Annual Report 2006

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Cover Picture

Potato farmer, Ato Fekadu Mulu of Gumet watershed, Sekela woreda, standing in his seed production plot of Gorebela variety

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Amhara Micro-enterprise development, Agricultural Research, Extension, and Watershed management (AMAREW) Project

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Executive Summary: AMAREW Project Annual Report 2006

This Annual Report is the second under the restructured AMAREW Project. USAID/Ethiopia support for the Amhara National Regional State (ANRS) Food Security Program falls within the Mission's ISP Strategic Objective 16: Market-Led Economic Growth and Resiliency Increased. Under SO 16, IR 3 (Natural Resource Management and Agricultural Productivity Improved) supports the ANRS regional food security program through activities concentrated on adaptive, demand-driven food, agriculture and environmental research; and a participatory approach to dissemination of technology information, natural resource conservation, and environmental rehabilitation. The AMAREW Project addresses SO 16 with a specific focus on IR3.

In addressing this overall objective, the Contractor, Virginia Tech, works with its active consortium members (Cornell and Virginia State University) and its ANRS partners, the Food Security Program Coordination and Disaster Prevention Office (FSPCDPO) as coordinator, the Bureau of Agriculture and Rural Development (BoARD), Amhara Agricultural Research Institute (ARARI), and the Environment Protection Land Administration and Use Authority (EPLAUA).

The following were the thrust areas of the Restructured AMAREW during the year:

- Building the capacity of the research and the extension system with emphasis on ANRS researchers and extension specialists to concentrate on adaptive research and technology transfer on crops and livestock, soil and water management, environmental rehabilitation and natural resources management, feed and food utilization practices, with the ultimate aim of improving the quality of life for rural households;
- Building the capacity of the BoARD and ARARI with regard to community level watershed management, facilitating and providing technical and operational support for specific research, extension, and community watershed development activities;
- Building operational and management capacity of institutions within the context of reformed and strengthened research and extension services through the identification of long-term training, short-term training, in-service training, farmer demonstrations and linkages with other institutions;
- Contributing to strengthening research-extension-farmer linkage.

In implementing the project activities, the major components of the restructured AMAREW are research, extension, watershed management, long- and short-term training, and micro-enterprise development integrated with all components.

After two years of testing, the Sekota Dryland Agricultural Research Center identified two cowpea varieties, *Asrat* and *Bekur,* with average seed yield of 12 q/ha each as best adapted for the conditions of Sekota and thus are recommended for large scale production. Under the leadership of the Adet Agricultural Research Center, two varieties of bread wheat (*Senkegna* and *Taye*) and one potato variety (*Tolcha)* were evaluated by the FREGs at Yedero and Gobgob kebeles of Lay Gayint, and were selected for the scaling up program of 2007.

The merits of different kinds of check dams, grasses and shrub species evaluated for gully stabilization at Lenche Dima, have now been well established and the results reveal that it is possible to rehabilitate degraded hill areas in relatively short time using the different conservation techniques. The rehabilitated area in Lenche Dima is now used as learning center for farmers and development workers. Farmers have started to observe the natural regeneration in the closed sites of Yeku and Lenche Dima where newly emerging shrubs and grass species and wildlife are now visible. At Lenche Dima watershed, in 2006, about 113 ha degraded hillside was enclosed and treated and 85 ha of closed area was partitioned into individual plots and allocated to 171 members of the community. Also, effective and efficient work has been done in terms of establishing physical water harvesting structures. The effort made in promoting the dome-shaped water structures is yielding encouraging results. Efforts should be further consolidated in the area of water harvesting, as water is one of the major determinants of livelihood systems in Lenche Dima watershed. The progress made through years of rehabilitating smaller catchments to rehabilitating larger ones by convincing communities is good practice which needs to be followed up in future scaling-up efforts.

In 2006, through AMAREW support, 429 quintals of improved seeds of 13 varieties of seven cereals and pulses were disseminated to 3779 households of the extension kebeles of the Project pilot woredas. The ARARI centers, extension workers, and the farmers have identified the technologies that should be scaled up in their respective woredas during the coming 2007 crop season.

As the formal sector of seed production in the country cannot satisfy the need for standard quality seed of most crops, ARARI centers and farmers have actively initiated multiplying and distributing improved seeds of cereals, pulses, and vegetables. On-farm potato yield ranging from 20 to 35 Mt ha^{-1} was achieved from six improved varieties in Gumet watershed. In 2007, under irrigation water, about 100 Mt of good quality seed is to be produced with the participation of about 80 farmers. The long-term idea is to assist the collective action groups of farmers to grow and specialize into seed potato production and marketing cooperative.

AMAREW's intervention in promotion of small ruminants (sheep and goats) in Lay Gayint and Sekota woredas, over the past two years, has significantly benefited the target households, especially Washera sheep and Abergelie goats, mainly because of their suitability to the respective ecologies. The project has done restocking of sheep and goats at individual household level under a revolving scheme of sheep and goats that has increased the small ruminant resources and incomes of the household of the watershed communities.

In four local universities, twenty-three diploma holders are being supported to earn BS degrees, whereas 9 BS degree holders are being supported to earn MS degrees in fields relevant to the development efforts of the ANRS. Four MS students have successfully completed their studies.

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Amhara Micro-enterprise development, Agricultural Research, Extension, and Watershed management (AMAREW) Project

1. Background and Project Management

1.1 Background

At the end of 2004, USAID/Ethiopia indicated its desire to restructure the AMAREW Project, following which the restructuring was completed early in 2005. The elements of the restructuring were received officially through letters from the USAID Mission Director and the Contracting Officer sent to the appropriate offices. This Annual Report is the second under the restructured AMAREW Project.

1.2 The New Integrated Strategic Plan (ISP) of USAID/Ethiopia

USAID/Ethiopia support for the Amhara National Regional State (ANRS) Food Security Program falls within the Mission's ISP Strategic Objective 16: Market-Led Economic Growth and Resiliency Increased. SO 16 includes four Intermediate Results (IRs): (1) Selected Essential Policy Reforms Implemented; (2) Selected Input and Product Markets Strengthened; (3) Natural Resource Management and Agricultural Productivity Improved, and (4) Livelihood Options for the Food Insecure Protected, Expanded, and Diversified. Under SO 16, IR 3 (Natural Resource Management and Agricultural Productivity Improved) will support the ANRS regional food security program through activities concentrated on adaptive, demand-driven food, agriculture and environmental research; and a participatory approach to dissemination of technology information, natural resource conservation, and environmental rehabilitation. SO 16 seeks to empower professionals at all levels to try innovative approaches, and households and communities to take responsibility for resolving their problems by making informed choices in planning and implementation of agricultural and natural resources management technologies. The AMAREW Project strives to contribute to the overall achievement of SO16 in the ANRS.

1.3 Consortium Members

Within the context of the Restructured AMAREW, the primary and Contractor University is still Virginia Tech, which handles all project management responsibilities including all personnel. Cornell University and Virginia State University continue to serve as members of the AMAREW Project consortium. The Contractor has set aside Technical Assistance funds to be accessed by all members of the consortium based on ANRS partners request and demand for their respective areas of expertise. Additionally, selected members of the Collaborative Research Support Program (CRSP) Universities participate in the AMAREW Project activities through the Small Grants and Mentorship Program (SGMP).

1.4 Amhara National Regional State (ANRS) Primary Partners

With the coordination of the Food Security Coordination and Disaster Prevention Office (FSPCDPO), the additional partners of the restructured AMAREW Project are the Bureau of Agriculture and Rural Development (BoARD), Amhara Agricultural Research Institute (ARARI), and Environment Protection Land Administration and Use Authority (EPLAUA).

1.4.1 Food Security Program Coordination and Disaster Prevention Office (FSPCDPO): The FSPCDPO is the overall coordinator of the activities of the AMAREW Project including chairmanship of the Regional Implementation Team (RIT), which oversees the activities of the restructured AMAREW. The Project often undertakes additional activities as needed to ensure the effective integration of all USAID-supported programs contributing to the Food Security Program of the ANRS. At the watershed management level, the participation of the Safety Net Project is essential for food resource provision for implementing planned activities.

1.4.2 Bureau of Agriculture and Rural Development (BoARD): Appropriate BoARD departments support activities in the Agricultural Research / Extension/ Watershed Management support efforts. The BoARD, working in coordination with the FSPCDPO, has the principal technical leadership role for carrying out the USAID-supported extension and integrated watershed management activities in the ANRS.

1.4.3 Amhara Agricultural Research Institute (ARARI): ARARI coordinates research among the principal agricultural research centers, sub-centers, rural technology centers, and the Ethiopian Institute of Agricultural Research Organization (EIAR). ARARI's principal mandate is to insure that research activities conform with and contribute to the region's food security strategy. AMAREW works directly with ARARI in supporting and technically advising the institute in technology generation and on-farm research, seed production, capacity building, and strengthening research-extension linkage. The main centers with which the restructured AMAREW works are Adet, Gondar, Sirinka, Sekota, and Debre Berhan.

1.4.4 Environment Protection Land Administration and Use Authority (EPLAUA): EPLAUA has the ANRS-wide mandate for the overall environment and land related policies and issues in the region. For the purposes of the AMAREW Project, the relevant activities of the EPLAUA fall under land administration, demarcation, and certification. In particular, the role and participation of the EPLAUA in the pilot watersheds are important. The Project works with EPLAUA in our areas of mutual interest.

1.5 The main Restructured AMAREW Project objectives for the year were:

- Building the capacity of ANRS researchers, research institutions, and research and rural technology development centers to conduct demand-driven applied research on low input, environmentally sustainable technologies that can be applied immediately to food insecure areas. This approach focused on adaptive research on crops,

cropping systems, soil fertility management, water management, environmental rehabilitation, natural resources management, animal feed, and food utilization practices.

- Building the capacity of the extension system to disseminate information on environmentally sound agriculture and natural resource management practices, and support other activities that improve the quality of life for rural households in a participatory manner.
- Building the capacity of the BoARD with regard to community level watershed management. Emphasis was given to interacting with community watershed organizations to plan and implement activities in a participatory manner.
- Building operational and management capacity of institutions within the context of reformed and strengthened research and extension services through the identification of long-term training, short-term training, in-service training, farmer demonstrations and linkages with other institutions.
- Serving as an effective partner to the Ethiopian Institute of Agricultural Research Organization (EIAR) and the Amhara Regional Agricultural Research Institute (ARARI) on all policy matters related to national and regional research strategies, food security, and human resource development.
- Facilitating and providing technical and operational support for specific research, extension, and community watershed development activities managed by the principal ANRS institutions.

1.6 Major Components of the Restructured AMAREW

1.6.1 **Research:** Agricultural research activities in the ANRS are directed by Amhara Regional Agricultural Research Institute (ARARI), which coordinates its research program at the national and international level through EIAR. During the year, the major objectives of the research activities were to improve production and productivity through the development and/or introduction of appropriate new technologies. A second but equally important objective was to strengthen human and institutional capacity to sustain the participatory approach to agricultural research and extension.

1.6.2 Extension and Integrated Watershed Management: Two separate, but related, activities were coordinated through the ANRS extension service under IR3. These are: (1) ANRS extension service delivery programs; and (2) integrated watershed management activities in selected watersheds in close cooperation with the Safety Net Program to address natural resource management requirements and build the assets of rural households in the pilot watersheds. AMAREW provided technical assistance, oversight and management support in extension and integrated watershed management. Extension activities were implemented in collaboration with the research and watershed management components. The underlying principle was to build the capacity of BoARD extension personnel to effectively disseminate technology information to rural households using participatory methodologies.

AMAREW continued to use and promote its two established pilot watersheds (Lenche Dima and Yeku) as learning and demonstration centers for integrated and participatory watershed management. Among the lessons demonstrated to visitors of these centers are strategies and methods of community organization for watershed management, approaches and practices in rehabilitation of gullies and reclamation of usable land, integration of research and extension, utilization of technologies for natural resource conservation and enhanced productivity, community participation in planning and implementation of integrated watershed management, establishment and management of area closures, and integration of income generating activities with watershed management practices. Various groups such as farmers, researchers, extension agents, development workers, woreda level authorities, policy makers, and individuals with the overall interest on integrated watershed management visited the learning centers.

1.6.3 Degree Training: Degree training for selected ANRS professionals is a major activity for building human and institutional capacity and facilitating the research/extension paradigm shift. AMAREW has established a partnership relationship with Ethiopian Universities for BS and MS level training. The selection of professionals for training was conducted in a competitive and transparent manner. MS research projects, which form part of the degree requirements, normally take place in the ANRS, with an emphasis on subjects, which respond to research and extension problems of the region.

1.6.4 Micro-enterprise Development (MED): Although the MED component was not allocated funds through the Restructured AMAREW, the project continued its concerted efforts to establish collaborative links with MED related multi-regional enterprise/market development initiatives funded by USAID and other donors. As a part of the work of the extension and watershed management components, MED related activities such as improved fuel efficient stoves, gabion production, seed production of improved crop varieties, improved fish production and marketing, and horticultural crops production and marketing, continued to be covered by the Restructured Project during the year.

1.7 Focus Areas (Woredas)

The RIT took great care in selecting eight pilot woredas for research and extension activities in order to enhance synergy and maximize activity integration in terms of information dissemination, resource availability, and market access. The list of the pilot woredas (by zone) selected by the RIT for initial pilot efforts are given below in Table 1 for each Project component:

Table 1. Selected pilot target woredas by zone and major activity components for the Restructured AMAREW Project, 2006

Target Area	Research	Extension	Watershed
Wag Hamra Zone			
Sekota Woreda	X	X	X
North Wollo Zone			
Gubalafto Woreda	X	X	X
South Wollo Zone			
Tehuledere Woreda	X	X	*x*
South Gonder Zone			
Lay Gayint Woreda	X	X	*x*
North Gonder Zone			
E. Belessa Woreda	X	X	*x*
North Showa Zone			
Ankober	X	*x*	
Ensarona Wayu	X	*x*	
West Gojam Zone			
Sekela	*X*	*x*	X

Note*: x indicates reduced level activities*

High Potential Areas: The RIT agreed to include two woredas in North Showa zone, Ankober and Ensarona Wayu, as high potential areas for the active involvement of the project's research component. Ankober is well known for its high potential in potato and barley production while Ensarona Wayu is noted for its outstanding wheat and pulses production. Efforts were made to disseminate research results to end users through the research and extension systems.

At the beginning of the Restructured AMAREW, the RIT also endorsed adding one more watershed with high potential characteristics. The watershed that met this requirement and had been adequately studied and characterized in connection with the original concepts of initiating the AMAREW Project is the Gumet Watershed in Sekela Woreda of West Gojam Zone. This watershed was originally selected and studied as one of the four pilot watersheds for USAID support. AMAREW has scaled up the promising lessons learned in the integrated watershed management of the two pilot sites (Yeku and Lenche Dima) to Gumet and established rapidly watershed management communities patterned after Yeku and Lenche Dima. The Gumet watershed work is making excellent progress.

1.8 The Role of the Regional Implementation Team (RIT)

As in the past, the Regional Implementation Team (RIT) maintained the oversight responsibility of the AMAREW Project where the FSPCDPO chaired and coordinated the Project activities. The RIT met at least once in three months to monitor project progress. The RIT members are Heads (or their representatives) of FSPCDPO, BoARD, ARARI, EPLAUA, AMAREW, and USAID. The RIT reviews and approves plans and reports, before submitting them to USAID/Ethiopia**.**

1.8.1 AMAREW Project RIT Members of 2006, attending one meeting or more:

Ato Amlaku Asres ……. Head, FSPCDPO, Chairman
Ato Amare Kendie ……FSPCDPO
Dr. Enyew Adgo ……..... NRM Research Director, ARARI
Ato Alemnew Alelign ……. Deputy Head NRM, BoARD
Ato Mesfin Astatke ……..…. Planning/Evaluation officer, BoARD
Ato Eshetie Gelaw ……..…. AMAREW Focal Person, BoARD
Dr. Tadesse Amsalu ……... Head, EPLAUA
Ato Getahun Alelmneh ……..…. EPLAUA, Land Admin. Expert
W/o Etalemahu Woldekidan ….…. EPLAUA
Dr. Belay Demissie ……..…….…. CTO, AMAREW, USAID/Ethiopia
Dr. Brhane Gebrekidan …… CoP, AMAREW Project

1.8.2 Selected items addressed and decided on by the RIT in 2006

- In the long-term training plan of the Project, a strategy should be in place enabling all current trainees complete their degree training after the end of AMAREW by December 2007.
- Expand the successful FREG approach to all woredas, with a special focus to introducing the strategy to new woredas where the FREG approach is not used.
- The project should play a catalytic role in strengthening the seed industry in the ANRS, including encouragement and motivation of the private seed sector. The use of TA and FtF expertise in improving and strengthening the seed system should be pursued.
- The RIT members agreed to conduct the internal evaluation of AMAREW during the first week of August 2006 and completed the evaluation as planned, which was based on visits to selected field sites and research centers where the project is active.
- The RIT recommended that all ANRS partners receiving funding from the Project should submit their respective sections of the Quarterly report to the AMAREW Project office for preparation of a consolidated Quarterly report to be submitted to USAID/Ethiopia and the RIT.
- The RIT recommended that a quick announcement of the Training Advisor position vacancy be published in a newspaper and a suitable candidate be hired, which was completed as recommended.

1.9 Project Administration

Project administration, during the year, as in the past, was done both at the Home Office level in Blacksburg Virginia and the Project's country office in Bahir Dar.

1.9.1 Home Office

The Project's Home Office at Virginia Tech in Blacksburg, Virginia, continues to be responsible for all guidance and support services to the project including

financial, technical, and administrative supports. Personnel for Technical Assistance and Mentors for the Small Grants and Mentorship Program are identified and dispatched to the field by the Home Office. Monthly financial reports are submitted from the field to the Home Office and regular replenishments of project funds are made from the Home Office to the field. Regular electronic communications as well as selected visits by officials from the Office of International Research, Education and Development (OIRED) ensure close interaction and communication with the Home Office. In this connection, during the year, Dr. Mike Bertelsen, Associate Director of OIRED and Associate Dean of the College of Agriculture and Life Sciences, visited Bahir Dar and Addis Ababa and interacted with USAID/Ethiopia, ANRS partners, and project staff on the progress being made on the restructured AMAREW. Others in the home office giving guidance and support have been Dr. S.K. DeDatta, Gene Ball, Peggy Lawson, Hong Zhang, and Jane Lee.

1.9.2 Bahir Dar Office

- Monthly financial were prepared and submitted to Virginia Tech regularly and replenishment requested and received.
- All quarterly reports as well as the 2005 Annual Report were prepared and submitted to USAID on time, and distributed to RIT members, ARARI Research Centers, USAID and stakeholders of AMAREW in the different ANRS.
- The underutilization of the allocated budget to the ANRS partners, as in the past year, was a matter of concern during the year.
- The problem of project focal persons frequently changing at each Woreda was another matter of concern for lack of efficient project implementation during the year.
- Virginia Tech approved the new employment contract agreements for AMAREW employees for one year for the July 2006 to June 2007 period.
- Dr Mike Bertelsen, Associate Director of OIRED, Virginia Tech, visited Bahir Dar for two weeks during the second half of October and provided the necessary support and guidance.
- AMAREW activities can be read and seen by visiting its our web site, http://www.oired.vt.edu/amarew/
- Staff changes in the Project during the year are shown in Annex Table 1 at the end of this report.
- During the year AMAREW staff participated and contributed in the following important workshops, reviews, and training sessions:
    - ARARI Research Annual Regional Review Meeting;
    - Discussion and orientation on USAID branding;
    - Training programs on Farmer Research Extension Group (FREG) formation, Vegetable Seed Production, SAS and SPSS computer software package skill development;
    - Workshop organized by SWHISA and BoARD on “How to Strengthen Extension in the ANRS”;

  - National conference on the success stories of "Scaling-up/Scaling-out of technologies", which was organized by EIAR;
  - The national discussion forum in Nazreth organized by the Federal Ministry of Agriculture and Rural Development on research, extension, and farmer linkage;
  - The CoP chaired and participated in four EIAR led Technical Advisory Council (TAC) meetings in Addis focusing on how to strengthen linkages between Federal and Regional research systems and shared pertinent AMAREW Project experiences with the TAC;
  - Sustainable Land Management workshop in Addis organized by the Federal Ministry of Agriculture and Rural Development
  - ORDA's 4th General Assembly.
  - The International Striga Workshop organized by INTSORMIL Purdue where the AMAREW CoP participated in a panel discussion;
  - Workshop organized by ARARI Headquarters on "Scaling up of Potato Seed Tuber Multiplication and Utilization of Related Technologies in the ANRS";
  - National Conference of the National Plant Protection Society in Addis where the CoP attended and participated in the panel discussion;
- The final versions of the 2005 Annual Report and the 2006 Work Plan were submitted to USAID/Addis and Virginia Tech, copies were also distributed to all partners including Woreda Offices of Agriculture and Rural Development and ARARI Centers;
- Following the arrangement made by Dr. Belay Demissie (AMAREW CTO), all senior staff of AMAREW were in Addis on February 06, 2006 to give a PowerPoint presentation on project update and success stories to USAID staff including the mission director, which was well received;
- The Project success stories were also submitted to VT for posting on the AMAREW Project website;
- Internal evaluation of AMAREW was done by the RIT and AMAREW staff during the first week of August, 2006 and report prepared and distributed to stakeholders;
- Visitors to AMAREW from the USA included Dr. Tammo Steenhuis from Cornell University, Dr. Mike Bertelsen and Dr. Bobby Grisso from Virginia Tech, President Eddie Moore and Vice President Turner as well as Dr. Wondi Mersie from Virginia State University;
- Dr. Eshetu, Dr. Brhane and Ato Ahmed visited Mekelle University to facilitate and settle issues related to AMAREW Project sponsored students;
- The finance and administration officer of AMAREW, in collaboration with the Project's focal financial officer with FSPCDPO, visited the pilot woredas to monitor the allocated budget utilization status.

