



Annual Report 2007

**ANRS
PARTNERS**



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Cover Picture

**Participants of the final workshop of AMAREW in the
Project's office in Bahir Dar, October 20, 2007**

Annual Report 2007



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

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Executive Summary: AMAREW Project Annual Report 2007

This Annual Report is the third and the last 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).

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

At the beginning of June 2007 the Contractor (Virginia Tech) and the ANRS partners (through the Chairman of the RIT and the Head of the FSPCDPO) submitted a formal written request to the USAID/Ethiopia Mission for a no-cost extension of the project. After five months of delay, the Agreement Officer responded to Virginia Tech stating that the request was denied and the project should close by the end of December 2007. This short notice did not give AMAREW sufficient time to smoothly end its five and a half years of work. Following the announcement by the AMAREW Project CTO of the closeout of the project, the AMAREW Project announced the termination of the project to "All AMAREW Project Currently Active Partners" and the AMAREW team traveled (November 23 to December 10, 2007) to all the project woredas and research centers to discuss the close out and bid farewell to our partners.

During October 20-27, 2007 under the leadership of the Prime Contractor, Virginia Tech, AMAREW organized a "Workshop on the Achievements and Lessons of the AMAREW Project over the Last Five Years (2002-2007)". The primary objective of this workshop was to show and share the experiences and lessons of the AMAREW project with stakeholders both at the ANRS and national levels. The workshop was also intended to serve as a discussion forum thereby stimulating the participants to adopt and scale up selected project lessons they find relevant to their own specific situations. Participants came from the office of the ANRS Head of Government, BoARD, FSPCDPO, ARARI (including its participating research centers), Bahir Dar University, EPLAUA, WOARDS, participating farmers' representatives, RIT members, the AMAREW CTO

representing the USAID/Ethiopia Mission, NGOs (GTZ, SIDA/SARDP, CIDA/SWHISA, AgriService, and FHI), and AMAREW Staff

All stakeholders unanimously agreed during the planning phase late in 2006 that these technologies be scaled up so that the target groups can benefit more from the outcomes in a sustainable manner. Accordingly, promising technologies for the scaling up have been identified for each woreda and watershed. Therefore, each center has implemented one or more technology (ies) identified promising for its target domains. The scaling up activities are basically envisaged to lay a foundation for strengthening the informal seed sector as an alternative scheme of improved seed source which, at present, is the major bottleneck of increased production and productivity in the country in general and in the region in particular. AMAREW has been providing funding opportunities, from the Contractor's portion of the funds, for implementation of agricultural research and extension projects in the Amhara National Regional State (ANRS) through the eight competitive Small Grants and Mentorship Program (SGMP) were supported and completed.

With the coordination of the project office, each of the pilot woredas has more or less managed the procurement and purchase of most of the varieties targeted for dissemination for 2007. the project performance through dissemination of crop technologies through the scaling up technology propelling approach has resulted in remarkable achievement in addressing a number of interrelated purposes of the project. This approach potentially serves the purpose of both pre-extension demonstration and also on-farm trails. It is also recognized as an important mechanism of bringing researchers, extension workers and farmers together on the farmer's plot, for sensible interaction.

In all the three pilot watersheds, communities took an active and leading role 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,

Two MS and ten BS students are not expected to complete their studies by December 31, 2007. Hence, with the financial and administrative support, the ANRS partners should ensure that these students complete their studies and contribute to the ANRS development. Beneficiary institutions (FSPCDPO, ARARI, BoARD, and EPLAUA) should follow-up and make the necessary arrangements for enabling students in the long-term training programs to complete their studies and join them with their newly acquired levels of education.

Following the sudden announcement of USAID that the project will not continue after December 31 2007, the terminal report of the research component has been prepared by the project team.

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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 third 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	<i>x</i>
South Gonder Zone			
Lay Gayint Woreda	X	X	<i>x</i>
North Gonder Zone			
E. Belessa Woreda	X	X	<i>x</i>
North Showa Zone			
Ankober	X	<i>x</i>	
Ensarona Wayu	X	<i>x</i>	
West Gojam Zone			
Sekela	X	<i>x</i>	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 2007, attending one meeting or more:

Ato Amlaku Asres	Head, FSPCDPO, Chairman
Dr. Getachew Alemayehu	Director General, ARARI
Dr. Enyew Adgo	NRM Research Director, ARARI
Ato Alemnew Alelign	Deputy Head NRM, BoARD
Ato Mesfin Astatke	Planning/Evaluation officer, BoARD
Dr. Tadesse Amsalu	Head, 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 2007

At project close out, the RIT allocations of AMAREW purchased equipment and furniture, which has been approved by the USAID/ Ethiopia Mission are given in Annex Tables 1-2.

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 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 (OIRE) ensure close interaction and communication with the Home Office. In this connection, during the year, Dr. Mike Bertelsen, Associate Director of OIRE and Associate Dean of the College of Agriculture and Life Sciences and Dr. Keith Moore visited Bahir Dar and Addis Ababa and interacted with USAID/Ethiopia, ANRS partners, and project staff on project close out issues. Others in the home office giving guidance and support have been Dr. S.K. DeDatta, Gene Ball, James Foreman, and Jane Lee.

1.9.2 Bahir Dar Office

Ato Semachew Kassahun, replacing Dr. Eshetu Mulatu, joined AMAREW as Training Advisor and FtF Coordinator on January 10, 2007.

During the first quarter of the year, USAID had informed AMAREW that the project will be evaluated by external evaluators within the coming few months, however, for reasons unknown to the Project, this never happened;

FSPCDPO distributed the 2nd tranche of the 2006 and the 1st 40% tranche of the 2007 project budget to BoARD, the woredas and ARARI during the first semester of the year, although the budget release from USAID of the 1st 40% tranche of 2007 was delayed and did not reach the ANRS AMAREW partners until June 2007.

Ato Jemal of FSPCDPO has been following up budget utilization status of the AMAREW project pilot woredas. He submitted the report on the 2006 budget expenditures of the AMAREW Project early in 2007. During August 2007, with the assistance of the Project office, Ato Jemal (AMAREW project accountant) of the FSPCDPO, visited and monitored the budget utilization status of all the AMAREW project pilot woredas under the BoARD. Based on these visits and the expenditure documentations he collected he was to prepare the financial report to be submitted by the FSPCDPO to the USAID Mission but this did not materialize.

FtF volunteers, Terril Christensen, worked on seed potato marketing and Dr. Charles Basham worked on ware potato value adding. Also, the FtF volunteers, Drs. Ozzie Abaye and Steve Oberlie, worked on development of small ruminants grazing improvement.

In Short Term Technical Assistance (STTA), Dr. Asmare Atalay, from Virginia State University (VSU), served ARARI on Laboratory Instrumentation for six weeks. Also, in August 2007, Drs. Dawit Haile and Anwar Hamama, from VSU provided technical assistance for two weeks each in computerization and web site development, and tissue analysis and laboratory management, respectively, to ARARI. In December 2007, Pamela Swint and Jessica Dorr, from VT, traveled to Bahir Dar, to provide a two-week course on GIS database and remote sensing (GIS/RS) to 12 EPLAUA staff (their Trip Report is given at the end of this section).

The CoP attended the Ethiopian Association of Agricultural Professionals (EAAP) Annual Conference and presented a lead paper on the necessary conditions for the application of the Green Revolution in Ethiopia entitled “*Lessons from India and the necessary conditions for scaling-up the Green Revolution in Ethiopia*”.

The CoP also participated in the Integrated Striga Management international workshop in Addis and served as a moderator of the opening session, gave the closing remarks of the workshop, and co-authored with Jonathan Gressel the Epilogue Chapter of the book “ Integrating New Technologies for Striga Control”.

The CoP also participated in the two days long donor supported projects in the ANRS consultative workshop organized in Gonder by BoFED.

AMAREW focused on scaling-up of appropriate technologies in its 2007 work plan and worked with its partner woredas and research centers in this joint effort.

The Chief of BEAT office, Mr. John McMahon, and project CTO, Dr Belay Demissie from USAID/Ethiopia, visited the project sites and activities at East Belessa and Sekela and favorably discussed the no-cost extension request of AMAREW;

The regular quarterly meetings as well as extraordinary ones of the RIT were held throughout the year in the Project office in Bahir Dar and important recommendations were made (results have been documented in the Minutes of the RIT meetings);

At the beginning of June 2007 the Contractor (Virginia Tech) and the ANRS partners (through the Chairman of the RIT and the Head of the FSPCDPO) submitted a formal written request to the USAID/Ethiopia Mission for a no-cost extension of the project. After five months of delay, the Agreement Officer responded to Virginia Tech stating that the request was denied and the project should close out by the end of December 2007. This short notice did not give AMAREW sufficient time to smoothly end its five and a half years of work;

The CoP, on behalf of the AMAREW team in Bahir Dar, sent a deeply-felt condolences to VT and to all those who lost their beloved ones on the tragic and painful incidence of 16 April 2007;

The inductive training for 51 new researchers joining ARARI, which lasted the entire month of August, was completed by the Institute with the support of AMAREW. The AMAREW research advisors (Drs Nigussie and Brhane) served as resource persons.

Monthly financial reports were prepared and submitted to Virginia Tech regularly and replenishment requested and received.

All quarterly reports as well as the 2006 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 severance payment for AMAREW local employees at the termination of the project. .

AMAREW activities can be read and seen by visiting our web site, <http://www.oired.vt.edu/amarew/>

The final versions of the 2006 Annual Report and the 2007 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;

2. Final Workshop of AMAREW

During October 20-27, 2007 under the leadership of the Prime Contractor, Virginia Tech, AMAREW organized a “Workshop on the Achievements and Lessons of the AMAREW Project over the Last Five Years (2002-2007)”. The primary objective of this workshop was to show and share the experiences and lessons of the AMAREW project with stakeholders both at the ANRS and national levels. The workshop was also intended to serve as a discussion forum thereby stimulating the participants to adopt and scale up selected project lessons they find relevant to their own specific situations.

The following three major groups of activities were planned for accomplishing the objectives of the workshop:

Presentations: Oral presentations on the background and overview of the project, followed by description of activities and summaries of accomplishments of the major project components of the project were delivered during the first day. There was a discussion session after each presentation. The venue for the presentations was the AMAREW Conference Hall in Bahir Dar.

Field Visits: Participants made field visits to the three pilot watersheds of the project (Gumet, Yeku, and Lenche Dima), an extension kebele (in Lay Gayint) and the Sekota DARC to observe the activities and gain firsthand impression on the achievements of the project.

Wrap up Discussions: A final day presentations by AMAREW’s partners/stakeholders and a wrap up panel discussion on project lessons learnt and recommendations on way forward were made on October 25 in the conference hall of the Lal Hotel in Woldiya, after which the workshop closed.

Participants came from the office of the ANRS Head of Government, BoARD, FSCDPO, ARARI (including its participating research centers), Bahir Dar University, EPLAUA, WOARDs, participating farmers’ representatives, RIT members, the AMAREW CTO representing the USAID/Ethiopia Mission, NGOs (GTZ, SIDA/SARDP, CIDA/SWHISA, AgriService, and FHI), and AMAREW Staff

On the first day of the workshop, in the conference hall of AMAREW in Bahir Dar, background, overview, and orientation to the Workshop Program was given by the AMAREW Chief of Party, following this overview each Technical Advisor of the Project presented the activities and achievements of his respective component during the last five years. General discussions followed the presentations.

Accordingly, Dr. Nigussie Alemayehu, Research Advisor, gave the Research Component Presentation while Ato Yacob Ashine, Extension Advisor, covered the Extension Component. Similarly Ato Getachew Bayafers, Watershed Management Advisor, addressed the Watershed Management Component and Ato Semachew Kassahun, Training Advisor and FtF Coordinator presented the Training Component and Farmer-to-Farmer (FtF) activities.

On the final day of the workshop, in the Lal Hotel in Woldiya, overview and organization of the Final Day's Presentations and Panel Discussion were introduced by Dr. Brhane Geberkidan. Reflections and perspectives were given by Ato Amlaku Asres (Head of FSPCDPO), Dr. Getachew Alemayehu (Director General of ARARI), Ato Abay Kindie (Head of GIS, EPLAUA), Ato Semagn Asredie (DebreBerhan ARC), Ato Defar Ashenafi (Dty Head, Guba Lafto WOARD), Ato Mohamed Saeed (Farmers' Coordinator), Ato Moges Genzeb (Tehuledere, WOARD), Dr. Keith Moore (representing OIRED,VT), and Ato Mesfin Astatke (Economics Advisor) made the closing remarks on behalf of the ANRS Government.

The participants agreed that 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, search for relevant technologies regionally and nationally, participatory technology evaluation and validation, and empowering communities for best results in watershed management.

In the general discussions on way forward, all presenters appreciated the contributions of the AMAREW Project over the last five years and expressed their strong desire to have the project continue its operations for more years. The USAID Mission representative, Dr. Belay Demissie, CTO, AMAREW Project announced in the meeting that the project is scheduled to close out on December 31, 2007, and that we all should make the necessary preparations for the close out.

The presentations and the field visits confirmed that a number of initiatives contributing to higher incomes of community members and participating farmers have been carried out, examples are:

- Fuel efficient stoves production and marketing by project organized women's group of Yeku watershed;
- Gabion boxes production and marketing by project supported self-help group of community members of Lenche Dima watershed;
- Vegetable and fruit production utilizing water conserved in both Yeku and Lenche Dima watersheds and subsequent marketing of the products leading to increased income;
- Seed production of improved crop varieties such as potatoes and sorghum and marketing output to increase incomes of participating farmers;
- Sheep and goat production and marketing under the revolving small ruminants acquisition scheme promoted by the project's extension component;

- Increased honey production and marketing using improved beehives promoted through the project.

Selected items which were highlighted by the CoP of AMAREW for follow up are:

- Consolidation and analysis of project data, identifying and documenting lessons learned from the project, and writing a final report
- Institutionalize and further strengthen the technology scaling up activities and the promising project lessons in the current project woredas
- Initiate and demonstrate scaling up activities of project lessons in selected new woredas of the ANRS
- Follow and strengthen the value chain involving the potato seed production system initiated by AMAREW, linkage with the ware potato production in West Gojam Zone and Lay Gayint woredas, eventually feeding into the potato dehydration factory being developed through the support of Rotary International
- A similar value chain activity is the vegetable seed production and marketing initiative in Ankober woreda of North Shoa
- Strengthen the overall seed system of the ANRS (focusing on selected important crops)
- Smooth transition of project activities to ANRS partners
- Enable most of the remaining long-term degree trainees which are in the pipe line to complete their studies
- Complete FtF programs which are being implemented cooperatively between Virginia Tech and Virginia State University, scheduled to end December 2008

In his presentation Ato Amlaku Asres, the RIT Chairman and Head of FSPCDPO, stressed the following positive lessons and “best practices” from the AMAREW Project

- Integrated watershed management demonstrated on the ground leading to the establishment of exemplary learning centers
- Asset creation at HH level and community level successfully demonstrated
- Environmental rehabilitation improved in the project sites
- Positive attitudinal and working culture change of the project community members
- Improved experience of water management
- Women participation in development significantly increased
- Contributed to the paradigm shift in strengthening linkages

Ato Semahegn Asrede – Director of Debre Berhan Agricultural Research Center, representing the AMAREW participating centers emphasized the following as the project’s significant contributions to his center

- On-farm research on crops, livestock, and natural resources done extensively
- Contributed significantly to strengthening Research –Extension- Farmer Linkage
- Technology dissemination activities to farmers done widely in the pilot woredas
- Seed production (technology scale up) demonstrated through active FREGs
- Small Grants and Mentorship Program (SGMP) support motivated researchers and enhanced collaboration with senior researchers both in the USA and Ethiopia

- Capacity building both through degree level training, short term training, and essential equipment and materials provision have been valuable to the center
- AMAREW project has assisted the center not only financially but also technically through the direct involvement of the AMAREW project.

Project Team Final visit

Following the announcement by the AMAREW Project CTO of the closeout of the project, the AMAREW Project announced the termination of the project to “All AMAREW Project Currently Active Partners” and the team traveled (November 23 to December 10, 2007) to the following woredas and research centers to discuss the close out and bid farewell to our partners:

- Debre Berhan** Agricultural Research Center (DARC)
- Tehuledere** Woreda Office of Agriculture and Rural Development (WOARD)
- Sirinka** Agricultural Research Center (SARC)
- Gubalafto** Woreda Office of Agriculture and Rural Development (WOARD)
- Sekota** Woreda Office of Agriculture and Rural Development (WOARD)
- Sekota** Dry Land Agriculture Research Center (SDARC)
- Lay Gayint** Woreda Office of Agriculture and Rural Development (WOARD)
- Eas Belessa** Woreda Office of Agriculture and Rural Development (WOARD)
- Sekela** Woreda Office of Agriculture and Rural Development (WOARD)
- Gondar** Agricultural Research Center (GARC)
- Adet** Agricultural Research Center (AARC)

The main issues discussed with the partners were:

- Strategies for the continuation of AMAREW initiated activities
- Organizing farmers into “Seed Producers Cooperatives” to assist in the continuation of the Seed Multiplication efforts of the project
- Strengthening Research-Extension-Farmer Linkage
- Capitalizing on the AMAREW’s pilot watersheds as learning centers
- Arrangements for AMAREW supported students to complete their studies
- Urgency of accounting for unused project funds at each partner’s responsibility
- The importance of continuing with the joint planning, implementation, monitoring and evaluation, involving researchers, extension personnel, and farmers

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 members have continued to monitor the situation and advised 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.
- 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.

Trip Report: Remote Sensing and GIS Training in Bahir Dar, Ethiopia

December 4-14, 2007

Pamela Swint and Jessica Dorr
Conservation Management Institute, Virginia Tech

Pamela Swint and Jessica Dorr traveled to Bahir Dar, Ethiopia from December 4th to the 14th 2007 to provide a two-week course on GIS database and remote sensing (GIS/RS). This project was coordinated by the Amhara Microenterprise Development, Agricultural Research, Extension & Watershed Management Project (AMAREW) and the Office of International Research, Education, and Development (OIRE) of Virginia Tech for employees at the Environmental Protection and Land Use Authority (EPLAUA) in Bahir Dar, Ethiopia. Dr. Michael Bertelsen of OIRE and Dr. Brhane Gebrekidan of AMAREW were the primary contacts for organizing the trip. Mr. Abaye Kindie of EPLAUA was the main contact within Bahir Dar, and was responsible for providing computers, software, and general technical needs during the training session.

The specific objectives of the training were to provide a two week training course focusing on 1) Spatial and non-spatial database management and 2) ERDAS Imagine. The course was taught using a combination of formal lessons, practical exercises, answering specific questions on ongoing projects, and general trouble-shooting of problems. The focus of the first goal was geospatial data management (utilizing Geodatabases and ArcCatalog), database queries, ModelBuilder and Visual Basic programming. Non-spatial data organization was covered using MS Excel and Access. The focus of the second goal was using ERDAS Imagine to perform image pre-processing, classification, spatial modeling, accuracy assessments, and change detection.

