility of research and extension jointly, while land preparation, planting, data collection of demonstration trials are the responsibilities of extension with training and other assistance provided by the research center. Research takes normally the lead in planning and implementing on-farm trials with extension playing the critical collaborative role. The annual research-extension planning workshops provide opportunities for extension agents to be exposed to available technologies in the research centers and to report major problems of their respective areas so that they will be a part of the future research agenda. In order to coordinate on-farm research activities, a woreda level Research-Extension Technical Committee (RETC) is operationally active. The RETC is composed of two members from the Woreda Office of Agriculture & Rural Development (WoARD) and two from the respective research center, with the Deputy Head of WoARD as the chair.

Exemplary work is also being done by some of the ARARI centers on research-extension-farmer linkage. For instance, several Farmers' Research Extension Groups (FREGs) have been formed in the mandate areas of each participating ARARI center with a focus on the important commodities of each area. The members of the FREGs range from 25 to 40 in number. They normally meet every month and make a tour of members' farms to share experiences and monitor the performances of the improved crop technologies.

### **Watershed Development Component**

**Project conceptualization:** As the ANRS is a big region, it was decided to utilize a "learning lab" methodology, based on application of integrated watershed management activities in few selected watersheds. Accordingly four pilot watersheds namely Lenche Dima, Yeku, Gumet and Gemenkura sites in the ANRS were identified initially for potential USAID project activities. Initial feasibility study was prepared for the first two areas in May 1999, followed by more detailed the project proposal. Conventional methods and Participatory Rural Appraisal (PRA) as a tool were used depending on the nature of the information to be collected. The major tools and the information are social and resource mapping, air photo interpretation, base map preparation, problem analysis group discussions, transect walk, seasonal calendar, bar graphs, pair wise ranking, semi-structured interviews and participatory planning.

### **Watersheds development objectives**

The AMAREW project watershed management component is designed to demonstrate integrative approaches to research, extension, community development, and micro-enterprise development in the two pilot watersheds (Yeku in Sekota woreda and Lenche Dima in Guba Lafto woreda). Major objectives include:

- a) To reduce the current level of land and water resources degradation caused by soil erosion, overgrazing, and deforestation;
- b) To reduce the current shortage of livestock feed and increase livestock production and productivity;
- c) To increase crop production by using *in situ* soil moisture conservation, improved crop varieties and integrated pest management; and
- d) To promote improved and alternative policy and institutional approaches through research and demonstrational trials.

**Projects setting:** The pilot project areas are in the drought-prone woredas of Gubalafto and Sekota. A crop-livestock integrated farming system prevails, with very low productivity. Yeku watershed is located in the Sekota Woreda, (20 Km South of Sekota town), Waghamra zone while Lenche Dima (20 Km East of Woldiya town) is in the Gubalafto Woreda, North Wello zone. Mean annual rainfall amounts are sufficient for most types of agriculture provided appropriate water conservation measures are in place. Temperatures remain relatively cool due to the high elevations. Most of the cultivated soils are deep but degraded and hard to manage due to high erosion hazard, low infiltration rates, low fertility, and physical hardness. Land holdings per household are small (0.75 ha) because of the high population density ( $> 100$  inhabitants  $\text{km}^{-2}$ ). The large livestock population also exerts considerable pressure on the land. A vast majority of the inhabitants in both watersheds are subsistence farmers. There are no significant industries in either area. The Lenche Dima watershed is close to a major highway linking Addis Ababa and Mekele while Sekota is farther away from the main road and easy access to markets. The above features are quite representative of most of the watersheds within the eastern drought prone region of the ANRS.

**Major watershed problems:** The main problems identified by stakeholders in the watersheds were drought, scarcity of water both for humans and livestock, soil erosion, deforestation, low crop productivity, crop pests and diseases, weeds, wild animals, shortage of oxen power, human and livestock health problems and diseases, cash shortage, inadequate access to markets, lack of good roads, and shortage of wood for fuel and construction.