1.10 Project-wide Significant Problems Encountered and Solutions

- The slow rate of project fund utilization by our ANRS partners is still persistent. Project staff continue to monitor the situation and advise implementers to make improvements in this regard.
- High staff turnover during the year both at the WOARD and the Research Center levels had negative consequences for efficient and timely implementation of planned Project activities. The Project's training and mentoring opportunities are helping to minimize this problem.
- Focal persons responsible for project work plan implementation continue to change too frequently, thereby making it difficult to follow up and ensure implementation of the planned activities. We have continued discussing the issue with WOARD officials to stabilize this situation.
- At the AMAREW staffing level, the Training Advisor / FtF Coordinator (Dr. Eshetu Mulatu) resigned during the year. The position was advertised nationally and the replacement is expected to join AMAREW early in 2007.

2. Internal Evaluation of AMAREW by the RIT

An internal evaluation of the activities of the AMAREW Project by the RIT was conducted from August 03 to 12, 2006. The active members of the RIT representing FSPCDPO, ARARI, BoARD, EPLAUA, USAID, and AMAREW as well as an additional USAID representative and the Project Advisors took part in the evaluation. A summary of the evaluation report is given below.

2.1 Background

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 working with its ANRS partners in strategically selected three pilot watershed sites and eight 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 (FSPCDPO), 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). The technical advisors of AMAREW, one for each component mentioned above, work with and advise their respective line department experts in all stages of project activities.

2.2 Farmers and WOARD assessment of the AMAREW project

In Lay Gayint, the AMAREW Project introduced several useful technologies for farmers' use. Mention could be made of the Washera type sheep with demonstrated rapid growth compared to the slow growing small size sheep locally known as Farta type sheep. The different improved crop varieties introduced based on farmers' assessments have also shown fast growth, good response to overall crop management, and better yield.

Major contribution of the Project in watershed management is the rehabilitated watersheds visited by the evaluation team. The community and WOARD consider this a lasting and sustainable contribution as it determines the future well-being of the community.

Due to the interventions of the AMAREW Project, livelihoods of community members in the kebeles of the project's involvement are improving. Improvement is recorded particularly in livestock holdings (goat, apiary) and natural resource and water conservation.

The Project has also improved the communities' access to clean potable water and water for the livestock.

There is a widespread understanding that Research-Extension (R-E) linkages are useful to better respond to small-scale farmers' needs. But due to commitment and follow up failures from all side, strong R-E linkage has not occurred. AMAREW has organized and facilitated workshops (planning and implementation) and has developed Memorandum of Understanding (MoU), which was signed between WOARD and the ARARI research centers.

We highly value AMAREW's approach of engaging the WOARD and the ARARI Centers to fully assume responsibility of field level implementation as it ensures sustainability of Project achievements and empowers local staff and community to lead future development efforts.

AMAREW is beneficial to each woreda in various aspects, including building our capacity physically and, building the capacity of our work force, has introduced R-E approaches that lead to better outputs in watershed management (community empowerment) and adoption of technologies (on-farm experimentation), has introduced several technologies that meet needs of rural communities, etc. Although the Project is working in a few pilot communities it has demonstrated spillover effects to non-target communities as well.

All joint planning review schedules (Research-Extension to be supported by AMAREW) have to be done earlier than ARARI's annual review schedule. There is no harm for AMAREW to conduct its joint planning workshops earlier than December of each year.

The physical water harvesting structures observed by the evaluation team at Yeku and Lenche Dima are impressive. With such water harvesting structures in place, it can be concluded that the amount of run-off has already diminished and water table

recharging has increased. The ponds and water harvesting structures developed thereof should be used for high value vegetable and fruit crops development.

The restricted manufacturing and use of the fuel-efficient stoves in Yeku made one of AMAREW's success stories but so far it is restricted to one Kebele alone. Only 58 HHs out of approximately 1000 or 6% are using such stoves. DAs were trained by the regional Energy Bureau to train and assist communities to manufacture and use energy saving stoves. The woreda and the Zone have to join hands and facilitate scaling-up of the technology.

The evaluation team has noted the reduced attention given to periodically evaluate the performance of the AMAREW Project. Monitoring and evaluation is a no choice option to note if projects are performing as planned and moving towards achieving the planned goal.

Generally the evaluation team said that it was impressed with the achievements at the pilot watersheds. The team however recommended that all stakeholders, meaning the community, Kebele leadership, concerned sector organizations should work together towards the watershed development. The team further recommended the development of watershed management bylaws to ensure sustainability of achievements.

2.3 Community members' assessments of AMAREW's interventions

In Lenche Dima, AMAREW has introduced community centered watershed development, which brought about an observable change in the watershed. Lenche Dima was a highly degraded site characterized by extremely high erosion and extended gullies. Due to area closures and gully treatments, increased canopy coverage resulted from enhanced natural vegetation regeneration and due to tree plantings. Run-off has been controlled and the effort is showing signs of increased moisture infiltration and rising water table.

Innovative inhabitants of the watershed are now engaged in small-scale vegetable and lowland fruit production using harvested rainwater stored in the wide spread dome shaped structures. Due to shortage of water and knowledge such activities were unknown in Lenche Dima earlier and all are outputs of the Project.

The Project's approach including (1) empowerment of the community to lead the watershed development efforts, (2) allocating treated land to individual community members under a usufruct right, (3) working through the WOARD, (4) requiring the allocation of a separate DA to follow on Project activities, (5) efforts to integrate high value crops (mango, papaya, cabbage, etc.) are all new to the area which motivated the community members to move forward with the Project.

2.4 Improving FREG organization and disseminating technologies

The evaluation team observed that the organization of FREGs has to shift from permanent membership to that which is time-bound and generates followers within a specified time period. For example, first level beneficiaries from FREG operation may stay for two years and then should organize second level beneficiaries who will

operate for the same length of time and then move on to organize other FREGs. This is one mechanism to disseminate new technologies introduced through FREGs and extends benefits from new technologies equitably among community members. It is also a way of scaling-up the technologies to bring a meaningful and widespread impact.

Improve the organization of the FREGs to include all stakeholders (PA leaders, DAs, Development Committee members) and for technologies to cascade to none FREG members. As much as possible link AMAREW's interventions with the Safety Net Program in each woreda, since AMAREW is a food security project.

Promote validated technologies to more farm HHs. FREGs make sense only when technologies are further disseminated to reach other farmers. In this connection, WOARD should document and hold quantitative data for all the interventions. That is the only way to demonstrate project impact

2.5 Recommendations on the way forward

In Lenche Dima, commendable work has been done in terms of enhancing the community's access to clean drinking water. Attention should be given to upgrading or maintaining the water pump, which is giving the community troubles due to its weak capacity. That, as the team understood during the field visit, represented one major felt need of the community.

Effective and efficient work has been done in terms of establishing physical water harvesting structures. The effort made in promoting the dome-shaped water structures is yielding encouraging results. Efforts should be further consolidated in the area of water harvesting, as water is one of the major determinants of livelihood systems in Lenche Dima watershed.

Joint planning review schedules (Research-Extension to be supported by AMAREW) have to be completed earlier than ARARI's annual review schedule. AMAREW should conduct its joint planning workshops by September-October beginning in 2006.

An aggressive technology popularization scheme should be designed and followed for those technologies that are rated appropriate and promising. For example, introduction of mango variety that reached fruit bearing stage in two years should be done aggressively to cover large areas.

The effort towards introducing new vegetable crops and assisting farmers to engage in on-farm seed production, for example North Showa, is one way to encourage the development of horticultural economies. A visionary intervention to link vegetable producers with the available market has to be launched. Moreover, to encourage vegetable use at the farm level, home science training has to be organized for farmers.

Much has been done and achieved in terms of on-farm demonstration and validation of improved technologies. A concerted effort should be made to compile data and produce a popular publication in a way that allows technology scaling-up.

All (ARARI, BoARD, and AMAREW) should join their efforts towards convincing policy makers to support the linkage institutionalization efforts.

What has been achieved by the FREGs in terms of enhancing improved seed supply at the local level is encouraging. The FREGs should be organized to engage in scaling-up of technologies of proven performance and work in partnership with the PA administration and the Kebele Development Committees. They should operate as parts of the larger village system but not in isolation on their own.

Targeting farm HHs for improved technologies should be done in a way that ensures synergy in the farming system. Small-scale farmers manage multiple farm enterprises but not a single enterprise, due to this, fruit tree, small ruminant, crop, etc. technologies should be combined and given to single beneficiary HH to improve performance and encourage interrelations among farm system components.

The team has noted data collection and compilation of usable data to be the weakest links of the AMAREW Project field level implementers. The AMAREW staff has to shoulder the responsibility of developing data sheet that will be filled by the field level implementers as soon as possible. Field level implementers have to be serious in collecting and recording reliable data on all interventions.

It has been repeatedly noted that the woredas are underutilizing their AMAREW Project allocated budget. The WOARD and the woreda administration team have to take appropriate action without any further delay to improve the timely project budget utilization by closely following implementation of planned project activities. Community empowerment has to be further strengthened to ensure sustainability of project achievements after project ends.

AMAREW should focus on scaling-up of technologies with proven performance by concentrating only on few selected promising technologies. Revisit the relevance of on-farm research projects underway, as some do not seem relevant in meeting farmers' needs. This is best achieved through promoting joint annual Research, Extension, and Farmer participation.

Review lessons learned on strengths and weaknesses of R-E linkage approaches promoted by AMAREW Project for scaling-up success. Develop a workable system that ensures linkage between Research, Extension, and Farmers. Advise the DG of ARARI and the head of the regional BoARD to take the lead. Following the research-extension strategy of the region, an action document that specifies memberships, meeting dates, activity plan, budget, etc. should be developed. The AMAREW Project should play a leading role in developing the document

Since all USAID funded projects have to comply with the M & E requirements of the donor, AMAREW has to sharpen its performance M & E plan. Because such a plan requires baseline data against which changes can be evaluated, AMAREW needs to assemble baseline data from relevant secondary sources or retrospective studies. For example, baseline data could be obtained from the regional BoARD survey of 56 woredas.

Although the project has accomplished much and is able to show to the internal evaluation team several good works in the field, many of them lack data to substantiate achievement. This should be considered a major gap and the project has to work hard to fill the gap in the remaining time of the project's life.

2.6 Overall Project Issues

The current development policy of Ethiopia takes the woreda as the centerpiece and unit of development. What the evaluation team has observed in some of the woredas visited did not show a condition that leads to the realization of the policy thrust. Some of the pilot woredas visited are experiencing leadership crisis and the development process faces serious challenges due to human factor. It is the understanding of the team that this may seriously impede the development endeavors from hitting their targets. It therefore suggested that policy level attention be given to rectify the situation.

Because the joint research-extension planning so far practiced did not encourage practical linkage to come by, in the remaining lifetime of the project the Project and its partners have to do their level best to promote timely joint Research-Extension-Farmer planning schedules. Beyond this, the regional government has to be advised to develop Research-Extension-Farmer linkage frameworks and modalities. The framework has to direct concerned development institutions such as the regional research institute and the regional agriculture and rural development bureau towards making linkages part of their value system. This in turn should lead towards institutionalization of R-E-F linkages.

Because all the WOARD at the project pilot woredas are characterized by underutilization of the budget allocated to them and this simply means loosing part of the budget to the donor, the team showed concern that serious thought be given to improving the budget utilization by the respective pilot woredas. Financial utilization reporting is the other drawback that characterizes almost all partners of the AMAREW Project, which needs significant improvement.

Because there are several research results be it from activities supported or not supported by the AMAREW Project that may bring economic benefits to the farming communities in the pilot project woredas in particular and the region at large, in the remaining project lifetime WOARDs and the respective research centers serving the respective AMAREW Project pilot woredas have to immediately engage in technology scaling-up and scaling-out endeavors rather than on merely development of more technologies.

In the interest of ensuring sustainability of project achievements in the pilot watersheds and extension sites, the AMAREW Project has to develop the project's phasing out strategy from its pilot sites. A document outlining the process to be followed to ensure sustainability of project achievements has to be developed with full community participation and agreed upon by project stakeholders before the project phases out. This is particularly important to ensure the continuation of closed areas that are major components of the improved watershed management scheme.

2.7 Lessons Learned

In all woredas and research centers, important lessons have been learnt from the AMAREW Project including participatory planning exercises, working as a team for a common goal, enhanced accountability, search for relevant technologies regionally and nationally, participatory technology evaluation and validation, empowering communities for best results in watershed management, etc. Participating communities now feel capable enough to search, evaluate, and promote technologies appropriate to farmers' conditions.

Prior to the intervention of AMAREW, the two pilot watersheds (Yeku and Lenche Dima) were characterized severely degraded catchments. Soil erosion was a characteristic feature of the catchments. The Project rehabilitated the watersheds into model development sites and has been engaged in developing water retaining and harvesting physical structures such as hillside terraces, trenches, percolation pits and micro-basins. Water boreholes and storage structures were developed to assist community members to start vegetable and lowland fruit production. Due to enhanced recharging of water the water table in the watersheds, particularly Yeku, has been significantly raised. The lessons learnt from the watershed development has been extended to other pilot woredas and non-target sites of the project, such as the Milda watershed in Sekota, Achikan in East Belesa, and Gumet in Sekela.

The progress made through years from only rehabilitating smaller catchments to rehabilitating larger catchments by convincing communities is good practice which needs to be followed in future scaling-up efforts. Farmers believe in what they see and not much in what they hear. The fact that communities allocated larger parts of the mountains for enclosure is because of observing the benefits from earlier closed areas.

In terms of capacity building, the WOARD and ARARI centers have benefited from several knowledge and skill-upgrading trainings and long-term degree trainings.

3. Research Component

3.1 Introduction

In pursuant of attaining the Strategic Objective (SO 16) of USAID/Ethiopia Mission aiming at improving agricultural productivity and natural resource management and thereby ensuring food security in rural households, AMAREW is providing both financial as well as technical support to its partners working in eight target pilot woredas of ANRS. While six of these pilot-woredas of AMAREW are labeled as food-insecure, the two woredas, Ankober and Ensarona Wayu, are said to be high potential. The project is accomplishing its duties through concerted efforts of four major components, namely agricultural research, extension, watershed management and training. The research component, which is answerable for this part of the annual report, has been engaged over the last four years in supporting and strengthening ARARI in its efforts to address the dire needs of the farming community by availing and disseminating agricultural technologies in a truly participatory on-farm demonstration approach. Further more, AMAREW is relentlessly trying to instill, among the principal stakeholders BoARD, ARARI, WOARDs and the relevant research centers, synergistic inter-institutional partnerships so that they may internalize the norm of participatory, community-driven and -owned research-for-development perspective as an integral part of their functions and procedures. In addition, AMAREW has been providing ARARI with a list of technical as well as financial backups in a bid to build its institutional capacity in areas of prime needs.

In this Annual Report of 2006 are included, among others, summarized accounts of the research as well as other related activities undertaken by the five partner research centers of ARARI along with the highlights of their achievements from completed research projects. Also are presented, the major activities accomplished by the AMAREW staff to support the research centers deliver the expected outputs. An extraction of the 2007 planning is also given in the report by way of trying to set straight the way forward.

3.2 Objectives and Expected Outputs

The overall purpose of the research component of AMAREW is to support ARARI for enhancing the processes of availing and adoption of appropriate agricultural technologies with commensurate fortification of the natural resources and thereby cascade into the goal of the project, which is improving agricultural production and productivity in the targeted woredas of ANRS. Consistent with this general objective, quite a large number of research and training activities were conducted on different thematic areas to fulfill the following specific objectives in 2006:

- Conducting participatory on-farm adaptive research and technology transfer on various thematic areas of crops, livestock, and natural resources rehabilitation and management.
- Building the capacities of the farmers, researchers and the extension workers, through short-term trainings, so that they would effectively discharge their duties in implementing planned activities as well as in other far-reaching topics tailored

to ensure food security and sustainable improvement in the quality of life for the rural households in the target-woredas and beyond.

- Strengthening the long-standing weak linkage existing between farmers, researchers and extensionists.
- Promoting the informal seed multiplication and distribution sector by encouraging farmers to specialize and evolve into community-based seed producers' enterprises.

In order to fulfill the objectives stipulated above, the AMAREW partner centers conducted quite a large number of on-farm adaptive as well as demonstration trials on research themes of crops, livestock, natural resources, socio-economics and extension in expectations of identifying appropriate technological options and knowledge that are relevant to the conditions of the target-groups. Plans were also prepared in view of conducting need-based short-term trainings to upgrade the technical skills of researchers, extension personnel and farmers. Each center together with the relevant WOARD was also expected to establish FREGs, which should eventually become their routine procedural platforms for conducting on-farm research and extension activities as well as the means of strengthening the bondage between these entities of development.

3.3 Target Woredas and Catering Research Centers

There are seven pilot-woredas in six zones of ANRS where the AMAREW-supported on-farm research activities were carried out by five research centers of ARARI. By far the majority of these woredas, as has been said earlier, is agriculturally low potential and is rather among those areas of the country, which are very badly poverty-stricken. However, the two woredas in North Shewa Zone are relatively better productive (Table 1). At each of the woredas, on-farm research activities were undertaken in at least three kebeles, which in turn represent the agro-ecologies typifying the woreda in general. At Sekota and Gubalafto, in addition to the kebeles, research was carried out on different thematic areas relevant to the watersheds, Yeku and Lenche Dima, respectively, as well.

Table 2. Pilot-woredas where partner research centers of ARARI are undertaking AMAREW-supported on-farm research

Target-Woreda	Zone	Agricultural Potential	Research center catering for
Sekota	Wag-Himra	Low	SDARC
Guba Lafto	North Wollo	Low	SARC
Tehuledere	South Wollo	Low	SARC
Lay Gayint	South Gondar	Low	AARC
East Belessa	North Gondar	Low	GARC
Ankober and Ensarona-Wayu	North Shewa	High	DBARC

3.4 Activities Planned for 2006

A total of 106 on-farm research activities were planned by the five partner centers (Adet, Gondar, Sirinka, Sekota and Debre Berhan) on various research themes of crops, livestock, natural resources, socio-economics and extension and more than 90% was successfully accomplished as planned (Table 2). One half of the planned research activities constituted adaptive trials on different agricultural technologies developed by the respective centers themselves or obtained from both within and outside the country. Some 20% of the activities focused on verification, demonstration and popularization of technologies that have been found appropriate for the respective conditions in the target woredas and watersheds. The remaining 30% of the activities were spread over explorative assessments, participatory seed multiplication, fertilizer trials, activities related to ecological rehabilitation and water management, livestock health, socio-economics and marketing of horticultural products.

Table 3. Number of AMAREW-supported on-farm experiments planned and executed by the partner-research centers during 2006

Sector	SDARC		GARC		AARC		SARC		DBARC		Total	
	Planned	Executed	Planned	Executed	Planned	Executed	Planned	Executed	Planned	Executed	Planned	Executed
Crops	8	8	11	10	6	6	10	10	6	6	41	40
Livestock	5	4	5	4	-	-	3	3	3	3	16	14
NRM	3	3	7	4	-	-	3	3	2	2	15	12
Socio-economics & Extension	4	3	3	3	-	-	24	24	3	3	34	33
Total	20	18	26	21	6	6	40	40	14	14	106	99

In addition to executing the on-farm activities described above, the research component of the project adopted the following items as an integral part of its plan for 2006.

- Monitoring and evaluating the implementation of the on-farm trials planned by the research centers in the target woredas.
- Following the establishment of Farmer-Research-Extension Groups (FREGs) by the research centers, which planned to create such an important platform for strengthening stakeholder linkages.
- Facilitating and following the timely offer of trainings, pertinent to the research component, identified and scheduled by partner centers and ARARI headquarters.
- Following up the implementation and progress of research projects under the Small Grant & Mentorship Program (SGMP) of AMAREW, which are already functioning and also make calls for new ones and identify the best fitting-candidates for implementation in 2007.
- Encouraging and assisting partner centers to organize field days whereby they could jointly monitor and evaluate research activities in a truly participatory manner and thereby make common decisions on issues of relevance for the next planning.

- Facilitate and take the lead for the conduct of joint planning of activities for 2007 whereby all the key stakeholders could share visions and responsibilities for the implementation of the joint plan.
- Submitting the necessary reports like the Quarterly and Annual Reports by complying with the terms of timeliness and quality of the content.

3.5 Highlights of Selected Research Results

3.5.1 Sekota Dryland Agricultural Research Center

Two varieties of cowpea *Asrat* with average seed yield of 11.5 q/ha and *Bekur* with 11.7 q/ha were found, over the last two years, to adapt best for the conditions of Sekota and thus are recommended for large scale production and crop diversification as a strategy to avert the vagaries of recurrent drought and crop failure commonly prevailing in the area. Similarly, three varieties of haricot bean (*Awash Melka-3*, *Tabor* and *Roba-1*) with average yields of 9-10 q/ha were also recommended based on their relative performances over the last two years. The Extension Division of the center will take these varieties for disseminating them through demonstration or popularization and also for recording some socio-economic considerations by farmers.

A baseline survey on flock size and structure of Abergelle goats as well as general livestock composition in the sub-moist ecologies of Wag Himra Zone was made and the information has been synthesized. The survey result shows that goats, by constituting about 47% of the livestock resource in the zone, are most important followed by sheep (36%) and cattle (13%). The flock structure of goats exhibited that adult females constitute about 50%, kids 23%, young females 11% and the rest 16% is covered by adult and young bucks and castrated males (Fig. 1).