An excellent relationship was fostered between CMI and EPLAUA on the personal and professional levels (Figures 1 and 2). Mr. Kindie was a terrific host in Bahir Dar, and made every effort to provide necessary equipment and additional accommodations outside of class. EPLAUA is interested in bringing back CMI personnel to Bahir Dar for related training as well as developing research projects. Research topics include wetland conservation, soil erosion modeling, and land cover classification and mapping. EPLAUA would like to obtain a project extension for AMAREW, which expires at the end of 2007. If this extension does not occur, CMI will pursue other avenues of funding. CMI will remain in contact with OIRE and EPLAUA for future collaboration. In addition, both Pamela and Jessica have offered to answer future GIS/RS questions that may arise within EPLAUA.

The challenges faced were a combination of trainee background knowledge of GIS/RS, language barriers (mostly in the trainees adjusting to Pamela and Jessica's accents since all trainees spoke English well), and general trainee computer skills. Although there was an eagerness to learn, EPLAUA desired fairly advanced techniques in GIS/RS when most of the trainees were unfamiliar with overall GIS/RS theory. Much time was spent with basic software tasks, which detracted from covering advanced GIS/RS material. The labs were cut back in their scope to give the trainees a general background and an overall appreciation of GIS/RS and software functionality. Although the emphasis of the training sessions were geared towards applied examples, general background and techniques were covered. Pamela and Jessica spent several

days of their own time prior to the trip preparing advanced information and left various documentation (remote sensing book, research literature, background reading) for the trainees to read at their convenience.

Recommendations

1. EPLAUA owns outdated and unstable versions of ArcGIS and ERDAS Imagine. Having the funding to update the software would be a tremendous benefit to the needs of EPLAUA.
2. Intensive training of just a few trainees would be more productive given the limited time frame and the specific amount of material needed to be covered. It seemed unnecessary training 12 people on every topic when only a few would use each analysis in the long run. Perhaps splitting the training sessions and trainees between beginner and advanced would be a better use of time.
3. A maximum of 2 people to a group (compared to 3 per computer during the December training session) would help the program cover more ground.
4. Providing trainers the EPLAUA data ahead of the training would give more time to plan applicable analysis and lessons specific to their area.
5. Considering all the topics that EPLAUA and AMAREW wanted covered, the short timeframe for the training sessions was a problem (see the following comments in evaluations, Appendix A). Perhaps just focusing on one of the topics (Remote Sensing or Database/GIS) would have been more appropriate considering the change from 4 weeks to 2 weeks.
6. In addition, it would have been an incredible amount of work and diverse knowledgebase for only one person to cover the entire 4 weeks that were originally planned. Pamela and Jessica were pleased to have a colleague to work with even during this shortened 2-week period.

Thank you for this opportunity. We learned so much from this experience, met such wonderful people, and had an incredible introduction to a beautiful country.

3. Research

3.1 Background

AMAREW has been operating in ANRS primarily seeking to enhance market integration and competitiveness, improve agricultural practices, and increase rural household income opportunities in selected food-insecure pilot woredas of the region. The project is operating in a way that five separate and yet integrated components, each with a designated advisor (except the first), would function. These are the micro-enterprise development, agricultural research, extension, watershed management and training. Each component is basically affiliated to one or more regional institution(s) as a primary partner(s). The Research Component (RC), which is answerable for this report, is affiliated to ARARI and thus has been working in partnership with the research centers under the institute, namely Adet Agricultural Research Center (ADARC), Debre Berhan Agricultural Research Center (DBARC), Gondar Agricultural Research Center (GARC), Sirinka Agricultural Research Center (SARC) and Sekota Dryland Agriculture Research Center (SDARC). Furthermore, the RC is also providing technical support for the community at Gumet Watershed in Sekela Woreda, which until AMAREW came into the area, had little/no access to agricultural technologies from the research system. From the outset, the RC was specifically aimed at availing appropriate agricultural technologies that would support the achievement of the ANRS' regional food security program through activities concentrating on participatory, adaptive, and demand-driven research on food, agriculture and environment. Playing a pivotal role in bringing about a shift from the existing traditional top-down approaches of research and extension paradigm to a bottom-up participatory approach is also taken as one of the objectives of the RC. Empowering the professionals of the partner institutions to get hold of innovative approaches, and households and communities in the pilot woredas to take responsibilities of resolving their problems by making informed choices in planning and implementation of agricultural and natural resources management technologies is another area of focus for the component.

In this Annual Report of 2007 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 their research projects. Also are presented, the major activities accomplished by the AMAREW staff to support the research centers deliver the expected outputs. In addition, the progresses made with the establishment of Seed Potato Production and Marketing initiatives that are underway at Gumet are included.

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 2007:

- Conducting scaling up of technologies found out to be promising.
- Conducting on-going participatory on-farm adaptive research and technology transfer activities started in the previous.
- 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.

- Strengthening the linkages 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.
- Follow up the SGMP implementation.
- Preparation of a consolidated document of the RC.

In order to fulfill the objectives stipulated above, the AMAREW partner centers conducted quite a large number of scaling up and on-farm adaptive as well as demonstration trials on research themes of crops, livestock, natural resources, in expectations of making use of technologies identified promising and also 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. It was also expected that a consolidation of information pertaining to the research component would be prepared to serve as an input for the final workshop of the project.

3.3 Target Woredas and Catering Research Centers

As could be discerned from Table 1, 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 affected by poverty. However, the two woredas in North Shewa Zone (Ankober and Ensarona Wayu) are relatively better productive. In addition to these woredas addressed by the research centers, the research component of the project is providing both technical as well as financial support for the community in the Gumet Watershed which is agriculturally, in relative terms, an intermediate one.

Table 1 Pilot-woredas/watersheds where partner research centers of ARARI were undertaking AMAREW-supported on-farm research

Target-woreda/Watershed	Zone	Agricultural Potential	Research center catering for
Sekota/Yeku	Wag-Himra	Low	SDARC
Guba Lafto/Lenche Dima	North Wollo	Low	SARC
Tehuledere	South Wollo	Low	SARC
Lay Gaint	South Gondar	Low	ARC
East Belessa	North Gondar	Low	GARC
Ankober and Ensarona-Wayu*	North Shewa	High	DBARC
Gumet	West Gojam	Intermediate	-

*The former Ensarona Wayu is now named as Siya Debrina-Wayu.

3.4 Activities Planned for 2007

- Based on the action plans developed by each center for 2007, follow through the implementation of the scaling up and on-going research activities.
- Follow up of the seed potato production and formation of Producers' Action Groups at the Gumet Watershed in Sekela.
- Follow up of the SGMP.

- Compilation of the results of AMAREW-supported on-farm research activities in a form that will be of use to assess the achievements accrued over the last five years of the project's lifetime.
- In collaboration with all stakeholders, AMAREW has planned to organize a critical workshop to address the issue of paradigm shift in research-extension-farmer linkage in the region and the research component, together with the other components, was expected to play a key role.

3.5 Highlights of Accomplishments

Implementations of activities planned for the year were generally in par with the plans although there were some adjustments in some (Table 2). One example of the latter is the workshop on research-extension linkage that has been planned to be organized, detail of which will be discussed later but the fact remains that it was not possible to conduct it. Highlights of the accomplishments on the different themes of activities planned are discussed under.

Table 2 The status of activities planned (P) and Accomplished (A) by each partner center, Gumet Watershed and AMAREW office during 2007

Activity	ADARC		DBARC		GARC		SARC		SDARC		Gumet		AMAREW	
	P	A	P	A	P	A	P	A	P	A	P	A	P	A
Implementation of the scaling up plans	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Implementation of on-going research activities approved	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Implementation of SGMP plans	√	√	√	√	-	-	√	√	-	-	-	-	√	√
Cross-site visit to West Shewa seed potato growers	-	-	-	-	-	-	-	-	-	-	√	√	√	√
Construction of private DLS	-	-	-	-	-	-	-	-	-	-	√	√	√	√
Organizing Research-Extension Linkage workshop	-	-	-	-	-	-	-	-	-	-	-	-	√	-
Holding field days	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Data collection and follow up	√	√	√	√	√	√	√	√	√	√	√	√	√	√

Preparation of a consolidated document	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Preparation of final workshop	√	√	√	√	√	√	√	√	√	√	√	√	√	√

* AARC=Adet Agricultural Research Center, DBARC=Debre Berhan Agricultural Research Center, GARC=Gondar Agricultural Research Center, SARC=Sirinka Agricultural Research Center, SDARC=Secota Dryland Agriculture Research Center; √ = Yes and – = no; P = planned and A = Accomplished as planned

3.5.1 Implementation of the scaling up of improved technologies

Over the last years of support from AMAREW the research centers have been able to identify agricultural technologies that can have a significant role in increasing production and productivity and thereby ensure food security of their respective pilot woredas. All stakeholders unanimously agreed during the planning phase late in 2006 that these technologies be scaled up so that the target groups can benefit more from the outcomes in a sustainable manner. Accordingly, promising technologies for the scaling up have been identified for each woreda and watershed. Therefore, each center has implemented one or more technology (ies) identified promising for its target domains (Table 3).

Table 3. Technologies scaled out by partner research centers of ARARI with AMAREW Project funding in 2007

Technology for the scaling up/out	Agricultural Research Center implementing the scaling up						
	ADARC	DBARC		GARC	SARC		SDARC
	<i>Lay Gayint</i>	<i>Ankober</i>	<i>Siya Debrina Wayu</i> **	<i>East Belessa</i>	<i>Guba Lafto</i>	<i>Tehuledere</i>	<i>Sekota</i>
Cereals							
Bread wheat	√	-	√	-	-	√	√
Tef	-	-	-	√	√	√	√
Sorghum	-	-	-	√	-	-	√
Pulses							
Faba bean	√	-	√	-	-	-	-
Chickpea	-	-	√	√	√	√	-
Lentil	-	-	√	-	-	-	-
Groundnut	-	-	-	-	√	-	-
Horticulture							
Potato	√	√	-	-	-	-	-
Highland vegetables' seed production	-	√	-	-	-	-	-

* AARC=Adet Agricultural Research Center, DBARC=Debre Berhan Agricultural Research Center, GARC=Gondar Agricultural Research Center, SARC=Sirinka Agricultural Research Center, SDARC=Secota Dryland Agriculture Research Center. **The former Ensarona Wayu is now named as Siya Debrina-Wayu.

The scaling up at Sekota has been conducted jointly by the research center and WOARD, which could be taken as a model for a harmonious inter-institutional linkage desired for a common goal. One hundred farmers were involved in the scaling up of bread wheat, 60 in that of tef and 50 in sorghum each farmer with a quarter of a hectare. A similar type of linkage between research and extension was also experienced in East Belessa where GARC and the WOARD are closely working on the scaling up of sorghum, tef and chickpea technologies. Sorghum has been scaled out for 11

farmers, tef for 16 farmers and chickpea for 24 farmers, each with a size of one quarter of a hectare. At Lay Gayint, ADARC with the WOARD scaled out improved technologies of potato, bread wheat and faba bean. Potato was all in all planted on 2 hectares of land, bread wheat on eight and faba bean on 6 fields, each field with a size of half a quarter to one quarter of a hectare. Similarly, DBARC has conducted the scaling up of seed potato with 20 farmers at Ankober and another group of 20 farmers has been identified to scale out the technologies of barley during the coming *belg* season. The scaling up activity on the cool-season vegetable seed production is also going on aggressively. The scaling up activities at Siya Debrina-Wayu has involved a total of forty farmers (10 farmers per crop) each with a land size of a quarter of a hectare for the selected crops, bread wheat, faba bean, chickpea and lentil.

The scaling up activities are basically envisaged to lay a foundation for strengthening the informal seed sector as an alternative scheme of improved seed source which, at present, is the major bottleneck of increased production and productivity in the country in general and in the region in particular. Given the fact that most of the pilot woredas of AMAREW are drought-prone and also are far from the seed production areas of the Ethiopian Seed Enterprise (ESE), the problem of lack of basic seeds of even the major cereals is exceptionally critical. As an alternative means of alleviating this chronic setback AMAREW has been encouraging the partner centers to strengthen community-based seed production of improved varieties of crops using the opportune that the scaling up activity will create.

3.5.2 Strengthening community-based improved seed potato system

In view of improving the income generation capacity of the community at Gumet Watershed in Sekela, AMAREW has been heavily involved to entrench the tradition of improved seed potato production. The project took the initiative of organizing few numbers of farmers willing to produce seed potato in 2006 where only seven farmers volunteered to try seven improved varieties, which they grew during August-December of 2006 producing some 80 quintals. Having seen the productivity, over 100 farmers battled to get the seed for the next planting but only 77 could manage to get seed. Of the 77 farmers who grew the improved varieties during January-April with irrigation, however, only 35 of them (three of whom are females) were able to produce an acceptable standard of seed potato of over 250 quintals (3-12q/person) (Table 4).

Table 4. Gumet watershed irrigated seed potato produced and disseminated in 2007

S.No	Name	Sex	Sub Kebele	Got'	Area planted (m ²)	Variety	Yield		
							Harvested (kg)	Submitted (kg)	Converted (q/ha)
1	Abebe Alehegn	M	Sawsa	Debregna	450	Zengena	425	400	94
2	Adis Abesha	M	Godir	L/Ambero	450	Zengena	500	500	111
3	Alehegn Aysheshim	M	Sawsa	Debregna	450	Zengena	300	300	67
4	Alehegn Hailu	M	Godir	L/Ambero	450	Zengena	500	400	111
5	Alemu Yihun	M	Godir	L/Ambero	450	Guasa	650	600	144
6	Animut Alehegn	M	Sawsa	Debregna	450	Zengena	500	500	111
7	Ayalew Tibebu	M	Sawsa	Debregna	450	Jalene	800	800	178
8	Ayene Mekonnen	M	Sawsa	Tintegala	500	Gorebella	955	900	191
9	Biresaw Guadu	M	Sawsa	Tintegala	450	Marachere	742	700	165
10	Birku Alem	M	Sawsa	Debregna	450	Marachere	815	700	181

11	Bogale Almaw	M	Sawsa	Aydegerel	500	Gorebella	635	600	127
12	Fenta Berihun	M	Sawsa	Debregna	900	Gera	893	800	99
13	K/Klemu Tibebeu	M	Sawsa	Debregna	450	Gera	642	600	143
14	K/Demelash Belay	M	Sawsa	Debregna	450	Jalene	480	400	107
15	K/Dese Senay	M	Sawsa	Debregna	450	Marachere	561	500	125
16	K/Nebiyu Ayalew	M	Sawsa	Debregna	450	Gera	700	700	156
	“	“	“	“	450	Guasa	567	567	126
17	Lakew Asreda	M	Sawsa	Wereita	500	Gorebella	1000	1000	200
18	Lijalem Ayana	M	Sawsa	Debregna	450	Jalene	700	700	156
19	M/Mengesha Chere	M	Godir	Ashalta	450	Marachere	600	600	133
20	Mekuriaw Senay	M	Sawsa	Debregna	450	Zengena	690	500	153
21	Mengist Liyh	M	Sawsa	Debregna	900	Jalene	1930	1900**	214
22	Mulat Meless	M	Godir	Keista	450	Jalene	500	500	111
23	Nebiyu Tibebeu	M	Sawsa	Debregna	450	Guasa	1300	1100	289
24	Sharew Wube	M	Godir	L/Ambero	450	Zengena	1050	900	229
25	Shita Zerihun	M	Sawsa	Debregna	900	Gera	1400	1200**	311
26	Sinishaw Migbaru	M	Godir	L/Ambero	450	Guasa	600	500	133
27	Tadesse Emire	M	Sawsa	Debregna	450	Jalene	680	500	151
28	Tibeyin Worke	F	Sawsa	Debregna	450	Gera	600	600	133
	“	“	“	“	450	Marachere	600	600	133
29	Wale Ayana	M	Sawsa	Debregna	450	Jalene	942	900	188
30	W/ro Enat Mulu	F	Sawsa	Debregna	450	Marachere	400	400	89
31	Yigarde Fetene	F	Sawsa	Debregna	450	Gera	700	700	156
32	Zerihun Fenta	M	Godir	L/Ambro	500	Gorebella	640	600	128
33	Zerihun Kebede	M	Godir	L/Ambero	450	Zengena	450	400	100
34	Zewde Boge	F	Godir	L/Ambro	450	Wechecha	685	685	152
35	Zigale Terefe	M	Sawsa	Debregna	450	Gera	497	400	110
Total							-	25352	-

The project has further supported the growers by providing trainings and construction of a 200m² Defused Light Store (DLS) as it is a critical input for sustainable production of seed potato (Fig.1). At a price of 300 Birr/quintal (which is even lower than the average price for seed potato), each farmer was able to earn 900-3600 Birr from the sale of the product depending on the amount s/he submitted to the Watershed Committee. The improved seed collected was further distributed by the WOARD to the community within and also outside the watershed on the basis of their regular extension program and financial source. This has an added advantage for the seed growers of Gumet since it creates a wider potential market demand for their seed in the future.

In order to ensure continuity of the benefit for the community, an agreement between the farmers has been reached that three groups of 10-12 individuals each be organized so that each group would have its own team of leaders. These sub-groupings are believed to better equip them with the knowledge base through trainings, cross-site visits, encourage them to possess their own DLS

individually and most importantly to link them with the ware potato producers that will have to be organized in the area and also with market opportunities outside the woreda.



Fig.1 Ato Nebiyu Tibebu (top left) is one of the highest earning farmers in the seed potato growing group at Gumet. A total of 253 quintals of seed potato was submitted by the farmers that have been organized into three groups of seed potato producers which are aspired to develop into community-based seed enterprises at Gumet watershed. The CoP of AMAREW (right), Dr Brhane was impressed by the enthusiasm of the group trying its level best to bring the effort into its full swing.

In order to make the groups gain practical and relevant experiences and lessons from the farmers that have been successfully producing and selling improved seed potato, a trip has been organized by the project to West Shewa Zone of Oromiya Region in early August 2007 whereby representative farmers, DAs and woreda experts took part. After gaining the experience from the trip, six farmers have decided to grow seed potato on as much land as one quarter of a hectare and have built their own DLS (Fig.2). At present, 14 farmers have already built their own DLS, three of them with corrugated iron sheet.



Fig.2 The DLS built by Ato Nebiyu Tibebu (Fig.1 left) after gaining the experience from West Shewa

3.5.3 Strengthening the research-extension linkage

AMAREW Project, with all possibilities and its efforts, has been trying to instill synergistic institutional linkages between ARARI, BoARD, WOARDs and the relevant research centers so that they can serve the target-groups better by working hand-in-hand towards having shared-vision and thus achieving same goal. At grassroots level, it has been possible to partly achieve what has been craved for, as has been illustrated during the joint planning workshops and also implementations of the technology scaling up activities. In order to maintain and even strengthen further this bondage of partnership at woreda level, the project technical advisors regularly facilitated joint follow-up meetings between WOARDs and the respective centers so that they could draw common action plans for the follow up and evaluations of the technologies scaled out at the respective woredas and watersheds.

