



Annual Report 2004

**ANRS
PARTNERS**



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Cover Pictures

(Clockwise from top left)

1. Participatory planning session involving farmers, researchers, extension agents, and AMAREW advisors.
2. The watershed communities in Yeku and Lenche Dima participated actively in water harvesting activities including the use of hand dug wells.
3. The Sekota Research Center of ARARI conducts active research on the *Abergelie* local breed of goats, which is well adapted to the lowlands of northern Ethiopia.
4. A seed increase field of improved and early maturing sorghum variety at the Kobo research site of ARARI was visited during the 2004 REFAC tours in which farmers, researchers, extension agents, ANRS officials, and AMAREW advisors participated.

Annual Report 2004



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

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**Report Prepared by
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Table of Contents

Description	Page
Executive Summary: AMAREW Project Annual Report	1
1. Background and Project Management	3
1.1 Project Purpose	4
1.2 Implementation Sites	4
1.3 Implementation Approach	5
1.4 Integration of Project Components	5
1.5 The Role of the Regional Implementation Team (RIT)	6
1.5.1. The 2004 RIT Members of the AMAREW Project	6
1.5.2. Selected Items Addressed and Decided on by the RIT during the year	7
1.6 Project Administration	9
1.6.1. Home Office	9
1.6.2. Bahir Dar Office	9
2. Project-wide Selected Accomplishments and Problems	11
2.1 Project-wide Selected Accomplishments	11
2.2 Short Term Technical Assistance in 2004.....	12
2.3 Project-wide Significant Problems Encountered and Solutions	14
3. Research Component	16
3.1 Introduction	16
3.2 Target Woredas for Research	16
3.3 Major Activities Planned for 2004.....	17
3.4 Accomplishments	17
3.4.1 On-farm Research.....	17
3.4.2 Highlights of the on-farm Research	20
3.4.3 Research and Extension Linkage	20
3.4.4 Research and Development on <i>Vernonia galamensis</i>	21
3.4.5 Small Grants and Mentorship Program (SGMP)	23
3.4.6 Laboratory Facility for Tissue Culture	23
3.4.7 Rapid Potato Seed Multiplication Program	23
3.4.8 Other Activities	24
3.4.9 Problems Encountered	24
4. Extension Component	25
4.1 Introduction	25
4.2 Accomplishments.....	25
4.2.1 Technology Shopping	25
4.2.2 Revising the 2004 Plan	25
4.2.3 Improved Seeds Procurement and Distribution	26
4.2.4 Other Technologies Demonstrated	26
4.2.5 Training for DAs and Farmers	27
4.2.6 Other Activities	28
4.2.7 Professional Contributions in Regional Meetings and Workshops ...	28

4.3	Cross Cutting Themes	29
4.4	Research-Extension Watershed Management Linkage at Project Level	29
4.5	Budget Profile	30
4.6	Monitoring and Evaluation	31
4.7	Problems Encountered and Solution Measures Taken	31
4.8	Conclusions	32
5.	Integrated Watershed Management Component	33
5.1	Objectives of the Component	33
5.2	Areas of Intervention	33
5.3	Planned Activities for 2004	34
5.3.1	Strengthening Community Level Watershed Management	34
5.3.2	Watershed Planning and Management	34
5.4	Activities Performed	34
5.4.1	Strengthening Community Level Watershed Management	34
5.4.2	Participatory watershed management planning, natural resources management, crops, livestock, micro-enterprise and social development interventions	35
5.5	Key Achievements	40
5.6	Initial Impact Indicators	40
5.7	Significant Problems Encountered	42
5.8	Action Taken to Solve Problems	43
6.	Training Component	44
6.1	Introduction	44
6.2	Long-term Degree Training	44
6.2.1	Summer B.S. Degree Training	44
6.2.2	M.S. Training	45
6.3	Short-term In-service Training	45
6.3.1	Module Development	45
6.3.2	Web Page Designing Training	48
6.3.3	Training on Training Methodologies	48
6.3.4	On-farm Experimentation Training	49
6.3.5	Researchers Giving Skill Training to Extension Workers	49
6.3.6	Up-grading Skills of Development Workers and Farmers	50
6.4	Incorporating Accountability Dimension to the Woreda Short-term Trainings	51
6.5	Educational or Motivational Tours	51
6.5.1	Tour for Researchers and Extension Specialists	51
6.5.2	Other Tours	54
6.6	Other Collaborative Activities	54
6.7	Problems Encountered and Measures Taken	55

List of Annexes

Annex 1.	Status of USAID/AMAREW Supported on-farm Research Trials in 2004	57
Annex 2.	Summary of Research Proposals Submitted Under the Small Grants & Mentorship Program	62
Annex 3.	Types, Amounts & Sources of Improved Seeds Distributed in the Pilot Woreda	66
Annex 4.	Extension Activities Conducted in the Five Pilot Woreda During 2004	68
Annex 5.	Lenche Dima Watershed 2004 Plan Achievement	71
Annex 6.	Lenche Dima Watershed Livestock Sub-Sector 2004 Achievement	72
Annex 7.	Lenche Dima Watershed Natural Resource Sub-Sector 2004 Achievement ...	73
Annex 8.	Lenche Dima Watershed Land Administration 2004 Achievement	74
Annex 9.	Lenche Dima Watershed Operational Cost	74
Annex 10.	Yeku Watershed 2004 Activity Report	75
Annex 11.	Synopsis of Graduate Students Research Work: Amy S. Collick Research Summary, Yeku, 2004	77
Annex 12.	Synopsis of Graduate Students Research Work: Oloro McHugh Research Summary, Lenche Dima, 2004	78
Annex 13.	List of AMAREW Project Staff in 2004	79
Acronyms	80

List of Figures

Figure 1.	Emmy Simmons, USAID Assistant Administrator, and Bill Hammink, USAID/Ethiopia Mission Director, visited Yeku Watershed	10
Figure 2.	Visitors during the 2004 REFAC meetings in Adet witnessed the superior performance of improved wheat and tef varieties	19
Figure 3.	ARARI has an active research and development activity on <i>Vernonia galamensis</i> , a potential export oil crop.....	22
Figure 4.	Over 200 Kenya top bar transitional types as well modern beehives were introduced to farmers in the pilot woredas	27
Figure 5.	Gully rehabilitation work done at Lenche Dima during the year	35
Figure 6.	The Abergelie local breed of goats in the lowlands of Sekota and the Awassi and indigenous breeds crosses in the highlands of North Shewa	37
Figure 7.	Fuel-efficient improved stove production by a team of ten women at the Yeku watershed.....	38
Figure 8.	Training on Module Development in Adet and Bahir Dar	47

Executive Summary: AMAREW Project Annual Report 2004

The Project Document of the Amhara Micro-enterprise development, Agricultural Research, Extension, and Watershed management (AMAREW) states that its primary objective is to establish community-based paradigm shift within the Amhara National Regional State (ANRS) for the development of strong, long-term partnerships among collaborating universities, research and service institutions, ANRS bureaus, extension services, NGOs, and private sector entities in both the US and Ethiopia. To address this overall objective, the United States Agency for International Development (USAID)/Ethiopia and Virginia Tech (as the Prime Contractor) signed Contract No. 663-C-00-02-00340-00 in June 2002 under the Rural Household Production and Productivity increased Strategic Objective (RHPP SO) to implement the AMAREW Project. The Project is generally aimed at assisting the ANRS to design activities, which will result in increased rural household income, thereby increasing food security.

The Virginia Tech Consortium (Virginia Tech, Cornell University, Virginia State University and ACDI/VOCA) and the Primary Partners of the Consortium in the ANRS, namely Food Security Program Coordination and Disaster Prevention Office (FSPCDPO), Amhara Regional Agricultural Research Institute (ARARI), Bureau of Agriculture and Rural Development (BoARD), Environment Protection Land Administration and Use Authority (EPLAUA), Amhara Micro and Small Enterprises and Industries Development Bureau (AMSEIDB), and Amhara Credit and Saving Institution (ACSI) collaborate in implementing the AMAREW Project. The technical advisors of AMAREW have continued to advise and assist their respective line department experts in planning and follow up of activities. The experts are assigned not to plan and implement activities by their own but to advice and assist implementing institutions of the ANRS in the planning and monitoring processes.

AMAREW has collaborated with its institutional stakeholders in the following areas:

- Upgrading human resource capacities of the ANRS partners and community service providers by building the analytical, operational, and management capacity of institutions within the context of reformed and strengthened research and extension services;
- Reinforcing the cooperative and collaborative institutional relations between the research and extension services of the new BoARD and thereby facilitating and strengthening research/extension linkages;
- Advising and strengthening the Amhara Regional Agricultural Research Institute (ARARI) in implementing its overall institutional agenda;
- Advising and strengthening the extension services of the pilot woredas in particular and the extension system of the Bureau of Agriculture and Rural Development (BoARD) in general to provide effective extension services;
- Promoting the generation and transfer of appropriate technologies to target communities in the Project's pilot woredas and watersheds;
- Institutionalizing a strong Integrated Watershed Development Management Team (IWDMT) to strengthen project activities in the pilot watershed management areas to serve as model sites for integrating research, extension, and micro-enterprise development efforts; and

The major trust of the AMAREW project is still to bring about a paradigm shift in participatory methodologies and foster close cooperation and functional integration of research and extension

in on-farm activities in the mandate areas with the ultimate aim of improving agricultural productivity and income of farming households. The functional integration involves jointly planning and implementing activities by different institutions for the benefit of the rural poor. The integration of on-farm research, extension, and watershed activities addressed by the AMAREW project are demonstrated during the year through joint planning and implementation of on-farm trials and popularization of improved technologies at the five pilot extension woredas, seed multiplication at the center sites and farmers' fields, as well as integrated activities at our two pilot watersheds.

Project-wide Selected Accomplishments

- The ARARI Research Centers and the woreda level Extension offices have done exemplary work in establishing Farmer-Research-Groups (FRGs), which are active and functional in the pilot woredas.
- AMAREW and ARARI continue to work aggressively and have made progress in expanding the working germplasm collection of *Vernonia* and are also actively investigating markets for this potentially important export crop.
- The Small Grants and Mentorship Program (SGMP) has now become operational in which selected ANRS researchers have now established contacts and functional relationships directly with their respective mentors.
- Research-Extension Linkage in the ANRS has been enhanced and strengthened through joint planning and implementation of research and extension activities between BoARD and ARARI.
- Successful gully rehabilitation work using sand bag and gabion check dam was carried at Lenche Dima watershed and this site has started to serve as a learning and demonstration center for government and non-government institutions. Area closure sites with enrichment plantation have been established at our two pilot watersheds and are under good management by community members, promising good sustainability. Community Watershed Management Organizations (CWMO) at the pilot watershed have reached a stage of taking lead role in the overall watershed rehabilitation work.
- Improved and fuel saving stove producers women groups were organized and have made significant increases in their incomes where they have now reached a stage to form a cooperative.
- Capacity building activities of the project have focused both on long and short-term training. Eighteen students, under the project's support, are currently studying for B.S. and M.S. degree courses at Alemaya, Bahir Dar, and Mekelle Universities. About 80 of ANRS trainees have participated in Project organized short-term in-service training such as training module development, web page designing training, training on training methodologies, and on-farm experimentation training. In up-grading skills of development workers and farmers, over 900 participants have been trained.

Annual Report 2004

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

1. Background and Project Management

The Project Document of the Amhara Micro-enterprise development, Agricultural Research, Extension, and Watershed management (AMAREW) states that its primary objective is to establish community-based paradigm shift within the Amhara National Regional State (ANRS) for the development of strong, long-term partnerships among collaborating universities, research and service institutions, ANRS bureaus, extension services, NGOs, and private sector entities in both the US and Ethiopia. To address this overall objective, the United States Agency for International Development (USAID)/Ethiopia and Virginia Tech (as the Prime Contractor) signed Contract No. 663-C-00-02-00340-00 in June 2002 under the Rural Household Production and Productivity increased Strategic Objective (RHPP SO) to implement the AMAREW Project. The Project is generally aimed at assisting the ANRS to design activities, which will result in increased rural household income, thereby increasing food security.

The AMAREW project continues to assist the efforts of the ANRS to bring about a major change in the process of planning and implementing agricultural research and extension, in such a way that farmers and all stakeholders would play a pivotal role in defining the course of agricultural research and extension. Accordingly, the established two pilot integrated watershed management areas are serving as sites for integrating research, extension, watershed and micro-enterprise development efforts. Similarly, the five pilot extension woredas are serving as pilot woredas for functionally integrating research and extension at woreda level.

The Virginia Tech led Consortium (Virginia Tech, Cornell University, Virginia State University and ACDI/VOCA) and its ANRS partners implement the AMAREW Project. The Virginia Tech Consortium and the Primary Partners of the Consortium in the ANRS, namely Food Security Program Coordination and Disaster Prevention Office (FSPCDPO), Amhara Regional Agricultural Research Institute (ARARI), Bureau of Agriculture and Rural Development (BoARD), Environment Protection Land Administration and Use Authority (EPLAUA), the Amhara Micro and Small Enterprises and Industries Development Bureau (AMSEIDB), and Amhara Credit and Saving Institution (ACSI), collaborate in implementing the AMAREW Project. The technical advisors of AMAREW have continued to advise and assist their respective line department experts in planning and follow up of activities. The experts are assigned not to plan and implement activities by their own but to advice and assist implementing institutions of the ANRS in the planning and monitoring processes.

1.1 Project Purpose

AMAREW has collaborated with its institutional stakeholders in the following areas:

- Upgrading human resource capacities of our ANRS partners and community service providers by building the analytical, operational and management capacity of institutions within the context of reformed and strengthened research and extension services;
- Reinforcing the cooperative and collaborative institutional relations between the research and extension services of the new BoARD and thereby facilitating and strengthening research/extension linkages;
- Advising and strengthening the Amhara Regional Agricultural Research Institute (ARARI) in implementing its overall institutional agenda;
- Advising and strengthening the extension services of the pilot woredas in particular and the extension system of the Bureau of Agriculture and Rural Development (BoARD) in general to provide effective extension services;
- Promoting the generation and transfer of appropriate technologies to target communities in the Project's pilot woredas and watersheds;
- Institutionalizing a strong Integrated Watershed Development Management Team (IWDMT) to strengthen project activities in the pilot watershed management areas to serve as model sites for integrating research, extension, and micro-enterprise development efforts; and
- Strengthen collaboration and regular communications between the R2D and AMAREW Projects.

1.2 Implementation Sites

Project activities are being implemented in five focal woredas and the two established watersheds (Yeku and Lenche Dima). The relatively large number of woredas previously covered by the project were found to be too many for the drastically reduced resources available to it. Hence, the RIT selected five pilot woredas for research, extension, and watershed management activities in order to enhance synergy and maximize activity integration in terms of information dissemination, resource availability and market access. Table 1 below gives a list of the pilot woredas (by zone) selected by the RIT for the Project's activities in 2004.

The main criteria considered by the AMAREW Project and the RIT in the selection of the focal woredas were:

- Current and past investment/involvement of the Project in the woreda;
- Current availability of technologies to demonstrate improved production and productivity at the household level;
- Potentials for demonstrating impact of research and extension;
- Potential and suitability of integration of all components of the Project (Research, Extension, MED, and Watershed Management);
- Ecological and zonal representation (with minimum duplication) with potential extension of lessons learned to other similar woredas in the future;
- The commodity focused and market oriented production strategy of the ANRS.

Table 1. Selected pilot target woredas by zone and major activity components of the AMAREW Project for 2004

Target Area	Research	Extension	Watershed	R2D
Wag Hamra Zone				
Sekota Woreda	X	X	X	X
North Wollo Zone				
Gubalafto Woreda	X	X	X	X
South Wollo Zone				
Tehuledere Woreda	X	X		
South Gonder Zone				
Lay Gayint Woreda	X	X		
North Gonder Zone				
E. Belassa Woreda	X	X		

1.3 Implementation Approach

During the reporting period, the five focal woredas and the two pilot watersheds have received the main focus of the AMAREW Project in Research, Extension, Watershed Management, and Micro-enterprise Development activities. Additionally, ARARI has also been conducting on-farm research activities in more food insecure woredas. AMAREW has primarily been working with ARARI at the four research centers, Adet, Sekota, Sirinka, and Sheno (Debre Berhan) in strengthening the research program and implementing on-farm research activities in the mandate areas of each research center. The extension and watershed components of AMAREW have mainly been assisting BoARD in implementing its activities in the pilot woredas and the two watersheds.

1.4 Integration of Project Components

With the recent devolution of power to the woreda level, development plan and program implementation are centered at the woredas, which are semi-autonomous in the administration and management of their human, material and financial resources. Hence, AMAREW is making concrete efforts to engage all components of the project at the level of each pilot woreda. Functional woreda level linkages have been formed and continue to be strengthened further. Through woreda level joint research-extension planning workshops, representatives from the woreda agricultural offices in the extension target woredas meet annually and review the on-farm research plans of their local research centers. In the conduct of on-farm research, for instance, site and farmer selection has been made the responsibility of research and extension jointly, while land preparation, planting, data collection of demonstration trials are the responsibility of extension with training and other assistance provided by the research center.