Fig. 1. Abergelie goats, which are well adapted to the lowlands, have been distributed to AMAREW participating farmers

3.5.2 Adet Agricultural Research Center

Two varieties of bread wheat (*Senkegna* and *Taye*), which were evaluated by the FREGs at Yedero and Gobgob Kebeles of Lay Gayint, performed much better, in terms of yield and disease resistance, than the varieties already under production in the area. It was, therefore, decided by farmers and other stakeholders to promote production of these varieties via the scaling up program planned for 2007. Similarly the farmers themselves decided to multiply the linseed variety *Geregera* as it was found to be best among the varieties evaluated in the area.

Two varieties of faba bean "*Degaga*" and "*Adet Hana"* were tested against the local cultivar under two management regimes of fertilizer and weeding (with and without). Mid-season evaluations conducted in October 2006 at the FREGs in Gobgob and Yedero jointly by farmers, researchers and extension workers confirmed that *Adet Hana* is the most promising for the area. Therefore, it is planned to multiply the seed of this variety in 2007.

The potato variety "*Tolcha*", which has been tested along with a number of other varieties in the area during the previous years with the support of AMAREW, was found to be the most promising for large scale production in the area and thus the

FREG members at Gobgob and Yedero decided to embark on seed-tuber multiplication in 2006 after being properly trained on production as well as post-harvest handling techniques of the crop. Almost all seed tuber producers have built their own diffused-light store (DLS) so that they can keep their produce until the next planting time. These farmers will also be used as the source of seed for scaling up of potato technologies in the area planned for 2007.

3.5.3 Gondar Agricultural Research Center

Two varieties of cowpea (*MEL NI 963* and *White wonder*) with average seed yield of 15 q/ha were found best among four other varieties that have been brought from Melkassa and Bako Research Centers and tested at East Belessa. These varieties in addition to their high seed yield had also higher biomass yield (3 t/ha) than all the other varieties tested. Therefore, they are recommended for dissemination through demonstration activities of the center.

Of eight improved and one local cultivars of sorghum evaluated in participation with farmers at Dengora, Hamusit and Achikan kebeles of East Belessa, four varieties (*Meko, Teshale, Abshir* and *Abuare*) were found best according to both farmers' and researchers' selection criteria. These varieties will, therefore, be considered for the scaling up program of the center in the area.

3.5.4 Sirinka Agricultural Research Center

The merits of different kinds of check dams, grasses and shrub species evaluated for gully stabilization at Lenche Dima, were well established and the results reveal that it is possible to rehabilitate degraded hill areas in relatively short time span using the different conservation techniques. The area rehabilitated in Lenche Dima can also be used now as a Field School for training farmers from other areas of similar needs.

The use of forage grasses (Napier grass) and legumes (*Desmodium*) in sorghum-based farming systems as push-pull strategy was found effective against the two most important pests of sorghum, stem borer and *Striga.*

Two improved varieties of tef, *DZ-01-974* and "*Gola*" were demonstrated along with the local cultivar in Tehuledere. The response of the farmers was such that the improved varieties are preferred over the local in respect of seed and biomass yields especially DZ-01-974 and also earliness and higher monetary value of the seed of Gola despite its lower seed and biomass yields than the former.

The experiment conducted for three years to find out companion crops for sorghum-based intercropping for the control of *Parthenium hysterophorus* exhibited that groundnut and cowpea are the most effective companion crops against the weed (Fig. 2).

Fig. 2. The invasive weed *Parthenium* is spreading fast and is becoming a major problem in the lowlands of Wello

3.5.5 Debre Berhan Agricultural Research Center

Two improved barley varieties (*Basso* and *Mezezo*) were demonstrated for the last two *belg* seasons around Ankober, Mezezo and Asagirt areas. Evaluations by farmers confirmed that both of them have long spikes and hence better yield potentials (2610 and 2424 kg/ha, respectively). Their black seed coat color is also preferred for home consumption. *Basso* is better in productivity but is more susceptible to smut than *Mezezo*, and both of them will be considered for scaling up in the coming season.

Participatory evaluation, adaptation and transfer of production technologies of bread wheat, faba bean, lentil and chickpea were conducted through FREGs in the wheat-belt plains of Ensarona Wayu. After successive field evaluations held with FREG members and other farmers outside the FREGs, among the seven wheat varieties evaluated, *Digalu* and *Hawi* were selected due to their yield potentials and disease resistance. Similarly, among seven faba bean varieties evaluated *Dagim*, *Lalo* and *Wayu* were selected by farmers due to their yield potential and root rot resistance. From the four lentil varieties evaluated *Alemaya* was selected by farmers, as were the improved chickpea varieties, *Mastewal*, which was recently released by DBARC, *Worku* and *Akaki.* These varieties will thus be considered for scaling up in the coming season.

On-farm evaluation of nitrogen fertilizer levels on bread-making quality of improved wheat varieties was conducted in three kebeles (Siya-Debir, Gerba, and Bollo) of Ensarona Wayu Woreda for two seasons on two soil types (recognized by farmers as *merere* and *bushela*). Maximum grain yield was attained with the application of 124 kg N/ha on *bushela* soil while even the application of 130 kg N/ha did not give the maximum yield on *mererie* soil ((Fig. 3). On the other hand, most of bread-making quality parameters, including protein content (the most important parameter) require levels higher than 130 kg N/ha, which may be neither affordable nor economical. Therefore, detailed work that will help to identify and optimize the most important parameters need to be studied by including such factors as sowing dates, varieties which are genetically contrasting and different levels of N.

Fig. 3. In the Ensarona Wayu area, under well-managed and drained *merere* and *bushla* soils, the performance of improved wheat varities is impressive

Fig. 4. High yielding barley varieties have been widely distributed to participating farmers in North Shewa and South Gondar zones

Testing of low-cost drip irrigation technology, which is suitable for water harvesting practices to produce onion and tomato, was carried out at Aliyu Amba Kebele of Ankober Woreda for the last two years. Farmers having water harvesting structures and other possible water sources were initially selected and drip irrigation facilities were installed for. Training on drip irrigation was given for 15 farmers, Development Agents of the peasant association and officials of the WOARD. Data collection and analysis were made on the amount of water applied and the time spent for watering. The results revealed that drip irrigation gave better yield while at the same time minimizing water wastage compared to bucket irrigation method. Drip irrigation also resulted in higher marginal rate of return.

Survey and monitoring of disease outbreak have been conducted on local and exotic chickens under farmers' management system in Northern Shoa since July 2003. The study was intended to investigate major poultry diseases and test or develop possible control strategies. Accordingly, some key health and production constraints, including infectious and parasitic poultry diseases, have been identified and also the effectiveness of antibiotics for infectious conditions and vaccine for viral diseases have been determined.

Evaluation of community-based control strategies against foot rot disease in Sheep was conducted in North Shewa by identifying three groups of sheep about equally at risk for foot rot. Incidences were recorded and control strategies had been implemented. The first group (g1) had received foot bathing in 5% formalin solution. The second group (g2) had received conventional treatment (topical dressing and antibiotic spray) as the case appeared. No treatment for foot rot was given to the third group (g3). The results indicate that 5% formalin bathing was not effective for treatment of virulent foot rot, but helped to reduce incidences in the next season when used strategically as prophylactic. The conventional treatment of topical dressing and antibiotic spray was found the best in treating or controlling foot rot cases, especially the virulent ones. Management practices are also among the major factors determining the epidemiology of foot rot, such that farmers, who participated in the training given on control and preventive measures of foot rot, were found to be successful in reducing the case at large irrespective of the treatment type.

An experiment comprised of four malting barley varieties (*Beka, Holker, HB-52* and *HB-120*) in combination with three levels of fertilizer (21/23, 41/46 and 62/69 kg/ha of N/P_2O_5) was conducted at Ankober in 2004-2005. Combined over two years, the results revealed that nitrogen doesn't have any significant effect on days to heading, maturity, plant height, 1000-seed weight and grain yield, suggesting that malting barley can be produced without the application of fertilizer at Ankober. This is because of the fact that farmers in Ankober have the tradition of using manure. On the other hand, the effects of variety were significant for most of the traits. Malting quality analysis revealed that all the varieties grown at Ankober give commercially acceptable quality (Fig. 4).

As the formal sector of seed production in the country cannot satisfy the need for standard quality seed of multiples of crops traditionally produced by the farmer, the center has earnestly taken the task of multiplying and distributing improved seeds of cereals, pulses, forage crops, and vegetables and is able to provide basic seeds to farmers, WOARDs, research centers, investors, and NGOs.

3.6 Highlights of Other Activities Accomplished

3.6.1 Establishment of FREGs

National as well as regional experiences show that FREGs provide a platform whereby different stakeholders could bring their efforts together in a more concerted way and thus serve the farmer better. Such positive experiences and the training organized and given on the subject by AMAREW during the first quarter of the year inspired GARC, SDARC and their respective WOARD partners to establish FREGs. While the former has established three of such groups in three kebeles at East Belessa, the latter has established two FREGs in its mandate woreda. One of the FREGs established by SDARC is outside the mandate area of AMAREW indicating that the endeavors of the project, especially those improving the research-extension linkage, are assuming a better course of action and the

stakeholders at different levels should capitalize on this positive stance so that the approach can be internalized by the respective partner-institutions.

3.6.2 Internal Evaluation by RIT

The whole members of the RIT have made internal evaluation of the performance of AMAREW in general and its individual components in particular during 4-12 August 2006. While appreciating the efforts made in respect of technologies and recommendations generated by the partners working on the research component of the project, the evaluators have underpinned a number of critical issues to which all the stakeholders should give due attention so that the project will meet the very objectives set at the time of its launch. The team, among other things, suggested that the time for holding planning workshops should take into account the planning schedules of the partner research centers and the respective WOARDs. Moreover, the team has critically emphasized that such planning workshops should involve all the key stakeholder institutions, namely the region- and zonal-level BoARD offices, research centers, WOARDs and most importantly the farming communities in the target-woredas and watershed sites.

Accordingly, AMAREW has promptly taken steps to properly address both issues and facilitated for the leading partners (research centers, WOARD and farmers) to conduct joint review of their 2006 and planning of 2007 research activities in the presence of other key stakeholders during mid October–early November, well ahead of center-level reviews and plannings (Fig. 5).

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Fig. 5. The internal RIT evaluation team visited and observed the activities of AMAREW in the Yeku watershed

3.6.3 Posting a new Research Advisor

Following the departure of Dr Fekadu Yohannes, who served the project as a Research Advisor (RA) since the beginning, through the usual procedure that RIT has adopted, the Project employed Dr Nigussie Alemayehu who is serving in the said capacity since mid-August 2006.

3.6.4 Review of Completed Research Projects of ARARI

ARARI, with financial support from AMAREW, organized a 3-day workshop, which was held during 14-16 August 2006 in Bahir Dar whereby quite a large number of papers on completed research projects have been presented and discussed. Some of these papers represent those completed projects that have been conducted under AMAREW's support in the target-woredas of the project. In the workshop, together with the CoP and the rest of the AMAREW's technical personnel, the new RA has also taken part. AMAREW supported ARARI in implementing this workshop, the proceedings of which will be published by ARARI.

3.6.5 Small Grants and Mentorship Program (SGMP)

ARARI researchers in collaboration with staff of other regional partners have been undertaking research under the Small Grant and Mentorship Program (SGMP) of AMAREW project. SGMP is designed to link mainly senior researchers in CRSP universities of USA with young researchers in the ANRS. Thus far, the project is financing, from the Contractor's portion of the Project funds, four projects:

1. A*ssessment of soil characteristics, surface water qualities and water table fluctuations on selected irrigated command areas in east and west Gojam and Awi zones;*
2. E*stimation of rill erosion using spatial rill damage and network assessment over hill slopes*;
3. A*ssessment of major threats of Lake Tana and strategies for integrated water use management*);
4. *Determining the optimal enterprise mix in crop-livestock integration for sustainable farming systems in the highlands of North Shewa, Amhara Region*.

A call for new research proposals was made in June 2006 for which 14 respondents were received. While three of these were from BoARD, the rest 11 were from ARARI centers. Since there is only limited fund available for financing research activities under the SGMP on one hand, but quite a number of applicants on the other, AMAREW was compelled to make decisions based on some fundamental principles and explicit criteria. Based on these criteria the following four proposals have been selected for the SGMP support for implementation during 2007:

1. *Durum wheat promotion in potential areas of Northwestern Ethiopi;*,
2. *Scaling out early-maturing and Striga-resistant sorghum varieties with their full packages in drought- and Striga-prone areas;*
3. *Integrated management of potato late blight through farmers field school;* and
4. *The relative contribution of bread wheat varieties, nitrogen fertilizer and environments to bread–making qualities in the highland vertisols of North Shewa*.

In view of the long time it takes to find mentors from the CRSP universities in the USA, the one year left for the project to close is certainly not enough to complete the projects and deliver what is expected of each. Hence, an alternative approach is followed this time to find local mentors of reputable international as well as national experiences for the respective proposals.

3.6.6 Traveling Workshops

Stakeholder consultative traveling workshops for joint evaluation of on-farm research activities were conducted at Lay Gayint and North Shewa, which were respectively organized by AARC and DBARC in collaboration with their partner WOARDs.

AARC organized a two-day (30 Sept and 1 Oct 2006) traveling workshop on the AMAREW-supported on-farm research activities being undertaken by the FREGs established at Gobgob and Yedero Kebeles of Lay Gaint. The participants included all the FREG members at the respective kebeles, researchers from the center, DAs of the two kebeles, the WOARD focal person of AMAREW and the RA. The objectives of the field day included, among other things, to jointly monitor and evaluate the activities conducted by the FREGs, assist the process of institutionalizing a strong researcher-extension-farmer linkage at grassroots level, make tentative selections of the best performing varieties of the different crops under test, and discuss issues that should be given due attention during the joint planning of activities for 2007 by critically evaluating the strengths observed and weaknesses and problems encountered in the course of implementations.

Similarly, DBARC together with its woreda-level partners organized an extensive venture of traveling workshop that lasted from 6th to 15th October 2006. Like that of AARC, the primary objective of the workshop was to conduct monitoring and evaluation on the on-farm trials jointly with farmers, DAs and woreda-level SMS and officials and thereby entrust, among all the stakeholders, the need for mainstreaming, by the relevant offices and other stakeholders, the norm of participatory and impact-oriented research for development approach.

The synthesis report on both workshops was prepared by the RA and made available in bound form to the relevant centers and also to the office of AMAREW.

3.6.7 Joint Review (2006) and Planning (2007) Workshops

AMAREW has been earnetly trying to foster synergistic institutional relationships between ARARI, BoARD, WOARDs and the relevant research centers in a bid to give lasting solutions of technological as well as knowledge options for the farmer through the concerted efforts of researchers, extension experts, development workers and above all the farmers, to work hand-in-hand towards achieving shared-vision and thus same goal. No doubt that earlier planning workshops jointly organized by the research centers and AMAREW were used as fora to identify research problems and priorities and evaluate released technologies for dissemination through the extension system of the target woredas. They, however, had fundamental limitations whereby the involvement of the farmer, as a critical element of the partnership, was very much restricted. Therefore, in 2006 an attempt was made to build upon what has already been attained over the last several years in creating the platform whereby all the stakeholders including researchers, woreda agriculture office experts, development agents and farmers, in the presence of region-, zone- and woreda-level officials or their representatives, took part in discussing and sharing experiences, identifying problems and challenges, suggesting best-bet solutions and options, and making decisions on furthering technologies and knowledge in a truly participatory manner. The workshops took place during mid October to early November of 2006 at the different centers/woredas. They were all organized and led jointly by the

extension and research personnel while AMAREW took the role of facilitation and technical support (Fig. 6).

The outcomes of the joint review and planning workshops focused on areas of scaling up of promising technologies identified over the last four years, capacitating the farmers and Development Agents (DAs) to sustainably realize the benefits that could accrue from these technologies, entrench continuity of the legacy of research-extension-farmer linkage, and linking production to sustainable market potentials so that all the stakeholders involved in the production-to-consumption continuum will establish a win-win relationship and carry on and finalize the on-going experiments and other backup activities.

Fig. 6. The joint planning for 2007 for each pilot woreda and watershed actively involved researchers, extension personnel, farmers, and AMAREW Project advisors

3.7 Problems Encountered

Budget shortage and delay in release has been emphasized as a crosscutting major constraint of all research centers. Furthermore, such technical problems as for example lack of appropriate experimental inputs, inaccessibility of research sites, putting priorities by farmers to other activities than to those to be done in partnership, and others, although are within the reach of the stakeholders or centers to deal with, have nevertheless impeded the pace of execution of planned activities to a significant level.

Another major and persistent problem has been the fact that reports are not sent either timely or in the required standard. Having spent such a significant amount of resources, in the face of ever diminishing volume of treasury, research centers and also ARARI should take the accountability so seriously that the usual reasoning of "high staff attrition rate" should not be a sufficient excuse. What has been done on the cost of the project should be appropriately reported so that everybody plays its role and thereby expedite the achievement of the objectives of the project.

3.8 The Way Forward

Based on the outcomes of the joint review and planning workshops held at each partner center and woreda, the research component of AMAREW will focus on the following themes during 2007.

3.8.1 Scaling out and/or up of improved technologies

Quite a number of technologies have been identified to have a significant impact in solving some critical problems of the farmers in the pilot woredas. It is, therefore, essential that these technologies be scaled out so that the target groups can benefit more from the outputs of these technologies in a sustainable manner. The research system in general has taken this year a major step forward in promoting the process of scaling out and up of technologies identified viable for a given production system. Moreover, RIT has also urged AMAREW and its partners in general so that they may give emphasis to make use of project-results and outcomes already identified and proved are momentous. In this respect, the partner centers as well as the farmers and extension workers have identified the technologies that should be scaled up in their respective woredas during the coming crop season in 2007. The number of technologies to be scaled up by each partner center along with the on-going ones is given in Table 4.

Table 4. Summary of research activities planned by partner centers for 2007

Research center	Number of research projects	
	Scaling up	On-going
SDARC	3	7
AARC	3	2
GARC	3	7
SARC	6	7
DBARC	6	6
Total	**21**	**29**

3.8.2 Contribution towards strengthening the seed system

In order to mitigate the existing gap between the demand for high-quality seed of improved varieties of a long list of crops on one hand and a very limited number of species covered by the formal seed sector on the other, AMAREW is trying to strengthen the informal seed sector by organizing seed production and marketing collective action groups. In this connection, two pilot Collective Seed Production

and Marketing Action Groups at Sekela and Lay Gayint were organized in a way that they will evolve into specialized seed production and marketing scheme. The project will have to continue assisting them in 2007 as well so that they become self-reliant seed enterprises.

3.8.3 Strengthening research-extension linkage

Although a significant stride has been made to bridge the gap that has existed between the research and extension systems, it is still far from the end. Agricultural research-extension services in the country have always been constrained by weak institutional as well as functional links. AMAREW has been doing a whole lot of things including organizing workshops, trainings and the like all with only little dents to make at top-management levels. But certainly at grass roots-level, it has been possible to create a fertile ground, as has been noticed during the joint planning workshops, to assure the investiture and internalization of the kind of linkage necessary to build.

Thus AMAREW, in collaboration with all stakeholders, plans to organize a critical workshop to address this important issue in the region so that a lasting mechanism will be formulated to improve the stagnating arena of research-extension-farmer linkage.

3.8.4 Upgrading the capacities of researchers, extension workers and farmers

The researchers involved in the project, energetic and enthusiastic as they are, are by and large young with less exposure to some specific skills of importance. Therefore, upgrading the skills of researchers in on-farm research methods and data analysis through tailor-made short-term trainings is an essential part of AMAREW's support to ARARI. In order to successfully implement the scaling up activities planned for 2007, building the technical capacity of both the farmer as well as the extension workers is also equally important and thus constitutes major part of the plan for the next year.

3.8.5 Finalization of on-going experiments

Over the last few years, the partner centers of ARARI have been doing research on a long list of themes. While some of these themes are adaptive which take relatively shorter time span to decide their fates, some are rightly investigative which conversely take longer time to establish their merits. Therefore, although as new activities for the 2007 planning, emphasis was given to scaling out of technologies already proved to bring about positive impacts, the research activities that have been started earlier and are not yet completed should be continued as planned so that the pledged results will be delivered.

3.8.6 Small Grants and Mentorship Program

The four new proposals, which have been accepted by the reviewers, will be implemented during 2007 after official agreements are entered between AMAREW and the principal investigators. These are:

(i) *Durum wheat promotion in potential areas of Northwestern Ethiopia;*

(ii) *Scaling out early-maturing and* Striga*-resistant sorghum varieties with their full packages in drought- and Striga-prone areas;*

(iii) *Integrated management of potato late blight through farmers field school;* and

(iv) *The relative contribution of bread wheat varieties, nitrogen fertilizer and environments to bread–making qualities in the highland vertisols of North Shewa*.

A one-day workshop will be organized by AMAREW to review the intermediate results and status of the four on-going projects and also to officially launch the four new ones. The workshop is tentatively planned to take place in March 2007.

4. Extension Component

4.1 Introduction

During the year, the Extension Component of the AMAREW project has been engaged in promoting participatory extension that consolidates effective transfer of technology and expedites linkage and integration of research, extension, and the farmer in the pilot woredas of the project. The main objective of the component is to contribute towards the overall effort of the project to improve food security in the target woredas through a demonstrable shift in paradigm in the research, extension and farmer linkage of the ANRS.