Implementations of the technology scaling up have been particularly instrumental in strengthening the linkage efforts made thus far. At almost all woredas, the activities have been conducted jointly by respective research centers and WOARDs by sharing tasks and assigning who should take the leading role for which task and most importantly by abiding to the arrangements. During the year, field days have also been jointly organized by the research centers and the respective WOARDs at Lay Gayint, East Belessa, Ankober and Siya Debrina-Wayu. Field days apart from being important fora for jointly evaluating field level-performances of improved technologies, also provide platforms whereby all primary stakeholders can interact and commit themselves in rendering strategies through which the target groups can sustainably make best use of the technologies.

AMAREW has taken the initiative of requesting the higher officials of BoARD and ARARI to organize a decisive regional workshop on fostering agricultural research and extension linkage paradigm with the project's technical as well as financial support. The officials have enthusiastically endorsed the idea of having the workshop and thus AMAREW has prepared the draft document on the workshop. However, it was not possible to conduct the workshop during the tentative time suggested by AMAREW (18-19 Sep. 2007) because of overlapping subsequent national as well as regional events.

3.5.4 Small Grants and Mentorship Program (SGMP)

AMAREW has been providing funding opportunities, from the Contractor's portion of the funds, for implementation of agricultural research and extension projects in the Amhara National Regional State (ANRS) through the competitive Small Grants and Mentorship Program (SGMP). SGMP was basically designed to promote the link between senior researchers of the Collaborative Research Support Program (CRSP) universities in the USA or CGIAR Centers and young researchers in the ANRS. Consequently, some ARARI researchers in collaboration with the staff from other regional partners have been conducting research under the scheme over the last several years. The projects financed by the program included: two projects on natural resources and one each on fishery and agricultural economics, and four projects on crops (Table 5). Four of the projects that have been approved in 2005 were supervised by expatriates from the CRSP Universities. Unlike the previous proposals, however, the mentor for each of the new projects approved in 2007 was selected from the local scientists with rich experiences in the respective subjects. A one-day (9 March 2007) workshop was held to assess the status of the four projects that are going on since 2005 and also to enter agreements between AMAREW and the principal investigators and thus officially launch the new projects (Fig. 3).

Table 5 Summary of the projects being conducted under the SGMP of AMAREW Project

<i>S. No</i>	<i>Title</i>	<i>Principal Investigator/ Profession and Level of Education</i>	<i>Area of Investigation</i>	<i>Organization/ Center</i>	<i>Category of Investigation</i>	<i>Budget Approved (Birr)</i>	<i>Proposed Duration</i>	<i>Name and Affiliation of the Mentor</i>
1	<i>Assessment of soil characteristics, surface water qualities and water table fluctuations on selected irrigation command areas in east and west Gojam and Awi Zones</i>	<i>Mekonnen Getahun,</i>	<i>Natural resources</i>	<i>Bureau of Water Resources, ANRS</i>	<i>Basic/ Strategic</i>	<i>54,266</i>	<i>2005-2006</i>	<i>Dr Asmare Atalay, Prof. of Soil Sci., Virginia Tech, USA</i>
2	<i>Estimation of rill erosion using spatial rill damage and network assessment over hill slopes</i>	<i>Gizaw Desta, MSc</i>	<i>Agricultural engineering</i>	<i>ARARI/ DBARC</i>	<i>Basic/ Strategic</i>	<i>52,401</i>	<i>2005-2006</i>	<i>Dr Conrad D. Heatwole, Biological Systems Engineering, Virginia Tech, USA</i>
3	<i>Assessment of major threats of Lake Tana and strategies for integrated water use management</i>	<i>Miheret Endalew, BSc</i>	<i>Natural resources management</i>	<i>ARARI/ FARC</i>	<i>Strategic</i>	<i>53,664</i>	<i>2005-2006</i>	<i>Dr Ernest W. Tollner, Driftmier Engineering Center, Biological & Agricultural Engineering Department, University of Georgia, Athens, USA</i>
4	<i>Determining the optimal enterprise mix in crop-livestock integration for sustainable farming</i>	<i>Tilaye Teklewold, MSc</i>	<i>Agricultural economics</i>	<i>ARARI/ DBARC</i>	<i>Strategic</i>	<i>40,439</i>	<i>2005-2006</i>	<i>Dr. John McPeak, USA</i>

	<i>systems in the highlands of North Shewa, Amhara Region</i>							
5	<i>Integrated Management of Potato Late Blight Through FFS</i>	<i>Agegnehu Shibabaw, BSc, Horticulture</i>	<i>Pathology</i>	<i>ARARI/ADARC</i>	<i>Applied</i>	<i>44650</i>	<i>2007</i>	<i>Dr Hailemichael Kidanemariam</i>
6	<i>Scaling out Early-Maturing and Striga-Resistant Sorghum Varieties with their Full Packages in Drought- and Striga-Prone Areas</i>	<i>Kebede Teshome, MSc,</i>	<i>Breeding/ Extension</i>	<i>ARARI/SARC</i>	<i>Applied/ Scaling up</i>	<i>45000</i>	<i>2007</i>	<i>Dr Tesfaye Tesso, EIAR, MARC</i>
7	<i>Durum wheat promotion in potential areas of Northwestern Ethiopia</i>	<i>Tadesse Dessalegn, PhD</i>	<i>Plant Breeding,</i>	<i>ARARI/ADARC</i>	<i>Scaling up</i>	<i>46000</i>	<i>2007</i>	<i>Dr Tesfaye Tessema, SG2000</i>
8	<i>The relative contribution of bread wheat varieties, nitrogen fertilizer and environments to bread –making qualities in the highland Vertisols of North Shewa, Ethiopia</i>	<i>Adamu Molla,</i>		<i>ARARI/DBARC</i>	<i>Strategic</i>	<i>50000</i>	<i>2007</i>	<i>Dr Getachew Belay, EIAR, DZARC</i>



Fig.3 Participants of the SGMP workshop held on 9 March 2007 at AMAREW office in Bahir Dar.

To date some of the beneficiaries of the program have already finished their planned activities and thus submitted full reports, some only the abstracts and others are still not finished with the activities. Below are presented the status of these reports or abstracts as presented by the authors.

Spatial rill initiation and rill network with and without tillage furrow conditions in the highlands of North Shewa, Ethiopia

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Introduction

Soil erosion is a serious threat for environmental degradation in the mountainous landscape of Ethiopia. The most common agent for soil erosion is water. To identify areas affected by water erosion, certain features like soil removal, signs of water run ways like rills and gulleys, accumulation of soil or sedimentation could be quite obvious on the landscape. Several factors are contributing to increased soil erosion, but unbalanced man to land ratio results in the

cultivation of marginal sloping lands is often responsible. The performance of control measures in terms of yield increment and reduction of soil erosion is far below the expectation (Hurni, 1984; Million, 1996; Herwege and Lude, 1999; Bewket and Sterk, 2002; Aklilu and Graaf, 2006). Apart from these erosion monitoring and adoption studies, little or no research was done on specific erosion processes that help to plan control measures. To control soil erosion, it is important to know specific erosion processes under different soils, topography and rainfall regimes.

As a principle of erosion control, physical soil conservation measures are built on areas where rills start to occur. Rills are used to describe small forms of linear erosion, which result from hydraulic erosion by overland flow. Rills are visible and noticeable linear erosion features easily identifiable by farmers. These processes of erosion would enable to identify the critical locations of erosion along the topo-sequence. In order to identify prone areas to plan a control measure rills are surveyed and measured.

The process of rill erosion occurs when the flow increases its depth and started to organize itself and reached a threshold value following lines of slopes (Rejman and Brodowski, 2005; Carucci, 2000; Herwege, 1996). The initiation and development of rills and rill characteristics have studied under different rainfall, discharge and slope length conditions (Rejman and Brodowski, 2005; Polyakov and Nearing, 2003; Favis Mortlock, 1998 or 2000). The effect of slope gradient, contributing area and tillage direction has been studied in Belgium (Takken et al, 2001; Desmet and Govers, 1997). However, prediction of rill initiation and development is highly influenced by the presence of micro-topography due to tillage that plays a role on hydraulic flow (Favis-Mortlock et al 1998; 2000; Desmet and Govers, 1997; Govindaraju and Kavvas, 1994).

Prediction of rill initiation was done by different studies (Vandael et al, 1996; Desmet and Govers, 1997; Montgomery and Dietrich, 1994; Torri, 1987) that can be used to identify potentially erosion prone areas along the slope profile. Vandaele, et al (1996b) summarised the available information on channels generated by overland flow and found that threshold rill starting points can be modelled using an inverse relationship between critical slope gradient at the most upslope head cut of rills and critical contributing area (Eq.1).

$$S_{cr} \cdot A_{cr}^b > C, \text{ constant} \quad (1)$$

Where the value of the area exponent (b) showed little variation between different studies. For most data sets, initiation could be well predicted when b was taken as 0.4. Desmet and Govers (1997) also found similar relationship with an area exponent of 0.5 to predict areas prone to rilling. However, the starting points for individual rills were not well predicted because of the influence of minute surface irregularities.

The study was conducted on bare cultivated field condition immediately after tillage. The experiment considered surface roughness in two sets: conventional tillage induced roughness and relatively smooth soil surface. Measurement of rill characteristics and tillage gradient and direction was done by a field survey. DEM of resolution 10 cm was constructed from the photographs in order to delineate rill initiation areas and rill network. This provided the level of detail required which is induced by tillage roughness.

The rill characteristics and the effect of slope and tillage roughness that lead to erosion damage are described and known. Using detail rill surveys at every 2 m-slope length and close range photogrammetry the spatial variation of rill formation and structure after early erosive storms were distinguished. The temporal variation of rills was also seen as a result of change in the surface in response to erosive storm and overland runoff. The form and size of rills vary according to the slope angle and shape, tillage pattern, and runoff contributing area within fields.

Rill characteristics data showed that rill initiation and development is mostly related to the slope and shape of the field, indirectly on the contributing area. Rill initiation and its dimension vary greatly between fields with tillage-oriented roughness and without or relatively smooth roughness condition.

The objectives were to identify rill prone areas in terms of topographic parameters where control measures to be planned and characterize the rill initiation and rill development under conventional tillage roughness condition.

Materials and methods

The study was carried out on farmer's field at Andit Tid watershed, former SCRP research station. It is located 9.81° N and 39.71° E at altitude of 3048 m a.s.l. The annual mean rainfall is 1539 mm, out of which 62 % occur during July to September. The texture of the top 20 cm soil was 64 % sand, 22 % clay and 14 % silt (sandy clay loam) and with bulk density of 1.46 gm/cm³. The slope of the field is not uniform and varies from 11-15 % and bare surface condition after tillage.

The experimental field is bounded by artificial drainage ditch to protect inflow of runoff from upper sources. The experimental field (18 by 25 m) was divided into two: one with tillage-induced roughness and the second with relative smooth surface by reducing the effect of tillage-roughness. Rill survey was conducted in transects parallel to the contour every 2 m slope length. The survey was made at two erosive storms.

Rill and tillage pattern survey

Rills with depth >2.5 cm were surveyed and their depth, top width, length above the measuring point, and relative positions from the upper boundary were measured. A rill measurement along transect every 2m slope length. Points of rill initiation were marked and upward and down ward developments were recorded. Individual and merged rills in each transect were separately measured and analyzed. In similar way, tillage parameters such as tillage gradient and direction, furrow break point length at which rills start to occur were measured for the rough set of experiment.

Digital Photogrammetry

In order to analyse the effect of spatial rill formation in response to a storm, ground based oblique photo technique was employed using calibrated digital camera. The camera positions were selected based on the orientation of the field to obtain enough overlap. The experimental plot was divided in to six sections (~9 by 9m each) for photography purpose. For each section overlapped images were taken from 6-8 directions. Each image consisted a minimum of three control points. The orientation of tillage, rill initial points, and rill networks are marked with targets. White golf balls and oranges were used for marking surface orientation and red colour balls used to mark rill initial points. White strings lay along rill networks to map rills on the photo. **Photomodeler** software used for camera calibration and photogrammetric analysis.

Construction of DEM

The basic assumption in soil attribute prediction is that topography is one of the most important factors affecting water and sediment transport in terrain. Thus topographic attributes can characterise water flow paths. Digital elevation model (DEM) describe the topography in a numerical way. Grid-based DEM with 10 cm resolution was constructed from the 3D point data obtained from photographic images. Topographic attributes are calculated directly from a DEM and include variables such as slope, aspect, flow

direction and specific catchment area. DEM quality was assessed and checked by ground control points.

Rill dimensions, rill network, and effect of tillage direction will be analyzed.

Topographic attributes derived from DEM

The surface shape is controlled by changes in elevation from one place to another and characterised by slope, aspect and curvature. These changes are mathematically represented as spatial derivatives, which on regular grids are approximated by finite differences (Gallant and Wilson, 1996). The DEM provides a base data set from which topographic attributes are digitally generated. The routing of water over a surface is closely tied to surface form.

Contributing area is a measure of the upslope area that delivers water to a point, grid cell. Using a single flow direction method (D8- method) in Arcview 3.2 flow direction was derived from slope and aspect. From flow direction, the upslope area (flow accumulation) that contributes flow to a cell was calculated.

Slope measures the rate of change in elevation. The slope arises from the assumption that the surface of the water table is parallel to the ground surface. Thus the local hydraulic gradient is assumed to be equal to the slope of the ground. It is calculated by using finite difference algorithm. The slope algorithm developed by Horn (1981) and currently implemented in ESRI GIS products is thought to be better suited to rough surfaces (Wechsler, 2006). The slope and aspect algorithm available in Arcview 3.2 GIS package was used.

Results and discussion

Tillage-roughness characteristics

Comparison was made between tillage-induced roughness and relative smooth surfaces by analysing individual rill characteristics and rill network development in response to single storms. Tillage-induced roughness referred in this study was the result of tillage using traditional plough pulled by pair of ox. The tillage implement has created furrow-ridge surface form every 20-30 cm apart on average. The average gradient of tillage was 7 % from the contour (i.e., 6 % less gradient than the slope of land). The absolute tillage gradient ranged from 4-11 % on land slope range of 9-15 % (mean of 13 %). The soil texture is sandy clay loam with bulk density of 1.46 gm/cm³. For this soil and slope condition, the depth of furrow ranges from 20-30 cm. The height of ridges above the furrow surface range from 10-30 cm and initial depth of furrow is 15-20 cm. After significant early storm events the depth was decreased to 8-10 cm.

The roughness was mainly attributed from the micro-depressions and ridges due to tillage practice. The orientation of roughness is generally said to be parallel to the tillage direction. However, this orientation was partly disturbed due to the random effect of oxen tracks and farmer footpath during ploughing. Despite the difference in the form of roughness, still we can say that roughness produced due to tracking was also oriented in the direction of the tillage, considered to be reasonable. But the effect of roughness shape on rill formation was not the objective of this study, which need further research.

Relation of tillage roughness and rill initiation

In this study, rill initiation was recorded with respect to the length of furrow break point along tillage orientation. Break point for rill initiation was occurred beyond 4 m furrow length in the direction of tillage on the top part of the filed. The length of furrow where break point occurred was decreased down slope where cumulative effects of furrows result in high runoff concentration. The shortest break of furrow ridges was measured at 2.5 m, which was measured at

about 13 m from upper boundary. The distribution of rill initiation versus furrow number counted down slope illustrated in fig.1 showed that the furrow length where break point occurred decreased as the number of furrows increased down slope. The distribution in the number of initial rills was also increased as furrows increase. A power function seems to reveal the relation between furrow number and runoff-accumulated area of furrows.

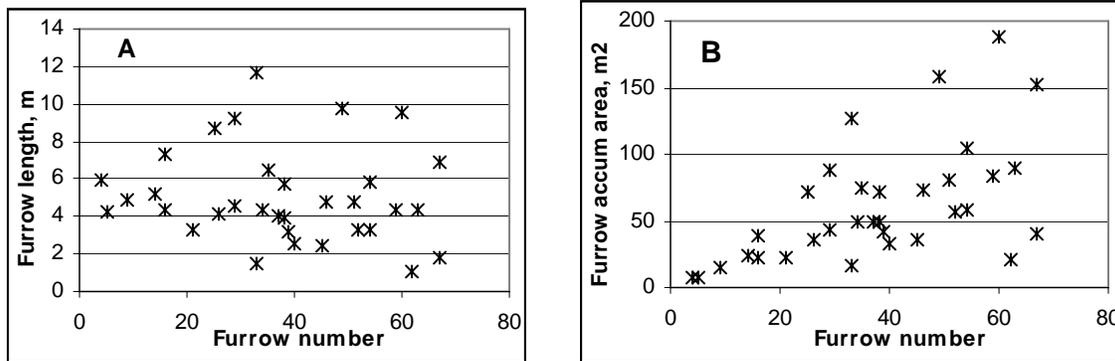


Fig. 1 Distribution of rill initiation in relation to furrow length (A) and accumulation area (B)

Rill characteristics

Individual or initial rills

Tillage induced rough surface: The distribution of initial rills illustrated in Fig.2 is the count of rills which start at each transect along the slope. About 33 initial rills were recorded on rough surface conditions. The 33.33 % of the rills occurred from 11-14 m slope length measured from the upper boundary (zero flux) of the field plot. The number of rills occurred less than 10 m slope length constitutes about 27.27 %, though it did not show consistent trend. Therefore, high probability of rill initiation occurred at about 11 m from upper boundary (see Fig.2). The average width of initial rills ranged from 13-22 cm. In the upper section (0-10 m) the width of rills was higher (12.55 % higher) than the total average width of initial rills compared to rill width measured greater than 10 m down slope. Rill width is slightly decreasing in the middle of the plot and then increased in the bottom where the slope is relatively low. An average depth of rills in the upper section (0-10 m) was less than 4.75 cm. The high width and low depth of rills on the top section is most likely indicating the shallow overland flow in the form of sheet flow. Since the initial rills were not well developed in the upper section, the measurement of depth and width was highly sensitive to error. Thus it is important to define the threshold for inter-rill and rill demarcation which otherwise difficult to measure smaller rills in the field. Those initial rills with significant depth say 5 cm and above were easily visible and measurable. The depth was gradually increased after 10 m down slope, with an average range of 5-8.5 cm (Fig.3).

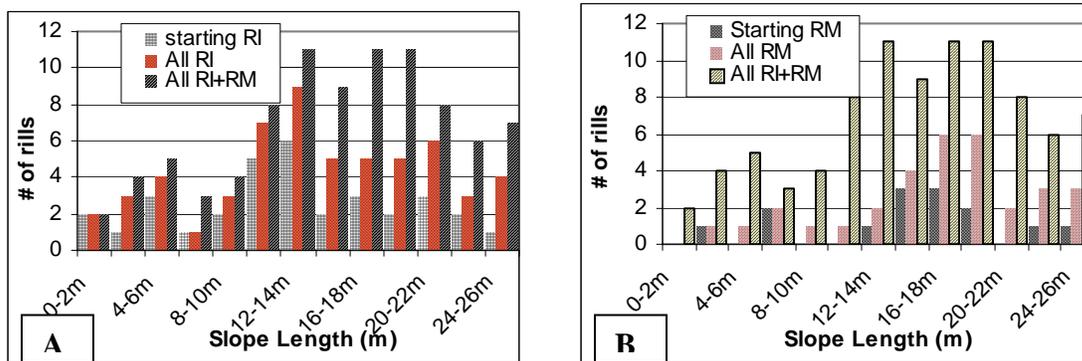


Fig.2. Number of initial (A) and merged (B) rills for a rough soil surface condition

The depth to width ratio indicated the scouring of rills. For the most upper section of the plot the ratio is from 0.20-0.30. However, when the slope length is greater than 10 m down slope the index ranges in between 0.35 to 0.50. It showed an increasing trend (Fig.3). This seems better index that shows the runoff energy in the rill flow. It indicated the slope and shape effect of the surface on rill formation.