The major trust of the AMAREW project is still to bring about a paradigm shift in participatory methodologies and foster close cooperation and functional integration of research and extension in on-farm activities in the mandate areas with the ultimate aim of improving agricultural productivity and income of farming households. The functional integration involves jointly

planning and implementing activities by different institutions for the benefit of the rural poor. The integration of on-farm research, extension, and watershed activities addressed by the AMAREW project are demonstrated during the reporting period through joint planning and implementation of on-farm trials and popularization of improved technologies at our five pilot extension woredas, seed multiplication at the center sites and farmers' fields, as well as integrated activities at our two pilot watersheds. The selection of participating farm households, trial sites, and execution of on-farm verification and demonstration in each target woreda have been conducted with the full participation of researchers, woreda development agents (DAs), and the local farmers.

In addition to the woreda level, the most potential for a strong and exemplary linkage is at the level of the two pilot watersheds. The two pilot watershed sites, Yeku in Sekota and Lenche Dima in Guba Lafto primarily, are the geographical sites for the integration of the various components of the AMAREW Project. At these two pilot watersheds, all project components converge to run an integrated watershed management program to address the Rural Household Production and Productivity increased Strategic Objective of the USAID/Ethiopia Mission. The Community Watershed Management Organizations (CWMOs) and the regional level Integrated Watershed Development Management Team (IWDMT) established by AMAREW are playing major roles in institutionalizing the interaction of regional agencies and in leading and coordinating their activities at the watershed level.

1.5 The Role of the Regional Implementation Team (RIT)

The overall work of the AMAREW Project is being coordinated and monitored by the Regional Implementation Team (RIT), chaired by the Head of the FSPCDPO. RIT met regularly, at least once in three months to monitor project progress. The RIT members are Heads (or their representatives) of FSPCDPO, BoARD, ARARI, ACSI, AMSEIDB, EPLAUA, CPB, AMAREW, USAID, and BoFED. Concerned institutions of the ANRS, in consultation with technical advisors of AMAREW, prepare their plans and reports and submit them to the RIT. The RIT reviews and approves plans and reports, before submitting them to USAID/Ethiopia.

1.5.1 The 2004 RIT Members of the AMAREW Project

Ato Amlaku Asres, ----- (Head, FSPCDPO, Chairman)
 Dr. Getachew Alemayehu, ----- (DG, ARARI) or
 Dr. Enyew Adgo, -----(Director, NRM Research)
 Ato Getie Asfaw, ----- (Planning Dept Head, BoARD)
 Dr. Zerfu Hailu, ----- (D/Manager, EPLAUA)
 Ato Yared Fekade, ----- (Head, AMSEIDB)
 Ato Getaneh Gobezie, ----- (Planning Dept Head, ACSI)
 Ato Ayenew Belay, ----- (Head, CPB)
 Ato Amsaya Anteneh, ----- (D/Head, BoFED)
 Dr. Tadele Gebreselassie, -----(CTO, AMAREW Project, USAID)
 Dr. Brhane Gebrekidan, ----- (CoP, AMAREW Project)

1.5.2 Selected items addressed and decided on by the RIT during the year

1. The RIT agreed that the six woredas where the AMAREW Project is going to operate beginning in 2004 are Lay Gayint, East Belessa, Guba Lafto, Tehuledere, Sekota, and Gera Keya (ARARI only).
2. The Mission gave its approval for a budget of USD 500,000 to 600,000 for the ANRS partners for the 2004 calendar year. The final RIT approved budget in Birr for the different components run by the ANRS partners was as follows: 249,000 for Training, 873,530 for Watershed, 2,048,002 for Research, 1,629,468 for Extension, and 300,000 for MED with a Grand Total of 5,100,000 for the year.
3. According to USAID/Ethiopia directives fund advances made by the mission should be cleared within 90 days and no subsequent funds can be given before liquidating the previous advances. Proper liquidation on time is crucial for optimum utilization of funds allocated to the partners. Members agreed that any communication that involves finance should be copied to the FSPCDPO both from the user to the USAID and vice-versa.
4. The RIT members endorsed the centralized channeling of USAID Project funds through the FSPCDPO who in turn will transmit the allocated budget to the respective woreda single pool financial system as well as ARARI, which is not served through the single pool woreda finance system. ARARI will receive its funds directly from the FSPCDPO. In this arrangement, FSPCDPO will take the responsibility of receiving the funds, distribute them to the ANRS partners according to the annual work plan, follow-up and submit on time the necessary documentation on ANRS partners fund expenditure to USAID/Ethiopia, and ensure the timely liquidation and replenishment of funds so that project activities will not be hampered by lack or slow release of budgeted funds.
5. USAID/Ethiopia embarked on a New Integrated Strategic Plan (ISP) for the 2004 – 2008 period and that all USAID/Ethiopia supported projects, including AMAREW, have to be lined up with the new ISP. The reduced budget level earmarked for the project and the need to scale it down as well as keeping it focused has entailed the need for restructuring the Project. The ANRS partners stated clearly that they preferred a participatory Redesign of the AMAREW project instead of phasing it out as suggested by USAID earlier in the year. USAID/Ethiopia has considered the views of the RIT members and finally decided to restructure the Project and continue to support it for three more calendar years starting with 2005.
6. The technology generation and dissemination components of the project are targeted for continuation because of their good track record of performance as well as relevance to the food security needs of the Amhara Region. The rationale for Project continuation and the specific parameters for restructuring the Project are as specified in the letter of the USAID Mission Director to the RIT Chair, dated October 8, 2004.
7. The budget of the project will be drastically reduced to one million dollars / year. This amount is to be divided between the Contractor and its ANRS partners. A number of activities planned in the original contract document will be drastically reduced or eliminated. Some examples are the MED component, Long Term Training, Distance Learning, Technical Assistance, etc.
8. USAID/Ethiopia has maintained the position that the MED component should be phased out of AMAREW and that USAID will find alternative arrangements outside of AMAREW for

continued funding of MED activities in the Amhara Region, despite the firm position the ANRS partners have taken saying that the MED component should not be phased out.

9. The main reasons for the MED phase out highlighted in the meeting of USAID and the RIT were: a) unsatisfactory performance of the component from the beginning of the project to the present; b) reduced AMAREW Project budget for the 2005 – 2007 period; and c) the initiation of new projects by USAID in the MED area, which can address the MED component in the ANRS
10. The modalities of EPLAUA's continued partnership with AMAREW and its level of funding was discussed. The USAID representatives stated that USAID future support to EPLAUA is expected to come mainly through alternative arrangements outside of AMAREW such as the proposed new USAID program on "Strengthening Ethiopian Land Tenure Policy and Administration Program".
11. The desirability of adding high potential woredas as project focal sites, over and above the current five food insecure AMAREW Project Woredas, was discussed and consensus reached to do so.
12. The RIT members asked for a list of the specifics of the deliverables to be expected from the Contractor. Accordingly, the main activities the contractor will be engaged in and provide services to the ANRS partners are the following:
 - Technical advice to the appropriate ANRS partners in research, extension, watershed management, and capacity building. Such advisory services could be extended to the whole ANRS in a wide range of technical and policy issues;
 - Short-term and Long-term training in mutually identified disciplines;
 - Organization and implementation of professional conferences and workshops;
 - Planning & leading in strategically selected study and experience sharing technical tours;
 - Planning and implementing Small Grants and Mentorship Program;
 - Participation in and leading the development of Annual Work Plans;
 - Active participation in the ANRS research, extension and research/extension linkage planning and following up implementation;
 - Preparation of Quarterly and Annual Reports of the project;
 - Providing Short-term Technical Assistance in areas selected by the ANRS partners;
 - Provide technical documentation support such as manuals, books, miscellaneous publications, CDs, etc;
 - Backstopping and program coordination from the Home Office.
13. This issue of project advisors work location was discussed at length in repeated RIT meetings. The pros and cons of keeping the team together or dispersing advisors to ANRS partner offices were debated. Keeping the team together in a centralized office set-up as is done now was seen to be more cost effective, integrative, and promoting effective team function. After weighing all the factors, and getting the specific feedback and comments from the RIT members of ARARI and BoARD, the two partners who are affected most directly by the staff location issue, the RIT agreed that it is best to maintain the present arrangement of project staff location in a centralized project office. It was also emphasized that ANRS partners should take the initiative of using the technical advisory services and support of the AMAREW project staff. The Project staff was also reminded to be proactive in reaching out to the partners and consulting with them for technical advisory services in their respective areas of expertise.

1.6 Project Administration

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

1.6.1 Home Office

The Project's Home Office at Virginia Tech is responsible for all guidance and support services to the project including financial, technical, and administrative supports. Personnel for Technical Assistance and Mentors for the Small Grants and Mentorship Program are identified and sent to the field by the Home Office. Monthly financial reports are submitted from the field to the Home Office and regular reimbursements 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 (OIREED) ensure close interaction and communication with the Home Office. In this connection, during the year, Dr. Mike Bertelsen, Associate Director of OIREED and Associate Dean of the College of Agriculture and Life Sciences, visited Bahir Dar and Addis Ababa and interacted with USAID/Ethiopia, ANRS partners, and project staff on the pending issues bearing on the restructuring of the Project. As discussed elsewhere in this report, project staff morale has been low during the year because of the dragging and unsettled issues of project restructuring. Dr. Bertelsen's visit and discussions helped resolve staff concerns as well as moving the restructuring agenda move forward faster.

1.6.2 Bahir Dar Office

The Project Administrator, Ato Taye Hailu, resigned during the year and moved to Addis Ababa for a new job with a local bank there. Following the Administrator, the Assistant Administrator / Accountant, Ato Daniel Nigussie, as well as the Senior Secretary, W/o Saada Mohamed also resigned. There were weeks of difficulty in handling the administrative responsibilities of the Project in the absence of these key administrative personnel.

We were able to hire a new Project Accountant/Assistant Administrator, Ato Ahmed Ayele, replacing Ato Daniel Nigussie. Ato Ahmed is now well oriented about the Project's financial and administrative activities and is handling them efficiently and effectively. The Project will not fill the Administrator's position because of budget reduction under the restructuring plan. Ato Ahmed will continue to shoulder all the financial and administrative responsibilities of the Project.

During the year, the CoP of AMAREW participated in a number of USAID/Ethiopia Mission organized meetings of the Mission's partners as well as US Embassy organized meetings.

During the year, the Project organized eight RIT meetings, one of which was held in the field in our Sekota site in collaboration with the R2D Project.

The project satellite office at Woldiya continues to function well and Ato Yitayew Abebe, the Watershed Associate, is using this office as his primary workstation. Ato Tesfaye Habtamu, the new Project Technician, has been based at the watershed site in Hara town and follows up the Lenche Dima pilot watershed activities on a day-to-day basis.

The project continued to work closely with selected CG centers such as CIP. A delegation of CIP scientists from Nairobi visited the AMAREW office and discussed strategies for rapid potato seed production and tissue culture techniques involving ARARI, CIP, and AMAREW. Encouraging progress has been made on this collaborative arrangement.

A high level delegation from USAID including Ms Emmy Simmons, Assistant USAID Administrator, and Mr. Bill Hammink, USAID/Ethiopia Mission Director, visited the AMAREW Project in Bahir Dar on January 21, 2004. AMAREW made a Power Point presentation jointly with the R2D Project in the AMAREW Project Conference room and answered questions of the visitors. The delegation also visited one of our Watershed Pilot Sites at Yeku, Sekota Woreda. The AMAREW Project Watershed staff and the CoP accompanied the delegation in their visit to Sekota.



Figure 1. Emmy Simmons, USAID Assistant Administrator, and Bill Hammink, USAID/Ethiopia Mission Director, visited the AMAREW Project Yeku watershed during the year. The Women's Association of Yeku presented a gift to Emmy Simmons.

The Project was informed by USAID Mission to submit the required budget for the Contractor for the half-year period, July – December 2004, which we did.

The respective Chiefs of Party of R2D and AMAREW signed the final version of the MOU between the two Projects during the year. The MOU specifies the modality of collaboration between the two projects including food resource allocation to AMAREW from R2D.

Also during the year, the opportunities surfaced for the initiation of the Farmer-to-Farmer Project implemented by our sister institution, Virginia State University (VSU), in collaboration with the AMAREW Project. Drs. Joseph Tritschler and Jacob Mignouna of VSU visited Bahir Dar and had good discussions; both with the ANRS partners and us, focusing on their new USAID supported FtF Project. Virginia State has planned on a strong linkage and working together with the AMAREW Project as they move forward with project implementation. We have agreed that their linkage with us is a win-win situation in that their planned activities are very much complementary to ours. We have discussed the possibilities of sharing personnel and facilities and streamlining our two projects so that we would have mutually supportive activities.

The CoP received a special invitation from the BASIS CRSP and participated in their intentional conference on *Combating Persistent Poverty in Africa*, which was held in mid-November in Washington, D.C. Another major conference event in which the CoP was involved in the year was the 50th Anniversary Celebration of Alemaya University at the end of October in which he led a team in preparing a major panel discussion paper entitled “*Development and Application of Agricultural Technology in Ethiopia: A Discussion Paper*”.

2. Project-wide Selected Accomplishments and Problems

Details on accomplishments and problems encountered during the year are given in the individual component reports. The section below presents only highlights and selected accomplishments and problems of the year.

2.1 Project-wide Selected Accomplishments

The ARARI Research Centers and the woreda level Extension offices have done exemplary work in establishing Farmer-Research-Groups (FRGs), which are active and functional in the pilot woredas.

AMAREW and ARARI continue to work aggressively and have made progress in expanding the working germplasm collection of *Vernonia* and are also investigating potential markets for this potentially important export oil crop.

The Small Grants and Mentorship Program (SGMP) has now become operational in which selected ANRS researchers have now established contacts and functional relationships directly with their respective mentors.

Research-Extension Linkage in the ANRS has been enhanced and strengthened through joint planning and implementation of research and extension activities between BoARD and ARARI.

Successful gully rehabilitation work using sand bag and gabion check dam was carried out at the Lenche Dima watershed and this site has started to serve as a watershed management learning and demonstration center for government and non-government institutions.

Area closure sites with enrichment plantation have been established at our two pilot watersheds and are under good management by community members, promising good sustainability. Community Watershed Management Organizations (CWMO) at the pilot watersheds have reached a stage of taking lead role in the overall watershed rehabilitation work.

With the Project's support, first stage land use certificates have been issued to Yeku communities and a similar action should follow soon at Lenche Dima soon.

Improved and fuel saving stove producers women's group were organized and have made significant increases in their incomes where they have now reached a stage to form a cooperative.

The Watershed Component played a lead role in the preparation of "National Integrated Watershed Management Guideline" initiated by the Federal Ministry of Agriculture and Rural Development (MoARD) that was financially supported by USAID. In addition to the technical contributions rendered by our watershed component, the AMAREW Project took the overall administration and workshop organization, which was held in Nazreth.

In an effort to improve the information dissemination capacity of our partner institutions (BoA, ARARI and DPPC), a training course on web page designing was organized with (Dr. Dawit Haile) of Virginia State University as the trainer and resource person.

In-country educational tours were organized for ARARI researchers and BoARD extension workers in three groups comprising crop, livestock, and natural resources management areas. The participants visited carefully selected places and were able to bring valuable information and technologies of potential use to the ANRS. They have documented their findings and experiences in well-written reports.

2.2 Short Term Technical Assistance in 2004

- 1. Drs. Joseph Tritschler and Jacob Mignouna** of Virginia State University, Farmer-to-Farmer Project team, made initial contact visits, from February 08 to 14, 2004, and had discussions with AMAREW and ANRS partners to arrange for the implementation of the USAID funded Farmer-to-Farmer Project in the ANRS with the partnership of the AMAREW Project. We have agreed on the modalities of implementation with the joint AMAREW/FtF appointment of our Training Associate, Dr. Elias Zerfu.
- 2. Dr Eyasu Elias and Dr. Franck Place** of the World Agroforestry Center in Ethiopia and Kenya visited the AMAREW Project during the last week of February 2004 and held discussions on the possibilities of using the two pilot watersheds for testing various

agroforestry technologies that the center is planning to carry out in Ethiopia. This visit is likely to lead into further collaboration between AMAREW and the World Agroforestry Center in the near future.