Brief comments on the planning activities, accomplishments of the problems encountered in the course of implementation, and remedial measures taken as solutions are presented in the following section of this annual report.

4.2 Planning Activities of the 2006 Work Plan

All the planning activities required for developing the 2006 work plan and incorporation of comments given by the RIT were completed at the beginning of the year. Following this, orientation on the content and implementation modality of the approved 2006 work plan was given to front-line implementers with the aim of developing clarity and shared understanding among project stakeholders. Furthermore, the annual work plan was broken into quarterly action plan both at woreda and kebele levels, specifying pattern of work flow, implementation timetable, and persons responsible for each activity in the work plan. This approach was essential to monitor effectively the implementation performance of the project.

In connection with this, duty and responsibility of the concerned technical staff of WOARD, in implementing project activities, was developed. The overall objective of this measure was to streamline project activities through result based performance evaluation system of the implementing partner, WOARD, for the improvement of project performance in accomplishing planned activities. This working document was finally distributed to the five pilot woredas with the signature of both the AMAREW project Chief of Party and the Deputy Head of BoARD.

4.3 Planning Activities of the 2007 Work Plan

To strengthen linkage and integration of the principal components of the project, a series of joint review (2006) and planning (2007) workshops were held in all the pilot woredas of AMAREW starting October 12 and ending November 11, 2006. The workshops organized in all the pilot woredas were completed successfully with adequate representation of key stakeholders. Participants at each pilot woreda included three researchers representing crop, livestock, and natural resource disciplines, plus the AMAREW focal person. Likewise, Woreda Office of Agriculture and Rural Development (WOARD) was represented by a large group of technical staff members composed of the woreda focal person of AMAREW, six to seven SMS

members of the WOARD, and six to nine development agents (DAs) working in the target kebeles of AMAREW. Fifteen farmers from each of the three target extension kebeles of AMAREW in each pilot woreda participated. The review and planning workshop at each woreda lasted for two days. In all cases, the first day was scheduled for reviewing the 2006 project performances and the second day for 2007 work plan development (Fig. 7 and 8).

Fig. 7. Small group discussions were held during the joint review and planning workshops at each woreda

In general, some of the positive outcomes of the joint review and planning workshop could be summarized as follows:

- Adequate representation of AMAREW stakeholders and the open forum of interaction encouraged participants to effectively contribute to project planning.
- Participants were made aware of the project's annual objective and implementation strategy.
- Participant's awareness of the duties and responsibilities of each stakeholder involved in AMAREW project was clarified. For example, farmers have identified their high priority issues to be addressed by research, extension, or themselves.
- Sense of ownership of project activities were clarified and appropriately discussed and assigned.

- Participants were able to understand the role of each stakeholder, conflicting interest resulting in the course of project implementation, and the subsequent gaps and constraints.
- Finally, participants were able to consciously plan and own the 2007 project activities based on adequate information and joint discussion.

4.4 Accomplishments (Tables 5 to 10)

During the past four years, AMAREW has been promoting the transfer of agricultural technologies generated by agricultural research institutions in the region/country or elsewhere offering small palm holders the best opportunity for increasing production and productivity. Accordingly, in 2006, the project has been engaged in procuring, purchase and dissemination of crop, livestock and natural resource technologies planned for each pilot woreda. Details of the accomplishments are given below in Tables 5 to 10.

4.4.1 Crops

Procurement, purchase and distribution of improved seed: With regard to improved seed, 21 improved varieties of cereal and pulse crops have been planned for dissemination in 2006 to all the pilot woredas. However, we managed to disseminate only 13 varieties of seven crops.

Fig. 8. During a field day, participating farmers visited a pre-extension demonstration plot of the wheat variety HAR-604 at Yedoro Kebele of Lay Gayint woreda

In terms of quantity, 429 quintals improved seeds of cereals and pulses which accounts for about 120% of the target seed amount was distributed to 3779 households of the extension kebeles in all the pilot woredas. An estimated 1288 ha of land was expected to be covered under the 2006 intervention of the project through improved seed.

The project performance in promotion of improved horticultural crops was encouraging. Promotion and dissemination of highland fruits (apples, pears, and plums) in the watershed kebeles of Lay Gayint and Tehuledere woredas was actively pursued. The amount of vegetable seed distribution exceeded the target. We were unable to disseminate the planned amount of seed of improved varieties of potato because of the long-standing problem of accessing the required quantity and quality seeds of improved potato varieties. This is the justification behind AMAREW's initiative to intervene in the farmer-based potato seed multiplication scheme under the small holders farming system in Sekela and Lay Gayint.

Accomplishment of the project with regard to promotion of improved tools, implements, improved storage structures and water-harvesting technologies was below target Table 5. This resulted mainly from the poor and cumbersome procurement and purchase system of the woreda administration.

4.4.2 Livestock

The target for dissemination of White Leghorn breed of poultry in all pilot woredas has not materialized because of unavailability of day-old chicks and/or three-month old pullets from anywhere in the region. The Andasa and Combolcha poultry farms which have been serving in the past as the only source of breeding stock, are now closed due to infestation by the viral Gumbro disease. On the other hand, AMAREW's intervention in promotion of small ruminants (sheep and goats) over the past two years has significantly benefited the target households. More specifically, smallholder early adopters of the Washera sheep breed have attained increased farm income, mainly because of the compatibility and relative advantage of the technology in the farming system. The project's target of dissemination of small ruminants in 2006 was 122% of what was planned (Fig. 9).

Accomplishment of the project during the year through apiary and forage development activities was not impressive. This was mainly due to the aforementioned shortfall of WOARD in materializing procurement and purchase of the necessary inputs.

Fig. 9. Participants of the 2007 planning workshop observing Washera breed sheep adopted by target HHs in Yedoro extension kebele of Lay Gayint

4.4.3 Natural Resources

Technology transfer activities of AMAREW under natural resources development are geared through promotion of physical and biological measures. Natural resource development activities have so far been promoted in almost all the pilot woredas. Nevertheless, with an attempt of gearing the intervention in a more focused manner, we restricted our activities to the three extension kebeles /sites selected for watershed management. Hence, extension related natural resource development activities during 2006 have been mainly restricted to the new micro-watershed management sites of East Belessa, Lay Gayint and Tehuledere Woredas. The 2007 work plan for natural resource development is entirely devoted to the three new micro-watershed management kebeles/sites of the three woredas. Details of the project's achievements in natural resource development in 2006 are given in Tables 5 to 10.

4.4.4 Establishment of IPM/FFS group

Two IPM/FFS groups, each with 24 members, have been organized in East Belessa woreda. These groups help and facilitate farmers' efforts in managing their crop protection problems.

4.4.5 Establishment of FREGs

Farmer-Research-Extension-Groups (FREGs) play a pivotal role as a means of fostering linkage and integration of research, extension and farmers and promoting small farmer based seed multiplication scheme in the farming system. Major emphasis has been given in AMAREWs' 2006 work plan for the establishment and promotion of FREGs in all the pilot woredas.

Nevertheless, only East Belessa and Tehuldere woredas have managed to be successful in the establishment of the targeted number of FREGs. Nine FREGs have been organized in East Belessa embracing 218 members and working on Abergele breed goat, fingure millet, shallot, sorghum, tomato and tef. Two

FREGs have also been organized in Tehuledere Woreda in which 59 members are working on tef, wheat, chickpea, lentil, pepper, sesame, groundnut, and sorghum.

4.4.6 Training

Training in the extension related areas have been offered by the project to both the technical staff of the WOARD and participating farmers in our technology transfer activities. The training activities have been devised to promote information and/or impart skill for successful accomplishment of transfer of technology.

Training on the establishment and running of Farmers-Research-Extension Group (FREG) was organized by the Project. Relevant technical staff of WOARD of the pilot woredas and all the appropriate ARARI centers participated in the FREG training carried out at two sites, Woreta and Dessie. A well-experienced national consultant, Ato Chimdo Anchala, from EIAR's Melkasa Research Center was hired by AMAREW to conduct this training. All the pilot woredas except Tehuledere have participated in this training. A total of 98 technical staff of BoARD and ARARI participated in the three days long training.

The training on Integrated Pest Management / Farmers Field School (IPM/FFS) was organized for SMSs and DAs working on crops in Lay Gayint and East Belessa. An expert from BoARD under the coordination and sponsorship of AMAREW conducted this training. Seven technical staff from each of the Lay Gayint and East Belesa woredas were trained at the Woreta ATVET College.

4.4.7 Experience Sharing Tour and Farmers' Day

Experience sharing tour involving SMSs of the WOARD, DAs working in the extension kebeles of AMAREW, and representative farmers from the pilot watershed management communities was organized for East Belessa, Lay Gayint and Tehuledere woredas early in the budget year.

The purpose of the tour was to expose and orient the participants on the development and running of watershed management at pilot level. Thirteen participants from each woreda, visited the Tsegure Eyesus watershed management site of GTZ in South Gondar, Lenche Dima watershed management site of AMAREW in Guba Lafto Woreda, Ayoub watershed management site of BoARD in Kobo woreda, and the modern irrigation scheme of small holders implemented Kobo-Girana Valley Development program. The experience sharing tour was essential for the development of pilot watershed management sites in the extension kebeles.

Farmers' day has also been organized in each pilot woreda involving researchers, extension workers, local administrators, and farmers from the extension kebeles of AMAREW. The farmers' days were planned to evaluate on-farm trials and pre-extension demonstrations and exchange views on selection of technologies.

4.4.8 Budget utilization

The second 30% tranche of the 2005 annual project budget, was released early in 2006. This portion of the budget has been utilized mainly for procurement and purchase of improved seeds and planting materials for the 2006 work plan.

The first 40% tranche of the 2006 budget was released in May 2006. Processing for the release of the second 30% tranche of the 2006 budget was completed at the end of the year only. This means that the third tranche of 30% has been missed primarily because of the slow budget utilization and financial reporting of our ANRS partners.

4.4.9 Problems Encountered

Sense of ownership and accountability at the WOARD level is still of concern. Instability of the leadership at the woreda administration and high staff turnover rate have aggravated the problem.

Shortage of skilled manpower is another problem. Most of the pilot woredas are understaffed by as much as 50%. Coupled with the high staff turnover that in most cases is due to resignations and endless staff transfer measures have been impediments for successful accomplishment of project activities at the WOARD level.

Shortage of manpower and logistics at the level of the research centers to adequately respond to critical needs of farmers and DAs have been problems alos.

4.4.10 Solution measures devised

Action plan revision

Mid-year implementation performance review of the extension component activities has been carried out as part of the projects internal monitoring exercise. The review at each pilot woreda was conducted through joint meetings of all SMS of each WOARD, all the DAs working in the extension kebeles of the Project and the Extension Advisor of AMAREW. Performances of WOARD in implementing the 2006 work plan during the first two quarters was thoroughly assessed, and those targets that have not been achieved were identified. Project activities whose time of implementation had passed were replaced with activities that could be implemented during the last two quarters of the Project year. Finally, the revised action plan for the 3rd and 4th quarter were reformulated incorporating reflections of participants. This measure was taken as a corrective measure to improve extension activity implementation performance of WOARD, and indeed it has helped to improve the implementation performance.

4.4.11 Reflections on Future Intervention

The main problems stated above remain to be challenging for successful implementation of project activities in 2007. The lag in any component of the project would inevitably hinder the realization of the overall objective of the project. Hence synergy of all project components in project implementation is essential for the overall project success.

Table 5. Accomplishments of Extension Activities Planned for 2006 in all Pilot Woredas

No	Activity	Unit	Pilot Woredas total			Remark
			Planned	Achieved	% Achieved	
1	**Crop**					
1.1	Improved varieties of cereals and pulses					
	Wheat – HAR -1685	Q	105	120	114.3	
	Wheat - HAR- 604	Q	0	51	NP	
	Wheat – HAR -1868	Q	30	0	0.0	
	Wheat - HAR-1508	Q	0	30	NP	
	Sorghum – Teshale	Q	3	0	0.0	
	Sorghum – Yeju	Q	3	0	0.0	
	Sorghum – Meko	Q	3	0	0.0	
	Sorghum – Abshir	Q	6	10	166.7	
	Sorghum – Gobiye	Q	7	0	0.0	
	Tef - DZ - 01 – 196	Q	25	40	160.0	
	Tef - DZ - 01- 44	Q	2	2	100.0	
	Tef - DZ - 01 – 99	Q	2	2	100.0	
	Tef – Cr – 37	Q	9	30	333.3	
	Barley - Mulunesh/Shedeho	Q	27.5	0	0.0	
	Maize – Katumani	Q	10	10	100.0	
	Maize - BH – 540/660	Q	21	0	0.0	
	Maize – Awassa 511	Q	3	3	100.0	
	Chick pea – Mariye	Q	48	56	116.7	
	Faba bean - CS -20 – DK	Q	24	70	291.7	
	Haricot bean - Awash Melka	Q	15	5	33.3	
	Groundnut	Q	4	0	0.0	
	Cereal and pulse crops total	Q	347.5	429	123.5	
	Linseed	Q	2	0	0.0	
1.2	Promotion of Horticultural crops					
	Potato(Hara/tolcha/menagesha	Q	150	0	0.0	
	Sweet potato	Cuttings	75000	75000	100.0	
	Peper - Mareko Fana	Kg	5.7	50	877.2	
	Pine apple suckers	No	3000	0	0.0	
	Garlic	Q	55	0	0.0	
	Onion	Q	0	0	0.0	
	Shallot	Q	0	0	0.0	
	Other vegetables	Kg	87.8	170	193.6	
	Apple, pear & plum	No	425	1279	300.9	
	Papaya	Kg	5	0	0.0	
	Avocado & Mango	Q	0	0	0.0	

1.3	Provision of grain storage	No	3	0	0.0	
	Defused light storage	No	1	0	0.0	
1.4	Promotion of irrigation technology					
	Pedal pump		80	9	11.3	
	Drip irrigation equipment		45	9	20.0	
	Canal construction		10	0	0.0	
1.5	Crop protection		0	0		
	Establishing IPM/FFS group					
	Equipping IPM/FFS group		6	2	33.3	
	Purchase of tie ridger		0	0		
1.5	Armstrong plow		60	60	100.0	
1.6	Training on		10	0	0.0	
	crop production technological packages		0	0		
	Tie ridging practice		273	0	0.0	
	Drip irrigation technology		3	3	100.0	
	Vegetable crops		22	9	40.9	
	Compost preparation		0	60	NP	
	IPM/FFS – WOARD staff		60	60	100.0	
	- Farmers		0	0		
2	**Livestock**					
2.1	Day old chicken					
	Three month old pullet	No	12780	0	0.0	
	Hay box brooder technology	No	600	0	0.0	
2.2	Bee keeping	No	104	72	69.2	
	Support in bee colonies					
	Model top bars to trained farmers	No	460	87	18.9	
	Provision of wax	No	10150	0	0.0	
	Provision of transistory bee hives	kg	202	484.75	240.0	
	Provision of wax printer	No	120	0	0.0	
	Provision of tools/ protective covers	No	1	1	100.0	
2.3	Introducing improved breeds of small ruminants	No	60	60	100.0	
	Provision of Abergele goat breed					
	Provision of Washera breed sheep	No	120	506	421.7	
	Restocking local breed goat	No	300	90	30.0	
2.4	Forage development	No	150	100	66.7	
	Seed supply of oat & vetch		0	0		
	Sesbania, pigeon pea, lablab and vetch seed	q	9	0	0.0	
	Pigeon pea	q	46	0	0.0	
	Establishment of forage seed multiplication center	q	3	0	0.0	
2.5	Fishery development		1	0	0.0	
	Purchase of mules for fish product cart		0	0		

2.6	Training	No	2	2	100.0	
	Hay box brooder technology and poultry management					
	Construction of top bars and bee keeping	No	412	78	18.9	
	Small ruminant management and forage development	No	386	159	41.2	
	Animal health and forage development	No	426	250	58.7	
	Fishery product management	No	33	30	90.9	
	Natural resource management	No	15	0	0.0	
3	**Bio - physical conservation measures**					
3.1	Hill - side terrace					
	Terace on individual holding	km	65	336	516.9	
	Stone check dam	ha	670	32151	4798.7	
	Gabion check dam	M^3	1000	3353	335.3	
	Gully rehabilitation/revegetation	M^3	1050	568	54.1	
	Bund stabilization	ha	10	80	800.0	
	Stone and soil bund stabilization	km	185	50	27.0	
	Construction of diversion ditch	M^3	1250	0	0.0	
	Construction of recharging pit	km	25	0	0.0	
	Water harvesting structure	No	5	2	40.0	
	Trench	No	2	0	0.0	
	Eye - brow basin	No	15000	47462	316.4	
	Microbasin		13000	7750	59.6	
	Different biological measures		5000	0	0.0	
	Compost making	ha	60	25	41.7	
	Pond construction	M^3	4200	0	0.0	
	Area closure	No	1	0	0.0	
	Establishing nursery site & seedling production	ha	300	270.8	90.3	
3.2	Pitting and planting	No	1	1	100.0	
3.3	Supports	No	249000	148405	59.6	
3.4	Tree seeds		0	0		
	Polythene bags	kg	60.25	47.75	79.3	
	Gabion wire provision	q	304.5	227.47	74.7	
	Training	kg	3000	2000	66.7	
3.5	Natural resource management, fuel saving stove and gabion making		0	0		
	Awareness creation on EPLAUA policies		0	0		
	Gabion making	No	0	69		
		No	15	0	0.0	
4	**Farmer, research and extension group (FREG)**					
4.1	Number of FREG members established	No	15	12	80.0	
	Training	No	0	59		

4.2	Research &extension linkage and implementation modality of FREG					
	WOARD staff	No				
	Farmers	No	85	39	45.9	
	Extension techniques	No	79	0	0.0	
	Nutrition, food storage, preservation and home management	No	85	0	0.0	
	Provision of modern spinning machine	No	25	25	100.0	
4.3	Support to anti - HIV/AIDS club	No	2	0	0.0	
4.4	Capacity Building	No	3	3	100.0	
5	**Experience sharing tour**					
5.1	Participants		33	4	12.1	
	COLTA training					
5.2	Support to FTCs and DA centers		85	0		
5.3	Implementation, Monitoring and Evaluation	No	12	3	25.0	
6	**Mid-term in-office progress review (by Woreda Administration)**					
6.2	Farmers' day (one day progress review)	No	5	5	100.0	
6.3	Participants	No	5	5	100.0	
		No	0	210		

Table 6. Accomplishments of Extension Activities Planned for 2006 in East Belessa Woreda

No	Activities	Unit	Physical		% Achieved	Remark
			Planned	Achieved		
1	**Crop**					
1.1	Improved varieties of cereal and pulse					
	Sorghum / Teshale, Yeju, Meko, Abshir, Birhan and Gobiye)	q	8	0	0	
	Tef - (Cr-37)	q	9	30	333	
	Chick pea - Marye	q	28	10	36	
	Ground nut – Sedi	q	2	0	0	
	Haricot bean - Awash Melka	q	2	0	0	
1.2	Promoting vegetables production					
	Garlic seed	q	30	0	0	
	Tomato	kg	2	0	0	
	Pine apple sucker	No	3000	0	0	
	Sweet potato	Cutting	60000	0	0	
1.3	Crop protection					
	Establishing - IPM/FFS group	No	6	2	33	
1.4	Provision of drip irrigation equipment	No	9	0	0	
1.5	Training on;	LS				
	Tie ridging practice	No	3	3	100	DAs
	IPM/FFS - WOA SMS & DAs	No	0	7	NP	NP (Not Planned)
	- Farmers	No	90	48	53	39 male and 9 female HH heads
	Crop production technological packages	No	180	0	0	Farmers
	Drip irrigation technology	No	11	0	0	2 SMS, 3 DAs & 6 farmers
2	**Livestock**					
2.1	Poultry					
	Day old chicks and feed	No	3000	0	0	
	Hay Box brooder	No	38	0	0	
2.2	Bee keeping					
	Support in bee colonies	No	100	0	0	
	Model top bars to trained farmers	No	1,000	0	0	
	Model tools and protective covers	No	20	20	100	
	Provision of wax	kg	200	134	67	
2.3	Provision of Abergele goat breed	No	50	164	328	
2.4	Supply of forage seeds					
	Vetch	q	3	0	0	
	Pigeon pea	q	3	0	0	
2.6	Training on;					
	Hay Box brooder making and poultry management	No	80	0	0	2 SMS, 3 DAs & 75 farmers
	Bee keeping	No	57	50	88	3 DAs & 54 farmers
	Small ruminant management	No	60	30	50	Farmers
3	**Natural resource**					
3.1	Bio-physical conservation measures					
	Check dam with gabion and stone bund	M^3	500	1136	227	Self help/safety net
	Gabion wire provision	kg	1000	1000	100	

	Gabion sheet making and purchase of equipment	LS		0		
	Construction of diversion ditch	km	25	0	0	Self help/safety net
	Terracing of individual holdings	ha	45	7.25	16	Self help/safety net
	Construction of recharging peat	No	5	2	40	Self help/safety net
	Construction of water harvesting structure	No	2	0	0	
	Area closure	ha	15	40	267	
	Different biological measures	ha	60	25	42	Self help/safety net
3.2	Nursery site establishment and tree seedlings production	No	1	1	100	At the watershed site
3.3	Tree plantation on					
	Watershed gully rehabilitation site	No	35000	38000	109	Self help/safety net
	Closure area & individual woodlot	No	45000	35400	79	Self help/safety net
4	**Extension and Home Economics**					
4.1	Establishing FREG	No	3	9	300	
	No of FREG members	No	NSP	218	-	NSP (Not specified on the plan)
4.2	Training on;					
	Research &extension linkage and implementation modality of FREG	No	8	10	125	
	Extension techniques	No	17	0	0	
5	**Capacity Building**					
5.1	Tailored training and/or experience sharing visit for Woreda staff	No	12	13	108.3	
5.2	COLTA training					
5.3	Support to FTCs and DA centers	No	3	0	0	
6	**Implementation, Monitoring and Evaluation**					
6.3	Mid-term in-office progress review (by Woreda Administration)	No	1	1	100	
6.4	Farmers' day (one -day progress review)	No	1	1	100	
6.5	Woreda level review workshop (reviewing 2006 and planning for 2007)		1	1	100	