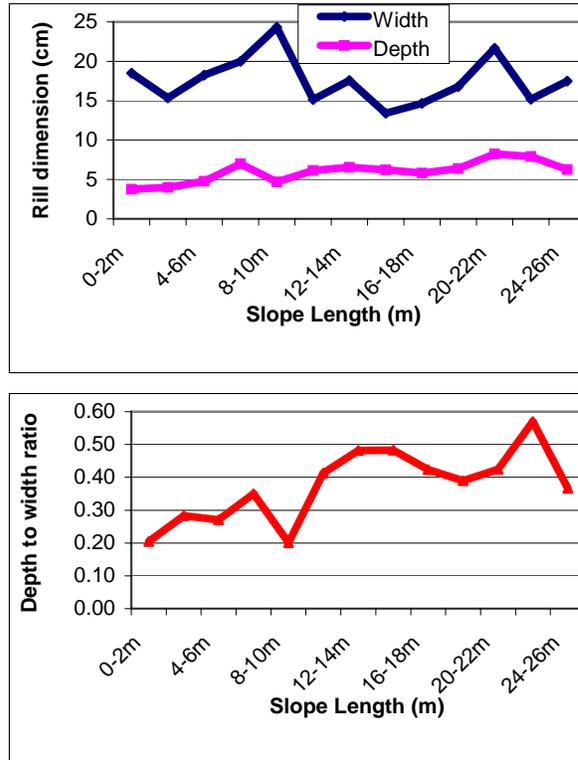


Fig.3. Characteristics of initial rills for a rough soil surface condition

Temporal rill initiation and development: Field survey was also made at the end of August. The purpose of the survey at this period was to investigate the evolution of rills due to surface change in response to erosive rain and runoff. As a result all initial rills recorded at initial storm events persisted. There were about 7 rills newly initiated, but these rills did not have contribution to the rill network. But upward and down ward development of initial rill segments was often observed. The individual rills formed initially showed slightly increasing depth down ward. The width became stabilise though there are exceptions. The width range became narrow. The depth to width ratio indicated towards the stage of stability of rills along the slope profile (see Fig.4).

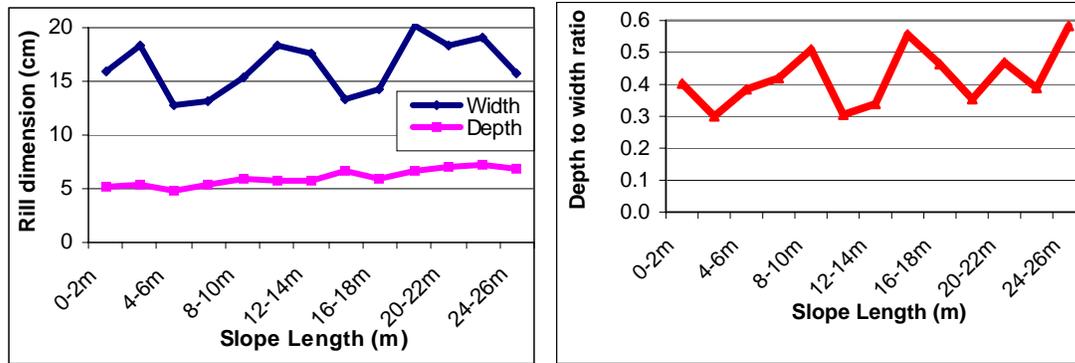


Fig.4. Characteristics initial rills after one-month for rough soil surface condition

Relatively smooth surface: Rill formation and network was also surveyed under relative smooth surface condition. The effect of tillage-induced roughness is reduced in this set. A total of only 15 initial rills were recorded for the relative smooth surface, which is less than half of the initial rills sampled on the rough surface (Fig.6). The probability of rill formation in the rough surface was high because of the existence of depressions that create conducive condition for rill formation. However, approximately equal proportion of individual rills organised to form the rill network. The respective numbers of individual rills on smooth and rough surfaces that constitute for the rill network were 60 % and 67 %. In both cases few individual rills reached and contributed to the outlet. When we compared rill distribution along slope profile between the rough and smooth surfaces, high concentration of rills was occurred in the top part for relative smooth condition and beyond 10 m slope length for rough surface condition. Significant rill initiation on smooth surface with depth > 5 cm and width >15 cm were recorded starting from the first top section (0-2 m slope length). About 40 % of initial rills occurred in the first top section of the field plot and when considering all individual rills in all transects 52 % occurred in the range of 0-6 m slope length (Fig.6). Width of rills was highly increased down wards compared to the rough surface condition. As a result of width increment, the depth to width ratio was also decreased from top to down slope (Fig.5).

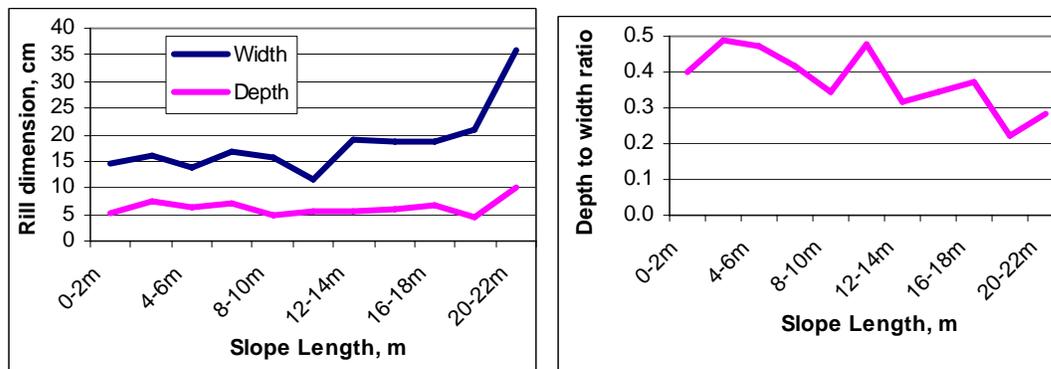


Fig.5. Characteristics initial rill for a relatively smooth soil surface condition

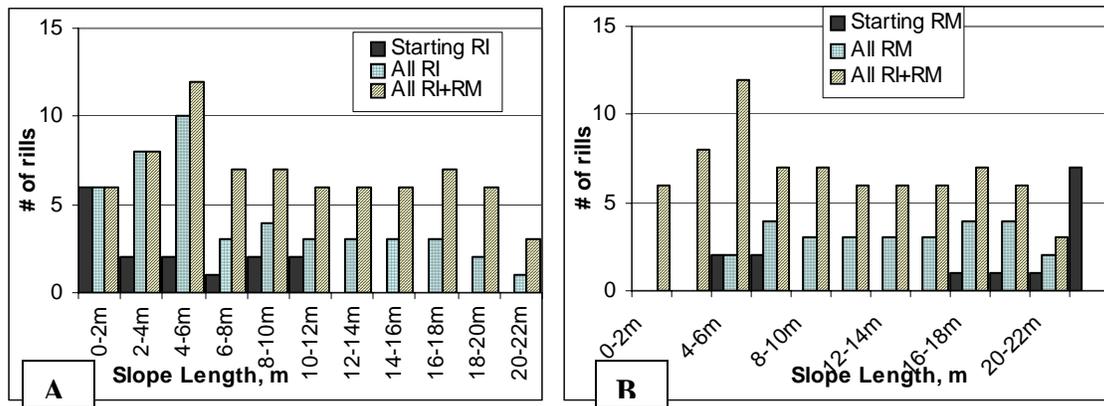


Fig.6. Number of initial (A) and merged (B) rills for a relatively smooth soil surface condition

Rill network development (merged or confluence rills)

Observation of rill network development after a month (end of August) showed no significant difference on number of rills forming the network. The percentage of merged rills with respect to the total individual or initial rills was equal for smooth and rough surfaces (47 % and 45 %). Whereas the percentage of merged rills with respect to those individual rills contributing to the network on smooth surface was higher than on rough surface (78 % and 66 %). The probability of rill formation on rough surface was high. On the contrary, more success of individual rills to form the rill network has observed on relatively smooth surface.

Rough surface: The average depth range of merged rills was 4-10 cm. The depth shows slightly increasing trend at early storm periods. But for the later rainstorm period the depth was increasing until the middle plot and decreasing down slope where the slope becomes less at bottom of the plot. However, the average width (range from 15 to 25 cm) has indicated no specific trend for early storms. It was between 12 and 20 cm above the middle part of the plot between 20 and 25 cm down slope at end of August. In a one-month interval, the average width and depth of merged rills increased by 2 cm and 0.5 cm respectively (Fig 7 and 8). Comparison of initial and confluence rills indicated that a 3-4 cm increase in the width of rills and 0.5-1 cm increase in depth was observed when two or more rills combined. At early storms, the scouring of merged rills was increased starting from 6 m down slope and became stable at bottom part of the plot where deposition has observed. At the end of August, the ratio was increased up to 16 m and then decreased. The depth to width ratio was between 0.30 and 0.50 where two and more rills merged except less value measured on the upper part. In general, the rill network has shown clear temporal development.

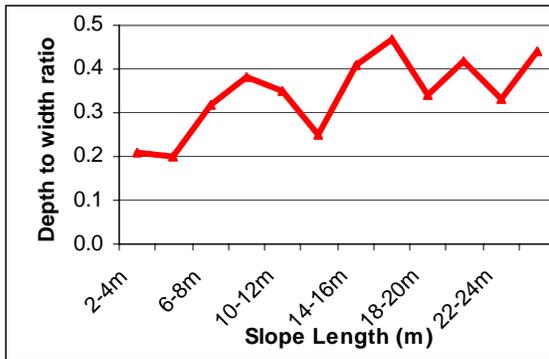
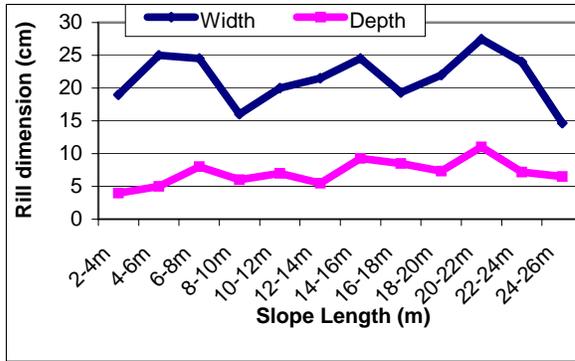


Fig.7. Characteristics of merged rills for a rough soil surface condition

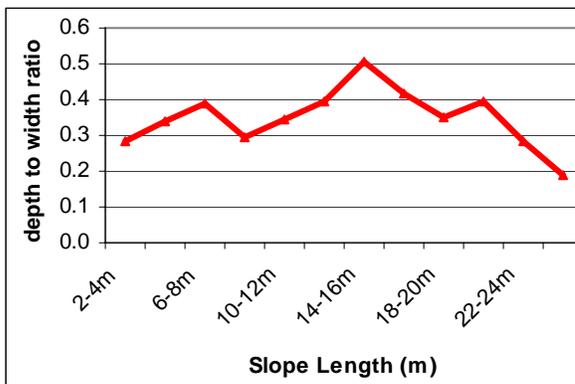
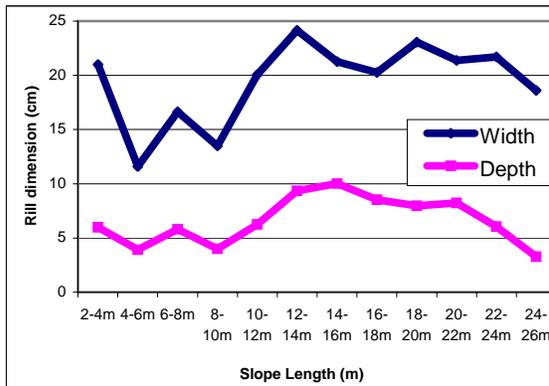


Fig.8. Characteristics of merged rills after one-month for rough soil surface condition

Smooth surface: The characteristics of merged rills are presented in Fig.9. The width of merged rills increased down ward. As a result the depth to width ratio was slightly decreased down slope although the value of the ratio was greater than 0.35.

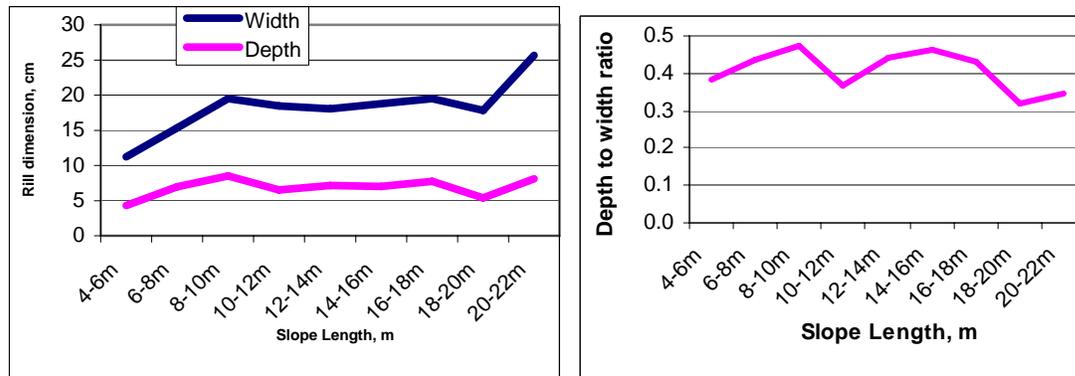


Fig.9. Characteristics of merged rills for a relatively smooth soil surface condition

Assessment of Major Threats of Lake Tana and Strategies for Integrated Water Use Management

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Abstract

The character of aquatic resources and the hydrologic regime of Lake Tana watershed is dependent on natural factors (climate, geomorphology and geology, and vegetation cover) and human activities (water use, land use, waste disposal, physical modifications, corridor engineering, urbanization etc.) inducing increased instability in the aquatic ecosystem of the lake. The assessment of major threats of Lake Tana and strategies for integrated water use management research targets to identify and characterize different activities in the watershed of Lake Tana. Special attention concentrates on the activities that impose potential threats on the lake ecosystem. The objectives of the research is to identify and characterize the different activities that are carried out in the watershed and how these activities are managed to minimize the potential risks to the lake resources and the wetland system. The collection of different data in the Lake Tana watershed *Woredas* is done through questionnaire field survey. At this time 80 % Lake Tana watershed, *Woredas'* data is collected. The Ethiopian Meteorological Service Agency provided the meteorological data of Lake Tana watershed. The remaining 20 % watershed *Woredas'* and other supportive data will be collected. The Geographic Information System/GIS format will be used for data analysis to map out and ease communication among the potential stakeholders. The results of the research will serve as a springboard to the potential stakeholders implementing different development activities in the watershed. The result of the research also gives clue to develop an integrated plan of development and establish monitoring and evaluating mechanism to mitigate the potential threats at possible minimized level to sustain the well being of the lake ecosystem serving its multipurpose use for the present and the next generations.

Preliminary Assessment of Soil and Water Qualities at Irrigation Command Areas in East and West Gojjam

Mekonnen Getahun¹ and Enyew Adgo²

¹Bureau of Water Resource Development in Amhara Region and ²ARARI

Abstract

In areas where rain fed agriculture is unreliable due to erratic nature of rainfall patterns, irrigation plays key roles in achieving food security and sustainable development. Such scenarios are currently facing the Amhara National Region State as well as the country whereby millions of people are forced to depend on external food aid. On the other hand, the region has tremendous irrigation potential, which is yet to be tapped if the current trends of food deficits are to be reversed. Irrigation promotion without appropriate safeguards can lead to, negative impacts on ecosystem and environment and need to be closely monitored and mitigated accordingly. Environmental hazards caused by improper practices and poor management of irrigation water can have detrimental undermine the productivity of land. Such negative environmental impacts can also extend beyond the irrigation schemes and affect the ecosystem and other downstream water users. If improperly implemented the negative impact of irrigation outweighs its positive contribution to the people's livelihood. Even though a number of irrigation schemes have already been developed, in Amhara Region no systematic soil and water quality studies are implemented to evaluate the sustainable use of irrigation schemes. This could have developed useful information in identifying and mitigating the negative impacts and future irrigation projects. Such a study would be overcome by taking similar samples in starting any irrigation activities, which could be overcome by taking similar samples in adjacent fields, where irrigation has not been practiced. Therefore, this study is initiating to quantify biophysical and socio-economic impacts of constructed irrigation schemes such as Jedeb, Geray, Fetam and Mendel and Tiquirit by examining main physical and chemical properties of soils at the irrigated and non-irrigated command areas, assessing the quality of water bodies used for irrigation purposes, identify cost effective options for excess water disposal from irrigated land, generate valuable information for the future irrigation schemes development resulted in water logging and other problems in irrigated lands and recommending appropriate measures to mitigate such negative impacts. Based on results obtained, suggestion will be made on future research and development needs.

Determining the Optimal Enterprise Mix in Crop-livestock Integration for Sustainable Farming Systems in the Highlands of North Shewa, Amahra Region

Tilaye Teklwold Deneke and John Mcpeak, USA

Abstract

Like in most highland areas of Ethiopia, mixed crop livestock farming system farming predominates in North Sehwa zone of Amhara region. However, with increasing population pressure and land scarcity, competition for scarce resource develops, and hence crop production is leading to increased competition for land so that a contradiction of the areas of grazing lands for livestock production, where the later being equally important and potential for the generation of income and food security as the first for the smallholder farmers in the highlands of north sehwa. Hence it was proposed to determine the economic optimum level of integration of crop and livestock in mixed crop-livestock farming system of north shewa. Both primary and secondary data were collected for this study. Secondary information was collected from the District Office of Agriculture and *Debere Berhan* Agricultural Research Center on farm database. Primary data was gathered from farmers field by way of formal survey through trained enumerators. At present, this study is at its final stage of data analysis. Analysis of data involves descriptive statistics, cost benefit analysis and mixed linear programming mode. To undertake the mathematical programming, first production functions have to be determined and stochastic

frontier analysis is used for this purpose. What remains now is finalizing the remaining data analysis and report. This will be done in the coming four months time.