**Implementation approach:** As part of a strategy to achieve food security, while protecting the environment through sustainable land use development, an integrated watershed management (IWM) approach to development has been identified by the region as a key development strategy. The major advantages of the IWM approach are involvement of the farmers in all phases of the development continuum of their watershed. Holistic planning that addresses issues which extend across subject matter disciplines (biophysical, social, and economic sciences) and administrative boundaries (village, woreda etc.) is essential. The project follows the concept that the whole watershed management is "an all integrated, holistic problem solving strategy used to restore and maintain the physical, chemical, and biological integrity of the ecosystem, protect human health, and provide sustainable economic growth". It focuses on hydrologically defined drainage basins (watersheds) rather than on areas defined by administrative boundaries.

The watershed management approach chosen here is innovative and intends to mold democratic pragmatism (bottom up) within the existing administrative rationalism (top down) governmental structure. The underlying objective is the creation of local organizational space to the rural community and their empowerment in playing the lead role in the overall development program.

### **Implementation arrangement**

Project implementation is the key responsibility of the local community at large and the Sekota and Gubalafto Woreda Agriculture and Rural Development Offices (WARDO). The AMAREW Project's major responsibility is the delivery of technical and advisory support in terms of technology identification, evaluation, and dissemination. With this understanding, the various activities in the pilot watersheds are outlined below:

**Building local level institution:** To encourage participation and ensure sustainability of the initiatives, Community Watershed Management Organizations (CWMOs) have been formed in each pilot watershed sites. Pilot watersheds were divided into cluster of villages and each village group was organized to select eight representatives for the CWMO. Thirty two farmers form the Community Watershed Management Organization with 1:1 male to female ratio. CWMO members elected seven executive committee members to lead the organization. Within the CWMO, the following four different committees for development have been formed: agriculture, natural resources, income generation, and social development. The CWMOs have the broad task of planning, implementing, and monitoring watershed management activities and resolving conflicts among their members. In terms of the support to improvement of the local organizations,

the project aims at empowering the project's watershed communities in several ways, such as enhancing:

- a) Consultation and collaboration between community organizations, woreda offices of agriculture and rural development, the local administration, and the project;
- b) Communication and dialogue among village groups on issues of mutual interest;
- c) Review and monitoring on-going activities and annual planning;
- d) Management and implementation of environmental and natural resource protection activities;
- e) Management and resolution of conflicts among community members.

The role of the AMAREW Project in all these activities is technical support and advice, as it doesn't play the role of a main implementer. The woreda office of agriculture / rural development and the Project merely have the supporting and technical backup role in the realization of the objectives set by the community. This approach helps in strengthening community based institutions and making them more sustainable and self-reliant.

**Natural Resources management:** Some of the interventions under the natural resources development and management sector include soil and water conservation on different land cover or uses (hillside, grazing land, and farm land), agro-forestry development (homestead planting, planting on bunds), gully rehabilitation, closed area management, afforestation, training farmers, etc.

**Livestock development:** Forage production, small ruminant husbandry, improved poultry production, apiculture, animal health improvement (training of community animal health workers, mobile health clinic service, etc.), grazing land management, and backyard forage development.

**Crop production and protection development:** The crop production and protection component focuses on the introduction of improved crop varieties with resistance to biotic and abiotic stresses, promotion of appropriate and improved farm tools and implements, use of moisture conservation practices, expansion of water harvesting technologies, introduction of irrigation practices (particularly drip irrigation), use of organic fertilizers through compost making, use of improved cultural practices for improved crop production, promotion of IPM methods to control pests, diseases, and weeds.