Table 7. Accomplishments of Extension Activities Planned for 2006 in Lay Gayint Woreda

No.	Activities	Unit	Physical		% Achieved	Remark
			Planned	Achieved		
1	**Crop**					
1.1	Introducing improved varieties of cereals & pulses					
	Tef - DZ-01-196	Q	15	15	100	
	Wheat – HAR – 1868	Q	30	0	0	
	Wheat – HAR – 1685	Q	0	30	NP	NP (Not planned)
	Wheat - HAR- 604	Q	0	51	NP	
	Barley - Mulunesh and/or Shediho	Q	27.5	0	0	
	Faba bean - CS-20-DK	Q	20	62	310	
	Linseed - Geregera	Q	2	0	0	
1.2	Promoting vegetables production and fruit					
	Garlic seed	Q	25	0	0.0	
	Tomato and other vegetables	Variable	28.8	105	364.6	
	Potato - Hara and/or Tolcha	Q	120	0	0.0	
	Apple and other temperate fruit seedling	Seedling	0	829	PNS	PNS (Planned but not specified in number)
1.3	Provision of grain storage	No	3	0	0.0	
1.4	construction of diffused light storage(DLS) structure	No	1	0	0.0	
1.5	Provision of drip irrigation equipment	No	9	0	0.0	
1.6	Trainings on:					
	Improved grain storage(Farmers)	No	30	0	0.0	
	Drip irrigation technology	No	95	0	0.0	2 SMS, 3 DAs &90 farmers
	Horticultural crops	Birr	93	0	0.0	3DAs and 90 farmers
	IPM, small scale irrigation, highland fruits and DLS	Birr	99	0	0.0	9DAs and 90 farmers
2	**Livestock**					
2.1	Poultry					
	Day old chicks	No	180	0	0.0	
	Hay box brooder	No	6	0	0.0	
	Three month old pullets	No	600	0	0.0	
2.2	Bee keeping					
	Assistance in bee colonies	No	90	87	96.7	
	Model top bars to trained farmers	No	3600	0	0.0	
	Provision of Wax	Kg	0	45		
	Transitional bee hives	No	60	0	0.0	
2.3	Introducing better performing sheep breed					
	Provision of ram	No	30	30	100.0	
	Provision of ewes	No	90	60	66.7	

2.4	Supply of oat and vetch seeds	Q	6	0	0.0	
2.5	Trainings					
	Hay box brooder making and poultry management	No	71	0	0.0	
	Apiary management	No	33	0	0.0	
	Small ruminant management	No	33	0	0.0	
	Animal health and forage development	No	33	0	0.0	
3	**Natural resource management**					
3.1	Gully rehabilitation					
	Gabion check dam construction/stone collection & filling/	M^3	500	0	0.0	
	Stone check dam construction	M^3	750	2785	371.3	
	Gully side plantation/pitting and planting/	No	5000		0.0	
	Purchase of gabion wire	Kg	1000	1000	100.0	
	Water way construction	M^3	0	1621		
3.2	Hill side terrace	Km	5		0.0	
3.3	Pitting and planting seedlings	No	5000	20500	410.0	
3.4	Farm terrace	No	5	0	0.0	
	Stone faced soil bund	Km	10	0	0.0	
	Stone bund	Km	5	0	0.0	
	Bund maintenance	Km	30	0	0.0	
	Plantation on bunds	No	84000	0	0.0	
	Compost making	M^3	2700	0	0.0	
3.5	Area closure	Ha	2	2	100.0	
3.6	Provision of polythene tube	Kg	200	124.5	62.3	
3.7	Training on gabion making	No	12	0	0	
	Training of LAU committee					
4	**Extension and Home Economics**					
4.1	Establishment of farmer, research and extension group (FREG)	No	3		0.0	
4.2	Training on;					
	Research & extension linkage and implementation modality of FREG	No	107	6	5.6	8 SMS, 9 DAs and 90 farmers
	Extension techniques	No	17	0	0.0	
	Nutrition, food storage, preservation and home management	No	PNS	25	-	Female households
4.3	Provision of spinning machine	No	2	0	0.0	
4.4	Supporting Family Planning and anti HIV/AIDS clubs	No	3	3	100.0	

5	**Capacity Building**					
5.1	Tailored training and/or experience sharing visit (Woreda staff)	No	1	1	100.0	
	Participants	No				
5.2	COLTA training	No	17	0	0.0	
5.3	Support to FTCs and DA centers	No	3	0	0.0	
6	**Implementation, Monitoring and Evaluation**					
6.1	Mid-term in-office progress review (by Woreda Administration)	No	1	1	100.0	
6.2	Farmers' day (one day progress review)	No	1	1	100.0	
6.3	Woreda level Review workshop (Reviewing 2006 and planning for 2007)	No	1	1	100.0	1 BOARD, 1 zone Dept. of agri., 7 researchers, 6 SMS members, 6 DAs, 1 supervisor & 49 farmers

Table 8. Accomplishments of Extension Activities Planned for 2006 in Tehuledere Woreda

No	Activities	Unit	Physical		% Achieved	Remark
			Planned	Achieved		
1	**Crop**					
1.1	Introducing improved varieties of cereals & pulses					
	Wheat - HAR-1685	Q	15	30	200	
	Maize - BH - 540/660	Q	15	0	0	
	Tef – DZ - 01 – 196	Q	0	15	NP	
	Haricot bean - Awash Melka	Q	3	0	0	
	Ground nut	Q	2	0	0	
1.2	Promoting horticultural crop					
	Potato - Tolacha/ Menagesha	Q	30	0	0.0	
	Peper - Mareko Fana	kg	5.7	50	877.2	
	Sweet potato – Awassa	Cuttings	15000	75000	500.0	
	Apple, peer and plum seedlings	No	0	450	NP	NP (Not planned)
1.3	Provision of drip irrigation equipment	No	9	0	0.0	
1.4	Trainings					
	Drip irrigation technology	No	8	0	0	
	On crops technologies for dissemination and IPM/FFS	No	93	0	0	
2	**Livestock**					
2.1	Poultry					
	Day old chicks	No	2400	0	0	Failed because ranches in the region interrupted
	Hay box brooder	No	30	37	123.3	
2.2	Bee keeping					
	Support through provision of bee colonies	No	120	0	0	
	Model top bars	No	3600	0	0	
	Wax	Kg	0	300	NP	
	Transitional bee hive	No	60	0	0	
	Protective gears – Cloth	No	0	31	NP	
	- Glove	No	0	40	NP	
	- Eye goggle	No	0	40	NP	
	Working tools – Fork	No	0	20	NP	
	- Smoker	No	0	40	NP	
2.3	Small ruminant development					
	Provision of ram	No	60	0	0	
	Goat restocking in the Watershed Kebele	No	150	100	66.7	
2.4	Forage development					
	Supply of Sesbania, Pigeon pea, vetch, lablab and vetch seeds	Q	12.5	0	0	
2.5	Fishery Development					
	Purchase of mules for fish product transportation cart	No	2	2	100	

2.6	Training					
	Hay box brooder making and poultry management	No	65	35	53.8	8 male and 27 female HH heads
	Apiary management	No	63	0	0	
	Small ruminant production and management	No	243	85	35	66 male and 19 female HHs
	Fishery product management	No	15	0	0	
3	**Natural resource management**					
3.1	Gully rehabilitation					
	Soil bund	M^3	500	0	0	
	Stone bund	M^3	750	0	0	
	Bund establishment by fodder species	km	20	0	0	
	Gully re-vegetation	ha	5	0	0	
	Purchase of gabion wire	kg	1000	0	0	
3.3	Tree plantation					
	Seed collection	kg	50	37.5	75	
	Provision of polythene tube	Q	2.5	0.97	38.8	
	Seedling production	No	20000		0	
	Pitting and planting seedlings	No	50000	9505	19.01	
3.4	Moisture harvesting structure					
	Trench	No	5000	500	10	
	Eye brow basin	No	3000	2500	83.3	
	Micro basin	No	5000	0	0	
	Improved pitting	No	4000	0	0	
	Hill side terrace	km	1.5	0	0	
3.5	Farm terrace	ha	20	0	0	
	Stone faced soil bund	km	10	0	0	
	Stone bund	km	10	0	0	
	Bund maintenance	km	20	0	0	
	Compost making	M^3	1500	0	0	
3.6	Area closure	ha	100	0	0	
3.8	Pond construction	No	1	0	0	
3.9	Training on gabion making	No	8	0	0	
3.10	Environmental protection and land administration & use activities					
	Awareness creation on EPLAUA policies and regulation for kebele administration, social court and other stake holders	No	0	69	NSP	Land administration & use committee members (63) and Kebele council (6) - Plan not specified in No
4	**Extension and Home Economics**					
4.1	Establishing farmer, research and extension group (FREG)	No	3	2	66.7	
	Number of FREG members	No	NSP	59	NSP	No. Not specified on the plan
4.2	Supporting Family Planning and anti HIV/AIDS clubs	No	3	0	0	

4.3	Training					
	Research & Extension linkage and implementation modality of FREG (17 SMS & DAs and 90 farmers)	No	107	0	0	
	Extension techniques (WOA SMS &DAs)	No	17	0	0	
5	**Capacity Building**					
5.1	Tailored training and/or experience sharing visit for Woreda staff	No	1	1	100	
	Participants		12	13	108.5	
5.2	COLTA training (6 SMS, 9DAs & 26 farmers)	No	41	0	0	
5.4	Support to FTCs and DA centers	No	3	3	100	
6	**Implementation, Monitoring and Evaluation**					
6.3	Mid-term in-office progress review	No	1	1	100	
6.4	Farmers' day (one -day progress review)	No	1	1	100	
6.5	Woreda level Review and planning workshop	No	1	1	100	45 farmers, 6 DAs, 2 supervisors, 9 Woreda SMS. 4 researchers

Table 9. Accomplishments of Extension Activities Planned for 2006 in Guba Lafto Woreda

No	Activities	Unit	Physical		% Achieved	Remark
			Planned	Achieved		
1	**Crop**					
1.1	Provision of improved varieties of cereals and pulses					
	Wheat – HAR – 1685	q	60	60	100	
	Sorghum - Teshale -1q, Yeju - 2 q, Meko - 1q	q	4	0	0	
	Teff - DZ- 01- 196	q	10	10	100	
	Maize – Katumani	q	10	10	100	
	Maize – BH - 540/660	q	6	0	0	
	Maize - Awassa 511	q	3	3	100	
	Chick pea - Mariye	q	20	13	65	
	Faba bean CS - 20 – DK	q	4	8	200	
1.2	Vegetable seed supply	kg	22	37	168.2	
1.3	Promotion of irrigation technology					
	Provision of pedal pump	No	80	9	11.3	
	Provision of drip irrigation equipment	No	9	0	0.0	
	Canal construction	kg	10	0	0.0	
1.4	Support for highland fruit nursery	Birr	20000	0	0.0	
1.5	Purchase of tie ridger	No	60	60	100.0	
2	**Livestock**					
2.1	Poultry					
	Day old chicken	No	4800	0	0	
	Hay box brooder	No	NP	35		NP but considered on mid-year plan reviewing
2.2	Bee Keeping					
	Top bar making both by farmers and carpenters	No	450	0	0	
	Provision of tools	Set	20	0	0	
2.3	Introducing better performing sheep breed					
	Provision of rams	No	150	0	0	
2.4	Forage development					
	Seed supply / Sesbania, Tree Lucerne, Vetch/	q	10.5	0	0	
	Establishment of forage seed multiplication center	No	1	0	0	

2.5	Training					
	Hay box brooder technology and poultry management	No	125	43	34.4	
	Construction of top bars and bee keeping	No	154	0	0	
	Small ruminant management and forage development	No	154	0	0	
3	**Natural resource management**					
3.1	Support for tree nursery					
	Seed purchase	No	0.25	0.25	100	
	Polythene tube purchase	q	2	2	100	
	Pitting and planting	No	30000	45000	150	
4	**Extension and Home Economics**					
4.1	Farmer, research and extension group (FREG)	No	3	0	0	
4.2	Training					
	Research &extension linkage and implementation modality of FREG (8 SMS, 9 DAs and 90 farmers)	No	96	14	14.6	10 DAs and 4 SMS trained and failed to realize training of farmers
	Extension techniques	No	17	0	0	
5	**Capacity Building**					
5.1	Experience sharing tour	No	29	0	0	
5.2	COLTA training	No	17	0	0	
5.3	Support to FTCs and DA centers	No	3	0	0	
6	**Implementation, Monitoring and Evaluation**					
6.2	Mid-term in-office progress review (by Woreda Administration)	No	1	1	100	
6.3	Farmers' day (one day progress review)	No	1	1	100	
6.4	Woreda level review and planning workshop	No	1	1	100	

Table 10. Accomplishments of Extension Activities Planned for 2006 in Sekota Woreda

No	Activities	Unit	Physical		% Achieved	Remark
			Planned	Achieved		
1	**Crop**					
1.1	Introducing improved varieties of cereals & pulses					
	Wheat - HAR-1685	q	30	0	0	
	Wheat - HAR-1508	q	0	30	NP	NP (Not planned)
	Sorghum – Abshir -5q, Gobye - 5 q	q	10	10	100	
	Tef - DZ- 01-99 - 2q, DZ -10 – 44 - 2q	q	4	4	100	
	Haricot bean - Awash Melka	q	10	5	50	
	Chickpea - local variety	q	0	33	NP	
1.2	Promoting horticultural crops					
	Vegetables seed (Different)	kg	35	28	80.0	
	Papaya	kg	5	0	0	
	Avocado	q	3	0	0	
	Mango	q	3	0	0	
1.3	Promotion of farm implements					
	Armstrong plow	No	10	0	0	
	Provision of drip irrigation equipment	No	9	9	100	
1.4	Training					
	Vegetables crops(Farmers)	No	0	60	NP	
	Insitu moisture conservation	No	60	0	0	Farmers
	Compost preparation	No	60	60	100	Farmers
	Drip irrigation technology	No	11	9	81.8	2 SMS, 3 DAs & 6 farmers
2	**Livestock**					
2.1	Poultry					
	Day old chicken	No	2400	0	0	
	Hay box brooder	No	30	0	0	
2.2	Bee keeping					
	Equipment and tools	Set	40	40	100	
	Wax	q	2	5.75	100	
	Queen excluder	No	75	0	0	
	Wax printer	No	1	1	100	
	Top bar	No	1500	0	0	
	Bee colony	No	150	0	0	
2.3	Forage seed provision					
	Cow pea	q	10	0	0	
	Pigeon pea	q	5	0	0	
	Sesbania	q	1	0	0	
	Grass seed (various)	q	5	0	0	
	Vetch	q	2	0	0	
2.4	Small ruminants	q				
	Abergele goat breed	q	0	450		Considered for replacement of poultry, apiary and forage tech.

2.5	Training					
	Hay box brooder making and poultry management	No	65	0	0	
	Bee keeping	No	79	79	100	4 DAs & 75 farmers
	Forage development	No	90	90	100	90 farmers
	Small ruminants	No	0	45	-	-
3	**Natural resource management**					
3.1	Bio-physical conservation measures					
	Hill side terrace	km	50	336	672	Self help/ Safety net
	Stone check dam	M^3	600	32144	5357.3	Self help/ Safety net
	Gabion check dam	M^3	300	0	0	Self help/ Safety net
	Gully rehabilitation	Ha	5	80	1600	Self help/ Safety net
	Bund stabilization	km	150	50	33.333	Self help/ Safety net
	Trench	No	10000	46962	469.62	Self help/ Safety net
	Eye brow basin	No	10000	5250	52.5	Self help/ Safety net
	Area closure	ha	80	183	228.75	Self help/ Safety net
3.2	Support to tree seedling nursery sites					
	Tree seeds	kg	10	10	100	
	Polythene bags	kg	100	100	100	
4	**Extension and Home Economics**					
4.1	Farmer, research and extension group (FREG)	No	3	0	33.3	
4.2	Training					
	Research &extension linkage and implementation modality of FREG	No	14	9	64.3	
	Extension techniques	No	17	0	0	
5	**Capacity Building**					
5.1	Tailored training and/or experience sharing visit for Woreda staff	No	1	1	100	6 SMS, 11 DAs & 12 farmers
5.2	COLTA training	No	17	0	0	6 SMS, 9 DAs & 26 Community leaders
5.3	Support to FTCs and DA centers	No	3	3	100	
6	**Implementation, Monitoring and Evaluation**					
6.2	Follow up, recording and reporting					
6.3	Mid-term in-office progress review (by Woreda Administration)	No	1	1	100	
6.4	Farmers' day (one day progress review)	No	1	1	100	
6.5	Woreda level review and planning workshop	No	1	1	100	

5. Integrated Watershed Management Component

The watershed management component of the AMAREW project aims at integrated watershed management planning and implementation within the Amhara National Regional State (ANRS), using participatory methodology. The approach serves as a site specific integration model of research, extension, training, and micro- enterprise activities of the project. Accordingly, the component's major objective is to facilitate the testing of the practical effectiveness and sustainability of a community based watershed management approach for environmental rehabilitation and ultimately attaining food security at the watershed level.

5.1 Targeted woredas and watershed sites

The targeted pilot areas for the watershed component of AMAREW project cover three zones of ANRS with one target woreda and one pilot watershed site in each. The two well established watersheds, Yeku and Lenche Dima (Fig. 10), initiated in 2003, are located in eastern ANRS representing moisture stress areas of the region and the third, Gumet in Sekela woreda, representing high moisture areas of western part of the region was initiated in 2005.

Fig. 10. Lenche-Dima watershed near the town of Hara, Gubalafto, is well established and serves as a learning center for farmers and development

Targeted woredas and pilot watershed sites supported by USAID/AMAREW Project

Zone	Woreda	Watershed
Wag Himra	Sekota	Yeku
North Wello	Gubalafto	Lenche Dima
West Gojam	Sekela	Gumet

5.2 Areas of intervention

The watershed component of AMAREW project in partnership with BoARD, ARARI and EPLAUA is engaged in testing a wide range of technologies, which address critical problems affecting the rural communities of the three pilot watersheds, namely Yeku, Lenche Dima, and Gumet. Table 11 below illustrates the various development interventions under implementation in relation to the problems identified by community members of the pilot watersheds.

Table 11. Major problems across the three pilot watersheds and selected interventions

Sector	Major problems	Sector interventions
Natural Resources	Soil erosion	Physical and biological conservation measures
	Deforestation and shortage of wood for fuel and construction	Tree plantings on closed areas, homesteads, introduction of improved and fuel saving stoves, training and demonstration
	Moisture stress, water shortage both for humans and livestock	Improved tillage practices, in-situ moisture conservation and water harvesting, improving water availability and delivery
Agronomy	In adequate rainfall with erratic and poor distribution	Introduction of in-situ moisture conservation practices, introduction of drought resistant and early maturing crop varieties, training and demonstration
	Lack of seed of improved varieties	Introduction of improved and early maturing varieties, on-farm research with improved varieties, farmer-based seed production
	Crop protection (Insects diseases and weeds) problems	Establishment and use of Farmers' Field Schools (FFS), and Integrated Crop Management (ICM) groups, demonstration of improved storage structures
	Declining soil fertility	Compost production, green manuring, proper crop management
Livestock	Shortage of animal feed	Forage development in backyards, closed areas, rehabilitated gullies and bunds
	Animal health problems	Increase mobile veterinary service, training Community Animal Health Workers (CAHW)
	Livestock water shortage	Construction and maintenance of ponds and watering points
	Low income and poor livestock management practices	Introduction of improved beehive, poultry, small ruminants, and training and demonstration in livestock management
Social issues	Weak local institution	Establishment and empowerment of local Community Watershed Management Organization (CWMO)
	Low level participation of women	Creation of organizational space for women, gender balanced development
	Increased HIV/AIDS problem, high fertility rate, poor nutritional balance	Establishment of Anti-HIV/AIDs clubs, awareness raising programs, family planning, nutrition and home management training
	Small farm size, lack of cash	Enhance the productivity of the farm, organization of micro-enterprise development, off-farm income generation activities, credit provision, etc.

5.3 Major activities planned for 2006

Strengthening the capacity of the watershed community and extension workers on joint planning, implementation, monitoring and evaluation of the overall pilot watershed development interventions including:

- Facilitating research, extension, and farmers joint planning process at the watershed level for 2007.
- Following-up the implementation and progress of land rehabilitation, water harvesting and related agricultural interventions being carried out in the pilot watersheds.
- Organizing and providing various farmer-training sessions, experience sharing tours and promoting various technology packages.
- Facilitating the availability of the required food resource to be used for Food-For- Work (FFW) activities for the two well established watersheds (Yeku and Lenche Dima)

5.4 Watershed development activities

Through community participatory planning approach the planned watershed development activities for 2006 were:

- Bio-physical natural resource conservation and degraded land rehabilitation
- Water supply, surface and ground water harvesting and development for household use and vegetable production
- Crop production and protection
- Livestock and forage development.