Scaling Out of Integrated *Striga* and Drought Management - Packages to Enhance Sorghum Production in North-Eastern Ethiopia

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¹ Sirinka Agricultural Research Center, North Wollo, P.O. Box 74 ² Melkassa Agricultural Research Center, Nazareth (Mentor)

Introduction

Sorghum is the second most important food crop next to tef in North Eastern Ethiopia. The crop has a multitude of uses where the grain is used for food and local beverages, and the stalk is used for syrup, feed, fuel, construction and even as a cash source. Efforts have been made by Sirinka Agricultural Research Center to find improved sorghum varieties for low moisture stress locations and *striga* infested arable lands to boost sorghum production per unit area. Accordingly, two early maturing and high yielding varieties namely *Yeju* and *Teshal*, and one *striga* resistant sorghum variety which is called *Hormat* were recently released for Eastern Amhara region. With the support of AMAREW Project, the efforts were continued to disseminate improved sorghum varieties with other sorghum technologies for selected locations in Kobo, Habru and Dawa Chefa weredas. Yeju and Teshal were used as alternative varieties for the selected locations. Yeju was distributed only in Kobo kebeles to take the advantage that it can mature 15 days earlier than Teshal to combat the chronic low moisture stress. Teshal was distributed in Habru and Dawa Chefa kebeles as they acquire better precipitation than Kobo. Hormat was disseminated in the three weredas as per their requirements.

Community Awareness Creation

At the beginning of project implementation, potential sorghum growing locations were identified with the assistances of Office of Agriculture and Rural Development in three locations. Accordingly, six kebeles from Kobo, two kebeles from Habru and three kebeles from Daw Chefa weredas were selected. Goby (020), Robit (012), Aradom (08), Abuare (07), Kobo zure (01) and Mendefera (06) were the selected kebeles in Kobo; Girana (018) and Lipso (014) were the selected kebeles in Habru; and Bedeno, Gerbi and Shekla were the kebeles in Dawa chefa wereda. Information was delivered to DAs' of individual kebeles about the project, the required number of participants and the procedures planned to be followed. As a point of priority, arrangement was made to meet the farmers in the selected kebeles of the three weredas. The farmers were briefed about the objective of the project and their obligation to participate in the project. Based on their interest the required numbers of farmers were selected. In some kebeles interested farmers were more than the required while in other kebeles farmers were few in number to meet the required number. In this regard the number of farmers was different from kebele to kebele because farmers' interest may vary from location to location.

Training and Workshop

A one day workshop and one day training arrangements were held on June 4 and 5, 2007 at Kobo, June 7 and 8 2007 at Mersa and June 13 and 14, 2007 at Kemisie. The workshop contains different stakeholders from Office of Agriculture and Rural Development, kebele leaders, Development Agents and farmers. During the workshop, the project proposal was presented, the concept of scaling out was discussed, questions raised and discussed; finally memorandum of understanding was signed among the participated bodies to share responsibilities. The agreements were similar with few variations from Wereda to Wereda. During the training description about the improved varieties and improved management practices of sorghum were presented for farmers and

development agents. Farmers in each kebele were organized as one group. One group coordinator and one reporter were assigned for the individual kebeles.

Seed Distribution

The seed stock was treated by chemical for smut control. Based on the land size of individual farmers, good quality seed was prepared for every farmer. The seeds were distributed before June 27, 2007 in accordance with the signed memorandum of understanding. About 3 quintal Hormat, 2.5 quintal Yeju and 2.75 quintal Teshal were distributed to the farmers at hand.

Seeding

Almost all farmers, who participated in the training workshop and acquired the improved seed, have planted their land from June 1, 2007 to June 12, 2007. About 65 hectare farmlands were covered by improved sorghum varieties during 2007 cropping season. Early monitoring and evaluation of the farms indicate that, most farmers couldn't maintain the optimum seed rate for sorghum. Additionally, farmers have not used fertilizer and tie ridger.

Monitoring and Field Evaluation

The project was evaluated by Amhara Regional Agricultural Research Institute directors and Sirinka Agricultural Research Center researchers on a field visit held on October 11, 2007. The varieties have performed well. The farms were seen as patches distinctly different from the local varieties in uniformity and maturity. Some farmers have said that about twenty neighboring farmers have requested the owner farmer to change the seed of the varieties by tef. The evaluation team has decided that another field day be arranged for regional, zonal and wereda administrative bodies including journalists from different news agencies. The field day was arranged on October 19, 2007 at Kobo. The farmers' reactions were very nice explaining that the varieties were suitable to their farming systems in different aspects. Wrap up session after field visit indicated that, the participants were highly satisfied with their stay in the field visit. They stressed that the project should be continued until all farmers can produce improved seeds.

Status of the project

Almost all farmers have harvested and stacked the sorghum. Some farmers have threshed and measured the yield advantage over the local variety. The farmers said that the improved varieties were better in yield than the local varieties. All farmers have registered at least another five farmers to convey seeds enough for half to one hectare farmland.

Challenges

Although the project has been successfully completed in the first year, a number of challenges were encountered. Some of the commonly and frequently occurred problems are listed out below.

- Poor institutional linkage.
- Failure to exercise the signed memorandum of understanding.
- Farmers were not ready to accept technical comments in the field.
- Improper and inappropriate implementation of projects in the previous years.
- Mixing of improved seeds with the local variety.

3.5.5 Other Activities Undertaken

Participation in Field Days: The research centers in conjunction with the respective WOARDs have organized field days on the activities being conducted to scale out improved technologies at their mandate areas during 2007. Together with the CoP and the rest of AMAREW staff, the Research Advisor has participated in these field days.

Participation in Inductive Training: ARARI with the financial support of AMAREW has organized a one month-long (1-31 August 2007) inductive training for its new recruits in five major topics. These are: (i) Diagnosis and planning, (ii) Research methods and experimentation, (iii) Data analysis, (iv) Research proposal writing and reporting, and (v) Orientations by senior mentors. The research advisor, together with other resource persons from ARARI and EIAR, has covered the second and third topics for 11 days.

Participation in Convocation of Graduation: Five AMAREW-supported students (one female and four male) have completed their first degrees from Mekelle University in July 2007. The Research Advisor for he was then a designated officer-in-charge, represented the CoP on their convocation and also together with the Training Advisor negotiated the speeding up of the completion time for the rest of the students who are sponsored by the project under the university, full report of which is covered under the Training Section of the compiled report.

Participation in AMAREW's October Workshop: The research component has prepared a consolidated form of the activities undertaken over the last five years of the project's lifetime and presented on the first day of the AMAREW final workshop held during 20-24 October 2007. In addition to the oral presentation, activities of the component have been visited by the participants of the workshop (except USAID) on the field and laboratories of the partner centers and woredas.

Preparation of the Terminal Report of Research Component: Following the sudden announcement of USAID that the project will not continue after December 31 2007, the terminal report of the research component has been prepared and submitted to the CoP of AMAREW.

4. Extension Component

4.1 Introduction

As in the previous years, the Extension Component of AMAREW during 2007 has been working on improving the technology transfer performances of pilot woredas and fostering functional linkage and integration of research, extension and the farmer in the program area. Efforts have been devoted to successful implementation of project activities targeted on the 2007 work plan through efficient monitoring exercise. Scaling up of technologies has been implemented for successful dissemination of a large number of crop and livestock technologies identified on the joint review and planning workshop. This approach was implemented through a collaborative effort of WOARD and the pertinent RC, its contribution in supporting the effort for linkage and integration has been significant. A number of accomplishments have been recorded through efforts made to extend successful experiences of the Yeku and Lencha Dima watershed management sites to the recently established pilot watershed sites of Lay Gayint, East Belessa and Tehuledere. In spite of its termination, the project's attempt of extending successful experiences gained on these recently established watershed management sites is promising. On the other hand, since 2007 was the final year of the project, the Extension Component has been engaged in preparation of terminal report and exist strategy which demanded intensive activity of data collection, refining, compiling and analysis. Furthermore, the component has taken part on the traveling workshop organized on the achievement and lesson of the AMAREW project. The following sections report on performances of the Extension Component during 2007. The report is organized under five sections. The first section presents accomplishments of the component during 2007 and highlights planning and monitoring activities performed during the year, activities related to dissemination of improved technologies and accomplishments of the component on activities entailing project termination. Section two reports on budget utilization profile of the component during 2007. Problems encountered in the course of implementation and solution measures devised are covered under section three and four.

4.2 Accomplishments

Despite impediments experienced by the project, the component has in general realized satisfactory achievements in accomplishing activities targeted for FY 2007. Details are discussed under the different headings presented here under.

4.2.1 Delivered annual report of FY 2006.

The 2006 annual report was produced early in the first quarter of 2007. The component has submitted a report organized in four main sections that narrate the 2006 performances of the component in detail. This indeed has been one of the accomplishments of the component in 2007.

Prepared action plan of FY 2007

Implementation of the 2007 work plan was activated with a brief orientation given to front line implementers in all the pilot woredas on its content and implementation modality. This was actually felt necessary for the sake of developing transparency among project actors. The annual work plan for each pilot woreda was also broken into quarterly action plan

briefly specifying share of extension kebeles, implementation timetable, and individuals responsible for implementation of specific activities. This activity was found essential for effectiveness of the monitoring practice that could lead to successful implementation of project activities.

4.2.2 Disseminated improved technologies.

Crop production

The 2nd tranche of the 2006 budget, which accounts for 30% of the annual budget for the ANRS partners, was released at the end of the fourth quarter of 2006. This budget was utilized for procurement and purchase of improved seed targeted for 2007 planting season, budget delay has often been a challenge for dissemination of improved varieties of crops. Nevertheless, inaccessibility of improved crop varieties targeted for 2007 has been a critical impediment on the component's effort to meet its target. Although the actual seed requirement of the project has been notified to the Input Distribution and Administration Department of BOARD as early as in January, the department did not respond promptly in providing all the varieties targeted and/or the right quantity. However, with the continuous effort of the project office, each of the pilot woredas has more or less managed the procurement and purchase of most of the varieties targeted for dissemination. Those varieties, which have not been found accessible, were in fact replaced with alternative varieties recommended by researchers and technical staff of the respective WOARD.

Accordingly, out of 17 varieties of 8 crop species targeted for 2007, the project has managed a dissemination of 10 varieties of 7 crop species. Three crop varieties were substituted by alternative varieties of the same crop. Whereas, barely varieties of Shedeho and Mulunesh were not accessible from the envisaged source, the Adet Research Center. In terms of quantity the project has met nearly 73% of its target for dissemination of improved varieties of cereals and pulses.

Similarly, 75% of the target set for promotion of vegetable crops was met. The project's attempt of extending experiences of the Gumet Watershed on seed potato production scheme to the Lay Gayint and Guba Lafto pilot Woredas was successful. Targeted HHs managed a successful harvest of 233 quintals of seed of five improved varieties of potato disseminated in the extension kebeles of Lay Gayint and Guba Lafto woredas. Nevertheless, for reason of project termination further activities of institutionalizing the seed potato production scheme has not been exercised. Therefore, the project, in its exit strategy, has called for the concern of pertinent stakeholders in paying close attention in enhancing the remaining activity.

Regarding fruit crops, the project has disseminated 1000 seedlings of highland fruits (apple, pear and plus) in extension kebeles of the Lay Gayint and Guba Lafto woredas. It has also disseminated 254 seedlings of grafted mango in the pilot watershed Kebele (Achikan) of East Belessa. The appropriate skill training on care and management of fruit tree seedlings has been given to adopters and a promising rate of survival has so far been realized on the seedlings disseminated.

Table 6 Dissemination of improved varieties of crop targeted for 2007

Woreda	Crop	Variety	Unit	Planned	Achieved	Achievement (%)	Number of HHs targeted			Remark
							Male	Female	Total	
Lay Gayint	Wheat	HAR-604	Qt	50.5	0	89	0	0	0	
		HAR-1668	Qt	16.9	0		0	0	0	
		HAR-1685	Qt	0	60		137	23	260	
	Barely	Shedeho	Qt	14.1	0	0	0	0	0	
		Mulunesh	Qt	14.1	0		0	0	0	
	Faba bean	Cs-20-DK	Qt	59	96	98	243	36	279	
		Degaga	Qt	39.4	0		0	0	0	
	Potato	Menagesha	Qt	75	0	99	0	0	0	
		Wochecha	Qt	75	27.8		40	7	47	
		Jalene	Qt	0	115		130	16	146	
		Digemegn	Qt	0	5		9	1	10	
	Vegetables	Carrot	Kg	16.2	16	99	0	0	0	
		Cabbage	Kg	1.1	15	1364	0	0	0	
		Beet root	Kg	28.8	28	97	0	0	0	
		Shallot	Kg	10.8	0	0	0	0	0	
		Garlic	Kg	9.6	0	0	0	0	0	
		Pepper	Kg	3.6	0	0	0	0	0	
Forage seed	Vetch	Qt	1.58	0	0					
	Oat	Qt	6.75	0	0					
Total	Fruits (Apple, pear & plum)		No	450	500	111.1	50	6	56	
	Cereals & pulses		Qt	194	156	80	380	59	539	
	Vegetables		Qt	170.4	148.39	87	179	24	193	
	Forage seeds		Qt	8.33	0	0	0	0	0	
Guba Lafto	Tef	DZ-01-196	Qt	10.3	6.5	22	63	5	68	
	Wheat	HAR-1685	Qt	67.5	60	90				
		Laste	Qt	0	1		3	1	4	
	Maize	Katumani	Qt				14	1	15	
	Faba bean	Cs-20-DK	Qt	19.7	20	102				
	Potato	Menagesha	Qt	75	0	100	0	0	0	
		Jalene	Qt	0	60		51	9	60	
		Gudina	Qt	0	10		9	1	10	
		Guasa	Qt	0	5		5	0	5	
	Vegetables	Different	Kg	45.78	0	0	0	0	0	
		Shallot	Qt	7.2	0	0	0	0	0	
	Forage seed	Vetch	Qt	1.35	10.5	203	0	0	0	
Oat		Qt	3.38	0		0	0	0		
Cow pea		Qt	0.45	0		0	0	0		
Total	Fruit, (Apple, pear & plum)		No	450	500	111.1	45	10	55	
	Cereals & pulses			0	96.5	67.5	70	7	87	
	Vegetables			0	82.66	75	91	10	75	
	Forage seed			0	5.17	10.5	203	220	80	300
Sekota	Tef	DZ-01-196	Qt	13.5	0	89	0	0	0	

		Cr-37	Qt	0	12		144	16	160		
	Wheat	HAR-1685	Qt	50.7	64	126	154	17	171		
	Sorghum	Abshir	Qt	4.5	0	0	0	0	0		
	Haricot bean	Awash Melka	Qt	4.7	2.5	53	9	3	12		
	Forage seed	Vetch	Qt	0.68	0	228	0	0	0		
		Oat	Qt	3.38	0		0		0		
		Cowpea	Qt	0.68	10.82		273	79	316		
Total	Vegetables	Different	Kg	0.21	0	0	0	0	0		
	Cereals & pulses		Qt	73.4	78.5	107	307	36	343		
	Forage seed			4.74	10.82		273	79	316		
Tehuled ere	Tef	DZ-01-196	Qt	13.5	5	37	76	4	80		
	Wheat	HAR-1668	Qt	0	52.9	162	197	11	208		
		HAR-1685	Qt	32.7	0		0	0	0		
	Maize	BH-540	Qt	0	5		38	2	40		
	Chick pea	Marye	Qt	22.5	0	0	0	0	0		
	Haricot bean	Awash Melka	Qt	22.5	0	0	0	0	0		
	Potato	Menagesha		18	0	0					
	Vegetables	Different	Kg	71.64	0	0					
		Shallot	Qt	10.8	0	0					
Forage	Vetch	Qt	0.68	0	0						
	Oat	Qt	6.7	0	0						
Total	Fruit	Grafted Mango	No	450	0	0					
	Cereals & pulses		Qt	91.2	62.9	69					
	Vegetables		Qt	29.52	0	0					
	Forage seeds		Qt	7.38	0	0					
East Belessa	Tef	DZ-01-196		6.75	10	198	127	6	133		
		DZ-01-974		6.75	0		0	0	0		
		Cr-37		6.75	30		380	20	400		
	Sorghum	Meko		0.5	0	0	0	0	0		
		Teshale		0.5	0		0	0	0		
	Finger millet	Tadesse		0.9	0	0	0	0	0		
		Padet		0.9	0		0	0	0		
	Chick pea	Marye		90	10	11					
	Potato	Menagesha		18	0	0					
	Vegetables	Different	Kg	8.8	0	0					
		Shallot	Qt	7.2	0	0					
		Garlic	Qt	7.2	0	0					
	Forage seed	Vetch		0.9	0						
Oat			2.25	0							
Sesbania			0.23	0							
	Pigeon pea		0.45	0							
Total	Fruits (Apple, pear & plum)		No	450	254	56.4	25	3	28		
	Cereals & pulses		Qt	113.05	50	44	507	26	533		
	Vegetables		Qt	15.3	0	0	0	0	0		

	Forage seed	Qt	3.83	0	0	0	0	0	
Grand total	Cereals & pulses	Qt	568.15	414.9	73	1274	128	1502	
	Vegetables	Qt	298.09	223.39	75	244	34	268	
	Fruits	Qt	1800	1254	69.7	120	19	139	
	Forage seed	Qt	29.45	21.32	72	493	159	616	

Livestock development

The first tranche (40%) of the 2007 budget was released late in June and by then most of the woreda staff responsible for facilitation of procurement and purchase of technology had left for summer training and other unforeseen impediments, such as incidence of bacterial disease on washera sheep breed, accomplishments of the component on most of the targets set for livestock production remained low. Accomplishments of the component through dissemination of livestock technologies during 2007 are detailed as follows. Selection of 60 households (hhs) for modern beehive and 60 hhs for transitional beehive adoption was carried out by Tehuledere WOARD and the necessary orientation has also been given to target beneficiaries.

- Dissemination of 108 bee colonies, which accounts for 37.5% of the target maintained for 2007, was realized.
- 138 modern beehives that represents 67.7% of the target set on 2007 work plan was disseminated for target beneficiaries in East Belessa(30), Lay Gayint(30) and Sekota(77) woredas.
- Only 20 transitory beehives that accounts for about 9.5% of the target has been disseminated for beneficiaries in East Belessa woreda. The reason for such a poor accomplishment has been the difficulty experienced on the finance control system in running local purchase.
- An achievement of 71.4% and 65.7% was realized on the target for dissemination of apiary protective gears and working tools.
- Provision of 276 kg of wax, which accounts for 37.2% of the annual target, was made to target beneficiaries in extension kebeles of East Belessa and Tehuledere woredas.
- A respective achievement of 60% and 40% was realized on the target maintained for provision of Honey Extractor and Wax Printer. The WOARD has managed procurement and purchase of three Honey Extractors out of five targeted and two Wax Printers out of five targeted.
- 284 sheep breed of washera, that represents 20.5% of the target maintained on the annual workplan (1201 heads) were disseminated to target households in the extension kebeles of Guba Lafto(66 sheep) and Tehuledere(180 sheep) woredas.
- The target maintained for restocking local breed goat in the pilot watershed management sites of East Belessa and Tehuledere woredas was realized at 75.2%. East Belessa managed a dissemination of 120 out of the 150 heads targeted for the year and Tehuledere managed 83 heads out of the 120 targeted.
- The target for dissemination of different species of forage crops was realized at 45.4%. The component disseminated nearly 12 Q of different species forage crop seed while the target was 26 Q.