3. **Yigezu Yirga Yigezu**, Graduate Student from Purdue, worked for three months, March-May 2004, in collaboration with AMAREW undertaking an evaluation of the impact of the new *Striga* resistant sorghum cultivars on farmers' incomes and welfare in the ANRS, with a special focus on the Kobo valley.
4. **Dr. John Sanders** from Purdue, Yigezu's advisor, visited the ANRS in March 2004 for a couple of weeks to supervise his graduate student on his impact assessment research on *Striga* resistant improved sorghums.
5. **Ato Ashagrie Getnet**, a staff member of Agri-Service Ethiopia Mertule Mariam area project, participated during the last week of May in a weeklong training workshop on Training Methodologies organized by AMAREW for researchers, woreda experts, and Development Agents.
6. **Dr. Dawit Haile**, Virginia State University, Computer and Mathematics Department Head, served as a resource person from June 28 to July 10, 2004 in a training workshop on Web Page Designing organized by AMAREW for BoA, ARARI, and DPPC staff members.
7. **Dr Olivier Husson**, a soil scientist with CIRAD in Madagascar, visited AMAREW Project activities in Bahir Dar and Lenche Dima from July 05 to 11, 2004. He visited the region to discuss his work on soil fertility management using biological methods. He gave a well-received seminar for regional partners in Bahir Dar. He spent a week traveling with ARARI and EARO scientists, and presented his observations and recommendations at Sirinka Research Center at the conclusion of his visit.
8. **Dr. Kidane Giorgis**, Director of the Dryland Research Division of EARO, accompanied Dr. Olivier Husson in his weeklong visit to the AMAREW Project areas in the second week of July. He helped AMAREW and ARARI to identify possible research interventions in the areas of soil fertility management and minimum tillage.
9. **Dr. Albert Essel**, Virginia State University, Associate Administrator of Virginia Cooperative Extension, participated from August 2 to 13, 2004 as a resource person in a training workshop on Training Module Development organized by AMAREW for BoA, ARARI, and DPPC staff members.
10. **Dr Tammo Steenhuis** of Cornell University visited the Project twice during the year, April 12 to 22 and October 12 to 28. During these visits, he worked with ARARI in Bahir Dar, consulted with the Watershed Component on future activities, and traveled to Sekota and Woldiya to meet with woreda officials and to advise the three graduate students from Cornell.
11. **Dr. Hailemichael Kidanemariam**, a private local consultant and potato seed production specialist, served as a consultant to ARARI and trained its staff on rapid multiplication techniques (RMTs) of seed potato. He advised ARARI to promote a combination of an informal and formal farmer-based seed production system, which should be supported by a strong, well-organized, and sustainable basic seed production program including RMTs. He made three different visits to the region during 2004 in connection with the RMT work.
12. **Dr. Conrad Heatwole** of Virginia Tech Bio-systems Engineering Department paid a couple of weeks (Oct 14 – 28, 2004) visit to AMAREW's activities in Bahir Dar, Lenche Dima, Sirinka, Sekota, and Sheno. Dr. Heatwole's primary purpose of visit was the implementation of the proposed research project with Ato Gizaw Desta of Sheno under the Small Grants and

Mentorship Program entitled “Estimation of rill erosion using spatial rill damage and network assessment over hill slopes”. He also gave well-received seminars on GIS applications at ARARI Sheno and AMAREW Bahir Dar.

13. **Dr. Mike Bertelsen**, Associate Director of OIRED and Associate Dean of the College of Agriculture and Life Sciences, visited Bahir Dar and Addis Ababa November 26 to Dec 4, 2004 and interacted with USAID/Ethiopia, ANRS partners, and project staff on the pending issues bearing on the restructuring of the Project. As discussed elsewhere in this report, project staff morale has been low during the year because of the dragging and unsettled issues of project restructuring. Dr. Bertelsen’s visit and discussions helped resolve staff concerns as well as moving the restructuring agenda move forward faster.
14. **Dr. Wondie Mersie**, Associate Director of Research at Virginia State University, who serves as AMAREW’s focal person in the US in investigating the market for *Vernonia*, visited the Jarie field of production of this oil crop, after the flowering stage of the crop. He carried out extensive discussions with ARARI and AMAREW officials and staff members on *Vernonia* research, utilization, and marketing. In addition, he consulted with ARARI and AMAREW on how to solve the serious problem of the invasive weed *Parthenium* including the development of a project proposal focusing on developing an IPM strategy, for submission to the IPM CRSP for funding. Dr. Wondi worked with us from December 05 to 15, 2004.
15. **Benjamin Liu**, a MS degree candidate and a student of Dr. Tammo Steenhuis at Cornell, worked on soil moisture modeling, water infiltration characteristics at Lenche Dima, and training of ARARI staff. He stayed in Woldiya and worked with the Sirinka Research Center for six months (July to December, 2004).

2.3 Project-wide Significant Problems Encountered and Solutions

The main project-wide problem during the year has been the accelerated discussion focusing on the USAID/Ethiopia Mission’s proposal for the phase out of the AMAREW Project. This proposal created continuing and extended uncertainty about the future and sustainability of the Project, which had impacted staff morale. This issue has been looming over the horizon since the beginning of the second year of the Project when the budget was drastically cut and subsequently the redesign issue surfaced. Both the Project management and the RIT interacted with the Mission intensively, and repeatedly, to find ways to stabilize the situation. Subsequent discussions between the RIT and USAID/Ethiopia did indeed stabilize the situation in that later in the year the focus was project restructuring in lieu of phase-out.

Since the USAID directives and parameters for the Redesign/Restructuring of the AMAREW Project took months to reach the Contractor and the RIT, there was unavoidable delay in finalizing the 2004 Work Plan and the Restructuring Document.

The rapid staff turnover in the MED Component of the project continued to be another major problem of the project. Since there were no MED personnel on the project during the year, the activities of this component have been at very low ebb. We were unable to fill any of the vacant positions in the MED component of the Project during the year because the Mission did not approve filling the MED Advisor’s position, furthermore AMSEIDB and ACSI did not see the need for filling the MED Associate position. The solution to the MED Component problem was expected to be resolved as part of the AMAREW restructuring approach.

Staff members of the pilot woredas and research centers were engaged in extended and seemingly endless performance evaluation conferences; as a result, some of the planned research, extension, and training activities were delayed or postponed because of these meetings and conferences. Coupled with this, the rapid and significant staff turnover, both in research and extension, has made this problem even worse.

On the management of the woreda level Project budget, it took some time for the woredas to understand how the Project budget should be handled in the new single pool financial system instituted by the Regional Government. The launching of this new financial system has delayed the execution of a number of the planned activities. Also, delays in fund transfer both at USAID Mission and the ANRS partners level have made timely implementation of activities difficult.

3. Research Component

3.1 Introduction

The AMAREW project has been engaged in implementing the hitherto Strategic Objective (SO) of USAID/Ethiopia, namely Rural Household Production and Productivity (RHPP) Improved. Intermediate Result (IR) 4 of the RHPP SO is aimed at strengthening food, agriculture and environmental research systems in the targeted areas through on-farm research programs. In this regard, the key regional partners of AMAREW project are ARARI and BoARD. AMAREW's goal is to institutionalize a participatory, community-driven approach in the technology generation and dissemination continuum that would ultimately lead to upgrading the livelihood of the rural poor in the targeted woredas. This section of the report covers the period January 1 to December 31, 2004, and has been prepared jointly by ARARI and AMAREW.

The objectives of the research component of the AMAREW project are: a) strengthening the on-farm research program, b) contributing to the improvement of the research facilities of ARARI's Research Centers to carry out on-farm research and c) work in an integrated way with the other components both at the pilot woredas and watersheds level.

3.2 Target Woredas for Research

Table 2 below shows the target woredas, selected Peasant Associations (PAs) and the two pilot watersheds where on-farm research has been conducted. Insufficient logistic support, however, hindered the Adet and Sirinka Research Centers during the report period to address some of the selected PAs. In addition, the Sheno research center has been also conducting on-going trials as a continuation of 2003 activities of the former target woredas in North Shoa.

Table 2. Target woredas and PAs for on-farm research

Zone	Woreda	PA/watershed	Research Center
Wag Hamra	Sekota	Hamusit	Sekota RC
		Tsemera	
		Mahibere Genet	
		Yeku Watershed	
North Wollo	Gubalafto	Amaye Mecha	Sirinka RC
		Wanzaye (Gebere Amba)	
		Lenche Dima Watershed	
South Wollo	Tehuldere	05 Kebele	Sirinka RC
		012 Kebele	
		015 Kebele	
South Gondar	Lay Gayint	01 Kebele	Adet RC
		013 Kebele	
		017 Kebele	
North Gondar	East Belessa	Deberzana	Adet RC

3.3 Major Activities Planned for 2004

- Monitor the implementation and performance of on-farm research trials conducted by the Research Centers during the current season. Conduct scheduled field trips with senior staff at ARARI and researchers at the respective center,
- Reinforce the research-extension linkage through the establishment of the Research-Extension Technical Committees at woreda level formed to coordinate activities,
- Participate in the training program of on-farm research methodology to be organized for ARARI Research Centers and the respective mandate woredas,
- Participation in the review meeting for evaluation of USAID-AMAREW supported completed on-farm research projects in the target woredas, to be organized by ARARI,
- Follow-up with ARARI management the procurement of equipment and supplies for the new Tissue Culture Laboratory at Adet Research Center through the USAID-AMAREW support,
- Follow up activities being carried out by AMAREW to bring in place the Rapid Potato Seed Multiplication Program in selected sites of the region in collaboration with CIP,
- A follow up of the process of implementation of the Small Grant and Mentorship Program (SGMP) of USAID/AMAREW,
- Participate in technical committees and other similar activities set up by ARARI and other regional bureaus,
- Continue providing advisory service to postgraduate students that are engaged in their MSc research work on pertinent problems of the ANRS, as requested by the Alemaya University.

3.4 Accomplishments

3.4.1 On-farm research

ARARI Research Centers have been handling with the support of USAID/AMAREW a number of on-farm trials in the target woredas. The core objective of on-farm research is to generate improved agricultural technologies in the areas of crop, livestock and natural resources. Field visits and Research-Extension-Farmer Advisory Council (REFAC) field evaluation tours were organized by the centers to assess the on-farm trials in each target woreda.

Table 3 provides technologies generated and/or demonstrated by ARARI Research Centers, while in Table 4 technologies that are under adaptation trials are given.

The detailed status of the on-farm trails supported by the AMAREW Project, listed by Research Center and woredas is shown in Annex 1.

Table 3. Technology generated and demonstrated by the research system in the target woredas

Technology	Variety	District/watershed	Research Center (RC)
Faba bean	Degaga CS 20 DK Messay	Lay Gayint	Adet RC
Barley	Setegn (3371/03) Mulu (3369/17) Shedho (3381/01) Dimtu (3369/19)	Lay Gayint	“
Wheat	Shina	Lay Gayint	“
Sesame	Adi	Kobo & Lenche Dima watershed	Sirinka RC
Groundnut	Shulamiz Roba	Kobo	“
Cotton	Cuokra Delta pine 98	Kobo & Lenche Dima watershed	“
Sorghum	Yeju, Teshale, Gobyie, Abshir, Brehan	Kobo, Gubalafto & Lenche Dima Watershed	“
Rope and Washer pump	Constructed from local material	Gubalafto and Tehuldere	“
Food barley	Misrach	Gera Keya	Sheno RC
Potato	Gorebela Gera	Gera Keya Lalomama Efratana Gidem	“
Wheat	HAR 604 HAR1899	Gera Keya Lalomama	“
Faba bean	Lalo Dagem	Gera Keya Lalomama	“
Teff	DZ-01-99 DZ-cr-44	Yeku watershed Sekota Yeku watershed Sekota	Sekota RC
Sorghum (Striga resistant and early maturing var.)	Abshir Gobiye	Sekota	“

Table 4. Adaptation trials carried out in the target woredas in 2004.

Technology	Number	Target area/ District	Research Center
Field crops	5	Lay Gayint	Adet RC
Pulses	3		“
Vegetable	1		“
Field crops	2	East Belessa	“
Pulses	4		“
Vegetable	1		“
Field crops	2	Simada	“
Pulses	3	Sekota	Sekota RC
Oil crop	2		“
Agro-forestry	1		“
Fertilizer trial on cereal crops	4		“
Irrigation technology	3		“
Moisture conservation	1		“
Fodder legumes	2		“
Soil conservation for gully stabilization	1	Yeku pilot watershed	Sekota RC
Field crop	1	Yeku pilot watershed	“
Pulses	2	Yeku pilot watershed	“
Fodder legumes	1	Yeku pilot watershed	“
Field crops	1	Gera Keya	Sheno RC
Water harvesting techniques in relation to agro forestry	2	Gera Keya	“
Field crops	2	Efratana Gidem	“
Water harvesting techniques in relation to agro forestry	1	Efratana Gidem	“



Figure 2. Visitors during the 2004 REFAC meetings in Adet witnessed the superior performance of improved wheat and tef varieties developed by the Adet Research Center of ARARI. Seeds of improved varieties have been disseminated through the AMAREW Project to farmers in the project sites.

3.4.2 Highlights of the on-farm research

i) Sirinka Research Center

The Sirinka Research Center has been engaged in pre-extension demonstration and popularization activities in its mandate woredas and the Lenche Dima pilot watershed on selected marketable crops such as cotton (var. Cuokra and Delta pine 98), sesame (var. Sedi) and groundnut. The farmers in the area expressed their interest on the new crops and believed that the adoption of these crops will have a far-reaching impact on their income.

The center is also carrying out multi-location demonstration trials on Yeju sorghum variety, which is early and high yielding. During the crop season, we observed that this variety was significantly earlier than the local varieties of the farmers.

In order to assist the regional efforts of rainwater harvesting in the different woredas, the Sirinka Research Center has demonstrated a rope and washer pump technology in Tehuledre woreda. This pump technology is simple to construct and operate and is cost-effective. Twenty pumps have already been distributed to farmers in the woreda owning water harvesting structures.

Furthermore, the center is in the process of constructing a small-scale biogas plant in collaboration with the Kombolcha Mechanization Center for demonstration in Lenche Dima pilot watershed. The biogas plant is a promising technology for the smallholder farmer as alternative energy source concurrently addressing soil fertility management using the sludge, a by-product from the biogas plant.

ii) Adet Research Center

The Adet Research Center has done an exemplary work in research-extension-farmer linkage. Several Farmer-Research-Groups (FRG) have been formed in Lay Gayint woreda in the three target PAs for improved wheat, barely, potato and Triticale varieties. The number of members of the FRG is in the range 25-40. Members frequently meet and conduct field monitoring and make an assessment of the performance of the improved crop technologies.

iii) Sekota Research Center

The regional government has entered into a massive campaign of water harvesting. Although the achievement is impressive, the schemes would not provide their intended use unless accompanied by efficient water management systems. To that end, the Sekota Research Center has been in the process of launching a project on small-scale gravity drip irrigation system around selected water harvesting structures in the woreda. The system uses locally available materials and local skill for construction.

3.4.3 Research and Extension Linkage

In order to coordinate on-farm research activities, a draft proposal for a woreda level Research-Extension Technical Committee was prepared during the year. The committee has two members from the Woreda Office of Agriculture & Rural Development (WOARD) and two from the Respective Research center. The committee is chaired by the Deputy Head of WOARD.

3.4.4 Research and Development on *Vernonia galamensis*

In the 1980's, the Ethiopian government, in an effort to reduce the dependence of the national economy on a single crop such as coffee, mandated the Coffee and Tea Development Authority (CTDA) to initiate a diversification program of coffee production in the country. *Vernonia galamensis* (a potential oilseed crop) was selected to have a potential for export market for industrial purposes. Incidentally, Ethiopia is the origin and center of genetic diversity of one of the subspecies, *Vernonia galamensis* var. *ethiopica*, and yet, only limited documented information was available on the characteristics of *Vernonia*, its ecology and culture.

The Adet Research Center has been involved in *Vernonia* research since 1996, to study performance variability across four locations: Sirinka, Finote Selam, Zema, and Merawi. Eighteen accessions obtained from the PGRC/E Gene Bank were used for the trials. Following the initial observation trials, a regional trial has been conducted by the center. Two high yielding *Vernonia* varieties have been identified and submitted to the National Variety Release Committee for registration and potential release. The committee has completed its field evaluation of the two varieties and decisions on the approval for release are expected shortly.

In the area of commercialization, some initial steps are being taken by the Ethiopian Government to attract foreign investors/business firms for commercial production of *Vernonia* oilseed. ARARI has grown some 10 ha of *Vernonia* at its Jarie farm and elsewhere in the region. We have inspected the Jarie farm production a couple of times during the season and found it to be excellent in performance. Dr. Wondie Mersie of Virginia State University who serves as our focal person in the US in investigating the market for *Vernonia* visited the Jarie field with us after the flowering stage of the crop. There is still the need to intensify research efforts on this crop for both quantity and quality of oil and open up opportunities for the country to exploit the export market. *Vernonia* appears to display all the essential elements and potential to exploit the export market opportunities.

Compared to domesticated traditional crops, research and development on wild plant species such as *Vernonia*, requires a tight coordination and cooperation between many organizational entities for success. The activities for cooperation range from initial research through commercialization. To be effective, ARARI's research program on *V. galamensis* requires further support and strengthening cooperative relationship between national and international organizations. In such cooperative efforts, among the main activities are the following:

- Helping scientists avoid isolated working conditions and providing them with proper scientific and technical supervision and sharing of experiences;
- Ensuring adequate dissemination of scientific and technical information;
- Maximizing research efficiency by harmonizing research and extension work on the crop;
- Mobilizing domestic and donor support for the research program;
- Organizing researchers to spearhead the lobbying of the public and the private sector for more cooperation and involvement.