### **Initial Impacts of the Watershed Management Activities**

The watershed development activities in the two pilot watersheds have finished essentially two years of operation. Expectation of significant impacts from watershed development initiatives, such as these ones, in a couple of years is not realistic. The project has given due consideration to the social aspect of development during its initial interventions and then move to the physical development aspects. Even though the project is at its early stage, the following signals of positive impacts can be observed:

**Local Institutions Strengthened:** Major task of the project in the first year was to establish and build the capacities and skills of Community Watershed Management Organizations (CWMOs) so that the members could be empowered to assume responsibility for further resource conservation. To achieve this goal, the project organized and implemented diverse types of trainings and workshops such as Community Organization Leadership Towards Action (COLTA), organization of watershed communities, leadership skills, and conflict management trainings. At present, the CWMOs have reached a stage where they can handle the watershed development efforts by themselves with little external support.

**Soil Erosion Reduced:** The problem of soil erosion and the associated crop yield reduction was identified as one of the major problems in the pilot watersheds. Physical and biological soil and water conservation works in the watersheds have been going on for several years with non-significant results. With the CWMOs taking ownership and playing the lead role of the overall development program, all community done conservation works were properly protected and maintained ultimately resulting in reduced soil erosion. In the last two years alone, forest development and user groups are managing over 200 hectares of closed areas.

**Ground Water Recharge Improved:** Yeku watershed in the past was categorized as an area with poor ground water potential. Some of the seasonal streams usually dry up shortly after the main rain, as early as the December-November period. After the establishment of an area closure site and construction of different physical conservation works for soil and water, such as trenches, hillside terraces, and check dams, one of the seasonal streams which crosses the closure hill side has water flow until the end of January. It was also made possible to get water from shallow hand dug wells at a depth of less than 10 meters.

**Harvested Water Utilized:** Rainwater harvesting is currently a high priority at national and regional levels and this Project is well on its way to contribute in a significant way within its pilot watersheds also. Although the number of constructed water harvesting structures are limited, those farmers who have constructed these structures have started production of vegetables and fruit trees. There is presently an increasing interest from the community in expanding these activities. To maximize crop production per unit volume of water, the project is working with the ARARI Centers in the introduction of rope and washer pump and drip irrigation technologies.

**Crop Productivity and Diversification Increased:** Erratic rainfall, accompanied by unpredictable seasonal variation, is a major characteristic of the rainfall pattern in the pilot watershed areas. As is common for most lowland areas of the country, rainfall is very poorly distributed within the rainy season; often there is too much water during a few days of the year, while water supply is inadequate during most of the crop-growing period. With the introduction of early maturing improved crop varieties, mostly released by research centers, farmers have indicated that they have started getting better yields. In addition, new crops such as sesame, groundnut, cotton, and triticale are being introduced and are showing promising results. In order to diversify production, those households that

have constructed water-harvesting structures are being encouraged to grow horticultural crops such as onion, potato, tomato, pepper, cabbages, mango, papaya, and avocado.

**Fodder Production Improved and Area Closure Accepted:** Livestock production is an integral part of the agricultural setting in the pilot watersheds as is the case in similar ecosystems in the country in general. With the increasing trend of the numbers of livestock and humans associated with the decreasing size of grazing land, livestock productivity is significantly decreasing. The situation analyses in the pilot watersheds have clearly revealed that livestock feed shortage is one major constraint of the community. The introduction of closed area management, backyard forage development, planting or direct sowing of forage species on bunds, etc. have all increased fodder availability.

**Off-farm Income Generation and Diversification Promising:** Self-help groups (SHG) are being organized in the pilot watersheds to be engaged on small-scale off-farm income generating activities. Promising examples under this section are:

- a) A women's improved stove producers SHG at Yeku pilot watershed has reached a stage of being transformed to cooperative;
- b) Another woman's SHG in the production of gabion box is under organization at Lenche Dima watershed;
- c) Hundreds of poor households were enabled to participate in small ruminant husbandry and improved poultry production;
- d) Modern honey production using improved hives and systems have been introduced to large numbers of households.

Most of these interventions have targeted mostly poor households and women.