Natural resources development

Since 2006, AMAREW has concentrated its effort through natural resource development on extending successful achievements realized on the previously established watershed management sites of Yeku and Lenche Dima to the three pilot watershed management sites of East Belessa, Lay Gayint and Tehuledere woredas. Promising results have already begun to be seen in terms of awareness creation, community empowerment, and outcome of the physical and biological measures introduced. Efforts have also been made to integrate technology promotion targeted at improving the livelihood of hh members of the watershed management sites. The actual physical work done at these watersheds is given in Table 7.

Table 7 Watershed activities under taken during 2007 at the three pilot watershed management sites of AMAREW

Activity	Unit	Accomplished at		
		East Belessa	Lay Gayint	Tehuledere
Check dam				
Construction	M ³	96	6208.9	50
Maintenance		120	498	-
Terrace			-	
Hillside	Km	3	-	10
Farmland		10	-	-
Trench	No	4500	-	-
Cut-off drain	M ³	-	726.6	-
Water-way	M ³	-	660	-
Road pavement	M	-	1695	-
Purchase of polyethylene	Kg	-	-	274
Purchase of MPT-seed	Kg	-	-	100
Sesbania seed for gully revegetation	Kg	3	-	-
Training on EPLAUA's land policy	No	-	26*	42**

*Consist of 25 male and one female. ** Includes: 21 land administration committee members, 6 members of kebele administration, 2 monks from the Haik Stiphanos Monastery, 10 members of the watershed, and 3 DAs, MPT=multipurpose tree seed.

Conducted mid-year performance review and action plan reformulation

As in the the previous years, a mid-year performance review and action plan reformulation has been conducted at the beginning of the third quarter. This activity was carried out for the main purpose of improving performance of the project in accomplishing planned activities and insuring efficient utilization of resources. Accordingly, performances of the extension component over 1st and 2nd quarter was thoroughly reviewed and the 3rd and 4th quarter action plans was also reformulated at each pilot woreda through an in-office review meeting which was conducted with the active participation of the WOARD head, the AMAREW focal person, concerned SMS members and DAs working at the extension kebeles of the Project. Contribution of such a monitoring practice in improving the 3rd and 4th quarters' implementation performance of the project and insuring efficient budget utilization remains to be indispensable.

4.2.3 Conducted various trainings

Different types of skill training related with the scaling up of technology promotion have been given to woreda staff, extension workers and target households in the program area. The following trainings have been conducted by the component during 2007.

- Training on implementation modality of the scaling up of technologies has been given to 2 SMS members, 6 Development Agents and 105 farmers of the Sekota woreda with a collaborative effort of Sekota Research Center and the WOARD.
- Training on awareness creation on EPLUA policy and regulation has been given to 25 male and 1 female households member of the pilot watershed management site of the Lay Gayint woreda.
- Training on the establishment and running of FREGs has been given to Development Agents in the three extension kebeles of Tehuledere.
- 57 target household members of the extension kebeles of Guba Laftowere were trained on bee keeping
- 43 household members of extension kebeles of the same woreda were also trained on small ruminant management.
- Training of 150 farmers on bee keeping and honey production improvement has been planned by Sekota (60), Tehuledre (60) and East Belessa (30) woredas but we however managed a training of 240 farmers, 8 DAs and 5 woreda staff
- The Tehuledre woreda has fully met the target maintained for training of 21 members of the kebele administration and Watershed Management Committee on land administration and certification policy of EPLAUA

Produceed Terminal Report

After a long process of engaging in data collection, refining, compiling and analysis activity the component has come up with a terminal report, focusing on accomplishments, effectiveness and impact of the project in its intervention through the extension component.

4.2.4 Delivered presentation on the workshop organized by the project

A traveling workshop on the achievements and lessons of the AMAREW project during the project lifespan has been organized by the project office as a practical accomplishment of project termination. The extension component has taken part in presenting performances, outcome and experiences of the five year intervention through extension.

4.2.5 Budget profile

The annual budget maintained for implementation of extension activities, including the Birr 100,000.00 allocated to BOARD for execution of project related activity, has been Birr 1,593,659.00. The component however was able to utilize only 40% of this amount which accounts for about Birr 637463.60. The project, during the previous years, has been securing 2nd tranche or 30% of the annual budget at the end of the budget year, so that it could comfortably utilize it for procurement and purchase of improved seed in the preceding budget year. Accordingly, utilization of 70% of the annual budget has been insured for the past three years.

4.2.6 Problems encountered and solution devised

High rate of staff turn over has still remained to be a chronic problem of the WOARDs in dragging the effort for development. The focal person of AMAREW in East Belessa was transferred to another sector office in the woreda. Almost all the DAs in all extension kebeles of the entire pilot woredas were reshuffled during the year.

Restriction to disseminate the Washera breed sheep targeted for the year resulted from disease outbreak identified on the breed in the source Woredas.

Inaccessibility of improved seed/seedling of the targeted varieties from sources within the region has appeared to be a critical impediment for the project's effort to meet its target.

Delay in budget release has been one of the critical challenges on the project's effort for better performance. The first tranche, 40% of the 2007 budget, was released in late June 2007 and thus has negatively affected smooth implementation of seasonal activities.

Poor response of target households in reimbursing revolving seed at the right quality and quantity was a problem.

Reluctance of some of the pilot woredas, such as Sekota, to run the revolving fund administration scheme in compliance with the agreement signed in between partners.

Inadequate technical and financial reporting by most of the pilot woredas was a problem.

The project office has tried to minimize most of the anticipated risks associated with these problems through routine monitoring activity. Familiarizing the newly assigned technical staff with the overall project objectives, strategies and activities through on the spot orientation has been one of the principal solution measures devised to overcome most of the problems described above.

The project office has been playing an active role of coordination to overcome inaccessibility of improved seed of the varieties targeted for the year through procurement and purchase arrangement from sources as far as Bale.

Concerned WOARDs have been advised to improve performances in areas where they have not performed well.

4.2.7 Conclusion

Failure to meet the milestone for budget release has remained chronic problem of the project in its effort for successful accomplishment of planned activities. Contribution of the 30% or 2nd tranche of the 2006 budget which has been released in December 2006 in supporting implementation of the 1st and 2nd quarter of 2007 was useful for seasonal activities implementation. The 40% or the first tranche of the 2007 annual budget has been released keeping its usual momentum, i.e. late in June 2007. The project performance through dissemination of crop technologies through the scaling up approach has resulted in significant achievement in addressing a number of interrelated purposes of the project. This approach potentially serves the purpose of both pre-extension

demonstration and also on-farm trails. It is also recognized as an important mechanism of bringing researchers, extension workers and farmers together on the farmer's plot, for active interaction. Furthermore, it insures proper application of all the stepwise activities involved in technology transfer. The Extension Component of AMAREW therefore would like to forward its recommendation on the necessity of continuing the scaling up approach in future years.

5. Integrated Watershed Management Component

5.1 Objectives of the 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.

5.2 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, established in 2003, are located in eastern Amhara national regional state representing moisture stress areas of the region and the third, Gumet in Sekela woreda, representing the high moisture areas of western part of the region, was initiated in 2005.

Targeted woredas and pilot watershed sites supported by USAID/AMAREW

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

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 watershed.

5.3 Major activities planned for 2007

- Facilitating research, extension and farmers joint planning process at the watershed level for 2007;
- 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;
- 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);
- Facilitate final workshop on the achievements and experiences of watershed management component of the AMAREW project;
- Preparation of annual and final report on the watershed management component;
- Facilitating and developing of project documentary film.

5.4 Major Tasks Accomplished during the year

Strengthening community level watershed management

In all the three pilot watersheds, communities took an active and leading role 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 activities. The Yeku and Lenche Dima watershed farmers, members of community watershed management organizations (CWMO), DAs and the Sekota and Gubalafto woreda extension workers have made an experience sharing tour for about five days. The group visited GTZ gully rehabilitation works at Debretabor, Arba Amba community, and Fogera irrigation site. From Gumet watershed two farmers from members of seed potato producers, a DA and woreda expert with the project research advisor also visited Jeldu and Holeta seed potato producer groups in western Shoa zone. All visited areas demonstrate the positive impact of community participation for sustainable environmental rehabilitation works and various agricultural and non-agricultural development interventions carried out by interested working groups.



Figure 1. *Community annual planning forum at Yeku watershed in Sekota woreda*

Area closure and plantation

Closing hillsides and application of soil and moisture conservation activities and cut-and-carry system through organized user group has become a highly accepted activity by the majority of the project pilot watershed communities. Within the year, the Lenche Dima watershed communities voluntarily closed a huge area of about 205 ha of degraded hillsides in eight areas through which trenches, micro basins, and check dams were constructed for further control of rain water and thereby enhance soil moisture conservation and encourage the regeneration of different tree and grass species. In the project pilot watersheds, the community has also planted 157,285 multi-purpose tree seedlings and four quintals of forage seeds (pigeon pea and *Sesbania*) over the closed areas and gullies of the pilot watersheds (Figure 2).

Figure 2. *Hillside trenches constructed on the closed areas of Lenche Dima watershed*



Figure 3. *Seedlings transportation from Alewuha nursery to Lenche Dima plantation site*



Physical soil and moisture conservation works

The growing impact of previous hillside treatment and gully rehabilitation activities in arresting run-off, retaining soil moisture and reducing erosion hazard on villages and cultivated lands has inspired the communities to expand similar activities on a wider scale throughout the watershed. In view of that, in the pilot watersheds, a total of 262 km hillside terrace, 26,700 micro basins, 12218 contour trenches, 4,245 m³ stone check dams, 479 m³ gabion check dams, 475 m³ sand bag check dams and 6,336 m³ sediment storage dams (SSD) have been constructed over the closed degraded hillsides, grazing lands and farmland boundaries. In Gumet and Yeku watersheds, on 380 ha, individual farmers maintained their on-farm bunds and constructed 52km new soil bunds.

Figure 4. Hillside trench can easily manage runoff generating at marginal lands



Figure 5. Runoff and sediments had effectively managed through trench and SS-dam at Yeku watershed



Rain and ground water harvesting

The watershed community of the pilot watersheds showed increasing interest in promoting construction of rain and ground water harvesting structures with very limited. Within the reporting year, a total of 22 water harvesting structures, 6 hemispherical ponds at Yeku watershed, and 15 hand-dug wells at Yeku and Gumet watersheds, and one dome at Lenche Dima watershed were constructed by 21 households of the watershed community (Figure 4). The number of farmers with water harvesting structures who are producing fruits and vegetables continues to grow at Yeku, Lenche Dima, and Gumet watersheds. In order to effectively recharge the ground water, 140 percolation pits and SS dams were also constructed above the wells in places where there are high runoff expectations.



Figure 6. Farmers who dug wells and hemispherical ponds have directly entered into planting and growing of vegetables and fruit trees (top); sediment storage dams can easily control runoff generated from the upper catchments (bottom)

Water supply

The Gumet watershed community was planning to have clean water from a spring located at the upper catchments of the watershed. Based on the 2007 plan, the AMAREW project assisting the community by providing budget for industrial materials and skilled manpower, the community in their part contributed labor and local materials for the construction of the water point. Now the developed spring provides clean water for human and livestock consumption as well as irrigation for the watershed community.

Crop Production

In all the pilot watersheds, promotion of improved varieties of crops and vegetables were implemented. During the year a total of 73.3 q of improved seeds of sorghum, maize, wheat, teff, triticale, barely, and pulses were distributed to 330 farmers, and 14.25 kg of vegetable seeds was also distributed to farmers who have water harvesting schemes at Gumet and Lenche Dima watersheds. Within the quarter 950 grafted mango seedlings were distributed to about 100 farmers in Yeku and Lenche Dima watersheds and 600 apple and pear seedlings were distributed to 103 farmers in Gumet watershed (Figure 5).

At Gumet watershed, a total of 104 quintals of seven varieties of improved seed potato were distributed during the first quarter of 2007, out of which seed producer groups planted 77 quintals. A total of 548.5 q potato was harvested, out of which 253.5 quintals were stored in the newly constructed DLS for further multiplication in the coming season. During the year from the stored potato, except Guasa variety, 206 quintals seed potato tubers were distributed to 164 farmers (151 male and 13 female hhs) (Figure 6). Now there are two-community groups organized in the watershed, improved potato seed tuber producers and ware potato producers.



Figure 7. Grafted mango seedling distribution in Yeku pilot watershed



Figure 8. A farmer's seed production field of potato in the Gumet watershed

Livestock production

The project has provided different types of inputs and equipment to facilitate and improve honey production in the pilot watersheds of Yeku and Gumet. During the year, 200 kg of wax, two honey extractors, four wax printers and 53 sets of accessories were purchased and distributed to the watershed community members. At Gumet and Yeku watersheds, a full package of seven transitional and 36 modern beehives were promoted.

Forage development

During the year, individual farmers at Gumet planted about 17,000 tree lucerne seedlings on bunds and gullies. Seven quintals of cowpea and other forage seeds were distributed to farmers and planted at Yeku watershed and two quintals of pigeon pea and *Sesbania* were also planted in the closed area of Lenche Dima watershed.



Figure 9. Well rehabilitated gully at the Lenche Dima watershed

Environmental Protection and Land Administration

At Lenche Dima watershed, three-day training was given to 46 farmers and kebele administrators on degraded closed hillside area management and utilization. Gubalafto Woreda Land Administration and Use Team organized the training. This awareness creation workshop has created an understanding on partitioning and distributing the closed areas for selected interested groups or individual farmers of the watershed community. During this year at Gumet watershed 442 farmers have also received land certificate in Sekela woreda.

At the regional level, to exercise proper land use planning, database management and GIS expertise of EPLAUA staff, AMAREW communicated with Virginia Tech to identify candidates on the above-mentioned field. Two candidates were selected and offered the planned GIS training to the EPLAUA experts in December 2007 as covered earlier in this report.

Farmers Training

Within the year, 356 farmers were trained on community leadership training for action (COLTA), hillside management and utilization, integrated pest management, potato seed production and handling, and livestock production and management at Lenche Dima and Gumet watershed.

Table 6. Activities conducted at Yeku, Lenche Dima, and Gumet watersheds in 2007

No	Activities	Unit	Yeku		Lenche Dima		Gumet	
			Target	Achieved	Target	Achieved	Target	Achieved
I	Soil and water conservation							
1.1	Area closure	Ha	-	-	200	205	-	-
1.2	Hillside terrace	Km		15.06	150	247.28	90	-
1.3	Contour trench	No	2000	1256	3000	10962	-	
1.4	Percolation pit	“	500	140	-	-	-	-
1.5	Percolation trench	Km		27	2500	2250		
1.6	Micro basin	No	2000	-	25000	26,700	-	-
1.7	Stone check dam	M ³	3200	1005	1200	3240	500	
1.8	Gabion check dam	M ³	200	392	380	45	500	42
1.9	Sand bag check dam	“			300	475	500	-
1.10	Gully head treatment	M ²	-	12.6	170	25	6 ha	2
1.11	Gully revegetation	ha	1		2	2.5	6	2.19
1.12	SS dam	M ³	2000	6336	-	-	-	-
1.13	Farm Bund construction	Ha	-	-	-	-	-	49
1.14	Pitting	No	50,000	40,875	175,000	56,410	-	-
1.15	Seedling planting	“	50,000	40,875	175,000	56,410	44,000	300000
1.16	Bund maintenance	Ha	-	3			380	581
1.17	Forage seed planting on closed areas	Ha			50	30		0.25
1.18	Gabion box produced	No	-	-	50	75	-	-
1.19	Seedling raised	No					100,000	371696
1.20	Road maintenance	Km	-	2			10	7
II	Water harvesting and water supply works							
2.1	Dome construction	No	-	-	4	1	-	-
2.2	Spring development	“	1	-	-	-	1	1
2.3	Hemispherical pond	“	5	6	-	-	-	-
2.4	Hand dug well	“	10	14	-	-	-	2
III	Livestock production							
3.1	No of Bee colony in a transition beehive						20	7
3.2	No of bee colony in a modern beehive	No	-	24			15	12
3.3	Promotion of wax printer	No	2	2			2	2
3.4	Promotion of honey extractor	“	4	4			-	-
3.5	Provision of wax	Kg	100	100			100	100
3.6	Provision of smokers and other accessories	Set	30	30			20	23
3.7	Provision of forage seed (cow pea pigeon pea and sesbabia)	Qt	5	7.18	2	2		
	Forage seedling planting (tree lucerne)	-	-	-	--	-	56,000	17,000

IV	Crop production							
4.1	Promotion of improved varieties of cereals			19	24	12	40.80	41.5
4.1.1	Sorghum -Yeju	Qt	-	-	4	1	-	-
4.1.2	Tef -DZ 01-196	“			16	5		
4.1.3	Tef - CR-37, for 40 farmers on 10 ha	“	5	3	-	-	-	-
4.1.5	Maize - Katumani	“			4	2		
4.1.7	High land maize-Kuleni, & Hora for 27 farmers	kg			-	-	30	20
4.1.9	Wheat–HAR-1685 (for 42 farmers on 10.7 ha at Yeku)	Qt	18	16	-	2		
4.1.10	Triticale – Minet on 27.25 ha for 109 hh	Qt	-	-	-	-	40	40.8
4.1.11	Barley- HB42 & Misirach for 13 farmers	Kg	-	-	-	-	10Q	16
4.1.12	Faba bean –Dagim for 5 farmers	“	-	-	-	-	5Q	9
4.1.13	Field pea for 5 farmers	“	-	-	-	-	-	9
4.2	Construction of seed bank store	No	1	-	1	-		
4.3	Promotion of horticultural crops							
4.3.2	Improved potato distributed and planted through irrigation by seed producer group	Qt	-	-			80	77
4.3.3	Total potato harvested	“	-	-			-	548.5
	♥ Potato seed purchased at Adet RC	“						24
4.3.4	Provision of vegetable seeds	Kg	-	-	7	5	40	9.25
4.3.5	Construction of community DLS	No	-	-			1	1
	Household level DLS constructed	“					-	11
4.3.6	Provision of grafted mango	No	300	400	100	450		
	Coffee	“	200	400				
	Papaya	“	300	200				
	Shallot	“	2Qt	20,000				
4.3.7	Promotion of temperate fruit seedlings For 103 farmers	No	-	-	-	-	650	600
	Apple	“						480
	➤ Crispy	“						120
	➤ Bond Red	“						120
	➤ Gransmith	“						120
	➤ Gonago Red	“						120
	Pear							120
4.3.8	Procurement of drip equipments	“	5	4				
4.3.9	Establishment of IPM field school	“	1	1	1	1		
4.3.10	Provision of materials for IPM field school	“			24	24		
V	Training and capacity building							
5.1	Provision of land certificate	No	-	442				
5.2	Farmers training on ♥ Degraded hill side management & utilization	“	-	-	40	46	-	-
5.3	♥ Seed Potato production and handling	“					80	188
5.4	♥ Integrated pest management (IPM)	“			24	24		
5.5	♥ COLTA training for farmers and supervisors	“			-	17		
5.6	♥ Animal production and management	“			-	25		
5.7	♥ Agro forestry	“					40	46

5.5 Observation Regarding Implementation

In the pilot watersheds of Yeku and Lenche Dima, soil and water conservation activities have been done through food for work and participation of the watershed community. The 100 MT oil resource required for the mobilization of both watershed communities (60 MT for Lenche Dima and 40 MT for Yeku) was obtained from USAID through SC-UK. Each woreda office of agriculture established the payment norm for oil resource based on the market price assessment results of both woredas, which resulted in 700g vegetable oil per person day of labor. The resource was fully and effectively utilized for the 2007 planned activities.