The modalities of cooperation can include networking, common training efforts, cooperative programs, conducting joint trials, germplasm collection/evaluation and improvement, exchange of scientific personnel and information, exchange of germplasm, organization of seminars and conferences on various *Vernonia* related topics. AMAREW has been providing key technical advisory supports to ARARI in most of these areas.

AMAREW's primary focal person on *Vernonia* market potential, linkages, and technical backup in the U.S. Dr. Wondie Mersie, has contacted a US company doing intensive research on the utilization of vernolic acid for various industrial uses. We have been informed that the concern of many of the U.S. companies such as this one with interest on *Vernonia* is the fear of not having a steady supply of *Vernonia* oil year round, which apparently has hindered its large-scale utilization. We believe the issue of sustainable and reliable production and supply of the crop from Ethiopia at the required quantities can be handled both spatially by diversifying sites of production and temporally with the use of irrigation. Additionally, if a reliable and economically attractive market links are found, ARARI and other ANRS entities can consider increasing production through contractual arrangements with local farmers in an out-growers scheme.



Figure 3. ARARI has an active research and development activity on *Vernonia galamensis*, a potential export oil crop. The Institute produced about seven hectares of the crop on its seed farm at Jarie Valley. AMAREW assists ARARI in all aspects of this work including finding markets in the USA with Dr. Wondi Mersie as the focal person.

The company Dr. Mersie has contacted has requested samples of the *Vernonia* oil produced in Ethiopia. We are working with ARARI to facilitate the dispatch of the oil sample to the US for laboratory analysis and further research.

The AMAREW project will continue to assist ARARI in:

- Strengthening national collaboration among *Vernonia* stakeholders;
- Identifying and encouraging entities in the U.S. for cooperation and collaboration in *Vernonia* research and development;
- Identifying potential markets and viable commercial linkages in the U.S.;
- Searching for and providing up-to-date scientific and commercial information;
- Providing technical support as appropriate;
- Promoting *Vernonia* research projects to be considered for the Small Grants and Mentorship Program of AMAREW;
- Contributing to ARARI efforts in the enrichment and enhancement of the germplasm resources of the crop.

3.4.5 Small Grants and Mentorship Program (SGMP)

The purpose of the Small Grants and Mentorship Program (SGMP) is to establish a collaborative linkage between young researchers of ARARI and BoARD with senior scientists in the Collaborative Research Support Program (CRSP) universities of the U.S.A. to encourage young researchers to develop and implement sound research projects with the associated element of professional competition.

In response to the call for proposals the AMAREW Project issued, a number of researchers of ARARI and BoARD submitted research proposals out of which six qualified for the SGMP award (Annex 2). The research proposals have passed through a rigorous screening and review process both by local professionals (AMAREW and ANRS) as well as interested mentors in the CRSP universities. The selected ANRS researchers have now established contacts directly with their respective mentors and prepared jointly for the scheduled visits of the mentors to Ethiopia. To that effect Dr. Conrad Heatwole of Virginia Tech has paid a one-week visit to Sheno Research center to discuss the implementation of the proposed research project with Ato Gizaw Desta. He also gave seminar on GIS applications at Sheno and Bahir Dar.

3.4.6 Laboratory Facility for Tissue Culture

In order to assist the regional effort of dissemination of improved technologies, through the assistance of the AMAREW project, ARARI has planned to set-up a tissue culture laboratory at the Adet Research Center. The procurement of the equipment and supplies for the planned tissue culture laboratory at Adet is underway.

3.4.7 Rapid Potato Seed Multiplication Program

Released potato varieties by ARARI Research Centers could not reach farmers in adequate quantity and quality due to lack of rapid potato seed multiplication facilities and/or a tissue

culture laboratory. In order to initiate a rapid potato seed multiplication program at the Adet Research Center, one large screen net with metal framework structure has been procured from the Philippines by the AMAREW project in collaboration with the International Potato Center (CIP) and installation at the center is already completed.

3.4.8 Other Activities

The research personnel of AMAREW have been also involved in other activities of the ANRS during the year. Some examples are: served in the task force formed by BoFED to prepare the 1997 E.C. Indicative Planning Document, edited the draft document of the Natural Resources component of the Socio-Economic baseline survey by BoFED, participated and contributed in several workshops, Annual Research Reviews, and symposia.

3.4.9 Problems Encountered

1. The AMAREW project has been operating, particularly during the last two quarters, in constant uncertainty initially due to the threat of phasing out, later the extended redesigning/restructuring exercise under the new Integrated Strategic Plan (ISP) of USAID/Ethiopia. This phenomenon hindered the staff to look forward and has had repercussion in the ANRS partners collaborating with AMAREW.
2. The unstable manpower development plan of ARARI RCs due to researchers leaving for various reasons, mostly without immediate replacements, has impeded the continuity and timely completion of research trials in the target woredas. The staff turn over is particularly manifested in natural resources management (NRM) and socio-economics areas. For instance, at the beginning of 2004 the number of researchers in Natural Resources Management of the Sirinka Research center was 10 but dwindled to 3 at the end of the year.

4. Extension Component

4.1. Introduction

During 2004, the Extension component of AMAREW worked towards strengthening the extension service in the five pilot woredas in identifying and popularizing food, agriculture and environmental technologies and relevant information to farming households. The 2004 Extension Plan was prepared and distributed to all stakeholders and commented on by all parties and finally approved by the RIT. But the plans continued to be revised by the woredas following the delay in fund release and the on-going re-structuring of the partner institution. The changes introduced by woredas were oftentimes accepted and were implemented accordingly. As many changes were introduced into the initial plan, this report focuses on reporting accomplished activities instead of reporting on planned against achievements.

The following sections report on the activities of the Extension Component during 2004. The report is organized under seven sections. The front section presents a narrative description of accomplished activities along with a figurative report in Tables (Annex 3 and 4). There is a section briefly touching on issues of integration among project components and institutional linkages. Another briefly section describes budget related issues, followed by a section touching upon aspects related to monitoring and evaluation. After presenting problems observed during implementation and monitoring while this extension section of the Annual Report concludes with an optimistic note on the likely performance of the Extension Component in 2005.

4.2 Accomplishments

The accomplishments of the Extension component during the year are presented below under different headings.

4.2.1 Technology shopping

In collaboration with Dr. Elias, the Training Associate, different and updated technology package documents were collected from federal offices and research centers, and those found to be helpful are being included in the extension plans of the pilot woredas.

4.2.2 Revising the 2004 Plan

The 2004 plan was revised with woredas in view of accommodating suggestions provided at different levels and to concentrate activities only in three PAs in each pilot woreda. However, it was at the end of the second quarter that the fund for implementing the 2004 extension plan reached the Regional BoARD, which apportioned it to the five pilot woredas. Woredas received the funds by the end of June 2004. Taking into account the remaining time for implementation of planned activities (July to December), the extension plans of woredas were then revised by Woreda Agricultural and Rural Development Offices (WARDO). Initially, only 60% of the approved budget was released, hoping that the remaining 40% would follow soon. But as woredas were adopting a single pool financial system as of July 2004, the issue of liquidating

advances timely and sending the necessary documents to the Regional BoARD became the mandate of the Woreda Finance and Economic Development Offices, not WARDOs. This resulted in delays to such an extent that the remaining 40% was not solicited by BoARD to implement planned activities in 2005. This again has forced woredas to make changes in the types and volumes of work envisaged in the 2004 plan. Efforts were underway to make sure that those changes were in line with the objectives of the Project and of the extension component.

4.2.3 Improved Seeds Procurement and Distribution

The types of improved seeds identified by AMAREW Project staff, woreda extension staff and researchers of ARARI as appropriate for the pilot woredas were procured from Adet Agricultural Center, Sirinka Agricultural Center, Bahir Dar Branch Office of the Ethiopian Seed Enterprise, Debre Zeit Agricultural Research Center, Melkassa Agricultural Research Center, and the Assela Branch Office of the Ethiopian Seed Enterprise. A total of 293 quintals of 31 improved varieties of 13 crop species were procured and transported to the pilot woredas. Annex 3 presents the types and sources of improved varieties of crops distributed to the pilot woredas during the second quarter.

Seeds were distributed to selected farmers in each of the PAs of the pilot woredas. A mechanism of making seeds available to other farmers next season has also been put in place. This was followed by demonstration of improved varieties and their respective recommended management practices. For example, in East Belessa woreda where research and extension activities are just beginning to work together, on-farm demonstration of better crop production technologies was done using improved varieties and better management practices of teff (on 28 farms), maize (on 13 farms) and sorghum (on 40 farms).

4.2.4 Other Technologies Demonstrated

Introducing and promoting use of improved technologies has been implemented

- Seven pedal pumps, five rope and washer pumps and 10 improved plows were introduced to farmers in Lay Gayint and in Sekota woredas.
- Assistance was made to farmers in Lay Gayint to construct 25 model grain and potato stores.
- Hay box brooder technology was introduced to 20 farmers in Gubalafto and 15 farmers in Lay Gayint.
- Eighty eight 88 Kenya top bar transitional beehives were made available to farmers in Sekota and Gubalafto woredas while in Tehuledere 134 modern beehives were equipped and made available to farmers to serve as model beehives. Two hundred ninety queen excluders (at Tehuledere) and a total of 16,592 top bars were provided for trained bee farmers in the five woredas. Thirty six sets of beekeeping tools and protective cloths have been bought by Tehuledere and Sekota Woredas to serve as training and model materials. In some woredas bee colonies have been transferred into modern beehives and up to 300% yield increase is expected.
- A total of 103 quintals of various species of forage plants have been made available to farmers in Sekota and Gubalafto woredas to promote improved forage production.
- 310 kg of seeds of multipurpose tree species were purchased for nurseries in Gubalafto and Tehuledere Woredas, and assistance in polythene tubes and tools were made to

nurseries so that they would raise hundreds of thousands of seedlings for 2005 planting season.

- 10,000 seedlings of fruit trees were multiplied and distributed to farmers in Sekota.
- 14,000 coffee seedlings and 1.25 million cuttings of high yielding and drought tolerant sweet potato variety were made available to farmers in Tehuledere woreda.
- Four frames to produce energy saving stoves were bought by Sekota and Tehuledere woredas, and made available to groups of women who will produce and sell stoves as a source of income.
- Two modified animal drawn carts are to be delivered to fishermen cooperatives to help them transport fish to town.
- 272,000 tree seedlings were planted on rehabilitated lands
- Two horticultural nursery sites have been established to promote fruit trees seedlings production and the multiplication of planting materials for horticultural crops in East Belessa.



Figure 4. Over 200 Kenya top bar transitional types as well modern beehives were introduced to farmers in the pilot woredas

4.2.5 Training for DAs and Farmers

Several training sessions were also organized for farmers and DAs in various fields.

- DAs and expert training: a) 101 DAs were given training in various technological packages, b) three woreda experts were trained in hay box technology.
- Farmers' training:
 - 1323 in compost making and utilization in four woredas
 - 181 in water harvesting and irrigation systems
 - 343 in horticultural crops, coffee and temperate fruits production
 - 27 in pest assessment and IPM
 - 49 in improved forage crops production
 - 120 in beekeeping.

The trainees in Tehuledere constructed 56 transitional beehives using locally available materials, 52 farmers have now transferred bee colonies from traditional to the transitional beehive, and a significant yield increase, at least twofold, is expected.

Sixty fishermen/women (41 men and 19 women), in fishnet making and fish processing, were trained by experts from the Regional BoA. Also ten DAs in Tehuledere were trained in fishing related technologies. Farmers have now acquired the skill to build standard fishnets.

Three Community animal health workers from the three PAs were selected and trained in Gubalafto woreda. Additionally, 43 in participatory research in Lay Gayint woreda, 90 in energy saving stoves production and utilization were trained. The trainees in Tehuledere constructed their own 30 energy saving stoves that would have reduced fuel wood consumption by about 50%. The trainees trained other farmers who have now started constructing energy saving stoves using local material, mainly stones and mud.

Additionally, the following number of farmers were trained in different areas:

84	in improved weaving and spinning techniques
105	in HIV/AIDS, family planning, food processing and nutrition
75	in Community Organization and Leadership Training for Action (COLTA)

4.2.6 Other Activities

- Three Farmers' Research and Extension Groups (FREG) were established in Lay Gayint Woreda in collaboration with Adet Research Center.
- Eight anti-HIV/AIDS and family planning clubs were established in Sekota and Lay Gayint woredas.
- Assistance was made to expanding artificial insemination (AI) service provision in Tehuledere and basic animal health services to the three PAs through mobile clinics in the other four woredas.
- Field visit was organized for 27 farmers, 2 DAs and 5 experts of Tehuledere woreda to assist the process of establishing and managing IPM/FFS. The visit helped establish two IPM/FFS groups that are now working on aphids and tick control.
- A total of 693 tools of various kinds were provided to farmers in Lay Gayint to assist farmers' engagement in homestead gardening and in soil and water conservation.

Detailed account of accomplished activities of the Extension Component in the five pilot woredas is provided in Annex 3 4 of this Annual Report.

4.2.7 Professional Contributions in Regional Meetings and Workshops

During 2004, the Extension Associate attended and contributed in several workshops related to extension and research.

- Served as a resource person in the training of researchers (from Adet Research Center) and extension personnel (from the East Belessa and Lay Gayint woredas) in the planning and execution of on-farm research that was conducted at Adet Research Center.
- Attended a national workshop on Ethiopian Agricultural Extension System, and presented a lead paper concerning the history and current status of agricultural extension in Ethiopia. He also introduced the efforts of AMAREW Project to strengthen the extension system of the ANRS and improve service delivery and quality.
- Edited one of the volumes of the survey results, and attended the workshop organized by BoFED to review Socio-Economic Survey of 50 Woredas in the Amhara Region.
- Attended the workshop on Lake Tana organized by Bahir Dar University and chaired the general discussion session.
- Attended the Research-Extension-Farmer-Advisory Council (REFAC) field visits of Adet Research Center.
- Prepared and submitted course curricula for two departments of the Faculty of Agriculture and Environment of Bahir Dar University.
- Provided assistance to the task force established by the Regional Government to study the marketing system of the Region and edited two volumes of the study results.
- Has given, whenever requested, technical advice in the areas of agricultural extension to partner agencies, notably BoARD and ARARI.

4.3 Cross Cutting Themes

The Extension Component has also given due attention and attempted to integrate in its activities the following three cross cutting themes of the Project.

- a) **HIV/AIDS** - All of the five pilot woredas had organized training in the prevention of HIV/AIDS. This component involved medical experts from the concerned offices. Some woredas have established stronger family planning and anti-HIV/AIDS clubs.
- b) **Gender** - Besides promoting the use of technologies that increase agricultural production and productivity, extension activities aimed also at ensuring that technologies and information that address the needs of women are disseminated (e.g. poultry, fuel-wood saving stoves, small ruminants management, etc.).
- c) **Nutrition** - The Extension desks of all pilot woredas organized training in family planning, food habits and better nutrition for rural women.

4.4 Research-Extension-Watershed Management Linkage at Project Level

The Extension Component worked closely with the Research and Watershed Management components of the project. It involved joint planning of component activities and team based field monitoring and supervision of these activities in the pilot extension woredas, pilot watersheds and also research centers.

In view of further improving the Research-Extension Linkage in the ANRS, efforts have been made to enhance the functional link between BoARD and ARARI both at Woreda level (through joint planning of research and extension activities, ref. see the 2004 plan for details) and at regional level, by encouraging the leadership to work together to strengthen functional linkages. The Extension Associate and the Training Associate jointly prepared and submitted a concept note to ARARI and BoARD as to how to improve linkages between the two institutions in view of bringing about a paradigm shift in research and extension and to improve efficiency and effectiveness of the two institutions. The then Deputy Head of BoA, currently Head of the Extension Division, and the Natural Resources Management Director of ARARI have been designated by their respective institutions to work with us to finalize the proposal and submit it to the leaders of both ARARI and BoA. Hopefully, the issue will be duly addressed once the restructuring of BoARD gets institutionalized.

Further efforts have been made to enhance the functional link between extension and research at woreda level by proposing a memorandum of understanding between Woreda Agricultural and Rural Development Offices and the nearby Research Centers. A technical committee with defined duties and responsibilities has been proposed, and both parties have in principle accepted the need for having a technical committee at woreda level and are studying the proposed modalities. We hope that this will be discussed and approved at the Regional level in 2005.