5.5 Major tasks undertaken

5.5.1 Strengthening community level watershed management

In all the three pilot watersheds, communities took active and leading roles in joint research, extension, and farmers annual work plan preparation, community mobilization, selection of farmers for various technology trials, delineate areas for enclosure, and food for work management, etc;

The Yeku and Gumet community watershed management organization (CWMO) DAs and the Sekota and Sekela woreda extension workers have made an experience sharing tour for about a week. The group visited GTZ gully rehabilitation works at Debre Tabor, Ganwuha integrated watershed management, and household drip irrigation using rain water harvested by means of trapezoidal pond in Lay Gayint, Sanka traditional irrigation and Lenche Dima community based integrated watershed development works, and Kobo Girana modern irrigation schemes (sprinkler and drip irrigation). All visited areas demonstrate the positive impact of community participation for sustainable environmental rehabilitation works and various agricultural and non-agricultural development interventions.

5.5.2 Physical conservation works and infrastructure development

Area closure and development

Farmers have started to observe the natural regeneration in the closed sites of Yeku and Lenche Dima. Newly emerging shrubs and grass species and wildlife, which were not visible in the past, are now plentiful. Closing hillsides for a given duration of time and application of cut and carry grass system through organized user group has become a highly accepted activity by the majority of the watershed communities. Within the year, the Lenche Dima, Yeku and Gumet watershed communities agreed and closed additional 155 ha degraded hillsides. Moisture conservation activities have been carried out and 255,906 multipurpose tree seedlings were planted in the closed areas of the watershed sites, backyards and gully sides.

At Lenche Dima watershed, in 2006, about 113 ha degraded hillside was enclosed and treated and 85 ha of closed area was partitioned into individual plots and allocated to 171 members of the community. Landless community members to whom the treated land was allocated earlier than 2006 are already getting economic benefits from selling grass.

5.5.3 Physical soil and water conservation works

The positive impact of previous hillside treatment activities in arresting water runoff, encouraging moisture infiltration and reducing erosion hazard on villages and cultivated lands has encouraged attitudinal changes on watershed communities to expand such activities on a wider scale throughout the watershed. In view of that, in the pilot watersheds, a total of 297 km hillside terrace, 27,783 trenches, 446 m^3 gabion, 3167 m^3 stone check dam and 854 m^3 sediment storage dam (SSD) have been constructed over the closed degraded hills and roadside. Forage seeds (pigeon pea and Sesbania) were planted on hillside terraces of 35 ha of land using the *belg* rains. Over 242 ha of farmland terrace has been maintained at Gumet and Yeku watersheds (Fig. 11, 12, 13).

Fig. 11. Run-off percolation pits encourage infiltration, Yeku watershed

Fig. 12. Gabion check dams are effective in gully rehabilitation, Yeku watershed

Fig. 13. In the Gumet watershed, gully rehabilitation using bamboo has become very effective, Top: view before using check-dam and planting bamboo Bottom: the same gully after check-dam and bamboo planting

5.5.4 Water harvesting

The number of participant farmers in developing water harvesting structures has greatly increased with very limited material assistance. Within the year, four farmers at Lenche Dima started digging four dome shaped water-harvesting structures and three farmers at Yeku watershed dug two hand-dug wells and one hemispherical pond in their fields. The number of farmers with water harvesting structures using the water stored in the domes, the owners, beyond using water for household consumption during the harsh dry season, are growing different vegetables and fruits (mangoes, avocadoes, oranges, coffees, bananas) in their home gardens. In 2006 additional 2507 fruit seedlings were also distributed to those farmers who constructed water-harvesting schemes (Fig.14 and 15).

Fig. 14. Farmers at Lenche Dima watershed have started harvesting fruits and vegetables grown using the rain water stored in the dome

Fig. 15. Mango production, which is a new AMAREW introduction to the Lenche Dima watershed, has excellent economic potential for the area

5.5.5 Water supply

The watershed component continues to give due consideration to the construction of a pump house and expansion of water points to the villages of the Lenche Dima watershed community, with the water schemes managed and operated by a water committee selected from the community.

5.5.6 Crop production

Provision of seeds and planting materials of improved crop varieties, vegetables and fruits through the research and extension components of the project was underway in the pilot watersheds during the year. Accordingly 97.5q seeds of different improved crop varieties including: sorghum, teff, maize, triticale, chickpea, and haricot bean were distributed to selected farmers in the three pilot watersheds.

The Gumet watershed potato seed production and marketing collective action group was established in 2006, with 7 members of selected farmers (one woman and six men), the group received 8 quintals of seven improved potato tuber seed of (Gera, Wochecha, Gorebela, Marachare, Zengena, Jalenie, and Guassa) obtained from research centers and planted on 0.4 ha, and produced 82 quintals of

basic potato seed (Fig. 16). Such group members have gained a total of 14,800 Birr from sales of improved potato tuber seed. For the 2007 crop season these 82 quintals of potato tuber seeds were redistributed for additional new 77 members (6 women and 71men) of the Gumet watershed community.

Fig. 16. Farmer Fekadu Mulu of Gumet Watershed and his potato seed production plot of variety Gorebela

Accordingly the farmers were also supplied with 36 kg of vegetable seeds, 4750 cuttings of sweet potato, and 1054 temperate fruit seedlings (454 apples of Bond Red, Crispin and Grand Spith varieties, 500 plums of Cherry and Santa Rosa varieties and 100 Pears). Apples were distributed to 80 farmers of Gumet watershed in Sekela woreda out of which 11 are women household heads. During the *belg* season, 2507 seedlings of coffee, avocado, orange, papaya, and cassava were also distributed to farmers with water harvesting structures at Lenche Dima watershed in Gubalafto woreda.

5.5.7 Livestock and forage development

Livestock development

The project has done restocking of goat and sheep at individual household level under a revolving scheme of goats and sheep that has increased the goat and sheep resources and incomes of the household of the watershed community. In 2006, in the three pilot watersheds, a total of 456 goats and 101 sheep were distributed to 111 farmers of the communities in the watersheds. The intervention was also

gender focused, as for example at the Lenche Dima watershed, 5 women and 21 men heads of households have benefited from the goat-restocking package.

Forage development

Forage development over the closed hillsides, gullies, and on- farm bunds have shown an encouraging result specially at Lenche Dima and Yeku watersheds, where most farmers at the present have started growing forages at their backyards or part of their farm fields. In 2006, at Lenche Dima, over 35 ha of closed hillside and 2.5 ha of gullies were planted with pigeon pea and sesbania, and about 77945 tree lucern forage seedlings and 20kg vetch were planted on bunds and gully side of Gumet watershed (Fig. 17).

Fig. 17. Degraded hillside and gullies are being used as source of forage at Lenche Dima watershed

- Frequent turnover of the woreda staff and DAs in the pilot watersheds affects negatively the continuity of the development efforts initiated there.
- Construction of the planned DLS for the basic potato seed produced on-farm by the Gumet collective action group was unnecessarily delayed due to administrative and beaucratic reasons in the WOARD.

5.6 Action taken to solve problems

- To maintain the development endeavor at watershed level, frequent follow-up and monitoring has been done in all the pilot watershed sites and orientation was also given to the new DAs on the objectives of the project including the planned activities underway.
- In consultation with the farmers, kebele administration, woreda experts and DAs, alternative arrangements, using facilities owned by the PA, were made to store the newly harvested seed potato tuber seed until it is ready for distribution and planting.

Table 12. Summary of activities conducted at Yeku, Lenche Dima and Gumet watersheds in 2006.

No	Activities	Unit	Yeku		Lenche Dima		Gumet	
			Target	Achieved	Target	Achieved	Target	Achieved
I	**Soil and water conservation**							
1.1	Area closure	Ha	50	30	75	113	75	12
1.2	Hillside tied terrace	Km	10	198	90	99.14	90	-
1.3	Trench	No	-	12787	5000	9996	5000	-
1.4	Run-off percolation pit	"	-	1824	-	-	-	-
1.5	Micro basin	"	-	-	5000	17940	5000	-
1.6	Gabion check dam	M^3	700	300	700	90	700	56
1.7	Stone check dam (wooden in km)	M^3	1222	421.5	300	2745.6	1000	0.5 km
1.8	Rock fill check dam (SS dam)	"	-	854.5	-	-	-	-
1.9	Gully head treatment	"	-	-	170	120	-	-
1.10	Gully revegetation	Ha			2	2.7		1.5
1.11	Bund construction	Km	-	0.8	-	-	-	-
1.12	Bund maintenance	Ha	-	22	-	-	-	250
1.13	Sisal planting for bund stabilization	Km		2				
1.14	Seedling production	No					-	65722
1.15	Zai pit	No	-	3119	-	-	-	--
1.16	Pitting	No	30,000	52,400	150,000	139,514	80,000	65,722
1.17	Seedling planting	No	30,000	50,670	150,000	139,514	80,000	65,722
1.18	Forage seed planting	Ha			-	35		
1.19	Establishment of community nursery	No	-	-	-	-	1	1
1.20	Closed areas distributed to 171 individuals in the watershed	Ha	-	-	-	85	-	-
1.21	Gabion box* / wire purchase	Kg			1500	2125	50	50 *
1.22	Feeder road maintenance	M		200				
II	**Water harvesting and water supply works**							
2.1	Dome construction	No	-	-	5	4	-	-
2.2	Hand-dug well	"	-	2	-	-	-	-
2.3	Hemispherical pond	"	-	1	-	-	-	-
2.3	Construction of water point	No	-	-	1	1	-	-
2.4	Pump house construction	No	-	-	1	1	-	-
2.5	Water pipe line laid	Mt	-	-	1200	1200	-	-

No	Activities	Unit	Yeku		Lenche Dima		Gumet	
			Target	Achieved	Target	Achieved	Target	Achieved
III	**Crop production component**							
3	**Introducing improved varieties of cereals and pulses**							
3.1	Sorghum seed				4	7		
	• Yeju	q	-	-	2	3	-	-
	• Meko	"	-	-	2	4	-	-
3.2	Tef (DZ-01-196)	"	-	-	8	8	-	-
	Tef (CR-37)	"	10	10	-	-	-	-
3.3	Maize (Katumani)	"	-	-	4	4	-	-
3.4	Haricot bean	"			1	1		
3.5	Chickpea (Mariye & local)	"	8	15	7	7		
3.6	Triticale (Minet)	"	-	-	-	-	15	45.5
3.7	Provision of improved potato seed	q	10	-	-	-	150	8
	Basic potato seed harvested by 7 farmers from (0.4) ha	"					-	82
	Improved potato seed redistributed	"					82	82
	Total income from sells of improved potato	Birr						14,800
3.8	Provision of vegetable seeds	Kg	-	-	10	9	37	60
3.9	Provision of sweet potato cuttings	No	-	-	-	-	-	4750
3.10	Provision of fruit seedlings (coffee, avocado, orange, papaya, and cassava)	No	-	-	-	2507	-	-
3.11	Deliver temperate fruit seedlings	"	-	-	-		300	1054
	- Apple	"				-		454
	- Pear	"						100
	- Plum	"						500
3.12	Promotion of farm implements							
	➢ Tieridger	No			32	32		
	➢ Pedal pump	"			5	5	5	5
	➢ Armstrong plow				-	-	5	5
	➢ Drip irrigation	set			-	-	5	5
3.13	Compost preparation	M^3	-	300				
IV	**Livestock component**							
	Hay box brooder produced	No	-	-	30	38	-	-
4.1	Goat and sheep restocking							
	Goat and sheep distributed	No	198	300 For 50hh	80	156 For 26hh	100	101 For 35hh
4.2	Bee keeping				-	-		
	- Promotion of modern beehive			-	-	--	-	29
	- Provision of transitional beehive	No		-	-	-	40	32
	" " Top bar			-	-	-	1200	240

No	Activities	Unit	Yeku		Lenche Dima		Gumet	
			Target	Achieved	Target	Achieved	Target	Achieved
	- Tools & equipment for apiculture	Set	15	10	-	-		
	- Provision of wax	Kg	100	100	-	--	80	90
	- Provision of wax printer	No	2	1	-	-		
4.3	Forage seedling (treelucern) planted	No					-	77945
	- Provision of forage seeds	Kg						22.5
V	**Training and capacity building**							
5.1	Farmers training on ➢ Agroforestry (for 3 days)	No					32	51
	➢ In-situ moisture and soil conservation	"	30	30				128
	➢ Farm implements, ➢ Drip irrigation	" "	5 9	5 9	150	24 + 3DAs		
	➢ Livestock production 3DAs - Apiculture for 3 experts	" "			135	25	-	52+3DAs
	➢ Temperate fruit production						-	35
	➢ Fuel saving stove making & house improvement	"	-	-	30	30	-	-
	➢ FREG training for experts & DAs	"	3			3		7
	➢ Land administration						-	38
	Fuel saving stove produced	"	-	26	-	88	-	-
5.2	Increasing awareness on HIV AIDS and family planning	No		500				
5.3	Conduct experience sharing tour	No					13	13
5.4	Conduct farmers field day demonstration on improved potato	No	-	-	-	-	-	120 farmers

6. Training Component

6.1 Introduction

The AMAREW Project, in collaboration with its local partners, plans and implements various developmental activities under different project components. New and improved technologies with proven potentials to enhance the productivity and production of the crop and livestock sectors and that lead towards sustainable management of natural resources are planned and executed in eight pilot Woredas and three watersheds. Understandably, for the new and improved technological options to be adopted, researchers and development workers who, respectively, lead the technology development and implementation process and farmers who are the direct users of the technology should have the necessary Knowledge, Skill and Attitude (KSA). Research and development workers are involved in the technology generation and dissemination process at different capacities and levels. Researchers who are developing the technologies and extension personnel who are engaged in technology dissemination proper should keep abreast with emerging methods and changing user needs and market demands. Wide array of personnel including Woreda level experts, subject matter specialists and grassroots level extension workers known as development agents (DAs) are found under the extension category. All of them need to have good grasp of the new technology that they are to popularize among the farming community. The grasp shall be in terms of knowledge of the technology proper and on selecting the appropriate methodological options and having the skills that enhance the rate of technology transfer among the ultimate users. Farmers should also have clear understanding on what the technology is all about and on how to make proper and efficient use of it. In view of the seriousness of natural resource degradation in the ANRS, all actors described above should also have clear insights on the importance of commonly managing the natural resources base to secure better livelihoods and to save for the future. One proven way of addressing all the above concerns and inspire development workers is to collectively plan and impart training that enhances the KSA of the same.

It should also be noted that, following the implementation of decentralized administration in Ethiopia, the Woreda Offices of Agricultural and Rural Development (WOARD) are given the power and responsibility to decide and lead all developmental activities relevant for their Woredas. Such power and responsibility is vested upon the WOARD without adequate human power demonstrated KSA. The necessity of building operational, analytical and managerial capacity of employees of the AMAREW project local partner institutions and farmers in view of providing relevant research and extension services is, therefore, imperative. Long-term degree training, short-term on-job training, educational and/or motivational study tours were, therefore, considered the key towards achieving the AMAREW Project overall goal of enhancing the livelihoods of the rural poor and thereby rural economies. Hence, as has been the case in the preceding years, the 2006 AMAREW Project training component work plan was designed and executed collectively with other project components and local partner institutions with the above critical considerations in focus.

6.2 Long-term degree training

Long-term degree training of local partner nominated research and development workers is taken as one of the principal means for building the human and institutional capacity of AMAREW Project partner institutions. This will facilitate the anticipated research/extension paradigm shift, the main thrust of AMAREW Project, to occur, alleviates the typical mid-career feeling of stagnation and enhances staff motivation and sense of purpose. To achieve this, the project, together with its local partner institutions, identified missing links and key areas that should be strengthened through higher-level academic training of partners' staff. The program was implemented by facilitating the recruitment of dedicated workers, with good academic records, assisting candidates in securing placements in local universities and sponsoring their studies. Through this program, 23 diploma holders are being supported to earn BS degree, whereas 9 BS degree holders are being supported to earn MS degree in fields relevant to the regional development.

6.2.1 BS degree training

Regular BS program

Three employees of ARARI were assisted to resume their respective class year studies in the regular program, two in Bahir Dar and one in Mekelle Universities. Out of them a student named Tefera Mekonen Wolde (ARARI, Debre Birhan) has completed his studies from the Department of Animal, Range and Wildlife Sciences, MU, with great distinction in July 2006 and submitted a copy of his temporary degree to the Project Office (Table 13).

Summer BS program

Twenty students (18 male and 2 female) were assisted to resume their respective summer class year studies in Mekelle (15 students), Haramaya (3 students) and Hawassa (2 students) Universities. Of those students who are studing in Mekelle University (MU) after completing the 2006 summer class successfully, seven have joined the regular day classes in 2006/07 A.Y, six, as per the University regulation set for final year summer class students and, one, due to changes in the curriculum of his department (Figure 18). All 20 students were supported administratively and financially and have successfully completed their respective class year studies (Tables 1 and 2 for details).

Monitoring and evaluation visit to Mekelle University

To resolve some pending issues related to BS degree final year students who joined regular classes in 2006/07 A.Y and monitor their performance, a project team composed of Dr. Brhane Gebrekidan (CoP and Senior Research Advisor), Mr. Ahmed Ayele (Administration and Finance Officer) and Dr. Eshetu Mulatu (R/E Training Advisor and FtF coordinator) made a monitoring and evaluation visit to MU from 10/27/2006 to 11/01/2006. Useful discussions were made with department heads where the students are allocated including Mrs. Alemtsehay Tsegaye, Head, Department of Dryland Crop and Horticultural Sciences (DCHS),

Mr. Aweke Mulualem, Head, Department of Land Resource Management and Environmental Protection (LaRMEP), Dr. Bolu Stephen, Head, Department of Animal, Range and Wildlife Sciences (ARWS), and Mr. Brhanu Abraha, Deputy Director, Faculty of Dryland Agriculture and Natural Resources - Distance and Continuing Education (FDANR-DCE). The team also talked to the University's President Dr. Mitku Haile on various issues. One major issue raised during the discussions with University officials and the students was to increase students daily meal allowance from the original 13.00 Birr/day to 18.00 Birr/day in view of the rising food prices in Mekelle. Evidences from one other sponsoring institute that endorsed the request and a formal letter were also given to the team from the office of the FDANR-DCE to serve as a decision support. AMAREW also endorsed the request and made the payment accordingly.

Fig. 18. AMAREW Project supported BS students in Mekelle University to graduate in July and September 2007: From right to left (1) Misganaw Teshome (Lay Gayint), (2) Kokeb Bogale (Lay Gayint), (3) Demir Hailu (Tehuledere), (4) Lacketch Mitiku (Sekota), (5) Melkamu Ayalew (Gubalafto), (6) Mekuria Yimer (Gubalafto), (7) Aymiro Yeheyes (Sekota), and (8) Tewodros Bimerew (MS student from East Belessa)

6.2.2 MS degree training

Under its long-term training program the AMAREW Project is supporting nine students to work for their MS degree. Eight of them are registered in Haramaya University (HU), whereas one is registered in MU. Of the total nine, four have already completed their studies and submitted to the Project office a copy of their University signed and sealed thesis, while three of them who joined later in 2005 are busy with their thesis research. The one in MU who joined in March 2006 have just completed his first semester classes and resumed II semester class schedules (Table 3). For those who already engaged in field research work part of their research fund has been released in the reporting year, whereas the outstanding amount will be paid upon settlement of the already received amount. Among the five students who engaged in MS studies in 2003 four have successfully completed, while a student named Demrew Wossenyeleh Gossa (WOARD, Tehuledere) is lagging behind for unknown reason and we suspect that he might not been able to withstand the rigors of higher learning. Details on MS students academic status, fields of study and theses topics are given in Tables 3 and 4.