**Social Equity Promoted:** Although landowners are the main participants in the project, the landless poor and marginal farmers have not been neglected either. Women were made major development actors in the watershed development. Fifty percent of the CWMOs members are women. Most of the income generating activities target poor women. Closed area managing SHG are mostly landless or those with very small land holding.

**Nutrition and Home Management Improved:** Training on home management, nutrition, HIV/AIDS, and family planning are being given mainly to women. Subsequent to such training, women have started using contraceptives and have started discussion openly with their husbands in areas of HIV/AIDS and the need for family planning, which was not usually done in the past. As a result of the training on nutrition and home management, farmers have recently started consuming vegetables more frequently.

## **Lessons Learned**

Community level organizations can potentially serve as focal points for efforts to resolve local disputes and mobilize farmers to collective and constructive action. However, watershed development projects in the past have focused mainly on the technical aspects with little attention given to the social issues and sustainability of the initiated

interventions. The food aid operation, which has been going in most parts of northern Ethiopia, mainly in Wello, has created deep-rooted dependency syndrome where farmers are unwilling to contribute free labor in the overall watershed development. In the short-term, it appears difficult to remove or greatly reduce the present reality of aid dependency syndrome. However, our Project's experience reveals that in selected communities there are very encouraging signs of farmers' willingness to contribute free labor for community development. For instance, farmers at Yeku watershed who were very resistant to contribute free labor at the beginning of the project have reached a stage of 40% free labor contribution at the present moment. This was mainly the result of closely involving the watershed community, in a participatory mode, in the overall development ventures and by following a "demand-driven" rather than a "supply-driven" approach in the watershed development.

Institutional stability and persistent follow up is a key factor for sustainable watershed management projects. Equally important is the institutional strength to deliver the appropriate support services on time. We have witnessed repeated institutional restructuring and alarming levels of staff turnover within the agriculture and rural development sector. Such levels of institutional restructuring and staff turnover greatly affect negatively the smooth and uninterrupted implementation of watershed activities.

Selection of technologies has to be done with the full participation of local communities. Technologies generated by research centers and introduced to farmers have to be appropriate and affordable to farmers. Such an approach will put the farmers first, as they participate in choosing the technology they need. Without meaningful participatory involvement of farmers at all stages, watershed activities can neither be embraced by farmers nor be sustainable. In this regard, the farmers-research-extension groups (FREG) established in the pilot watersheds have been found to be very effective tools.

Participatory planning is not an "open" exercise in that all parties involved have their own agendas. The challenge is to define and develop a common position, which should be open for the inclusion of activities identified in response to immediate needs of the stakeholders. Community Watershed Management Organizations (CWMOs) established in the two watersheds (Yeku and Lenche Dima) have already begun playing lead roles in influencing the direction of research and extension in the watershed areas. As a result, implementation of community-determined soil and water conservation interventions as well as other watershed development activities are underway.

Area closures in the two watersheds have become social closures with no armed guards or fences, but only by an agreement reached among the community members to exclude animals from the protected closures and to avoid cutting of vegetation. The results to date are encouraging and in some cases impressive. Concerned regional officials have visited these areas at repeated occasions and have recognized them as promising and exemplary activities to be scaled up in similar situations elsewhere in the ANRS.

## **Human capacity building experience of the AMAREW Project**

Through the different components of the AMAREW Project, development and dissemination of new technologies that could be used in improving the production and productivity of crops and livestock, as well as managing the natural resources are being implemented in the selected areas of the mandate woredas of the ARARI research centers, the five pilot extension woredas, and the two established pilot watersheds. Obviously, for these new technologies to be adopted, people who are supposed to implement the technologies should have the required knowledge, skill and positive attitude. This includes people involved at all levels of the technology development and dissemination process. Woreda experts also have to be equipped with the necessary knowledge and skill about the technologies that they are disseminating as well as alternative methods of technology transfer. Similarly, researchers require knowledge that would help them to be effective and efficient in developing appropriate technologies. Furthermore, farmers should have clear understanding about the technologies and skills that would help them improve their productivity and household income. In addition, they also require knowledge and skill that will help them to judiciously manage their natural resources.