4.5 Budget Profile

Though the 2004 plan was submitted when requested, the fund was released in June. The amount of money that reached the woreda offices of Agriculture and Rural Development to implement extension activities was only 60% of the approved annual budget. As indicated above, this year too there have been serious problems in liquidating advances timely. Only few of the pilot woredas managed to utilize even the 60% fund released. Changes in fiscal policy (finance is no more under the authority of BoARD) and the extended staff performance evaluation meetings and the on-going restructuring of BoARD has in one way or another limited the capacity of woreda staff to implement planned activities timely. Besides, the tradition is to buy inputs ahead of the planting season. But the funds reached late in the planting season. All seeds that were distributed would not have been purchased had it not been for the cooperation of the AMAREW Project Office that kindly lent the Extension Component some money to buy seeds. The money was later reimbursed by the woredas. Thus a mechanism of making funds available to woredas during the first and the second quarters is critical.

As compared to last year, however, there is a positive trend in all woredas in making use of the fund to implement planned extension activities. Though actual figures are yet to be produced, most woredas have used much of the released amount. The Regional BoARD is following up the process and all woredas are expected to liquidate all advances soon.

4.6 Monitoring and Evaluation

As regards monitoring and evaluation, the planned annual review workshops at woreda and Regional levels could not take place for administrative reasons. The internal monitoring mechanisms, woreda level fortnightly meeting of Desk Heads under the chairmanship of the Office Head, followed by monthly and quarterly technical reporting of Woreda Offices to Regional BoARD were implemented. The contents of this annual report are drawn from these reports of Woreda ARDOs. Yet, closer follow up and agreeing to what extent the woredas can revise their plan needs to be agreed upon.

By the end of the year, each of the woredas assessed the performance of the extension component, both in terms of the technologies introduced and the extension methods employed. Based on this assessment, wherein farmers were the main participants, the woredas have prepared their 2005 plans.

4.7 Problems Encountered and Solution Measures Taken

Major problems reported by woredas for not implementing all planned activities include extended period that experts spent in staff evaluation meeting and in reviewing the 2004/2005 woreda level plan, the problems associated with the new single pool financial system at the woreda level in timely accessing the released fund, and too many in-coming additional assignments, often unrelated to Extension. In woredas where delays in implementation are significant and where fund release has been slow, the attention was brought to the Woreda Administration, and the latter promised follow-up and assistance for smoother implementation of planned activities. Besides, frequent attempts to change plans have been observed, owing to intentions to adjust to woreda plans, particularly to commodity programs of the Regional Government (e.g. focusing on beekeeping activities in Tehuledere led the woreda to shift resources from other sectors to beekeeping).

The other problems that the Extension Component of AMAREW was faced with in 2004 were:

- Still weak research-extension link at woreda level;
- Limited knowledge base of experts in available technologies;
- Mindset of some experts about bottom-up planning;
- Transitional difficulties and lack of experience associated with decentralization ;
- Limited experience to do situation analysis, to be engaged in basic on-farm research and to plan and implement need driven extension activities;
- Problems related to technology multiplication, timely and adequate availability of input and credit. As indicated in the last year's report, extension without putting in place working mechanisms for making technologies, credit and inputs available for farmers would not go beyond creating awareness;
- Difficulties to timely get funds to woreda Agricultural and Rural Development Offices;
- Problems associated with timely liquidating advances;
- Extremely poor experience in communication and reporting;

- Though rarely, the quality of packed seeds, particularly sorghum was so low that in East Belessa it was considered as a failure.

The Extension Associate and other senior staff of AMAREW used every opportunity to bring to the attention of Woreda and Regional BoARD concerned officials the need to address these constraints. Some corrective actions through training and discussions were also made.

4.8 Conclusions

Though 2004 was the second year to plan and implement extension activities in the pilot woredas it was also particularly a difficult year for implementing planned extension activities as the Regional Government was engaged in major restructuring of agricultural institutions and in extended staff performance evaluation processes. This significantly limited the possibility of implementing and supervising planned activities.

Besides, funds reached woredas at the end of June 2004. This resulted in making changes in the original plans. Despite being a difficult year, many woredas managed to implement much of the planned activities. Along with farmers, experts of all woredas assessed the performance of the technologies introduced and the extension methods used to demonstrate the technologies. The weaknesses and strengths were reviewed, and planning on what can be done was agreed on. They have now begun drawing realistic action plans. We, therefore, expect better accomplishments in 2005.

5. Integrated Watershed Management Component

5.1 Objectives of the Component

The watershed management component of the AMAREW project aims at serving as pilot sites-specific integration model of research, extension 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 watershed level.

5.2 Areas of intervention

The watershed component of AMAREW project in partnership with BoARD, ARARI and EPLAUA is engaged in testing a wide range of technologies, which are believed to solve critical problems that have greatly affected the rural communities in the pilot watersheds. The following chart illustrates the various development interventions under implementation in relation to the problems identified by community members of the pilot watersheds:

<i>Sub-system</i>	<i>Major problems</i>	<i>Sub-system interventions</i>
Natural Resources sub-system	Soil erosion	Physical and biological conservation measures
	Deforestation and shortage of wood for fuel and construction	Area closure, tree plantings, homestead plantation, introduction of improved stoves
	Shortage of animal feed	Back yard forage development, planting on bunds,
	Loss of soil fertility	Compost production,
	Moisture stress, water shortage both for humans and animals	Improved tillage practices, in-situ moisture conservation, physical conservation works, trenches
Agronomy sub-system	Erratic and poor distribution of rain	Introduction of in-situ moisture conservation practices and implements, introduction of drought resistant and introduction of crops more appropriate to the environment early maturing varieties, trainings and demonstrations
	Lack of improved crop seed	On-Farm research on improved released varieties, engage farmers in seed production
	Insect and pest problems	Establishment of Farmers Field Schools (FFS) and Integrated Crop Management (ICM) groups, introduction & demonstration of improved storages
	Loss of soil fertility	Compost production, green manuring, etc.
Livestock sub-system	Shortage of animal feed	Backyard forage development, planting on bunds, increase area closures for grass development, enrichment planting
Livestock sub-system	Animal health problem	Increase mobile veterinary service, training Community Animal Health Workers (CAHW)
	Livestock water shortage	Construction and maintenance of ponds
	Low income, poor livestock management practices	Introduction improved apiculture, poultry, small ruminants husbandry
Social sub-system	Weak local institution	Establishment and empowerment of local Community Watershed Management Organization (CWMO)
	Low level of women participation	Creation of organizational space for women, gender balanced development
	Increased HIV/AIDS problem, high fertility rate, poor nutritional balance	Establishment of Anti HIV/AIDS clubs, awareness raising programs, family planning, nutrition and home management training
	Small farm size, lack of disposable cash	Organization of Micro-enterprise development, off-farm income generation activities, credit provision, etc.

5.3 Planned activities for 2004

In line with the above chart, the following two categories of work were identified for the calendar year 2004:

5.3.1 Strengthening Community Level Watershed Management

Support the empowerment of Community Watershed Management Organizations in the planning, implementation, monitoring and evaluation of the overall pilot watershed rehabilitation process and managing activities to serve as the responsible structure to maintain/sustain development after outside assistance terminates.

5.3.2 Watershed Planning and Management

- Through participatory planning and management activities, carry out soil and water conservation and overall watershed rehabilitation works;
- Conduct pilot studies to support the creation of off-farm income generation activities;
- Facilitate visit of experts for short-term Technical Assistance (TA);
- Finalization of pilot watersheds hydrological monitoring by graduate students.

5.4 Activities Performed

5.4.1 Strengthening Community Level Watershed Management

AMAREW Project and its ANRS partner institutions, in collaboration, have achieved both organizational and physical results that can be shown to visitors. One of the objectives of USAID at the beginning of this project was that tangible results of its investment would be visible. For the first year, the most visible sign of the AMAREW project was the area closure at Yeku, which never failed to impress visitors who walked through it. Area closure is one of the easiest things to do, however, and the communities at Yeku have forged ahead and implemented additional activities that are visible from the road. After a slow start, the communities at Lenche Dima have performed work that in visual impact surpasses that of Yeku, especially the gully rehabilitation work and the hillside treatment above Kolo-Kobo. Both of these areas are to the point that they could now be used as regional training centers, an informal goal of this component that no one expected would be reached. This has all been made possible mainly through the strong and motivated community organizations established through this project. People in both communities have indicated that they are organized now, have seen what they can do, and will not go back to the way they were before AMAREW started working with them. Specific activities in this regard in 2004 were:

- The two Community Watershed Management Organizations (CWMO) established in year 2003 have been given additional leadership and management trainings. Some of the training contents included *conflict management, consensus building, community*

organization and leadership skill, etc. In these trainings, Farmer Association and religious leaders were present;

- In both watersheds, communities took an active and leading role in annual work plan preparation, community mobilization, selection of farmers for various technology trials, site selection, Food-for-Work management, etc;
- Evaluation on year 2003 and 2004 activity performance has been conducted with the leading role of the CWMO;
- Article of Association for the two CWMOs have been drafted and agreement has been reached on the roles and responsibilities of the Watershed Associations (WA), Farmer Administrations (FA), Office of Agriculture and Rural Development (OARD), and the AMAREW Project;
- In an effort to provide a day-to-day on site technical support to the community watershed association and development agents at Lenche Dima, the AMAREW project, with consultation of officials of Gubalafto woreda agriculture and rural development office, has recruited Ato Tesfaye Habtamu as Lenche Dima watershed coordinator.

5.4.2 Participatory watershed management planning, natural resources management, crops, livestock, micro-enterprise and social development interventions

The watershed rehabilitation activity is being planned and implemented following community based, integrated watershed management principles using Local Level Participatory Planning Approach (LLPPA), where local communities and government institutions take the leading role and overall project ownership. Extensive development works have been conducted in both watersheds during this reporting period. Highlights on these activities and detailed target output results are given in Annex 5-10.

5.4.2.1 Natural resources management

Physical and biological conservation works have been carried extensively in both watersheds through food for work as well as free community labor. The physical conservation works include hillside terracing, check dams (stone, gabion, sand bag), stone and soil bunds, eyebrow and micro-basins, trenches, sediment storage dams (SS dams), and rock-fill dams.



Figure 5. Physical and biological conservation works have been carried extensively in both Yeku and Lenche Dima watersheds through food for work as well as free community labor. The picture shows a sample of the impressive gully rehabilitation work done at Lenche Dima during the year.

Biological conservation works mainly focused on area closure, gully rehabilitation, hillside planting and individual homestead plantation. Planting on bunds on farmlands through direct sowing of forage species have shown very successful result specially at Lenche Dima. Forage production by livestock development beneficiaries at Yeku, in addition to meeting individual households livestock feed requirements has enabled farmers to make additional money from the sale of forage seeds to the office of agriculture and NGOs.

5.4.2.2 Crop production

Among reasons for low crop yield, in addition to moisture stress, declining soil fertility and pest problem, is the lack of high yielding improved crop varieties at the hands of the watershed residents. There are at present very promising high yielding released crop varieties at the hands of the research centers and the seed producing enterprises. In 2004, improved varieties of teff, wheat, triticale, sorghum, cotton, groundnut, sesame, maize were tried in the two watersheds with the full collaboration of Sirinka and Sekota research centers. Farmers have evaluated these introduced varieties as having good qualities especially their early maturity and high yielding ability. On the other hand, to increase the role of organic fertilizer in soil fertility management, over 30 households were trained in compost making and 14 have already started organic fertilizer application.

5.4.2.3 Livestock development

Poultry, apiculture, goat restocking, and forage development constitute the major part of livestock development interventions in the pilot watersheds. In 2004, planned poultry development activities were not carried out as it was not possible to get day-old chicks as well as three months old pullets from Kombolcha research center and elsewhere. This was basically a problem to many development sectors (GOs and NGOs).

A total of 405 goats were distributed to poor households at Yeku and Lenche Dima watersheds. Evaluation of the 2003 annual restocking has shown good performance. Major limiting factors of the 2004 restocking activity as indicated by farmers were the late delivery of goats to beneficiary farmers on June-July (mainly dry period) while the ideal time was March-April (where feed availability from *belg* rains is high) and poor selection of market places i.e. markets with different climatic nature to the pilot watersheds. As stated earlier, forage production has shown encouraging result especially at Yeku. Most of the closed areas and rehabilitated gullies are presently serving as potential sources of additional feed.

The late release of fund had also made the performance of apiculture development in both watersheds significantly lower than planned. Transfer of bees from traditional to modern bee hives is mainly done in July-August and the money for the purchase of bee colonies was made available in August. Some farmers who had their own bee colonies, however, have transferred them to modern beehives especially at Yeku.

As part of the program in improving the animal health status at Lenche Dima, two Community Animal Health Workers (CAHW) were trained and issued with basic animal health equipment and drugs. Mobile animal health clinic services have been initiated.



Figure 6. The Abergelie local breed of goats is well adapted to the lowlands of Sekota, while the crossbreed sheep between the Awassi and indigenous breeds are doing well in the highlands of North Shewa and Wello. ARARI has active research in both.

5.4.2.4 Water harvesting development

Water shortage has been identified as the major limiting factor for all development activities in both watersheds. To alleviate the water shortage problem in both watersheds, different water harvesting structures including dome shaped, trapezoidal and hemispherical water harvesting structures were made. At Lenche Dima farmers involved in the construction of dome shaped water-harvesting structures have already begun production of fruits and vegetables. The shallow hand-dug well at Yeku has served, as an indicator for the existence of ground water potential within 10 meters depth. This has increased farmers' interest to take the initiative in having their own wells in the years to come.

5.4.2.5 Micro-enterprise development

Promotion of off-farm income generating activities in the pilot watersheds is a major development aspect. One of such efforts involves training of women groups in improved fuel-efficient stove production. Ten women as a team at Yeku was trained on improved stove production and at the present moment have reached a stage of being registered as cooperative through the cooperative promotion bureau. The project provided these women with stove molds while they contributed their workshop attendance per diem to start production. As indicated in the Amhara Region *Bekur Newspaper of Tikimt 30, 1997 E.C.*, this group of women has come to a total capital of over 6,500 birr and have almost reached to be food secured from the income they made. More importantly, the contribution of this initiative is in the reduction of deforestation in the locality as such stoves have a 50% fuel consumption reduction compared to open stoves.

Another on-going activity in the area of micro-enterprise development includes training of women groups on gabion production at Lenche Dima watershed. There is a high demand for gabion boxes in the woreda and its surroundings. The nearest source of gabion boxes is either Debre Tabor or Addis Ababa with a cost of 350 birr per box. It is believed that the production of gabion boxes at Lenche Dima, in addition to raising incomes of poor women groups will greatly reduce government and non-government institutions' time spent through long distance travel for the procurement of gabion boxes.



Figure 7. The Project completed training on fuel-efficient improved stove production and provided stove molds to a team of ten women at the Yeku watershed. The team has turned the stove production into a profitable business venture, to which the ANRS mass media has given extensive coverage.

5.4.2.6 Land administration

A major development activity being undertaken by the Environmental Protection, Land Administration and Use Authority (EPLAUA) in the two pilot watersheds and extension woredas is the land registration, demarcation and administration work and the provision of first stage land certificates to farmers. In this reporting period, various policy familiarization workshops were organized for the farming community and different government institution workers. A total of 1,704 participants have attended these familiarization workshops. In areas of land registration 14,058 farm plots were registered. Land certificates have been issued to farmers in the Yeku watershed and those for Lenche Dima are to follow soon.

5.4.2.7 Cross-cutting issues

HIV/AIDS – In this reporting year, awareness raising trainings and public gatherings on the problem of HIV/AIDs have been organized at both watersheds. Fifty farmers (mainly women) at Yeku watershed attended a two days training that was given by health officials of Sekota. Anti-AIDS Club has been organized at Lenche Dima and will soon start its awareness promotion activities within the watershed and surrounding PAs.

Gender – In both watersheds, efforts have been made to make sure that women headed households are given priority. In all areas in which women are actively involved (e.g. poultry, fuel-wood saving stoves, small ruminants management, etc.), the training and support activities were mostly targeted at women. As a reflection of this principle, 50% of the community watershed association members (sixteen) are women. Most of the on-going micro-enterprise development activities are targeting women.

Nutrition and Family Planning – Nutrition and family planning trainings were given to women at both watersheds. As revealed during the 2004 activity evaluation meeting, those women who have attended the training session have openly indicated that they have started use of contraceptives and freely discuss with their husbands on issue related to HIV/AIDS and family planning, which was not a usual case in the past.

5.4.2.8 Other developments

- A short-term technical assistance was facilitated from 5-11 July, 2004. Dr Olivier Husson, a researcher with CIRAD in Madagascar, visited the region to discuss his work in soil fertility management using biological methods. He gave a well-received introductory seminar for regional partners and one EARO representative in Bahir Dar. He spent a week traveling with ARARI and EARO scientists, and presented his observations and recommendations at Sirinka research center. Research planning based on his observations is under way.
- Field level research works being undertaken by graduate students of Cornell University has recently been completed in both watersheds. As a continuation of the various graduate students initiated research activities at Lenche Dima watershed, Memorandum of Understanding (MoU) was signed between ARARI and the AMAREW project. Almost all equipment that were in use by the graduate students at Lenche Dima and Yeku watersheds

were handed over to Sirinika and Sekota Research Center. A summary of graduate students research work is shown in Annex 11 and 12.