5.6 Major Problems Encountered

Frequent turnover of the woreda staff and DAs in the project pilot woredas and watersheds hindered the follow up of the seasonal activity implementation.

Inefficient and timely utilization of the allocated budget by the partner institution

Delay of the release of the 2007 project budget.

5. Training Component

6.1 Introduction

Training, as major element of capacity building, is one of the four components of the AMAREW project. The program is designed and implemented in a way to upgrade the competence of the staff of AMAREW project partner institutions so as to enable them to accomplish the planned extension, research and watershed management related interventions effectively. This being the short-term objective, the training component also has a long-term positive impact on enhancing the design and implementation capacity of project partners benefiting from the program. With this perspective, the training component of AMAREW project works in unity with other project components to upgrade and strengthen the knowledge and skill base of the staff of the partners. The activities in this line include joint organization and facilitation of trainings, planned long and short-term trainings offered to stakeholders, educational and experience sharing tours, and work on systematized training program designs and implementations. Moreover, in view of sharing the experience and knowledge of farmers from the developed world, the training component also coordinates and facilitates implementation of Farmer-to-Farmer (FtF) exchange programs run in collaboration with the Virginia State University (VSU). To this end, the following activities were planned and executed in 2007.

6.2 Activities planned for the reporting period

- Follow-up and facilitate the implementation of training planned by the three other components of the AMAREW project, i.e., research, extension and watershed management in the five research centers, six extension pilot Woredas and three pilot watersheds,
- Prepare draft proposal, search and locate resource institutes / persons and facilitate the timely implementation of planned short-term training activities on research methodologies and data analysis for staff working in the headquarters and research centers of the Amhara Regional Agricultural Research Institute (ARARI),
- Request and receive the grade reports for AMAREW Project supported students studying in different local universities,
- Follow-up ongoing degree studies in the summer & regular program in different local universities,
- Develop Scope of Work, facilitate and follow-up implementation of Farmer-to-Farmer program which is run by AMAREW Project in collaboration with Virginia State University and some local partners,
- Undertake FtF impact survey and assess the results of the recommendations given by volunteers,
- Develop concept paper for the formation of small ruminant collective action groups and seed potato growers' cooperative,

Activities performed for the reporting period

6.3 Long-term degree training

MS degree training

One of the 2007 work plan under MS training component is to follow up and render technical and administrative support to have four MS students complete their studies within and after the life of the project. Consequently, two who have joined Haramaya University have completed their studies, submitted official thesis copy and grade report to the Project office, settled all financial matters, reported back to duty and do not have any further pending issues with the project. Two others (Binyam Desta Degaga and Tewodros Bimeraw) have not yet completed their studies (Table1). Binyam Desta Degaga from Haramaya University and Tewodros Bimeraw from Mekelle University will be completing in July, 2008. One of the MS students (Demrew Wesenyeleh Gossa), who joined Haramaya University in September 2003, has discontinued his study without trace.

BS degree training

The AMAREW Project is supporting the studies of local partner nominated students to obtain their BS degrees in four local universities, i.e, Mekelle, Haramaya, Hawassa and Bahir Dar., in regular and summer programs. Hence, follow up has been made and various assistances have been rendered to a total of 23 project supported students. Securing grade reports, payments of training related costs for universities and students, communicating with the different universities on on-going training issues, etc are among activities performed in this reporting period. Referring to the completion dates, of those 22 students 12 of them have completed their studies, submitted grade report to the Project office, settled all financial matters, reported back to duty and do not have any further pending issues with the project (fig 1). While the other 10, will be completing in different times ranging from 2008-2010 (Table 1). Similarly, one of the BS students (Tesfaye Setegne Zewdu), who joined Mekelle University in June 2003, has discontinued his study without trace.

6.4 Short-term training

Training on research methodologies and data analysis for junior ARARI researchers

Upgrading researchers' skill on research methodologies and data analysis was one of the activities planned to be performed in this physical year.. Accordingly, an inductive training has been given to researchers from August 1-30, 2007. In this training, about 50 participants (newly recruited and junior researchers) had stayed in the training program for an extended period of time and meanwhile exposed to the various challenges and methods of agricultural research through classroom sessions and fieldwork experiences. The contribution of AMAREW project in this regard was identification of training requirements, proper institute, resource persons, fund allocation and direct involvement in training delivery.

6.5 Other technical trainings

Understandably, the training component of AMAREW project works in unity with other project components (research, extension and watershed management) to up-grade and strengthen the knowledge and skill base of the staff of partner institutions in the five research centers, six extension pilot Woredas and three pilot watersheds. The activities in this line include joint organization and facilitation of trainings, planned long and short-term trainings offered to stakeholders, educational and experience sharing tours, work on systematized training program designs and implementations and follow up of the whole range of training related matters. Hence, a total of 1263 trainees have participated in short term intensive trainings, seminars and experience sharing tours.

6.6 FtF activities accomplished

In view of sharing the experience and knowledge of farmers from the developed world, the training component coordinates leads and facilitates implementation of Farmer-to-Farmer (FtF) exchange programs which run in collaboration with the Virginia State University (VSU). To this end, the following activities were planned and executed in the reporting year.

In Horticulture, Small ruminants and Fishery focus areas, a total of nine SoWs have been developed and as a result of this, nine volunteers have been fielded and provided technical assistances to farmers and professionals in their respective disciplines (Table 2).

The technical assignments in horticulture focus area were:

- 1/ Development of seed potato marketing system
- 2/ Development of ware potato value adding and marketing system
- 3/ Development of ware potato storage system
- 4/ Upgrading of the existing seed potato growers' nucleus group into cooperative status

The technical assignments in small ruminant focus area were:

- 1/ Development of Small ruminant grazing/browsing system
- 2/ An assessment of overgrazing and erosion complexity
- 3/ Development of small ruminant collective marketing and input use group

The technical assignments in fishery focus area were:

- 1/ Enhancing researchers' knowledge & skill on culture based fisheries and pond management
- 2/ Development of fish marketing system for Zege and St. George fishery production and marketing associations

During the performance of the assignments, visit and field survey programs were arranged for the volunteers with Amhara Regional Agricultural Research Institute (ARARI), Sekota Agricultural research centre, Andasa Livestock Research centre, Sekela, Lay Gayint, Sekota and Guba Lafto Woreda Office of Agriculture and Rural Developments, Lenche Dima and Yeku Watershed Development and Sirinka Agricultural Research Centre, Zege and St. George fishery production and marketing associations and

seed potato growers' nucleus group from Gumet watershed. After completing the difficult field survey mission, the volunteers have produced a report that will guide the work of AMAREW's local partners (mainly BoARD & ARARI), private small, medium and large-scale small ruminant rearing farmers, seed potato growers, community leaders and regional and federal level policy makers in their effort to enhance agricultural production & productivity and conservation of natural resources of the region. Moreover, all the volunteers delivered seminar presentations and technical trainings for staff members of the AMAREW partner organizations in their respective disciplines. Generally from the work of the above volunteers, a total of 1364 direct and 35104 indirect beneficiaries received technical assistance.

6.7 FtF volunteer assignments' impact analysis

In order to identify as to “what did the assignments deliver?” and the “tangible results gained” due to FtF volunteer technical assistance in the three focus areas, field survey based impact assessment was done in the reporting period. Summary of FtF impact analysis (i.e, volunteers' assignment, recommendations made by the volunteers and those adopted by partner institutions) is indicated in table 3 below.

Horticulture focus area

The role and importance of the completed VSU volunteer assignments in achievement of the targets set for this activity (potato production) has been huge. Seed potato production attempt which is started with a few farmers in a small watershed is getting momentum, which has a spill-over effect for the region's extension through expansion of quality seed potato supply sustainably. Moreover, the small-scale ware potato production system in the ANRS is not integrated to the market which imposed multitude of negative influences such as producers' persistent use of poor quality seed, no private sector involvement and lack of processing plants. For market-oriented production to develop, assessment of seed and ware potato marketing and value adding opportunities is a prerequisite. To this effect, through their in-depth assessment & professional recommendations, volunteers contribute a lot in designing a marketing system towards market integration of small-scale potato production system in view of bringing sustained growth of the potato industry and smooth operation of the forthcoming Injibara potato dehydration plant. Altogether, tangible advances have been made, especially; in the areas of quality seed production and as a result significant income increment have been achieved at individual household level.

Small ruminant focus area

Altogether, in all assignments in this sub-sector, strategies for rearing small ruminants in an improved and organized way (feed management, disease control, controlled breeding, improving blood levels through selection, etc.) and collective marketing schemes targeted towards the domestic as well as export markets were assessed, analyzed and recommended. As these assignments are relatively started in recent times, it is too early to state about impact at this point. However, all of the assignments under this sub-sector have been eye openers in motivating development practitioners. Hopefully, sooner, they will result a positive impact since some of the recommendations made by volunteers are already picked-up by the partner institutions.

Fishery focus area

Although it is too early to see the whole image of volunteer impact, from what is being observed and the motivations reigning one can safely predict that the mission was relevant in contributing towards the improvement of aquaculture in Amhara region. Subsistence aquaculture producers already implement some of the recommendations like improving pond water turbidity by planting trees around the pond & compost handling and fish feeding. Due to this, although it is still small amount, some farmers like Meku Negash, Tenaw Meku, Denekew Kebede and Yehasab Ayele already started harvesting fish and consumption. One thing to be noted is that, before these interventions, the above farmers and other farmers near them were not totally aware about fish let alone consuming. We are hopeful that this foundation will induce further changes in the surrounding community members through diffusion effect. The development of such subsistence fish farming will produce a sustainable high quality animal protein source for family consumption to families with limited dietary animal protein availability as well as some marketable fish to enhance farm families' income. More over, by the help of volunteer assistance, the technical capacity of the researchers in Bahirdar Fisheries and Aquatic Life Research Centre (BFALRC) is enhanced. Researchers, who were previously having limitations in sex identification of fingerlings & in other techniques of nursery pond management, are able to improve their knowledge and are now motivated more than ever before to apply their skill to subsistence pond fish farming. Apart from the subsistence aquaculture, using the volunteer recommendations and idea, commercial aquaculture of Zege and St. George fishing and marketing associations will develop in the near future given the resource limitations they have being resolved. Altogether, though difficult to single out quantitatively the role played by volunteers for income change, these commercial associations have benefited a lot in taking business idea from the three consecutive volunteers so far.

From the short time that the pond aquaculture is started and immediate objective of producing fish for subsistence purpose, at this time it is not also possible to put numerical value/income generated from this recently started subsistence pond aquaculture and also difficult to tell the impact of volunteer assistance towards income change.

6.8 Development of concept paper

Currently there is consensus that the regional agricultural development institutions need to incorporate a market / trade based approach in their future work to encourage producers to produce a diversified range of quality products in view of supplying identified market opportunities. Leading market oriented production system could only be achieved in the presence of strong organizations, with bargaining power, in each sub-sector. Following the previous FtF volunteers' recommendations on small ruminant and potato production & productivity improvement, there was an attempt going on to organize 3 groups of small ruminant production, marketing and input use farmers' group (two at Adet and Sekela for sheep and one at Sekota for goats) and cooperative establishment in the existing seed potato growers group in Gumet watershed.

Consequently, a concept paper was developed and submitted to ARARI that assists as a preliminary point for the formation of small ruminant collective action group and seed potato growers' cooperative.

6.9 On going activities requiring attention

Two MS and Ten BS students are not expected to complete their studies by December 31, 2007. Hence, with the financial and administrative support, the ANRS partners should ensure that these students complete their studies and contribute to the ANRS development. Beneficiary institutions (FSPCDPO, ARARI, BoARD, and EPLAUA) should follow-up and make the necessary arrangements for enabling students in the long-term training programs to complete their studies and join them with their newly acquired levels of education.

Organize the existing nucleus group of seed potato growers in to cooperative and link to the ware potato growers and the forthcoming Injibara potato dehydration plant. Along this line, credit supply and other necessary inputs to the forthcoming cooperatives should be attended to.

Finalize the attempt already made to organize small ruminant rearing farmers group in Sekela, Adet and Sekota.

Provide technical assistance to the emerging pond aquaculture and to the improvement of fish marketing.

In the three focus areas of intervention, which are mentioned above, stick to the value chain approach and give emphasis for the whole range of value adding instead of only concentrating to production increment.

Table 1. Details of completion status & annual budget requirement for students completing after 2007

No	Name of trainee	Completion date	Institution/place of work	2008	2009
1	Tewodros Bimeraw Hailu (MS. Student)	July 2008	East belessa WOARD	1000	0
2	Binyam Desta Degaga (MS. Student)	July 2008	DebreBirhan research centre	7000	0
3	Mohammed Hussein Yimer (BS. Student)	Sept 2008	Tehuledere WOARD	1260	0
4	Ashagrie Melkamu Wole (“ ”)	July 2009	GubaLafto EPLAUA	11640	6200
5	Biksegne Asfaw Endale (“ ”)	July 2009	LayGayint WOARD	11640	6200
6	Desalegn Abreha Worku (“ ”)	July 2009	East Belessa EPLAUA	11640	6200
7	Mesfin Bahita Tesfaye (“ ”)	July 2009	Sirinka research centre	11640	6200
8	Teshome Getaneh Lule (“ ”)	July 2009	Sekota EPLAUA	11640	6200
9	Tewodros Girma Abebe (“ ”)	July 2009	TehuleDere WOARD	11640	6200
10	Addisu Bihonegn Eshetu (“ ”)	Sept 2010	Sekota research centre	1260	1260
11	Berhanu Fentaye Tadfesse (“ ”)	Sept 2010	Sekota WOARD	5050	5050
12	Jemila Esleman Jibril (“ ”)	Sept 2010	East Belessa WOARD	5050	5050
	Total			90460	48560

Table 2. Details of the Completed FtF assignments in 2007.

No	Assignment No.	Assignment Title	Focus area	Name of the Volunteers signed for the assignment	Remark
1	AMAREW 04.1/2007	Development of seed potato marketing system	Horticulture(potato)	Mr.Terrill Christensen	Feb 3-17, 2007
2	AMAREW 04.2/2007	Development of ware potato value adding and marketing system	Horticulture(potato)	Dr Charles Basham	March 23-April 7, 2007
3	AMAREW 04.3/2007	Development of ware potato storage system	Horticulture(potato)	Mr. Alan W. Laird	September 22-October 5,2007
4	AMAREW 04.4/2007	Upgrading of the existing seed potato growers nucleus group into cooperative status	Horticulture(potato)	Mr. Alan W. Laird	September 22-October 5,2007
5	AMAREW 06.1a/2007	Development of Small ruminant grazing/browsing system	Livestock (small ruminant)	Dr Ozzie Abay	May 9-24, 2007
6	AMAREW 06.1b/2007	An assessment of overgrazing and erosion complexity	Livestock (small ruminant)	Dr. Steve Oberle	May 11-24, 2007
7	AMAREW 06.2/2007	Development of small ruminant collective marketing and input use group	Livestock (small ruminant)	Mr. Kevin Heaton	August 28-September 15, 2007
8	AMAREW	Enhancing	Livestock (Fishery)	Mr. Daniel	July 20—

	02.2/2007	researchers knowledge & skill on culture based fisheries and pond management		Theisen	August 7, 2007
9	AMAREW 02.3/2007	Development of fish marketing system for Zege and St. George fishery production and marketing associations	Livestock (Fishery)	Mr. Perry Raso	July 20— August 7, 2007

Table 3. Summary of FtF impact analysis (i.e, volunteers' assignment, recommendations made by the volunteers and those adopted by partner institutions)

No.	Assignment	Name of Volunteer	Date of Assignment	Recommendations	Recommendations adopted by partner institutions
1	Assessment of Ware Potato Marketing Opportunities	Roger Knutzen	April 3-20, 2006	<ul style="list-style-type: none"> • Working towards an industrial-base economy • The country should enter the WTO as a least developed nation • Working towards commercializing the agricultural-sector • Establishing a link between research and extension • Organizing agricultural cooperatives • Eliminating the many layers between the farm gate and the end user • Privatization of the land • Develop irrigation project • Use the hybrid true potato seed • Establish potato processing plant 	<ul style="list-style-type: none"> • Potato dehydration plant at In... is going to be established • Currently preparation is under... to enter the WTO by the government (Although it is b... the scope of the assignment) • The value chain approach is b... followed for potato (Linking production to industries and ultimate consumers is in prog... • A nucleus group of 15 produc... produced significant amount basic seed and generated high income from this venture. • Formation of FREGS in pilot woreds is underway
2	Development of On-Farm Potato Seed Tuber Production and Marketing Scheme	Joseph Guenther	May 20-June 3, 2006	<ul style="list-style-type: none"> • Continue to promote clean seed and suitable varieties • Continue efforts in storage development and management • Continue community-based program, DA involvement and cooperative development • Develop a color-coded seed identification system • Develop seed potato planting packs • Contact Technico¹ 	<ul style="list-style-type: none"> • Seven improved potato cultivars distributed to 77 producers. • Efforts underway to privately construct DLS from locally available resources by the seed potato producers. • DA involvement in seed potato production improved signific...

1

Suggesting Improvement
in Aquaculture Production
System

3

Brian Nerrie

July 8-23, 2006

- Continue the regulation and their enforcement of commercial fishing on Lake Tana
- Encourage fisheries associations to attain cooperative status
- Improve post-harvest fish handling, processing methods, and waste management with respect to food safety and environment
- Assist fisheries cooperatives/farmers to expand production through pond aquaculture
- Keep production systems simple with focus on tilapia subsistence and commercial levels
- Examine local feedstuffs as fish food
- Develop training programs for research, extension and farmers
- Upgrade the fish marketing system
- Overcome production system issues before expanding to new species
- Regional fish resource utilization policy, which entertains enforcement, has been developed
- Fisheries associations improve production, fish handling and marketing (i.e. Purchased two additional deep freezers, Purchased two additional Boats)
- The associations have also accessed themselves to micro-credit and received a total loan of 200,000 Birr, from small and medium enterprise promotion agency in the region, to expand their production
- Training delivered to researchers on Tilapia fingerling production and grow-out
- New Billboard, St. George for nutritious Lake Tana fish, has been posted in front of the association office to advertise the fish market

Assessment of Improved Small-Ruminant (Sheep and Goat Rearing and Marketing opportunities with emphasis on assessing the current production systems, opportunities and design of workable production strategies.-debre Birhan, Dese, Weldiya, Sekota, Debre Tabor, Dangla, Sekela, Gish Abay and Gondar.