The recent decentralization making the woreda the functional unit of development has placed heavy responsibility on the shoulders of the staff of the woreda agricultural and rural development offices on a broad range of technical issues. Often the staff that carries this responsibility is neither sufficient in number nor adequately prepared to carry through the required task. Due to this, building the analytical, operational, and management capacity of partner institutions and farmers within the context of the strengthened research and extension services were considered as key areas requiring the project support.

The human capacity building activities were selected based on the needs of partner organizations. Furthermore, as outlined in Fig.1 below, the different human capacity building interventions focus on imparting knowledge and skill across the involvement areas of the AMAREW Project. Capacity building targets crop and livestock production, natural resource management, community organization, and leadership both through long and short-term training activities. The ultimate goal is to strengthen and reinforce the project's component based interventions in research, extension, and watershed management.

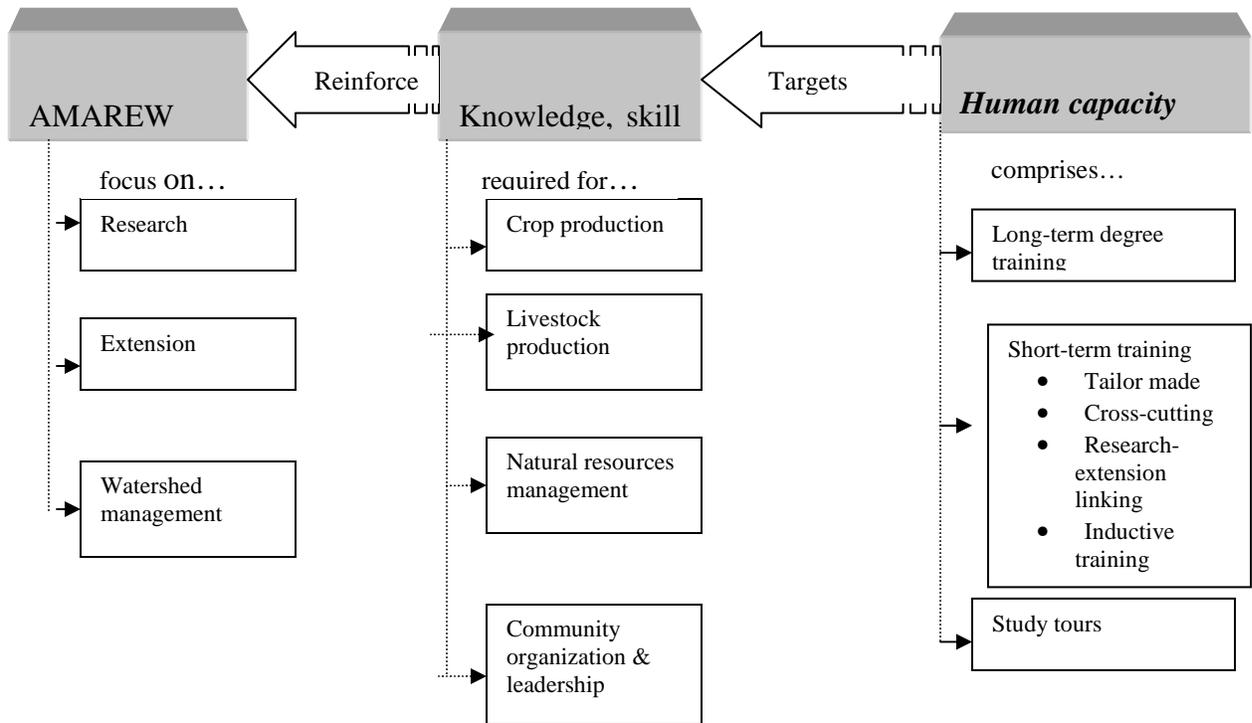


Fig.1. Framework for implementing the AMAREW Project's capacity building activities