- The office at Woldiya has become fully operational where the watershed management associate has been assigned for long duration.
- Participants in the 2005 work plan development included, representatives from woreda line bureaus, researchers, AMAREW staff, Watershed Association members and peasant association leaders. All these jointly developed the 2005 work plan which is yet to be submitted to USAID.
- Dr Kent Reid, who was the Senior Extension Watershed Management Advisor (EWMA) of AMAREW Project since the beginning of the project, has completed his terms of employment and left the project as of December 14th, 2004. Ato Yitayew is now the lead person in the project's integrated watershed management work.

5.5 Key achievements:

- Successful gully rehabilitation work using sand bag and gabion check dam was carried at Lenche Dima watershed and this site has started to serve as an impressive demonstration site for government and non-government institutions;
- Area closure sites with enrichment plantation have been established and are under good management by community members;
- First stage land use certificates have been issued to Yeku communities and certificates for Lenche Dima communities are expected soon;
- Improved stove producers women's group was organized which has reached a stage to of forming a cooperative;
- Community Watershed Management Organizations (CWMOs) at the pilot watersheds have reached a stage of taking the lead role in the overall watershed rehabilitation work.
- Played a lead role in the preparation of "National Integrated Watershed Management Guideline" initiated by the Federal Ministry of Agriculture and Rural Development (MoARD) that was financially supported by USAID. In addition to the technical contributions rendered by our watershed component, the AMAREW Project took the overall administration and workshop organization which was held in Nazareth.

5.6 Initial impact indicators

The watershed development activity in the two pilot watersheds has just finished its second year of operation. Significant impact from watershed development initiatives of a particular site is not something that is achievable in a couple of years. The project has given due consideration to the social development (software) during its beginning and then moved to the engineering (hardware) or practical development activity implementation. Even though the project is at its early stage, the following initial impacts are being observed:

Local institutional strength: The major task of the project in the first year was to establish and build the capacities and skills of Community Watershed Management Organizations (CWMOs) so that the members will be able to assume responsibility for further resource conservation. To achieve this goal, the project has conducted and supported various trainings and workshops.

Trainings like *Community Organization Leadership Towards Action (COLTA)*, *Organization and Leadership Skills and Conflict Management (OLSCM)* trainings were given. The CWMO at present have reached a stage to handle the watershed development efforts by themselves. This is considered as one of the major positive impacts of the project.

Reduced soil erosion: The problem of soil erosion and the associated crop yield reduction was identified as one of the major problems in the pilot watersheds. Physical and biological soil and water conservation works have been going on the sites during the last decade. Most of these works, however, were mostly damaged and the problem of soil erosion remained as serious as ever.

With the organization of the CWMO, and playing the leading role of the overall development program, all conservation works were properly protected and maintained on time, ultimately resulting in reduced soil erosion. Since the last two years, forest development and user groups are managing over 200 hectares of closed areas.

Water recharging ability: Yeku watershed, in the past, was categorized as an area with poor ground water potential. Some of the seasonal streams usually dry sometime in November – December shortly after the main rainy season. After the establishment of an area closure site and construction of different physical soil and water conservation works (trenches, hillside terraces, check dams, etc.), one of the seasonal streams which crosses the closure hill side has water flow till the end of January. It was also made possible to get water from shallow hand dug wells at a depth of less than 10 meters.

Water availability: Rainwater harvesting is currently accorded high priority both at national and regional level and this project is contributing to this total national effort. Even though the number of constructed water harvesting structures in the two pilot watersheds are limited, those farmers who have constructed these structures have started the production of vegetables and fruit trees. There is presently a growing interest from the community in the construction of such structures. To maximize the production per unit volume of water, the project is working with research institutes in the introduction of rope and washer pump and drip irrigation technologies.

Crop productivity and diversification: Erratic rainfall with variation both within and between seasons is a major characteristic of rainfall pattern in the pilot watershed areas. As it is common for most lowland areas, rain is very poorly distributed in both spatial and temporal terms. Often there is too much water during a few days of the year, while water supply is insufficient during most of the crop-growing period. With the introduction of *early maturing* and draught resistant improved crop varieties mostly released by research centers and seed enterprises, farmers have indicated that they have started to get better yield. In addition, new crops such as *sesame*, *groundnut*, *cotton*, and *triticale* are being introduced showing promising results. In order to diversify production, those households who have constructed water harvesting structures are being assisted to grow horticultural crops like onion, potato, tomato, pepper, sweet potato, fruit trees including mango, papaya, avocado, etc.

Fodder production: Livestock production is an integral part of the agricultural setting in the pilot watersheds and in the ANRS in general. With the increasing trend of livestock and human

population and decreasing grazing land, livestock productivity is at a decreasing trend. The problem analysis exercise in the pilot watersheds have clearly spelt out that livestock feed shortage is one major constraint to the community. The introduction of closed area management, backyard forage development, planting or direct sowing of forage species on bunds, etc. have increased fodder availability.

Off-farm income generation and diversification: Self-help groups (SHG) are being organized in the pilot watersheds to be engaged on small-scale off-farm income generating activities. Presently, women's improved stove producers self-help group at Yeku pilot watershed has reached a stage of being transformed to a cooperative. Similarly, a farmer's self help group in the production of gabion box is under organization at Lenche Dima watershed.

In the last two years, hundreds of poor households were enabled to participate in small ruminant husbandry, improved poultry production, modern honey production intervention to increase household income as well as diversification. This program mostly targets poor households and mainly women headed in the formation and restoration of households' asset.

Social equity: Although there is a land-related focus in the project, the landless, poor and marginal farmers have not been forgotten. Women were made major development actors in the watershed development. Fifty percent of the Community Watershed Management Organization members are women. Most of the income generating activities is targeting poor women. Closed area managing self-help groups are mostly landless or those with very small land holdings.

Impact on nutrition and home management: Training on home management, nutrition, HIV/AIDS, family planning are being given to farmers, mainly women. As the result of such training women have started using contraceptives and have started discussion openly with their husbands in areas of HIV/AIDS and the need for family planning, which was not a usual thing in the past. As a result of the training on nutrition and home management, farmers have started to eat vegetables like carrot, and beetroot for the first time in their life.

5.7 Significant Problems Encountered

There were no critical and significant problems adversely affecting the watershed development in the year 2004 compared to 2003. Major critical constraints faced in 2003 and fully resolved this year was the issue of grain resource allocation. R2D has done all the required arrangements in both watersheds, which is really appreciated by other AMAREW Project. Another improvement observed this year is a stronger research extension linkage and more commitment/ownership for the follow-up of the implementation of planned activities by the BoA. In spite of this encouraging improvements, however, it would be worthwhile to mention the following problems:

Late release of budget: Delayed release of budget has still remained a major critical problem and has greatly affected most of those activities (livestock, crop, water) that require timely material or inputs purchase. This has resulted in two undesirable conditions. First, some activities have been conducted outside their proper timing (late sowing, late transfer of bees, etc),

second, postpone the activity to the coming year that has negative impact on trust from the communities.

Problem in accessing released fund at woreda level: The regional state has embarked on a single pool financial system at woreda level. It was found to be more time taking them in the past to access money for the day-to-day activity implementation at both watersheds. The procurement process was very lengthy and the delays witnessed have caused activities that are time bound either to be done outside their actual time or be postponed entirely.

High staff turn over: The frequent staff turn over at woreda level was taken as a major limitation for interrupted or discontinued nature of activity implementation. For instance, four and three natural resource desk heads have left or moved to other posts at Woldiya and Sekota respectively in 2004. In most cases, the natural resources desk head is the designated focal person for the pilot watershed and extension PA sites of the AMAREW Project.

5.8 Action Taken to Solve Problems

- Making the Woldiya office fully operational and assigning the watershed associate for most of his time at Woldiya was found to be effective in filling the gaps at times of staff turnover and overall activity follow-up and coordination among partner institutions;
- The employment of a temporary watershed coordinator full time stationed at Lenche Dima has dramatically accelerated the watershed rehabilitation work;
- To overcome the problem of late release of fund for some of the activities at Yeku, limited amount of money from other food security projects (EU, federal, etc.) was made available.

6. Training Component

6.1 Introduction

Through the different components of the project, new technologies that could be used in improving the production and productivity of crops, livestock and managing the natural resources are being planned and implemented in the five pilot woredas and the two watersheds. Obviously, for these new technologies to be adopted, people who are supposed to implement the technology should have the required knowledge, skill, and positive attitude. This includes people involved at all levels of the technology dissemination process. Woreda experts need to have knowledge and skill about the technologies they are disseminating and on alternative methods of technology transfer. Farmers should have clear knowledge about the technologies and skills that would help them apply in practice. Furthermore, they require knowledge and skill that will help them to commonly manage natural resources and build social cognition.

In addition to this, as a result of the decentralization process, the woreda agricultural and rural development offices now shoulder the power and responsibility of deciding on all developmental activities that should be carried out in the woredas without having the required manpower and capacity the job seeks. Due to this, building the analytical, operational and management capacity of partner institutions and farmers within the context of strengthened research and extension services through the identification of long-term training, short-term training, educational or motivational study tours were considered as key areas requiring the project support. Hence, the 2004 training plan was designed taking the above assumptions into consideration.

6.2 Long-term degree training

Degree training of selected ANRS professionals is considered as one of the principal means for building human and institutional capacity and facilitating the research/extension paradigm shift. In line with this, the project together with the partner institutions identified key areas that need to be strengthened through upgrading academic qualification of their staff.

6.2.1 Summer B.S. degree training

Seven staff members of BoARD and three staff members of ARARI joined degree classes to resume their second year B.S. classes at Alemaya, Bahir Dar and Mekelle Universities. Furthermore, Ato Aytenew Endeshaw who replaced Ato Aderajew Abuhay, a staff member of East Belessa woreda who was forced to discontinue his studies due to personal health, was also enabled to join Mekelle University.

With regard to 2003 Summer classes, there were some issues that needed to be resolved. These were finance transfer from the AMAREW Project to Mekelle University and issues related to getting academic records on time. Two-member team from the Project left for Mekelle and had discussion with the University officials regarding the outstanding issues. As a result of the discussion, agreement was reached on how to resolve them. Furthermore, the team met the Summer B.S. students and had a brief discussion regarding

academic issues. Follow-up memo was sent to the University to communicate the issues raised by the students, which needed improvement.

6.2.2 M.S. training

In the AMAREW Project long-term training program, five M.S. students are being financially supported to continue their studies at Alemaya University. The students resumed their studies in September 2003; and the majority of them have completed their course work. Consequently, three of them have presented the University approved research proposal to the AMAREW Project to get the opinion of the project professional staff and start their research work. The studies are proposed to be conducted in the mandate areas of Adet, Sekota and Sheno Agricultural Research Centers.

Staff members of the Project have given them an expertise advice and they were also asked to prepare an action plan to facilitate the budget release. As a result, they prepared a three-month action plan with the required budget and based on this and as per the University approved proposal the budget was released for them. The names, field of study, institutional distributions and academic status of trainees are listed in Table 5.

6.3 Short-term in-service training: Upgrading researchers and BoARD experts knowledge and skills

These courses and training are targeted to equip employees of partner institutions and the ultimate beneficiaries of the project, the farmers, with the required Knowledge, Skill and Attitude (KSA) to attain the much sought household production and productivity increase. These training programs were organized at three levels. First, to impart practical skill, which will help researchers to be involved in client-oriented on-farmer research. Second, to create a forum whereby researchers and extension workers come together and exchange ideas and feedback. The third and the major one is the training organized to equip farmers with the required KSA which would make them utilize the technologies made available to them through the different extension interventions. Although these training programs may seem separate and isolated, they have complementarities and all are targeted to one goal i.e. improving the production and productivity of crops and livestock production and improving the management of natural resources. The trainings planned and executed under the different categories are as given below.

6.3.1 Module development

The training activities conducted as a result of the 2003 annual plan has revealed the significant training related problems that existed in the pilot woredas and most probably throughout the ANRS. The problems relate to:

- Absence of mechanism to ensure that the trainings were based on client needs;
- Inconsistency in the training contents used for the same subject in the different woredas; and

- Unavailability of standards for training methodologies used, duration of courses, and other related problems.

Table 5. List and academic status of staff members of the partner institutions attending B.S. and M.S. degree courses at Alemaya, Bahir Dar and Mekelle Universities in 2004

No.	Name of trainee	Partner institute	Degree sought	Field of study	Training institute	Academic status
1	Demrew Wesenyeleh	BoA	M.S.	Agricultural Extension	Alemaya University	Second year, ready to defend research proposal
2	Getaneh Wubalem	BoA	M.S.	Agricultural Economics	Alemaya University	Second year, ready to defend research proposal
3	Bitew Genet	ARARI	M.S.	Soil and Water Cons. Engineering	Alemaya University	Second year, conducting field research
4	Yonas Girma	ARARI	M.S.	Irrigation Engineering	Alemaya University	Second year, conducting field research
5	Zewdu Birhane	ARARI	M.S.	Agricultural Economics	Alemaya University	Second year, conducting field research
6	Tesfaye Setegn	BoA	B.S.	Land Res. Mgt. and Environ. Protection	Mekelle University	Completed the second summer program
7	Aderagew Abohay	BoA	B.S.	Dry land Crop Sciences	Mekelle University	Completed the second summer program
8	Kokeb Bogale	BoA	B.S.	Land Res. Mgt. and Environ. Protection	Mekelle University	Completed the second summer program
9	Misganaw Teshome	BoA	B.S.	Dry Land Crop Sciences	Mekelle University	Completed the second summer program
10	Demere Hailu	BoA	B.S.	Land Res. Mgt. and Environ. Protection	Mekelle University	Completed the second summer program
11	Aymiro Yhyess	BoA	B.S.	Animal and Range Sciences	Mekelle University	Completed the second summer program
12	Lakech Mitiku	BoA	B.S.	Land Res. Mgt. and Environ. Protection	Mekelle University	Completed the second summer program
13	Mekuria Yimer	BoA	B.S.	Dry land Crop Sciences	Mekelle University	Completed the second summer program
14	Sitotaw Taffese	BoA	B.S.	Animal Sciences	Alemaya University	Completed the second summer program
15	Mohammed Hissein	BoA	B.S.	Animal Sciences	Alemaya University	Completed the second summer program
16	Wolelaw Endale	ARARI	B.S.	Mechanical Engineering	Bahir Dar University	Discontinued due to health problem
17	Dilnesa Ewnetu	ARARI	B.S.	Mechanical Engineering	Bahir Dar University	Completed the first year program
18	Tefera Mokennen	ARARI	B.S.	Animal Sciences	Mekelle University	Completed the first year program

With this background, BoARD and the AMAREW Project decided to include training for bureau experts on module development and training methodologies in the 2004 work plan. Following this, the Project sought collaboration from AMAREW project consortium member Universities and fortunately a consortium member University, the Virginia State University, came forward to send a resource person, Dr. Albert Essel, an Associate Administrator for Programs of the Cooperative Extension at Virginia State University, with expertise in Training Module Development. Moreover, the AMAREW Project senior staff members have also participated in handling some of the subjects in the sessions. After getting the consent of the resource person, the training contents were jointly framed and the training was organized at Adet Agricultural Research Center and the AMAREW Project Headquarters.

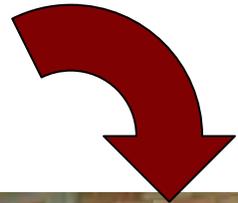


Figure 8. Training on Module Development was given in Adet and Bahir Dar to 25 participants from our ANRS partner institutions. AMAREW staff and a consultant from Virginia State were the trainers.

The training was organized from August 2-13, 2004, the first week at Adet for the theoretical phase and the second week at Bahir Dar for actual module development practical work. Total participants of the training were 25 comprising 14 from BoA, 7 from ARARI and 4 from EPLAUA. The training subjects related to: Program planning, Training needs analysis, Module development (Theory and Practical with equal emphasis). As a result of the training, trainees were able to produce draft modules on:

- Construction of Hay Box Brooder
- African Bollworm Control on Faba Bean
- Agricultural Marketing Data Collection
- Preparation of Check Dam Construction Plan

Before the training ended, the trainees were able to develop an action plan, which was planned to help them finalize the draft documents. Encouraging impact has started to be observed as a result of this training. The BoARD is moving towards module based training and presently all experts have been instructed to prepare modules for the trainings that they are planning to give. Furthermore, a task force is in the process of finalizing training modules for the Farmer Training Centers (FTCs). Some members of the task force were participants of the module development training, as a result, they have shared the knowledge they gained from the training and this made the FTC module development work easier and successful.

6.3.2 Web page designing training

In an effort to improve the information dissemination capacity of our partner institutions, a training course on web page designing was organized. A resource person, Dr. Dawit Haile, who came from Virginia State University offered the training. Participants were drawn from BoA, ARARI and DPPC Headquarters. The training was given from June 28 to July 10, 2004. At the end of the program, participants developed draft web pages of their own organizations.