Judith Moses

July 23-August 10, 2006

- Separation of young stock from dams during the night to provide supplementation and to lessen competition with adult animals
- Provide training on lamb & kid finishing methods, nutritional management requirements as a micro-enterprise project for a small group of interested producers
- Provide training on body condition scoring for goats and adapted scoring for fat tailed sheep, inner eyelid/gum color for health & parasite issues & other simple health & conditioning checks.
- Disseminate information and pilot techniques for improved grazing methods such as the binding rest program for vulnerable areas (Sekota Woreda methods), Cut-and- Carry (no graze), or other appropriate grazing methods.
- Provide training and information on surveillance and diagnosis of seasonal disease outbreaks.
- Provide producer and extension agency training & support on common disease symptoms, treatments, medications, and simplified postmortem (autopsy) techniques after death.
- Improve housing situation initially for young stock and female breeding stock considering social implications or resistance.
- Provide training on management requirements to supply purebred or specific cross-bred options as a micro-enterprise.
- Provide training on selection methods for the commodity goat and sheep producer and methods of eliminating inferior/random breeding methods.
- Continue the research of native breed potential such as the Barka goat and the Dangila and Bonga sheep
- Re-initiate distribution of Meadi free Awassi rams when ready and import additional rams or semen when available.
- Additional supports and resources for extension offices and research centers in the form of basic lab availability, training, software, reference materials, funding for trials.
- Expand tree, browse, and grazing variety nurseries for planting in yards, degraded areas and around private plots.
- Expand farmer training school programs (similar to Sekota woreda).

- Based on FtF volunteers' recommendations, hands-on training sessions were organized for those who after receiving the training shall train producers
- Hence 23 mentors trained on condition scoring for goats, methods that minimize competition from dams to young stock, surveillance and diagnosis of seasonal disease, elimination of inferior breeding stock, elimination of random breeding (Castration of unwanted male goats)

5	Assessment of Improved Small-Ruminant (Sheep and Goat Rearing and Marketing opportunities with emphasis on assessing the current marketing system, opportunities and development of marketing strategies that benefit producers and traders-Debank, Farta and Debre birhan	Larry Jacoby	August 20-September 2, 2006	<ul style="list-style-type: none"> • Install parasite control program. • Improving adequate weight gain, meat carrying capacity, carcass yield, and finishing through local breed selection and feed management • Improve transportation system • Standardize animals brought to abattoirs, follow strategies to bring animals to slaughter weight by on site feeding • Introduce marketing system such as ear tattooing, notching, scarification, tagging, etc. • Promote trade relations with Sudan • Organize producers into collective input use and marketing groups, supply credit and other inputs to organized groups • Pastureland improvement and reorganization • Design system to provide market information to farmers. • Increase the number of highland shoats processed by abattoirs. • Encourage the brand recognition of Ethiopian Grass-Fed Natural marketed as a superior product, not as a commodity. • Train agricultural extension agents to solve the problems with small ruminant rearing and marketing. • Develop a curriculum for farmers training in the production of sheep and goats. • Obtain experts who can teach meat exporters, owners of slaughtering facilities and extension agents about improving the export market for sheep and goat meat. 	<ul style="list-style-type: none"> • Asheref industry business group is a Sudan based company, with a capacity of 1500 shoats per day and is currently under construction. This will create a potential market for farmers and traders. • AMAREW project with collaboration to ARARI prepared concept paper to establish small scale ruminant production and marketing groups (Model farms). After approval of the budget, it will be implemented in the near future. Hence attempts underway to organize 3 collective groups of 1000 at Sekela (sheep), 1 at Sekota (goats) & 1 at Adet (sheep).
6	Assessment of Improved Small-Ruminant (Sheep and Goat Rearing and Marketing opportunities with emphasis on the provision of professional training to producers, traders and development workers that ensures better returns to producers and traders-A/A, Debre Birhan.	Steven Weerts	September 13-21, 2006	<ul style="list-style-type: none"> • Perform study using existing flocks of sheep to make extensive treks. • Setup model rearing through existing cooperative family groups. • Encourage use of weight estimate method • Encourage direct contact between the abattoirs and farmers. • Work on water storage development. • Establish small farmer groups and empower them to have information on production and marketing. 	<ul style="list-style-type: none"> • After organizing marketing groups, provide tailored training for farmers about small ruminant rearing and marketing opportunities given
7	Assessment of Improved Small-Ruminant (Sheep and Goat Rearing and Marketing opportunities with emphasis on the provision of professional training to producers, traders and development workers that ensures better returns to producers and traders Debre Birhan, B/Dar	David Kier	Sept.14-25, 2006	<ul style="list-style-type: none"> • Perform study using existing flocks of sheep to make extensive treks. • Setup model rearing through existing cooperative family groups. • Encourage use of weight estimate method • Encourage direct contact between the abattoirs and farmers. • Work on water storage development. • Establish small farmer groups and empower them to have information on production and marketing. 	<ul style="list-style-type: none"> • Direct contact will be made between small ruminant farmers around BahirDar and Asheref PLC.

Terrill Christensen

February 2-18, 2007

- AMAREW together with its partners develop seed distribution networks that can be tracked from the beginning (tissue culturing) to the end (processing plant or local market).
- Find proper storage for the seed potatoes. Construct Diffused Light Store (DLS)
- Study possible dark cool storage.
- Use extension agents to encourage and teach the growers of the benefits of self government and self improvements so that the formation of seed growers association will be viable and sustainable.
- The regional directors should give attention to the road that will help get the commodity to market from remote areas (improve the road infrastructure).
- Incentives to farmers to make them more cooperative for the work needed.
- The extension agent should deliver technical training which has a comprehensive set of records for each lot of seed provided by the Research Institute to the seed farmer and the increase of planting material.
- The extension agent should also visit the ware-farmers and train them with the benefits of using new seed, such as better quality and higher tonnage.
- Provide incentive for development agents who are working with seed growers.
- Draft strategy on how to sustainably link production to consumption. A marketing system has been developed at regional level
- Lab equipments for potato tissue culturing have been fixed at ARARI.
- Seed potato producers vigorously increased in number from 15 to 70 in Gumet water shed area.
- Seed potato producers constructed additional DLS in cooperation.
- Further more members are planning to privately construct additional DLS using locally available resources.
- A team of AMAREW project staff, Woreda SMS, development agents and farmers had cross-site visit to seed potato growers area (Holeta) as an incentive to work more in this vocation (Potato farming).
- In collaboration with different stakeholders, preparation is underway to organize **ware-potato** producers (Just to link to **seed potato** production group)
- The rural road which connects PA to watershed, that will help transport potato seed to the market, has been maintained using community funds and local resources.

Development of Ware
Potato Value Adding and
Marketing System

9

Charles Basham

March 21-April 5, 2007

- Establish simple grading standard.
- Establish a market intelligence system with at least weekly reporting of market prices in selected cities.
- Make available plans and financing for construction of low cost, low tech storages to individual farmers and cooperatives.
- Strengthen and focus on establishment of cooperatives on potatoes
- Improvement in the management of the forthcoming Injibara plant.
- Insistence upon use of certified seed of approved cultivars should be made a part of contractual arrangements with growers through their cooperatives.
- Establish an Integrated Pest Management program for potato production.
- Set quality standards as part of production contracts.
- Recruit farmers with irrigation capabilities with payments bonuses for out-of-season production.
- Recruit coops to serve as contracting agents for their members.
- Evaluate the market for potato-based snack food products such as chips.
- Expansion of the market in Sudan should be pursued vigorously.
- Encourage and support FREGS.
- Seed potato producers in Guma watershed area constructed one additional DLS in cooperation.
- Further more members are plan to privately construct additional DLS for ware potato storage using local available resources.
- Attempt is underway to upgrade the existing seed potato grower group in to cooperative status.
- Additional FREGS established in potato production areas
- Currently market for agricultural produce, especially for potato and livestock products, is being dominated due to **Sudan** companies.
- Award already given for the construction of fence for Injibara potato dehydration plant.

Feed resource assessment and utilization of browse vegetation for small ruminants-Bahir Dar, Sekela, Lay Gayint, Farta, Guba Lafto and Sekota

1
0

Ozzie Abaye

May 7-25, 2007

- Immediate attention to **Sekela** and **Sekota** areas as there is overgrazing and the ecosystem is at alarming level (rotational stocking may be used as a means to prevent further degradation & increase pasture productivity)
- Implement management schemes to reduce disappearance of browse species.
- A follow up study on alternative feed resources, ecology, and improving soils for increased crop/pasture production.
- Expanding farmer–and community driven land conservation approaches
- Assess alternative management strategies on public grazing land
- To reduce extreme grazing pressure on the public lands, farmers need alternative feed resources when livestock feed is in short supply such as:
 - Ensiled materials
 - Introduction of back yard alternative supplemental forages for cut and feed
 - Introduction of improved breed (increase feed efficiency)
- Expand holistic and integrated natural resource conservation
- Expand the utilization of GIS technology for integrating existing and future research information.
- A follow up study on alternative feed resources, ecology, and improving soils for increased crop/pasture production.
- Expanding farmer–and community driven land conservation/protection approaches
- Assess alternative management strategies on public grazing land
- Expand holistic and integrated natural resource conservation & protection approach
- Expand the utilization of GIS technology for integrating existing and future research information.
- Improve and expand soil sampling and testing efforts across the region and country for increased crop/pasture production and nutrient efficiency
- Community based watershed management whereby Cut-and-Carry system to increase feed efficiency and reduce extreme grazing pressure is being adopted at Lenche-Dima watershed.
- Researchers at Sekota promote exercise to ensilage “Cassia” to improve feed availability in the area
- Based on the volunteer recommendation, a follow up assignment is going to be finished in GIS technology in Sep-Oct 2007

An Assessment of Overgrazing and Erosion Complexity-B/Dar, Woldiya, Lenche Dima watershed, Lay Gayint, Debre Tabor, Sekela, Gumet watershed.

1
1

Steve Oberle

May 11-25, 2007

- Expand holistic and integrated natural resource conservation
- Expand the utilization of GIS technology for integrating existing and future research information.
- A follow up study on alternative feed resources, ecology, and improving soils for increased crop/pasture production.
- Expanding farmer–and community driven land conservation/protection approaches
- Assess alternative management strategies on public grazing land
- Expand holistic and integrated natural resource conservation & protection approach
- Expand the utilization of GIS technology for integrating existing and future research information.
- Improve and expand soil sampling and testing efforts across the region and country for increased crop/pasture production and nutrient efficiency

Development of fish marketing systems for Zege and St. George fishery production and marketing association

1
2

Perry Raso

July 18-August 7, 2007

- Coach farmers to adjust stocking densities over time to maximize the tilapia yield
- Teach farmers to use nested hapa net method so that they can sort out fish according to size.
- Introduce a predator species
- Work on improving fish harvesting and processing techniques (e.g., create and maintain a cold chain)
- Work on improving storage techniques (e.g., rotate product, put fillets on wood, plastic...)
- Use a model to predict sustainable harvest of fish from lake Tana
- Locating gear supplier to get fishermen necessary gear
- Establish and enforcement of well defined fishery regulations
- Enforcements of proclamation 92/2003
- Train fisheries inspectors
- Monitoring Asheref Business Groups impact on local fisheries and availability of fish for consumption in B/Dar
- Data collection on current fish stocks.
- Establish catch limits
- Regulate mesh size

- Preparations under way to introduce Cat-fish as a predator
Tilapia fish at the research level

Training on Mono-sex tilapia pond aquaculture and fingerling production- B/Dar, DebreElias and Enemay

1
3

Daniel Theisen

July 18-August 8, 2007

- Identify pockets of motivated farmers where a single extension agent can easily and frequently visit them.
- Establish with a farmer a management strategy
- Build a greenhouse hatchery
- Request seines and waders from FtF
- Improve water source to be shared by hatchery, holding area & ponds
- Create a working relationship with Suliman Galal of Ashraf Industrial Group PLC.

- Preparations already made to build a greenhouse hatchery with an adjacent holding area in an existing building



Figure 1. Four of the twelve BS graduated students

ANNEXES

Annex 1

RIT Allocation of AMAREW Equipment

14-Dec-07

Equipment Description	Chassis no.	ENGIN NO.	Model #	Manufacturer	Allocation
Laptop for Angela Neilan - Latitude C610			3G5QM11	Dell	BoARD
Laptop for Kent Reid - Latitude C640			65PWP11	Dell	BoARD
Laptop for Brhane G/Kidan - C640			H3PWP11	Dell	FSPCDPO
Laptop for Nigussie Rich Pelrine - Inspiron 8200			B1CNQ11	Dell	ARARI
Project Printer (Lazer Jet Printer 1200)			CNC2272851	HP	BoARD
Double Cabin Ford Ranger XL	MINVBSFE802W233881	WPAT120358		Ford	BoARD
Double Cabin Ford Ranger XL	MINVBSFE802W232329	WPAT120109		Ford	ARARI
Double Cabin Ford Ranger XL	MINVBSFE802W231145	WPAT119713		Ford	EPLAUA
Double Cabin Ford Ranger XL	MINVBSFE802W224471	WPAT118292		Ford	ARARI
Double Cabin Ford Ranger XL	MINVBSFE802W233133	WPAT120275		Ford	BoARD
Double Cabin Ford Ranger XL	MINVBSFE802W230913	WPAT119637		Ford	FSPCDPO
Double Cabin Ford Ranger XL	MINVBSFE802W230983	WPAT119634		Ford	BoARD
Fax machine L-200			17341	Canon	ARARI
Computer (Sumsung)			115/23v/2/1A	NA	EPLAUA
Computer (sSumsung)			8/24/2001	NA	ARARI
Photo Copy Machine NP6317			UKB 19572	Canon	FSPCDPO
Dell Oplex Gx 260 Computer			251 LHOJ	Dell	FSPCDPO
Dell Oplex Gx 260 Computer			12 MLHOJ	Dell	EPLAUA
Dell Oplex Gx 260 Computer			FX 8 ZJOJ	Dell	BoARD
Dell Oplex Gx 260 Computer			DQ 1 LHOJ	Dell	ARARI
Dell Oplex Gx 260 Computer			DW 4 LHOJ	Dell	BoARD
Printer 4100N With Cable			RB2 4796 #2	HP	ARARI
Office Furniture (Detail Attached)				Addis Fana	see attachment
Office Furniture (Detail Attached)				Dan tecno	see attachment
Lap top ,Brhane Gebrekidan				Dell	ARARI
Digital Camera			FinePIx S6000		FSPCDPO

Spare Parts & Access ories,Ford rangers	
Spare Parts & Access ories,Toyota Cruisers	
Dell Power Edge 4600 (Server)	
Hp Laserjet Color Printer 990CX	
Slide projection 2500 (Slide Projector)	
Hp Scan jet Scanner 7400C	
Dell Oplex Computer GX260	
Hp Laserjet Printer 4100N	
Hp Laserjet Printer 4100N	
Hp Laserjet Printer 4100N	
3N OverHead Projector	
Toyota Landcruiser	JTECBO1J20-1008394
Toyota Landcruiser	JTECBO1J70-1008794
Toyota Landcruiser	JTECBO1J20-1008797
Jiang Yang Diesel Generator (35,785 Birr) installation cost (8,817.75 Birr)	
LCD Projector	
APC SMART UPS 1000 VA	
Panasonic Telephone Advanced Hybrid System Apparatus	

IHZ-0400768

IHZ-0403535

IHZ-0403549

J0161473		
10611389		
12122789	Dell	ARARI
MY 27 JI SG2		EPLAUA
8114300020		ARARI
CN2-4cs-0717		ARARI
6 JJ 2 MOJ		ARARI
J 2 MLHOJ		BoARD
99 M2 MOJ		EPLAUA
G9 M2 MOJ		FSPCDPO
G4 M2 MOJ		ARARI
51 M2 MOJ		ARARI
CNMXL64276		BoARD
SPMGD41626		EPLAUA
SPMGC39485		FSPCDPO
1064417		ARARI
	MOENCO-Japan	ARARI
	MOENCO-Japan	BoARD
	MOENCO-Japan	FSPCDPO
20GF	Equatorial Business Group	ARARI
VPL-CS5	SONY	BoARD
		EPLAUA
		FSPCDPO

Annex 2

AMAREW In-Country Office Furniture Inventory and RIT Allocation Worksheet

No	Types of Items	Quantity	Allocation
1	Conference Table 160x80x750	4	BoARD
2	Steel Chair W/out arm plastic	6	BoARD
3	Conference Table 160x80x750	1	BoARD
	Sub-total	11	
1	Executive high hydrolic arm chair with leather	1	FSPCDPO
2	Imported high quality managerial chair	35	
		14	FSPCDPO
		10	BoARD
		6	ARARI
		5	EPLAUA
3	Guest chair	22	
		5	FSPCDPO
		7	BoARD
		5	ARARI
		5	EPLAUA
4	Light weight chair	30	
		7	FSPCDPO
		9	BoARD
		7	ARARI
		7	EPLAUA
5	Typist Swivel chair	4	
		1	FSPCDPO
		1	BoARD
		1	ARARI
		1	EPLAUA
6	Executive Table with side Computer Table	1	
		1	FSPCDPO
7	Conference Table with palasandros wooden	4	
		4	FSPCDPO
8	Double pedistal Desk	11	
		3	FSPCDPO

		3	BoARD
		3	ARARI
		2	EPLAUA
9	Typist Table with curved side table	4	
		4	BoARD
10	Credenza Shelf 110x170x40	15	
		4	FSPCDPO
		4	BoARD
		4	ARARI
		3	EPLAUA
11	Lockable shelf 200x120x30	4	
		4	FSPCDPO
12	Filing Cabinet	16	
		4	FSPCDPO
		4	BoARD
		4	ARARI
		4	EPLAUA
13	Coat and hat stand	15	
		5	FSPCDPO
		10	BoARD
14	Paper tray	20	
		20	FSPCDPO
15	Computer Stand /for Server/	1	
		1	ARARI
	Sub-total	365	
	Total Furniture	376	

Annex 3. List of AMAREW Project Staff in 2007

No.	Name	Gender	Education Level	Position
1	Brhane Gebrekidan	M	PhD	CoP and Senior Research Advisor
2	Nigussie Alemayehu	M	PhD	Research Advisor
	Yacob Ashine	M	MS	Extension Advisor
3	Getachew Bayferes	M	MS	Watershed management Advisor
4	Semachew Kassahun	M	PhD	Training Advisor and FtF Coordinator
5	Ahmed Ayele	M	BA	Financial Administrator and Accountant
6	Achamyelesh Mengstie	F	Junior College Diploma	Senior Secretary
7	Fasika Desta	F	Diploma	Telephone operator and Assistant Secretary
8	Dereje Bihonegn	M	Diploma	Driver
9	Yitayeh Endalew	M	Diploma	Driver
10	Yilkal Mekuriaw	M	Completed 12 th Grade	Driver
11	Sefrash Admassie	F	Completed 12 th Grade	Office Assistant
12	Yehizbalem Gebeyehu	F	Completed 5 th Grade	Janitor
13	Alem Deribe	M	Completed 6 th Grade	Security Guard
14	Teshome Mengistu	M	Completed 12 th Grade	Security Guard
15	Tizazu Belete	M	Completed 6 th Grade	Security Guard

Annex 4. 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 Internacional 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	Debut 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	Swedish 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