Table 13. List and academic status of AMAREW Project supported partner institutions staff members attending BS degree studies in different local Universities in 2006

No.	Name of trainee	Partner institute	Field of study	Training institute	Academic status	CGPA
1	Aymiro Yhyess Hailu	BoARD	ARWS	MU	Joined final year regular class	3.28
2	Demerew Hailu Abebe	BoARD	LaRMEP	MU	Joined final year regular class	3.58
3	Dilnessa Ewnetu Feleke	ARARI	Mechanical Eng.	BDU	Joined final year regular class	2.42
4	Kokeb Bogale Engida	BoARD	LaRMEP	MU	Joined final year regular class	3.10
5	Lacketch Mitiku Egezinu	BoARD	LaRMEP	MU	Joined final year regular class	2.54
6	Mekuria Yimer Gesese	BoARD	DCHS	MU	Joined final year regular class	2.87
7	Melkamu Ayalew Kebede	BoARD	DCHS	MU	Joined final year regular class	2.49
8	Misganaw Teshome Ayele	BoARD	DCHS	MU	Joined final year regular class	2.71
9	Sitotaw Taffese Ayele	BoARD	Animal Sci.	HU	Completed 4th summer program	2.47
10	Tefera Mokennen Wolde	ARARI	ARWS	MU	Completed his studies	3.97
11	Tesfaye Setegne Zewdu	BoARD	LaRMEP	MU	Completed 3rd summer program	2.80
12	Aytenew Endeshaw Tatek	BoARD	LaRMEP	MU	Completed 3rd summer program	3.19
10	Mohammed Hussein Yimer	BoARD	Animal Sci.	HU	Completed 4th summer program	2.42
14	Wolelaw Endale Ambie	ARARI	Mechanical Eng.	BDU	Joined 3rd year regular program	2.37
15	Addisu Bihonegn Eshetu	ARARI	Animal Sci.	HU	Completed 2nd summer program	3.23
16	Ashagrie Melkamu Wole	EPLAUA	NREM	MU	Completed 2nd summer program	1.95
17	Berhanu Fentaye Tadfesse	BoARD	Rural Devt	DU	Completed 2nd summer program	2.80
18	Biksegne Asfaw Endale	BoARD	NREM	MU	Completed 2nd summer program	3.75
19	Desalegn Abreha Worku	BoARD	NREM	MU	Completed 2nd summer program	3.30
20	Jemila Esleman Jibril	BoARD	Rural Devt	DU	Completed 2nd summer program	3.20
21	Mesfin Bahita Tesfaye	ARARI	NREM	MU	Completed 2nd summer program	3.60
22	Teshome Getaneh Lule	EPLAUA	Civil Eng.	MU	Completed 2nd summer program	3.00
23	Tewodros Girma Abebe	BoARD	NREM	MU	Completed 2nd summer program	3.80

BDU = Bahir Dar University, DU = Debub University, HU = Haramaya University, MU = Mekelle University

LaRMEP = Land Resource Management and Environmental Protection, DCHS = Dryland Crop & Horticultural Sciences, ARWS = Animal Range and Wildlife Sciences, NREM = Natural Resource Economics and Management

Table 14. Completion date of BS students as related to AMAREW Project completion date of December 2007

No.	Name of trainee	Completion date	Remark
1	Tefera Mokennen Wolde	July 2006	With in project period
2	Aymiro Yhyess Hailu	July 2007	With in project period
3	Demerew Hailu Abebe	July 2007	With in project period
4	Dilnessa Ewnetu Feleke	July 2007	With in project period
5	Kokeb Bogale Engida	July 2007	With in project period
6	Lacketch Mitiku Egezinu	July 2007	With in project period
7	Mekuria Yimer Gesese	July 2007	With in project period
8	Misganaw Teshome Ayele	July 2007	With in project period
9	Melkamu Ayalew Kebede	September 2007	With in project period
10	Tesfaye Setegne Zewdu	July 2008	One semester after project
11	Wolelaw Endale Ambie	July 2008	One semester after project
12	Aytenew Endeshaw Tatek	July 2008	One semester after project
13	Mohammed Hussein Yimer	September 2008	One summer after project
14	Sitotaw Taffese Ayele	September 2008	One summer after project
15	Ashagrie Melkamu Wole	July 2009	One summer and two semesters after project
16	Biksegne Asfaw Endale	July 2009	One summer and two semesters after project
17	Desalegn Abreha Worku	July 2009	One summer and two semesters after project
18	Mesfin Bahita Tesfaye	July 2009	One summer and two semesters after project
19	Teshome Getaneh Lule	July 2009	One summer and two semesters after project
20	Tewodros Girma Abebe	July 2009	One summer and two semesters after project
21	Addisu Bihonegn Eshetu	September 2010	Three summers after project
22	Berhanu Fentaye Tadfesse	September 2010	Three summers after project
23	Jemila Esleman Jibril	September 2010	Three summers after project

Table 15. List and academic status of AMAREW Project supported local partner institutions staff members attending MS degree studies in Haramaya and Mekelle Universities

No.	Name of trainee	Partner institute	Field of study	Academic status
1	Bitew Genet Tasew	ARARI (Adet)	Soil and Water Conservation Eng.	Defended in April 2005
2	Yonas Girma Abebe	ARARI (Debre Birhan)	Irrigation Engineering	Defended in December 2005
3	Zewdu Birhane Ayele	ARARI (Sekota)	Agricultural Economics	Defended in June 2005
4	Binyam Desta Degaga	ARARI (Debre Birhan)	Agronomy	Busy with thesis research
5	Muluken Bantayehu Nigatu	ARARI (Adet)	Plant Breeding	Busy with thesis research
6	Demrew Wesenyeleh Gossa	BoARD (Tehuledere)	Agricultural Extension	Without trace, could not withstand rigors of learning
7	Getanehe Wubalem Meshesha	BoARD (Regional Bureau)	Agricultural Economics	Defended in June 2006
8	Tadesse Beyene Engda	BoARD (Regional Bureau)	Agricultural Economics	Busy with thesis research
9	Tewodros Bimeraw Hailu	BoARD (East Belessa)	Animal, Range and Wildlife Sci.	Attending 1st year II semester classes

Table 16. **Completed MS thesis and proposals submitted to the Project office, 2006**

No.	Name of student	Study program	Completed thesis or research proposal submitted
1	Bitew Genet Tassew	Soil and Water Engineering	Status of Selected Small-Scale Irrigation Projects in Amhara Region: The Case of Adrako Micro-Earth Dam **(submitted completed thesis*)***
2	Getaneh Wubalem Meshesha	Agricultural Economics	Farmers' Participation in Contract Farming: The case of bread wheat *(Triticum aestivum* L. em. Thell.) Production in Womberma Woreda, ANRS **(submitted completed thesis)**
3	Yonal Girma Abebe	Soil and Water Engineering	Appraisal, Spatial Structure and mapping of Soil Salinity and Irrigation Water Quality of Yellen-Jeweha Areas in North Shewa Zone of the Amhara Region **(submitted completed thesis)**
4	Zewdu Birhane Ayele	Agricultural Economics	Fertility Decisions of HHs in Response to Environmental Goods Scarcity: The Case of Sekota District, Wag Himra Administrative Zone of Amhara Region, Ethiopia **(submitted completed thesis)**
5	Binyam Desta Degaga	Agronomy	Relationship and Divergence among Tef *(Eragrostis tef* (Zucc. Troter) Germplasm from North Shewa, South and North Wollo, Ethiopia **(submitted thesis proposal)**
6	Muluken Bantayehu Nigatu	Plant Breeding	Genotype by Environment Interaction and Quality Traits of malting barley *(Hordeum vulgare L.)* in North Western Ethiopia **(submitted thesis proposal)**
7	Tadesse Beyene Engda	Agricultural Economics	Analysis of Factors Determining Utilization of Potential Fish Resources in Lake Tana, Ethiopia **(submitted thesis proposal)**
8	Tewodros Bimeraw Hailu	Animal, Range and Wildlife Sciences	Not yet
9	Demrew Wossenyeleh Gossa	Agricultural Extension	Adoption of Improved Chicken Breed and its Management Practices in Rural Ethiopia: The Case of Tehuledere and Dessie Zuria Woredas of South Wollo **(submitted thesis proposal)**

It means, under its institutional capacity building program, the AMAREW Project is supporting studies of 23 BS and 9 MS degree aspiring students drawn from its three major local partner institutions - ARARI, BoARD and EPLAUA. In the reporting year one BS and four MS students have completed their studies and reported back to duties. As shown in Tables 1 and 2 eight more BS students and three MS students are expected to complete in July 2007 within the Project's active period, whereas 14 BS students will complete their studies within a time period that extends out of the Project completion date of December 2007. All MS students should complete their studies within the limit of the Project period.

A point of interest to note in Table 16 is, as was perceived originally, all MS thesis research work have addressed regional agricultural development problems and are believed to assist the rural development efforts of the ANRS. Beyond that, an important outcome of the long-term training is that it contributed to overcome the frequent staff turnover syndrome that characterized both ARARI and BoARD, which naturally place their workers in remote, sometimes inaccessible areas like Sekota and East Belessa. Such areas are characterized by poor social service provisions and less attraction to technical staff. In addition to being an incentive for experienced staff to remain on duty, the program has improved staff ability to do the work in which they are already engaged or to prepare them for new assignments for which a need has arisen.

There are, however, two outstanding issues requiring the attention of the Project and the Regional Implementation Team (RIT). The first and most important is the case of the 14 BS students whose study period extends beyond the anticipated Project completion date of December 2007. Being aware of the situation, the Project and the RIT have been seeking mechanisms to support the students in the absence of the Project in view of not letting the students get frustrated and/or not to lose the large amount of money so far invested in their studies if the latter have to withdraw for a lack of support. The Project CoP and the training advisor have verbally agreed to budget for all the costs in the 2007 work plan and make arrangements for advance payment of the costs. The second case refers to MS student Demrew Wossenyeleh Gossa (see Table 15) whose completion date is long overdue, as all others who started their studies with him in 2003 have already submitted their thesis. The student disappeared without leaving a note after making use of Project fund that amounted to Birr 27,670.00 (twenty seven thousand six hundred seventy birr). Efforst are underway to track the student and finalize the case.

6.3 Short-term and on-job training

These trainings are meant to equip employees of partner institutions and the ultimate beneficiaries of the project, farmers, with the required KSA to attain the much sought farm household productivity and production increase. These training programs were organized at three levels. Level one aimed at imparting practical knowledge and skill to help researchers and extension staff to engage in demand driven and farmer participatory technology generation, evaluation and dissemination process. Level two

aimed at creating forums for researchers, extension workers and farmers to come together and exchange thoughts and feedbacks. The third element, which may be considered the major one, deals with empowering farmers by equipping them with the required KSA to demand technologies and make proper use of technologies made available to them through extension interventions. Activities under this category though may seem isolated; have complementarities and are targeted to achieve one common goal - improving the productivity and production of major crops and livestock with meaningful impact on rural households' livelihoods in the context of improving the management and use of the severely degraded natural resource base. The trainings planned and executed in view of attaining the above goals are presented below. However, note should be taken that what is presented below does not give a complete picture of what has been achieved under the training component of AMAREW project in the reporting year. This is because, training being a cross-cutting component, what has been done under this program is reported by the three other project components and is omitted from here to avoid redundancy.

6.3.1 Training on statistical packages for ARARI researchers

Statistical software training on SPSS and SAS programs have been offered to 29 ARARI staff allocated to the eight research centers and the headquarters, working on different commodity programs, from May 26 to June 4, 2006 at the Fisheries Research Center of ARARI located in Bahir Dar. It was a collaborative effort of ARARI, the AMAREW Project and SIDA. Two fishery, one mechanization, three socioeconomics and research-extension, seven livestock, six crop, five natural resource and two biotechnology researchers benefited from the training effort (Table 17). A highly experienced resource person from the biometrics unit of the International Livestock Research Institute (ILRI), Mr. Zerihun Tadesse, offered the training and submitted a copy of 'SPSS and SAS Software Training Manual' which has been distributed to each trainee, held with AMAREW, and placed in the ARARI headquarters library for further referencing.

The training covered wide range of topics under three major headings including data management, data analysis and data presentation. The training was a hands-on training whereby all presentations were assisted with on the spot practical. With this training endeavor the planned program was achieved 100%.

Table 17. Participant composition of the SPSS and SAS software training held in Bahir Dar from May 26 to June 4, 2006 for ARARI researchers

Research center	Research division	Number of participants
Bahir Dar Fishery	Fishery	2
Sub-total		**2**
Bahir Dar Agricultural Mechanization	Mechanization	1
	Socioeconomics	1
Sub-total		**2**
Gondar ARC	Livestock	1
	Crop	1
	Socioeconomics	1
	Natural resource	1
Sub total		**4**
Debre Berhan ARC	Livestock	1
	Crop	2
	Natural resource	1
Sub-total		**4**
Andassa ARC	Livestock	3
Sub-total		**3**
Sekota ARC	Livestock	1
	Crop	2
	Natural resource	1
Sub-total		**4**
Sirinka ARC	Livestock	1
	Crop	2
	Natural resource	1
Sub-total		**4**
Adet ARC	Crop	2
	Socioeconomics	1
	Natural resource	1
Sub-total		**4**
ARARI headquarters	Biotechnology	2
Sub-total		**2**
Grand total		**29**

6.3.2 Training on highland vegetables seed production technology and marketing

Training on the above topic has been offered from 7-9 June 2006 at Debre Brhane Agricultural Research Center (DBARC) of ARARI for 27 trainees composed of farmers, Development Agents (DAs), Subject Matter Specialists (SMS), NGO employees drawn from Ankober, Baso ena Worena and Kewt Woredas of North Shewa Zone of ANRS and DBARC researchers (Table 18). The lead resource person was Dr. Lemma Desalegne of Melkassa Agricultural Research Center (MARC), senior staff in the area of vegetable production including seed

production and marketing. He was assisted by 5 experienced horticulture team members from DBARC. The topics covered included vegetables seed production behavior, seed production agronomy, disease and insect pest management in seed fields, pre and postharvest seed quality control measures, strategies for vegetable seed marketing and seed production practices of selected highland vegetables (Cabbage, Swiss chard, carrots, beetroot, radish, onions and other common vegetables, Fig. 19).

The training was supported by audiovisual presentations and field practical with an output of formation of three Farmer Research Extension Groups (FREGs), one in Bakelo Kebele (Baso ena Worena woreda), one in Lay Gorebela (Chefa) Kebele (Ankober woreda) and one in Shewa Robit area (Kewet Woreda). The FREGs are already engaged in highland and lowland vegetable seed production depending on the environmental setting of the respective locations (Fig. 20). The plan is to encourage and assist the FREGs to specialize into vegetable seed production micro-enterprises under a scaling-up scheme. A training document was distributed to all literate participants and a copy is placed in DBARC library and held with AMAREW's office. With this training program the planned program was realized 103.5%, as the number of participants was more than the expected one.

Table 18. Participant composition of the vegetable seed production training held in DBARC from June 7-9, 2006

Type of trainees	Woreda	Number of participants
Farmers	Ankober	7
	Baso ena Worena	9
	Kewt	2
Development Agents	Ankober	1
	Baso ena Worena	1
	Kewt	1
Subject Matter Specialists	Ankober	1
	Baso ena Worena	1
	Kewt	1
Research technical assistants	Ankober station head	1
	Baso ena Worena station head	1
TERA farm worker	Baso ena Worena Woreda	1
Total		**27**

Fig. 19. Training in highland vegetable seed production, featured is beetroot plot managed by DBARC at Gorebela Kebele

Fig. 20. Chefa Kebele (Ankober woreda) vegetable seed production FREG established during the highland vegetable seed production training, visited by the AMAREW Project RIT evaluation team in August 2006

6.3.3 Training on Farmer-Research-Extension-Group (FREG)

Training was offered on FREG to a total of 92 trainees in two separate sessions in Woreta (12-14 June 2006) and Dessie (19-21 June 2006). At Woreta 48 trainees drawn from Sekela, East Belessa and Lay Gayint WOARD, Adet, and Gondar ARC, and Woreta Agricultural Technical, Vocational Education Training (ATVET) College received the training, whereas at Dessie 44 trainees drawn from Sekota and Gubalafto WOARD, Sekota and Sirinka ARC received the training (Tables 19 and 20).

The lead resource person was Ato Chimdo Anchala from Melkasa Agricultural Research Center (MARC) with an outstanding field level experience in successful FREG formations. He was assisted by one senior research-extension researcher from Adet ARC (at Woreta) and one research-extension researcher from Sirinka ARC (at Dessie). Topics covered in the training included, among others, evolution of agricultural extension in Ethiopia and lessons learned, research-extension linkage problems, efforts and achievements made by National Agricultural Research Systems (NARS), concepts and principles of FREG and local best practice of FREG.

The Woreta FREG training included field level practical which resulted in the formation of two active FREGs on rice in Kuhar Michael Peasant association in Fogera Woreda, which is being assisted by the Research-Extension division of Adet ARC, whereas the one in Dessie resulted in the formation of two other active FREGs in Godguadit Kebele of Tehuledere Woreda (Fig. 21) on lowland and highland cereals and pulses. The FREGs in Godguadit are being assisted by Sirinka ARC. The resource person provided different resource materials which were copied and distributed to participants individually or in groups, and held in AMAREW's office for further retrieval. Achievement of the training was 111.6% for the sessions in Woreta due to participation of large number of ATVET college staff, whereas it was only 60% for the session in Dessie due to absence of Tehuledere WOARD staff due to the confidence crisis of the then WOARD head who was not willing to send his staff to attend the program. The after training evaluation showed a high degree of satisfaction of trainees due to the choice of resource persons, content and timing of the training and mix of the classroom and field practical schedules. All participating WOARDs together with the ARCs found in their Woreda have established at least two FREGs which are now active.

Table 19. Participant composition of the FREG training held in Woreta (12-14 June 2006)

Institution	Number of participants		Percent of expected	Remark
	Expected	Actual		
Sekela WOARD	7	7	100.0	
East Belessa WOARD	14	10 (2 female)	72.0	Low attendance for no good reason
Lay Gayint WOARD	14	6 (3 female)	43.0	Low attendance due to occurrence of Armyworm in the woreda
Adet ARC	4	2	50.0	Low attendance for no good reason
Gondar ARC	4	5 (1 female)	125.0	
ATVET (Woreta)	0	18 (1 female)	1800.0	ATVET management request to upgrade know how of mentors
Total	**43**	**48 (7 female)**	**111.6**	

Table 20. Participant composition of the FREG training held in Dessie (19-21 June 2006)

Institution	Number of participants		Percent of expected	Remark
	Expected	Actual		
Sekota WOARD	14	8	57.1	Low attendance for no good reason
Gubalafto WOARD	18	14	77.8	
Tehuledere WOARD	18	0	0.0	No attendance due to lack of good will of the WOARD head
Sekota ARC	4	3	75.0	
Sirinka ARC	4	9	225.0	Strong conviction to empower farmers under FREG to influence research
OFLA (an NGO from Korem)	0	1	100.0	NGO management request to upgrade know how of employees to assist farmers in FREG formation
Total	**58**	**35**	**60**	

Fig. 21. FREG formation exercise in Godguadit Kebele of Tehuledere Woreda

6.3.4 Compilation of Instructional Inductive Training Modules

To sustain the starter support program to the novice research worker started in 2005 as an inductive training schedule and, guided by the idea of preparing inductive training modules for local use by ARARI (see AMAREW Annual Report 2005), continuous efforts have been made in the reporting year. The idea was marvelous as it helps minimize training costs, increases efficiency and make inductive training part of the regional research institute value system.

To this end, based on a request made by ARARI and AMAREW to ISNAR division of IFPRI to assist in the preparation of the inductive instructional training modules under different headings, Dr. Elias Zerfu, representing CARMPoLEA made a working visit from 25-26 May, 2006. The objectives of his visit were, together with ARARI and AMAREW:

- To evaluate the adequacy of the training materials submitted by resource persons who delivered the 2005 inductive training course (see AMAREW Annual Report 2005) to be organized as an instructional module,
- To assess the availability of already developed modules within IFPRI /ISNAR that potentially may replace the titles covered during the 2005 inductive training to avoid duplication of efforts.

Table 21. Suggested replacement training modules and ideas on the way forward for module preparation

Current topic	Available replacement module proposed	Remark
(a) Diagnosis, (b) Problem Analysis & Selection of Intervention, (c) Planning & Implementation of Research Intervention	Not yet available	New module to be prepared
(a) Participatory Approaches to Research for Development: *Research methods and toolkits* (b) Challenges of the Research & Development Systems & Changing Paradigms	(1) Participatory Research for (a) & (b), (2) Engendering Participatory Research for (a) & (b)	Hard & soft copies to be provided by ISNAR/IFPRI upon AMAREW/ARARI written request
Progress and Process Monitoring, Evaluation and Impact assessment	Planning, Monitoring and Evaluation and Impact Assessment	Hard & soft copies to be provided by ISNAR/IFPRI upon AMAREW/ARARI written request
(a) Communication in Agricultural Research (b) Powering up Public Communications in Agricultural Research	(1) Scientific Paper Writing for (a) (2) Making Oral Presentations for (b) and, (3) Sessions on Advocacy from the Module on Spatial Analysis for Rural Economic Policy, Part III could be used for (b)	The two modules together will serve the purpose Hard & soft copies to be provided by ISNAR/IFPRI upon AMAREW/ARARI written request
Research methods & experimentation in crops (agronomy, breeding, crop protection)	Not yet available	New module to be prepared
Research methods & experimentation in livestock (animal feed & nutrition, livestock disease management, dairy, beef, poultry, etc.)	Not yet available	New module to be prepared
Research methods & experimentation in natural resources	Not yet available	New module to be prepared
Socioeconomic and extension research methods	Not yet available	New module to be prepared
Orientation on Ethiopian NARs, Government policy on research, research status in specific disciplines & prevailing research gaps	Not yet available	New module to be prepared

- Regarding the availing of the replacing modules it was agreed for IFPRI/ISNAR to make available soft copy of the modules. The modules will be reviewed by ARARI and the AMAREW Project and subsequent decision will be made on whether to adopt as they are or use them after making some refinement,
- For any module to be developed anew, the module title and objectives should be suggested and agreed upon by senior ARARI scientists in their respective fields,
- Based on the agreed upon module objectives, a structure for each of the intended modules should be developed by stakeholders that include ARARI and the AMAREW Project with a professional support from IFPRI/ISNAR,
- ARARI and AMAREW project should submit a request to Center for Agricultural Research Management Policy Learning in Eastern and Sourhter Africa (CARMPoLEA) specifying the type of support required. CARMPoLEA in its turn is expected to develop a budget for the service it will be rendering.

The effort has thus to be followed in the forthcoming year (2007) as one of the major training component activities.

6.3.5 Training on research management

The training on '*Managing Agricultural Research within Innovation Systems Perspective*' for agricultural research managers planned for the reporting year could not materialize due to three main reasons (a) delayed reply by CARMPoLEA - the reply to the AMAREW Project's request of June 29, 2006 came only on August 18, 2006, (b) discrepancy between the budget allocated for the training and that requested by CARMPoLEA and, (c) busy schedule of the ARARI research managers to avail themselves for the training. For the training to be implemented as scheduled, the AMAREW Project went further and requested CARMPoLEA to bring down the requested training budget. Accordingly, CARMPoLEA reduced the budget from the originally proposed US$ 12, 533.00 to US$ 7,355.00 but still not to a level requested by AMAREW. ARARI and AMAREW have, therefore, agreed for AMAREW to contribute part of the budget and ARARI to cover the remaining portion of the budget from its AMAREW allocated budget. Due to busy working schedules of ARARI research managers and unavailability of the Global Associates that should handle part of the training from the ISNAR/IFPRI side, it was agreed between the three parties, CARMPoLEA, ARARI and AMAREW for the training to be offered in February 2007 of the forthcoming plan year. The same training schedule submitted by CARMPoLEA and endorsed by ARARI and AMAREW will be followed.