After returning back to his duty place, Dr. Dawit has also sent reference books on computer hardware, the web-designing package ‘Dream Weaver’ and networking. The books are kept in the library of the AMAREW Project so that staff members of partner institutions can access them easily.

6.3.3 Training on training methodologies

Our assessment of the implementation of the 2003 training plan has revealed to us that most of the woreda staff members had limited experience in utilizing alternative training methodologies as they are mainly technical experts in their specific fields of study. As a result, it was believed that organizing a training program on training methodologies would have positive effect in increasing the efficiency of the training planned for year 2004. Since research centers also have similar problems, it was thought that they would benefit if they participated in such kinds of training.

With this background, training on training methodologies was organized for 13 woreda extension workers and development agents who came from East Belessa and Lay Gayint woredas and for 8 researchers who were staff members of Adet Research Center. The training was given from May 24-26, 2004 at Adet Agricultural Research Center. Resource persons were drawn from the AMAREW Project and Agri-Services Ethiopia, a local NGO practicing innovative training methods in its project woredas. In order to insure the implementation of the outcomes of the training program, trainees were made to prepare an action plan so that it helps follow-up.

6.3.4 On-farm experimentation training

As a result of the joint research-extension planning, extension workers were enabled to be involved actively in the on-farm experiments proposed by researchers of ARARI. This will require extension workers to play a major role in the execution of the on-farm research. However, the extension workers do not have the skill required to shoulder this new responsibility. Hence, imparting such skill through training was thought to be the prerequisite to initiate the intended program. Moreover, junior researchers of ARARI also benefited from the training.

In line with this, training on on-farm experimentation was organized for 13 woreda extension workers and development agents who came from East Belessa and Lay Gayint woredas and for 8 researchers who were staff members of Adet Agricultural Research Center. The training was given from May 27-29, 2004 at Adet agricultural Research Center. Resource persons were drawn from the AMAREW Project and Adet Agricultural Research Center.

Following the training, plenary meeting was organized to frame out areas of responsibility sharing. This resulted in identifying activities to be performed in the on-farm research and responsible organization for the activity. This helped to clarify responsibilities and also forge strong linkage between research and extension. The training and the agreement made between Adet Research Center and the two woredas made the woredas to be actively involved in the on-farm activities. For example, the 2005 on-farm experiments were mainly supervised by East Bellessa woreda office of agriculture staff.

6.3.5 Researchers giving skill training to extension workers

Most of the research activities conducted by ARARI research centers are mainly adaptive in nature. This implies that they have immediate utility to solve the problems existing in the field. However, they can only attain the targeted purpose if they are communicated and made known to the end users. One way of doing this is creating a functional linkage between research and extension and communicating the information to extension workers. Training of extension workers by researchers about newly developed technologies and clarifying gaps on those which are already existing is considered one means to attain this. In line with this, training was organized by Sekota Agricultural Research Center for twelve Development Agents (DAs) on implementation of location

specific fertilizer trails. After getting the training, DAs participated in site and farmer selection, observation, and reporting of the woreda-wide location specific fertilizer trials.

6.3.6 Up-grading skills of development workers and farmers

Different extension interventions were planned in 2004 to increase production and productivity at household level in the five pilot extension woredas. To complement the planned extension interventions, farmers were required to be equipped with the knowledge and skill, which will help them practice the planned extension interventions. Moreover, in order to help them impart the required knowledge and skill to farmers, development workers should also be educated about the working systems of the technologies. In line with this, all the five pilot woredas planned skill-upgrading trainings to farmers and extension workers on diverse areas of agriculture, human nutrition and HIV/AIDS, which were, mainly, consistent with the planned extension interventions and which were intended to compliment them. Among the planned training activities for 2004, the training offered by the five pilot extension woredas are summarized in Table 6.

As a result these trainings, impacts have started to be realized in the pilot woredas. In some woredas, trained farmers in energy conserving improved stoves have entered into constructing and selling stoves. Furthermore, farmers who were trained in construction of improved beehives (transitional type) have started making their own beehives using local materials.

Table 6. Number and type of participants in the different categories of training in the five pilot woredas

No.	Category of training	Extension Workers	Farmers		Total
			Female	Male	
1.	Crop production and protection	20	85	200	305
2.	Livestock husbandry	30	19	161	210
3.	Natural resources management	6	90	50	146
4.	Nutrition, HIV/AIDS and family planning	15	105	50	170
5.	Leadership and community organization	5	18	60	83
Total		76	317	521	914

6.4 Incorporating accountability dimension to the woreda short-term trainings

During the last two years, different kinds of trainings were organized for development agents and farmers. However, it is hard to say that these trainings were offered to those who deserve and are ready to apply them into practice. Consequently, the impact of training was not being realized as was expected. This has made policy makers at various levels to develop negative attitude towards training and have even started to doubt its usefulness. On the other hand, there is a huge gap between what farmers could have performed and what they are practicing presently. Creating awareness, changing their attitude, and imparting the required knowledge and skill can only bridge this gap. For all of these, training is a vital instrument.

Therefore, to come out from this entanglement, a mechanism which makes the training relevant and which also insures trainees accountability for the training they receive is thought to be helpful. This is a well-recognized technique and has worked elsewhere. The technique involves preparing a training contract agreement document, which clearly states the responsibility of both the training providers and trainees, and getting them abide by it. The technique also helps as indirect training need analysis tool. That is to say, if trainees feel that they don't have the necessary inputs, which will help them to adopt what they will be learning, they should not ask or come forward to be trained. Therefore, they should give way to those who have the capability and preparedness to practice what they have learned.

A draft format was prepared and given to officials of the Bureau of Agriculture officials to get their opinion and suggestion. After incorporating their suggestions it will be implemented in the 2005 training activity.

6.5 Educational or motivational tours

Most of the time we can find organizations and places that have unique or successful experiences that can be shared with others. These can be technologies or working systems. These technologies and working systems have helped the practitioners to tackle different aspects of agricultural problems. Learning from experiences of such communities, institutions or places is a shortcut method to solve the problems of an area. Furthermore, it has also a great motivational effect.

6.5.1 Tour for researchers and extension specialists

With this background, in-country educational tours were organized for researchers. These were 27 ARARI researchers working in crop, livestock, natural resources management, and socio-economics research areas. The objectives of the tour were:

- To identify potential technologies, operational systems and experiences, which could be adopted to ANRS conditions;

- To establish and strengthen linkages between researchers working in different centers of ANRS with the researchers of the federal research centers and organizations;
- To be able researchers get to feedback and be motivated in their job.

The tour participants were organized into three groups comprising crop, livestock, and natural resource management teams and visited the following areas:

Crop science group:

Debre Zeit Agricultural Research Center: Grapevine research, Seed multiplication,

Laboratory equipments, Research- Extension-processing industries linkage, Internationally introduced crops, Genesis farm (private multi-purpose farm)

Holleta Agricultural Research Center: Highland fruits, Highland pulses, Tissue culture, Potato, African Highland Initiative (AHI) activities, Farmer Research Groups (FRGs)

Melka Worer Agricultural Research Center and Awash state farms: Cotton, Groundnut, Sesame, Horticulture

Melkassa Agricultural Research Center: Sericulture, Sorghum, Pearl millet, Lowland pulses, Horticulture, Entomology

Awassa Agricultural Research Center: Root crops research

Natural resources group

Kobo Girana Valley Development Program: Irrigation activities

AMAREW Project: Lenche Dima watershed

Mekele University: Indigenous tree species arboretum, Forest rehabilitation project, Cactus project, Water harvesting activities, Consult soil and water related documents

Relief Society of Tigray (REST): Soil and water conservation work, Commercial forest development project, Water harvesting and irrigation

National Forestry Research Center: Tree seed project, Consulted forestry research documents

World Agro-Forestry Center: Tree seed project, Made inventory of the center's publication

Addis Ababa University - Biology Department: Tissue culture, Vegetable propagation of tree species, Conservation of endangered indigenous species

Debre Zeit Agricultural Research Center and Surrounding Areas: Water harvesting related research, Agro-forestry, Genesis farm (private multi-purpose farm)

Melkassa Agricultural Research Center: Irrigation experiments, Sericulture research

Melka Worer Agricultural Research Center: Irrigation and drainage, Fruit crops research trials, Forage crops research trials, Forestry research

Wondo Genet Forestry College: Agro-forestry demonstration sites, Sida project, Gudalema Watershed

Animal science group:

Holleta Agricultural Research Center: Dairy, Nutrition, Forage, Bee-keeping, Animal traction, On-farm dairy research and development

Debre Zeit Agricultural Research Center/ILRI Research Site: Poultry, Forage, Dairy cooperatives, Genesis farm (private), Fattening (small scale farmers), National veterinary Institute, ILRI research site activities

Adami Tulu Agricultural Research Center: Animal fattening research

Ziway-Chamo Rift Valley: Fishery activities

Sebeta: Animal health research center, Fishery research center, Milk and milk products processing plant (private)

Gondar ILVDP: Forage, Small-scale dairy, Farmer cooperative, milk and milk products processing plant

The researchers visited the above-mentioned places and activities and were able to bring valuable information and technologies worth trying in the ANRS. They have documented this in their trip reports. All teams have finalized compiling their experiences and excerpts of the recommendations are planned to be reported on a workshop, which will be organized at regional level for woreda level extension workers, regional BoARD experts and researchers.

6.5.2 Other tours

Field visit was organized for 27 farmers, 2 DAs, and 5 experts of Tehuledere Woreda to assist the process of establishing and managing IPM/FFS. The visit helped establish two IPM/FFS that are now working on aphids and tick control.

Experience sharing visit was organized to Mertule Mariam Agri-Services project site for AMAREW project senior technical staff. The visit was planned to get first hand experience of the innovative extension approaches being practiced by Agri-Service Ethiopia (ASE). As a result, the visit helped to get experience and forge relations with ASE staff. Indeed, the visit has enabled AMAREW project staff to identify some institutional innovations that could be adopted in the pilot woredas. For example, the modular training system and Community Based Institutions (CBIs) being practiced by ASE was identified as an innovation that could be adopted in the AMAREW Project pilot woredas. This has helped us to organize training of module development training for woreda experts and institutionalization work of the watershed associations in the two watersheds.

6.6 Other collaborative activities

The regional Bureau of Agriculture was planning to enter into wide scale promotional activity of improving vertisol technologies. In line with this, a request was made to the AMAREW Project to get the help of staff members of the project having experience in vertisol management promotional activities. The Bureau sought support with regards to organizing training for woreda level extension workers. In response, Dr. Elias Zerfu was designated from the project and he has helped the bureau in identifying appropriate training titles, relevant resource persons and designing the schedule. Furthermore, he has also participated as a resource person in the BoA's vertisol training.

ARARI was planning to send its staff members to India for experience sharing. The program was financially supported by UNDP and was related to the Adi Arkay woreda Integrated Rural Development Program. Knowing the AMAREW Project's experience in organizing and facilitating such kinds of tours, ARARI requested the assistance of the project in facilitating the tour. Based on this, Dr. Elias made correspondences with the appropriate Indian Institutions and assisted in identifying appropriate places to be visited and prepared the itinerary of the tour.

Dr. Elias participated in a one-day panel discussion meeting on weed control organized by BoARD and made professional contribution on alternative methods of community organization to mobilize the community for control of invasive.

In collaboration with Dr. Habtemariam, the training Associate consulted different technology package documents prepared by the federal MoARD and brought those found to be helpful to design relevant extension packages for the project pilot woredas. The documents have been compiled in soft and hard copies and have been made ready for quick reference.

Drs. Habtemariam and Elias prepared a draft research-extension linkage concept paper, which will be used as initial document which is intended to create a functional linkage mechanism between the research and development wing of BoARD and ARARI to jointly design linkage framework with facilitation of AMAREW project. To refine the issues raised in the concept paper, contact persons selected from the two organizations will follow up further course of action.

Dr. Elias attended a one-day workshop organized by Agri-Service Ethiopia (ASE) on promotion of farmer innovations based on the request made by ASE and presented a concept paper on indigenous technologies and farmer innovation.

Based on the request made by the Ethiopian Agricultural Research Organization (EARO), Dr. Elias participated in the launching workshop of strengthening Farmer Research Groups (FRGs) Project organized at Melkassa Agricultural Research Center and presented a lead paper on concepts and practices of farmer participatory research.

Dr. Elias represented the office and attended a conference organized to share best practices of some identified NGOs operating in ANRS. The best practices included activities being conducted in capacity building of woreda level ANRS staff and farmers. The conference was organized by the regional DPPC.

Dr. Elias attended a one and half-days seminar representing the AMAREW Project office on Disaster Management Coordination and Disaster Risk Reduction in Amhara Regional State organized by Institutional Support Project (ISP)-Save the Children-UK/Canada. He made professional contributions in the general discussion sessions.

Dr. Elias represented the office and attended a one day meeting called by the regional bureau of commerce, and city development to identify capacity related needs of Small Scale industries and the private businesses in ANRS.

During REFAC meeting called by the Adet Research Center, along with other AMAREW staff, Dr. Elias participated. Apart from making professional contributions, he also used the occasion to note capacity building requiring activities, which need to be addressed by short-term training.

6.7 Problems encountered and measures taken

- In 2004, most of the woreda and research center staff spent the critical cropping season in employees performance improvement meetings. As a result, it was difficult to conduct some of the planned trainings on time and there were cases where some of them cancelled.
- Woreda experts planned some of the trainings before assuring the presence of resource persons. Due to this, some trainings were canceled. To avoid this, in 2005, summary of the trainings to be given including name/s of the resource person/s, and place of work will be made and his/her availability will be also ascertained before hand.

ANNEXES

Annex 1. Status of USAID/AMAREW supported on-farm research trails in 2004

I. Adet Research Center

No.	Lay Gayint woreda	Division	Completed	On-going
1	Bread wheat variety adaptation trial	Field crops		◆
2	Bread wheat preliminary variety trial (early set)	Field crops		◆
3	Increasing diversity of bread wheat through participatory seed production and dissemination	Field crops		◆
4	Faba bean variety adaptation trial	Field crops		◆
5	Field pea variety adaptation trial	Field crops		◆
6	Linseed variety adaptation trial	Field crops	◆	
7	Effect of N and P levels on the grain quality and yield of malt barley	Agronomy	◆	
8	Response of triticale to nitrogen and Phosphorus fertilizer levels	Agronomy	◆	
9	Determination of seed rate on two-released triticale varieties	Agronomy	◆	
10	Standardization of techniques for cool season vegetables seed production	Horticulture		◆
11	Comparison of locally produced and imported cool season vegetable seeds	Horticulture		◆
12	Study on the effect of potassium fertilizer on frost resistance of bread wheat	NRM	◆	
13	Study on the effect of potassium fertilizer on frost resistance of faba bean	NRM	◆	
14	Participatory evaluation and multiplication of improved crop technologies in food insecure woredas	Research-extension		◆
East Belessa woreda				
1	Maize variety adaptation trial	Field crops	◆	
2	Sorghum variety adaptation trial	Field crops	◆	
3	Faba bean variety adaptation trial	Field crops		◆
4	Field pea variety adaptation trial	Field crops		◆
5	Chick pea variety adaptation trial	Field crops		◆
6	Haricot bean variety adaptation trial	Field crops		◆
7	Triticale variety adaptation trial	Field crops	◆	
8	Bread wheat variety adaptation trial	Field crops	◆	
9	Potato variety adaptation trial	Horticulture		◆
10	Evaluation of tie-ridging for soil moisture, fertilizer use efficiency and increasing yield of sorghum	NRM	◆	
Simada woreda				
1	Bread wheat variety adaptation trial	Field crops	◆	
2	Linseed variety adaptation trial	Field crops	◆	
3	Investigation of rates of closed area regeneration with and without water harvesting techniques	NRM	◆	
4	Evaluation of different water harvesting techniques in improving the survival rate of tree seedling		◆	
5	Participatory evaluation and multiplication of improved technologies in food insecure woredas	Research-extension		