6.3.6 Community Organization Leadership Training for Action (COLTA)

The training was planned to be offered in the 3rd quarter of 2006 but due to the absence of many WOARD staff to follow summer degree training programs it was postponed to the 4th quarter. A Training of Trainers (ToT) has been given to

WOARD staff in two sessions in Woreta (for East Belessa, Lay Gayint and Sekela WOARD nominated staff) and Dessie (for Sekota, Gubalafto and Tehuledere WOARD nominated staff), respectively. Mr Shashigo was the resource person.

6.4 VSU Farmer-to-Farmer Program Component

In the reporting year 10 Scope of Work (SoW) in the areas of Horticulture, Livestock and Marketing have been developed and submitted to the VSU FtF Project coordinator, Dr. Wondi Mersie and the VSU FtF recruiter, Mrs. Mary Albrecht. Out of the ten, seven SoWs were approved based on their soundness and compliance with USAID FtF program requirements. Seven volunteers from the USA composed of farmers, university professors and, workers in related areas were then selected and fielded to accomplish the proposed tasks for which they submitted written reports (Table 22). The AMAREW Project together with its local partners (ARARI and BoARD) has evaluated the CV of each volunteer before they were fielded.

Depending on the respective assignment's requirement, visits and field survey programs to as far as Jeldu (West Shewa Zone) and Sekota (Wag Himra Zone) were arranged for the volunteers to enable them grasp the situation so as to come up with realistic recommendations. Activities included conducting farm, market, industry and institutional surveys, PowerPoint presentations, submitting final reports and volunteer exit interviews. Whereas every volunteer reported a high degree of satisfaction with the in-country program implementation arrangements, hosts for the individual assignments were pleased with the outcome of the assignments, as most volunteers submitted reports that clearly showed the way forward. Some of the volunteers went further and published articles related to the topic on appropriate media (Table 23) and helped in creating linkages between in-country hosts, the partner and international institutions working in the area of the assignments they handled. Beyond that, after returning home, some sent documents related to the topic for further referencing (Table 23).

Table 22. VSU FtF projects implemented in 2006 under the partnership of the AMAREW Project

Assignment # (AMAREW)	Assignment Title	Volunteer name	Assignment dates (from/to)	Type of assistance	Hosts assisted
04.3/2006	Assessment of ware potato marketing opportunities	Roger Knutzen	April 2-April 21	Business enterprise development	Private farmers & Coops
04.1/2006	Development of on-farm potato seed tuber production & marketing scheme	Joseph Guenthner	May 18-June 5	Business enterprise development	Private farmers & Coops
02.1/2006	Suggesting Improvement in Aquaculture Production System	Brian Nerrie	July 8-July 23	Business enterprise development	Private farmers & coops
06.1/2006	Assessment of small ruminant production system, opportunities for improvement & recommending workable improved production systems	Judy Mosses	July 23-August 13	Business enterprise development	Private farmers
06.2/2006	Assessment of small ruminant marketing system, opportunities for improvement & determining better marketing strategies that equally benefits producers & traders	Larry Jacoby	August 20-Sept. 3	Business enterprise development	Private farmers
06.3.1/2006	Enhancing development workers competence with knowledge & skill on systems & strategies of small ruminant rearing & marketing that benefits producers and traders	Steve Weerts	Sept. 13-Sept. 22	Organization development	Public sector
06.3.2/2006	Enhancing development workers competence with knowledge & skill on systems & strategies of small ruminant rearing & marketing that benefits producers and traders	David Kier	Sept. 13-Sept. 26	Organization development	Public sector

Table 23. Title of 2006 VSU FtF done assignment reports, articles published elsewhere and relevant documents and items submitted to AMAREW (to be given to hosts)

Assignment # (AMAREW)	Volunteer name	Report title	Published article	Acquisitions from volunteers
04.3/2006	Roger Knutzen	Assessment of Ware Potato Marketing Opportunities (pages 7)	Ethiopia Potato Project Opened His Eyes to What America is Doing, Potato Country Magazin, July-August 2006, pp. 18-20	(1) Potato storage information, designs, photos, (2) Articles on True Potato Seed (TPS) (3) Backpack sprayer (Solo)
04.1/2006	Joseph Guenthner	Development of On-Farm Potato Seed Tuber Production and Marketing Scheme (pages 17)	(1) A Visit to Guta's Potato Farm in Gojo, Ethiopia, The Guenthners Report, Spudman Magazin, July/August 2006, pp 44-45. (2) Positif resultaat voor Ethiopische aardappelteler, Aardappelwereld magazine, Juni 2006, No. 6, P 37	(1) A CD on potato production & Marketing, (2) The volunteer has established relations of between the programs partner and Technico, a for-profit company interested in Africa which has a patented process that involves tissue culture, mass production of uniform-size minitubers (Technitubers®) & field production practices that lead to high-quality seed potatoes produced at a low cost and in a much shorter time period than with conventional seed potato multiplication practices
02.1/2006	Brian Nerrie	Aquaculture Development (pages 20)		
06.1/2006	Judy Mosses	Goat & Sheep Production and Marketing in the Amhara Region of Ethiopia (pages 30)		(1) Small Ruminant Production, Medicine & Management (hard copy and CD), (2) Sheep Production Handbook
06.2/2006	Larry Jacoby	Small Ruminant Marketing Opportunities & Challenges (Slides 55)		Various articles on sheep and goat production, management and marketing
06.3.1/2006	Steve Weerts	Goat & Sheep Marketing in the Amhara Region of Ethiopia		
06.3.2/2006	David Kier	Goat & Sheep Marketing in the Amhara Region of Ethiopia		(1) Sheep Production Handbook (CD) , (2) Wisconsin Lamb (Market Lamb Production Manual)

6.4.1 FtF projects on training development workers on small ruminant production and marketing

The two volunteers in this category, Steve Weerts and David Kier (Table 23) offered Training of Trainers (ToT) for sheep and goat development workers (breeders, veterinarians, feed and nutritionists, forage agronomists) drawn from Debre Birhan Agricultural Research Center (DBARC), North Shewa Zone BoARD, Baso ena Worena WOARD, Debre Birhan Sheep Breeding Center and Planet Food NGO at DBARC, and to development workers drawn from Andassa Agricultural Research Center (AARC), Amhara Region BoARD and West Gojam Zone BoARD at AMAREW conference room in Bahir Dar (Table 24 and Fig. 22). The training covered relevant topics including how to assist producers to improve feeding regimes, health control, manage body weight, improve mating systems, and lead market oriented production systems. The trainers brought relevant documents on CDs and provided that to every trainee for future use.

Table 24. Participant composition for the training on small ruminant production and marketing held at Debre Birhan (September 19-20, 2006) and Bahir Dar (September 21, 2006)

At Debre Birhan		At Bahir Dar	
Type of trainees	**Number**	**Type of trainees**	**Number**
DBARC researchers	8 (1 Female)	ALRC researchers	4
DB Sheep breeding center workers	2 (1 Female)	Regional BoARD workers	1
North Shewa Zone BoARD workers	2	West Gojam Zone BoARD workers	1
Planet Food workers	2	Yilmana Densa WOARD workers	1
Baso ena Worena WOARD workers	1	Burie WOARD workers	1
Total	**16**		**8**

Fig. 22. VSU FtF volunteer David Kier leading the practical training session on market oriented livestock production and management

For details on the VSU FtF Projects implemented under the AMAREW's partnership the reader may refer to the official 2006 Annual Report (October 1, 2005 to September 30, 2006) a copy of which is held with AMAREW's Project office.

6.4.2 FtF 2007 Work Plan

Together with the FtF staff in Addis Ababa and the VSU FtF recruiter who came from Wisconsin, the 2007 FtF annual work plan has been developed and submitted to the project coordinator, Dr. Wondi Mersie. AMAREW has proposed 3-4 assignments on potatoes, two on small ruminants and two in aquaculture. Among these, for the VSU FtF first quarter (October 1-December 30, 2006) two SoW on potatoes have been developed, submitted and approved. The assignments are the following:

1. Assignment #: AMAREW 04.1/2007: D**evelopment of seed potato marketing system**
2. Assignment # AMAREW 04.2/2007: **Development of ware potato value adding and marketing system**

In addition, a Partner Activity Profile which enables impact assessment of VSU FtF projects has been completed and submitted to the project coordinator Dr. Wondi Mersie.

6.5 Establishment of a collective seed potato production and marketing scheme

Improving and strengthening seed production and supply at the farm level in view of attaining food security and bringing sustainable growth of rural economy has been one major requirement of the USAID Mission. Accordingly, the AMAREW Project has set plans to engage in developmental seed initiatives in 2006. The work has started with potatoes, a strategic crop of choice to combat food insecurity situations and bring growth of rural economies in the ANRS. In this regard, a concept paper that focused on on-farm potato seed production and marketing scheme establishment has been developed and a search has been made at national and regional levels to obtain source seed of adaptable improved potato cultivars. The search enabled acquisition of basic seed of seven improved cultivars with which cultivar evaluation and at the same time basic seed production plot were established in plots belonging to six nucleus collective action group members in Gumet watershed (Sekela Woreda) (Table 25). Due to acquisition of only 100 kg basic seed, six cultivars were planted on 500 m^2 area each, whereas only one cultivar (Gera) was planted on 1000 m^2 due to acquisition of 200 kg basic seed.

Two farmers' days have been observed, the first during flowering stage (Fig. 23) and the second at harvest. In the first farmers' day over 70 farmers, Sekela WOARD staff, Sekela Woreda administration staff, potato program coordination from Adet ARC, AMAREW Project senior staff and other professionals attended the event, whereas during the second all HH heads of the watershed community attended the event while at the same time participating in the harvesting and storage process. During both events, a high degree of satisfaction due to the performance of the new introductions was reported by the community members and most showed interest to be part of the exercise. Farmers rated the new introductions for their disease resistance, culinary, consumption, and marketing qualities, among others. Both female and male groups ranked *var.* Gera first followed by *var.* Gorebela. All producers, however, insisted that all the improved cultivars should be retained and put into production as all, according to their evaluation, are good.

Due to the high level of management and good adaptation of the cultivars to the environment, a high on-farm yield that ranged from nearly 20-35 Mt ha^{-1} was harvested (Table 25). It means, from the 500 m^2 each cultivar occupied, during this first cycle, more than 1 Mt seed tuber has been harvested and stored for sprouting. In December 2006, using irrigation water, the basic seed will be further multiplied on approximately 3.5 ha land by raising the collective action group members to 50. The idea is to assist the collective action groups to grow and specialize into seed potato production and marketing cooperative in view of supplying quality seed to farmers who will be contract growers to the forthcoming Injibara Potato Dehydration Plant to be established by the Mena-Hunger^{+} Project (Rotary Club International).

Table 25. Gumet (Sekela Woreda) collective action group members, the cultivars they raised for seed potatoes and yields obtained

No.	Farmers' name	Cultivar name	Flower color	Yield ($Mt/500m^2$)	Yield ($Mt\ ha^{-1}$)	Farmers preference	
						F	M
1	Nebiyou Ayalew	Guassa	White	1.5	29	5	4
2	Nebiyou Ayalew	Jalenie	White	1.6	31	4	3
3	Nebiyou Ayalew	Ater Abeba (Local)	Purple	0.6	11	6*	5*
4	Fekadu Mulu	Gorebela	Purple	1.8	35	2	2
5	Nebiyou Tibebu	Wochecha	White	0.9	19	5	3
6	Kokeb Biruh	Gera	White	1.7	33	1*	1
7	Mezgebu Mihret	Gera	White	1.8	35	1	1
8	Wubet Konne	Zengena	Purple	1.3	26	3	1
9	Biruh Kassa	Marachare	White	1.8	34	3	2

1 Best Choice 3 Intermediate 5 and 6 Least Choice

Fig. 23. Field day in Gumet seed potato production and marketing collective group fields, June 10, 2006 (*var. Zengena* is in front and *Gera* at the back side)

6.6 Other activities accomplished during then reporting year

- The Training advisor and FtF coordinator attended a potato seed production farmers' day organized by Adet ARC and observed on April 16, 2006. The exercise was helpful in fine tuning AMAREW's effort to further an on-farm potato seed production and marketing scheme in the potato growing Sekela and Lay Gayint pilot Woredas.
- He also attended a week long Project Monitoring and Evaluation training organized by the FtF coordinator from 23-30 April 2006 in Addis Ababa. The training was organized based on the requirements of USAID for FtF field staff to attend such trainings. Further intensive and more organized training on the topic is yet recommended by the FtF coordination.
- He had a meeting with Rotary Club International representatives on May 30, 2006 and repeated meetings with its local representation on issues related to the supply of known origin and quality ware potatoes to the envisaged potato processing plant to be established in Injibara, Banja Shekudad Woreda. If realized as stipulated, the establishment of the processing plant will give opportunities for the development of the on-farm seed production scheme that AMAREW Project is assisting in the pilot potato growing Woredas,
- He participated in farmers' day organized by Debre Brehan ARC on sheep improvement in Aksta, Legambo Woreda, South Wello Zone on June 22, 2006. Ideas obtained will serve AMAREW's effort through its FtF program to improve the production and marketing of small ruminants, potential resources for the growth of the regional rural economies.
- From July 26-27, 2006 the FtF CTO and Program Manager, Dr. Shirely Prior visited the AMAREW office and FtF activities accomplished under its partnership. The CTO visited and discussed with the St. George fisheries and marketing associations and made some recommendations on future aquaculture related FtF assignments. Although the schedule to visit potato development FtF activities in Gumet watershed failed due to travel delays of the CTO, based on explanations from the AMAREW team, the CTO made some recommendations on what future potato development FtF projects should focus. Prior to the CTO's Bahir Dar visit, on July 24, 2006 the FtF coordinator of the Project briefed the CTO in Addis Ababa on all FtF assignments accomplished under the AMAREW Project partnership,
- He led collection of baseline data from the Gumet watershed by developing a questionnaire and facilitating the assignment of one summer practical student from Haramaya University from July 21 to August 4, 2006. The data collected has been entered into the computer for processing. He also led data collection from Tehuledere Woreda Project's extension sites from September 3-18, 2006. The data generated on IPM, apiculture, poultry and improved seed technology support is useful to assess project impact on producers' livelihoods and to delineate those technologies which should be scaled-up in the future.
- The Training Advisor and FtF coordinator participated in the RIT Internal Evaluation of the AMAREW Project from August 4-13, 2006, served as a

secretary designate of the evaluation team and produced a report entitled 'Report on AMAREW Project Internal Evaluation by RIT (102506).

- He attended a three day workshop from August 13-16, 2006 organized by ARARI to discuss and streamline completed research projects.
- He served as an Officer-in-Charge from August 18-September 20, 2006 as the Project CoP was on annual leave.
- He received representatives of CIP in the Project office who were interested to know about AMAREW's endeavors in developing local potato seed production and supply systems. He made a 30 minute PowerPoint presentation for the visiting team composed of international and national members on August 30, 2006. He assisted the realization of the workshop on 'Management of the Weed Parthenium (*Parthenium hysterophorus* L.) in Eastern and Southern Africa Using Integrated Cultural and Biological Control Measures' partners Planning and Reporting Workshop held in Bahir Dar from 4-6 August 2006,
- Based on the initiative of the AMAREW Project CoP, two finger millet improved cultivars acclaimed for their good performance under low moisture stress conditions were introduced into the region. A 100 kg nucleus seed of each of the two cultivars (Tadesse and PADET) was obtained from Arsi Negele research station of MARC. The seed was divided into two halves and one half was given to West Gojam Zonal Bureau of agriculture and rural development and was planted in two farmers fields in Mecha and Achefer Woredas. The other half was given to East Belessa WOARD and planted in two farmers' fields. Agreement was signed between West Gojam Zone Office of Agriculture and Rural Development and the AMAREW Project. With a proven performance, the seed will make a nucleus, to start on-farm finger millet seed production scheme in the future.

ANNEXES

Annex 1. List of AMAREW Project Staff in 2006

No.	Name	Gender	Education Level	Position	Remarks
1	Brhane Gebrekidan	M	PhD	CoP and Senior Research Advisor	
2	Fekadu Yohannes	M	PhD	Research Advisor	Until July 05, 2006
3	Nigussie Alemayehu	M	PhD	Research Advisor	From August 13, 2006
4	Eshetu Mulatu	M	PhD	Training Advisor	Until Dec. 1, 2006
5	Getachew Bayferes	M	MS	Watershed management Advisor	From January 16, 2006
6	Ahmed Ayele	M	BA	Finance and Admin. Officer	
7	Achamyelesh Mengstie	F	Junior College Diploma	Senior Secretary	
8	Aster Tekalign	F	Junior College Diploma	Secretary/Receptionist	
9	Dereje Bihonegn	M	Diploma	Driver	
10	Yitayeh Endalew	M	Diploma	Driver	
11	Yilkal Mekuriaw	M	Completed 12th Grade	Driver	From Feb. 08, 2006
12	Fasika Desta	F	Completed 12th Grade	Office Assistant	
13	Yehizbalem Gebeyehu	F	Completed 5th Grade	Janitor	
14	Debebe Tadesse	M	Completed 12th Grade	Supervisory Security Guard	Until Nov. 3, 2006
15	Alem Deribe	M	Completed 6th Grade	Security Guard	
16	Teshome Mengistu	M	Completed 12th Grade	Security Guard	
17	Tizazu Belete	M	Completed 6th Grade	Security Guard	From Nov. 09, 2006

Annex 2. Acronyms

AARC	Adet Agricultural Research Center
ACDI/VOCA	Agricultural Cooperative Development International/Volunteers in Overseas Cooperative Assistance
ACSI	Amhara Credit and Saving Institution
AMSEIDB	Amhara Micro and Small Industries Development Bureau
AMAREW	Amhara Micro-enterprise development, Agricultural Research, Extension and Watershed management
ANRS	Amahra National Regional State
ARARI	Amhara Regional Agricultural Research Institute
ARWS	Animal Range and Wildlife Sciences
ATVET	Agricultural Technical Vocational Education Training
AU	Alemaya University
BDU	Bahir Dar University
BoARD	Bureau of Agriculture and Rural Development
BoFED	Bureau of Finance and Economic Development
CAHW	Community Animal Health Workers
CARMPoLEA	Center for Agricultural Research Management Policy Learning in Eastern and Southern Africa
CIP	Centro International de la Papa
COLTA	Community Organization Leadership Training for Action
CoP	Chief of Party
CPB	Cooperatives Promotion Bureau
CRSP	Collaborative Research Support Program
CTO	Cognizant Technical Officer
CV	Curriculum Vitae
CWMO	Community Watershed Management Organization
DA	Development Agent
DBARC	Debre Berhan Agricultural Research Center
DCHS	Dryland Crop and Horticultural Sciences
DG	Director General
DLS	Diffused Light Storage
DU	Debub University
EARO	Ethiopian Agricultural Research Organization
EIAR	Ethiopian Institute of Agricultural Research
EPLAUA	Environmental Protection, Land Administration and Use Authority
EWMA	Extension Watershed Management Advisor
FA	Farmer Administration
FDANR-DCE	Faculty of Dryland Agriculture and Natural Resources – Distance and Continuing Education
FFS	Farmers' Field School

FREG	Farmer-Research-Extension Group
FSPCDPO	Food Security Program Coordination & Disaster Prevention Office
FTC	Farmer Training Center
FtF	Farmer to Farmer
GARC	Gondar Agricultural Research Center
GIS	Geographical Information System
HH	House Hold
HU	Haramaya University
ICM	Integrated Crop Management
IFPRI	International Food Policy Research Institute
ILRI	International Livestock Research Institute
ISNAR	International Support for National Agricultural Research
INTSORMIL	International Sorghum and Millet
IPM	Integrated Pest Management
IR	Intermediate Result
ISP	Integrated Strategic Plan
IWDMT	Integrated Watershed Development and Management Team
KSA	Knowledge, Skill, and Attitude
LaRMEP	Land Resource Management and Environmental Protection
MARC	Melkasa Agricultural Research Center
MED	Micro Enterprise Development
M&E	Monitoring and Evaluation
MoARD	Ministry of Agriculture and Rural Development
MoFED	Ministry of Finance and Economic Development
MoU	Memorandum of Understanding
Mt	Metric ton
MU	Mekelle University
N	Nitrogen
NGO	Non Governmental Organization
NREM	Natural Resource Economics and Management
NRM	Natural Resource Management
OIRED	Office of International Research, Education, and Development
ORDA	Organization for Rehabilitation and Development in Amahra
PA	Peasant Association
REFAC	Research Extension Farmer Advisory Council
RA	Research Advisor
RC	Research Center
R-E	Research Extension
RIT	Regional Implementation Team
SARC	Sirinka Agricultural Research Center
SDARC	Sekota Dryland Agricultural Research Center
SGMP	Small Grants and Mentorship Program

SIDA	Swidish International Development Agency
SMS	Subject Matter Specialist
SO	Strategic Objective
SoW	Scope of Work
SWHISA	Sustainable Water Harvesting and Institutional Support Assistance
TAC	Technical Advisory Council
USAID	United States Agency for International Development
VSU	Virginia State University
VT	Virginia Tech
WA	Watershed Association
WOARD	Woreda Office of Agriculture and Rural Development