II. Sirinka Research Center

Tehuledere woreda			Completed	On-going
1	Pre-extension demonstration of rope and washer pump	Agri. Economics & Research-extension		◆
2	Pre-extension demonstration of cotton varieties (Cukokra and Delta pin) on farmers' fields	Agri. Economics & Research-extension		◆
3	Pre-extension demonstration of sesame variety on farmers' field	Agri. Economics & Research-extension		◆
4	Pre-extension demonstration of groundnut variety (roba) on farmers' field	Agri. Economics & Research-extension		◆
5	Scaling up of IPM FFS to the farmers of North Wollo zone	Agri. Economics & Research-extension		◆
6	Pre-extension demonstration of day-old chick hay brooder	Agri. Economics & Research-extension		◆
7	Pre-extension demonstration of haricot bean on farmers' fields	Agri. Economics & Research-extension		◆
8	Survey of horticultural crops marketing system in Eastern Amhara	Agri. Economics & Research-extension		◆
Gubalafto woreda (except Lenche Dima Watershed)				
1	Pre-extension demonstration of rope and washer pump	Agri. Economics & Research-extension		◆
2	Pre-extension demonstration of cotton varieties (Cukokra and Delta pin) on farmers' fields	Agri. Economics & Research-extension		◆
3	Pre-extension demonstration of sesame variety on farmers' field	Agri. Economics & Research-extension		◆
4	Pre-extension demonstration of groundnut variety (roba) on farmers' field	Agri. Economics & Research-extension		◆
5	On-farm screening of tree species for moisture-stressed degraded hills	Natural Resources Management.		◆
6	On-farm evaluation of the Silvicultural system of <i>Acacia polychanta</i> for farm forestry purposes	Natural Resources Management.		◆
7	Scaling up of IPM FFS to the farmers of North Wollo zone	Agri. Economics & Research-extension		◆
8	Pre-extension demonstration of day-old chick hay brooder	Agri. Economics & Research-extension		◆
9	Pre-extension demonstration of haricot bean on farmers' fields	Agri. Economics & Research-extension		◆
10	Survey of horticultural crops marketing system in Eastern Amhara	Agri. Economics & Research-extension		◆
Lenche Dima Watershed				
1	Pre-extension demonstration of sesame variety on farmers' field	Agri. Economics & Research-extension		◆
2	Pre-extension demonstration of cotton varieties (Cukokra and Delta pin) on farmers' fields	Agri. Economics & Research-extension		◆
3	Pre-extension demonstration of sesame variety on farmers' field	Agri. Economics & Research-extension		◆
4	Pre-extension demonstration of groundnut variety (Roba) on farmers' field	Agri. Economics & Research-extension		◆
5	Pre-extension demonstration of rope and washer pump	Agri. Economics & Research-extension		◆
6	Study on the overlap of holidays and their effects with major agricultural calendars	Agri. Economics & Research-extension		◆

Sirinka Research Center (continued)

7	Participatory evaluation of different check dams, grass and shrub species for gully stabilization in Lenche Dima watershed	Natural Resources Management		◆
8	On-farm screening of tree species for moisture-stressed degraded hills	Natural Resources Management		◆
9	On-farm evaluation of the Silvicultural system of Acacia Polychanta for farm forestry purposes	Natural Resources Management		◆
10	A demonstrative study on the Integrated use of cattle manure as an alternative energy source and soil fertility management option	Natural Resources Management		◆
11	Participatory evaluation of push-pull strategy for the management of stem borers and striga weed in sorghum-based farming system	Crop protection		◆

III. Sekota Research Center

No.	Sekota Woreda (excluding Yeku w/shed)	Division	Completed	On-going
1	Adaptation of multipurpose trees and shrubs	Natural Resources Management		◆
2	Survey on indigenous trees and shrubs species of churches monasteries and mosques of Wag Himra zone	Natural Resources Management		◆
3	Location specific on farm fertilizer trial on teff, sorghum, barely and wheat	Natural Resources Management		◆
4	On farm demonstration and evaluation of tie-ridges with early maturing sorghum varieties	Natural Resources Management		◆
5	Investigation of low cost gravity drip irrigation for efficient management of rain water harvesting	Natural Resources Management		◆
6	Improving irrigation management practices with water-deficit irrigation	Natural Resources Management		◆
7	Determination of crop water requirement for major irrigable crops at wag-last district	Natural Resources Management		◆
8	On farm demonstration of vermin compost and its rate determination on wheat and horticultural crops	Agronomy		◆
9	Evaluation of the effect of transitional bee hive-volume on honey production	Livestock		◆
10	On farm evaluation of different fodder legumes in Wag Himra	Livestock		◆
11	On farm evaluation of different types of Napier grasses in Wag Himra	Livestock		◆
12	Pre-extension demonstration of improved early maturing sorghum varieties on farmers' field	Agri. Economics & Research-extension		◆
15	Haricot bean variety adaptation trial	Field crops		◆
16	Ground nut variety adaptation trial	Field crops		◆
17	Cow pea variety adaptation trial	Field crops		◆
18	Sesame variety adaptation trial	Field crops		◆
20	Biomass transfer benefit of inter seeded legumes on sorghum yield	Field crops		◆

Sekota Research Center (continued)

Yeku Watershed			Completed	On-going
1	On farm evaluation of different fodder legumes	Agri. Economics & Research-extension		◆
2	On farm verification of physical and biological soil conservation measures for gully stabilization and biomass production in Yeku watershed	Natural Resources Management		◆
3	On farm demonstration of vermin compost and its rate determination on wheat and horticultural crops	Agri. Economics & Research-extension		◆
4	Demonstration of biomass saving injera stove as marketable and conservation tool for women's group in Yeku watershed	Agri. Economics & Research-extension		◆
5	Haricot bean variety adaptation trial	Field crops		◆
6	Cow pea variety adaptation trial	Field crops		◆
7	Pre-extension demonstration of teff variety on farmers' field	Agri. Economics & Research-extension		◆
8	Demonstration of Iric moldboard plow at Wag Lasta district	Agri. Economics & Research-extension		◆
9	On-farm evaluation of two triticale varieties	Agri. Economics & Research-extension	◆	

IV. Sheno (Debre Berhan) Research Center

Gera Keya woreda				
No.	Research Trial	Division	Completed	On-going
1	Food barely variety adaptation trial	Field crops	◆	
2	Integrated approach for the control of RWA	Crop Protection	◆	
3	Evaluation of different water harvesting techniques for improving the survival rate of tree seedlings	Soil & Water Mgt.	◆	
4	Investigating the effect of potassium nutrition on yield and frost resistance of selected crops	Soil & Water Mgt		◆
5	Investigation of rates of closed area regeneration with and without water harvesting techniques in drought prone areas of Amhara region	Forestry		◆
6	Evaluation of strategic deworming programs on village sheep in Gera Keya	Livestock	◆	
7	On-farm demonstration of improved wheat varieties with its production package	R-Extension		◆
8	On-farm demonstration of improved potato varieties with its production package	R-Extension	◆	
9	On-farm demonstration of improved food barley variety with its production package	R-Extension	◆	
Lalomama woreda				
1	On-farm demonstration of improved wheat varieties with its production package	R-Extension		◆
2	On-farm demonstration of improved potato varieties with its production package	R-Extension	◆	
3	On-farm demonstration of improved faba bean varieties with its production package	R-Extension		◆

Sheno Research Center (continued)

Efratana Gidem woreda				
1	Teff variety adaptation trial	Field crops	◆	
2	Sorghum variety adaptation trial	Field crops	◆	
3	Agro meteorological and cropping pattern analysis in northeastern part of Amhara region	Soil & Water Mgt.	◆	
4	Investigation of rates of closed area regeneration with and without water harvesting techniques in drought prone areas of Amhara region	Forestry		◆
5	Study on diseases of chicken and developing/testing control options in the backyard production system of Eastern Amhara	Livestock		◆
6	On-farm demonstration of improved potato varieties with its production package	R-Extension	◆	
Angolelanatera woreda				
1	Farming systems survey of Angolela-Asagirt woreda in north Shewa	Socioeconomic	◆	
Asagirt woreda				
1	Farming systems survey of Angolela-Asagirt woreda in north Shewa	Socioeconomic	◆	

Annex 2. Summary of Research Proposals submitted under the Small Grants and Mentorship Program

- 1. Title: Determining the optimal enterprise mix in crop-livestock integration for sustainable farming systems in the highlands of North Shewa, Amhara Region:**
Anteneh Girma (ARARI), Sisay Lemma (ARARI), Dr. John McPeak (Syracuse University), Dr. Ben Okumu (Cornell University)

Mixed crop-livestock farming system predominates in North Shewa zone of Amhara region. However, with increasing population pressure, competition for scarce resource develops, leading to increased competition for land between crop production and livestock grazing. The later sub-sector is equally important and is a potential for the generation of income and food security of the smallholder farmers in the highlands of North Shewa. Hence it is important to determine the economic optimum level of integration of crop and livestock in mixed crop-livestock farming system of the study area. This study will be undertaken in North Shewa zone through a team of researcher from socio economics, animal science, and plant science and natural resource discipline. Both primary and secondary data will be collected for this study. Secondary information will be collected from the District Office of Agriculture and the Debre Berhan Agricultural Research Centre. Primary data will be gathered from farmers through field monitoring and formal survey using trained enumerators and technical assistances, respectively. A multistage sampling method will be used to identify sample *kebeles* (*peasant Associations*) and farmers. Analysis of data will involve descriptive statistics, cost benefit analysis and mixed linear programming model. The research will come up with optimum enterprise mix that can be used to advise farmers to improve their decision-making. It will also have sustainability and policy implication to direct future research and development planning in the area. The study is expected to be completed within two years with estimated cost of 7927.5 USD.

- 2. Title: Effect of integrated watershed management approach on soil erosion control and land productivity of Gotu watershed at Srinika:** *Belete Berhanu (ARARI), Tewodros Assefa (ARARI), Yigardu Mulatu (ARARI), Andualem Asegid (BoARD), Getahun Abera (BoARD)*

The highlands of Ethiopia characterized by undulating terrain, with erodible soils, seasonal intense rains, and low natural vegetation cover are highly exposed to land degradation. Soils in the northern regions have lost about 30-50 percent of their productive capacity. The Ethiopian government also recognized the severity of the soil erosion problem since the drought and famine of 1973-74. It initiated a massive program of soil and water conservation measures. But the achievements fell far below the expectations. Although, the reasons for failure of the soil and water conservation efforts vary spatially and temporally, the planning process and approaches that were followed were the main and common reasons for the failure of the programs. This study tries to see the effect of integrated watershed approach on soil erosion control and land productivity. A pair of experimental watersheds will selected and baseline data collected using Rapid Rural Appraisal (PRA) and calibration of the catchments before starting the treatment in one of the catchments. In this approach the key entry point for implementation of the

project is the full participation of the community. This study will hold it two phases; the first phase will take 3 years. The Sirinka Research Center has laboratory facilities for soil and water analysis, sufficient computers to analysis data, GIS facilities, field instruments, and a nursery site. The study is expected to benefit primarily the farmers, but also researchers, extension agents, NGO's and higher education. The project will cost USD 8,400 in total.

3. Title: Assessment of major threats of Lake Tana and strategies for integrated water use management: *Miheret Endalemaw (ARARI), Dr. Ernest W. Tollner, University of Georgia*

This project will identify different activities in the watershed of Lake Tana and pinpoint giving special attention to the activities that impose potential threats on fisheries and the wetland in the Lake Tana's ecosystem. The results that will be obtained from the project will serve as a springboard to the potential stakeholders implementing different development activities in the watershed to come together to develop an integrated plan of development and monitoring and evaluating mechanism to mitigate the potential threats. The outcome of the project also helps to develop cross-sectoral activities to be carried out in harmony with potential stakeholders minimizing the possible potential threats on the fisheries and wetland of the lake.

The character of aquatic resources and the hydrologic regime of a river or Lake Basin are determined by natural factors (climate, geomorphology and geology, and vegetation cover) and human activities (water abstraction and diversion, aquatic pollution, physical modifications, watershed land use change, corridor engineering, urbanization etc.). These factors induce increased instability in aquatic plant communities, invertebrates and fish. These are some of the activities that play great role in the wetlands unless and otherwise managed detrimental to fisheries and wetland ecology as whole. In the case of Lake Tana the information so far available on the above subject area is scanty. The objective of this project is to fill this gap through identifying activities that are carried out in the watershed and how to manage these activities to minimize the potential threats to fish resources and the wetland systems.

Assessment and identification of the potential threat imposing activities will be carried out in the watershed through field survey, through questionnaire and literature survey. The assistance of resource persons residing in different stakeholder institutions and the contribution of the mentor will use in carrying out the data collection and data analysis will be carried out.

4. Title: Epidemiology and management of chickpea wilt/root rot diseases in northwestern Ethiopia: *Merkuz Abera (BoARD), Dr. Anton Baudoin (Virginia Tech)*

Ethiopia accounts more than one-third of the total chickpea area and about half of the total production in Africa. Estimates of total area production for chickpea reported that the Amhara National Regional State (ANRS) covers 59% of the national total. Northwestern Ethiopia (west Amhara) covers 65% of the chickpea production area of the

Amhara region. Chickpea has many production constraints; of these the most important is disease problem. Wilt / root rot complex is one of the major disease problems of chickpea in Ethiopia in general and ANRS in particular. At present wilt/root rot complex disease increases its distribution and severity and has a significant place in limiting factors to chickpea production in the country. In ANRS, farmers are discouraged to produce chickpea because of wide distribution and high severity of the diseases. Because of this problem most farmers of northwestern Ethiopia (west Amhara) have also abandoned to grow chickpea and have made significant changes in the type of crop grown; chickpea is substituted with grass pea.

So information on the epidemiology and management options of chickpea wilt/ root rot in the ANRS is a prerequisite for the effective control of the disease. The over all objective of the chickpea wilt/root rot disease investigation on epidemiology and management options is to develop sustainable and environmentally acceptable chickpea wilt/root rot diseases management strategies that can help minimize crop losses due to the diseases, there by, contribute to increase chickpea production.

The study will be conducted in the regional following field survey, laboratory activities and field and green house experiments.

The project benefits the development and implementation of integrated disease management (I.D.M.) and over all promotion and popularization of improved crop protection technologies to end users such as extension workers, investors and farmers.

5. Title: Assessment of soil characteristics, surface water qualities and water table fluctuations on selected irrigated command areas in East and West Gojjam, and Awi zones: *Dr. Enyew Adgo (ARARI), Mokonnen Getahun (SAERAR), Yakob Wondimkun (SAERAR)*

In areas of rain-fed agriculture where rainfalls are unreliable, erratic in nature and poorly distributed, irrigation plays a key role in achieving food security and sustainable development. Shortage of rainfall and the resulting drought problem is currently facing the Amhara National Region State (ANRS) in particular and the country in general forcing millions of people to depend on external food aid. On the other hand, the region has tremendous water resources and irrigation potential which have to be developed if the current trend of food deficit has to be reversed. In order to minimize drought-related risks and to improve crop and livestock production and productivity, water harvesting, upgrading of traditional irrigation practices and promotion of small-scale irrigation schemes have now become one of the top priorities in the regional development plan. Environmental hazards caused by improper practices and poor management of irrigation water could ultimately undermine the productivity of the land. Such negative environmental impacts could also extend beyond the irrigation schemes and affect other water users downstream. In promoting irrigation activities, therefore, the negative impacts of irrigation systems on the ecosystem and the overall environment have to be closely monitored and mitigation plans placed timely.

A number of irrigation schemes were already developed before and after the establishment of the Commission for Sustainable Agriculture and Environmental Rehabilitation in Amhara Region (CO-SAERAR). However, systematic soil and water

quality studies were not undertaken to help evaluate the sustainable use of the schemes and provide useful information in mitigating the negative impacts as well as for planning of irrigation further development projects. Such studies mostly require the collection of reliable baseline data before implementation of irrigation schemes.. Knowledge on the type and distribution of soils, their input requirement, their relative responsiveness to the inputs applied and expected outputs, and changes in physical and chemical soil properties observed over time in relation with the water quality used are relevant information to monitor the changes brought over time as a result of irrigation.

Therefore, this study is proposed to assess and quantify the biophysical and socio-economic negative impacts brought about through irrigation and to recommend appropriate measures to mitigate such negative impacts. Based on the results obtained further research and development needs will be suggested.

6. Title: Estimation of rill erosion using spatial rill damage and network assessment over hill slopes: *Gizaw Desta (ARARI), Dr. Conrad Heatwole (Virginia Tech)*

Rill damage assessment is a method designed for monitoring and assessing soil erosion damage of recent origin, to identify important causes of rill erosion, and to elaborate initial steps in soil and water conservation. Development projects, extension workers and land users desire appropriate designing of conservation measures. For a specific area, it is therefore necessary to consider when, where, and how to start soil and water conservation. Through survey of rill damage, you can get hints on what is behind soil erosion, and which limitations may hamper successful soil and water conservation. These processes of erosion would enable to estimate rill erosion and identify the critical locations of rill erosion along the slope profile. Adequate assessment of spatial rill erosion is again only possible if the effect of tillage on flow direction is also taken into account.

Soil and water conservation measures face usually problems of acceptance if only biophysical factors are taken in to consideration. An original design or layout may be first accepted and then changed by the land users after additional thinking. Consultations with local land users on what, where, how, why and when to implement conservation measures in respect to rill structures is perhaps the most important step of the planning approach for conservation-based development.

To achieve this, field survey on spatial rill damage and rill network along a slope profile will be carried out at each section of rills. Rill dimensions and topographic attributes to be obtained by measurement in the field and calculations will be subjected to subsequent analysis using different techniques.

This project will therefore investigate whether it is possible to estimate rill erosion and identify the initiation of rills based on a topographic threshold conditions (contributing area and slope), investigate the extent to which tillage direction can affect the rill network on agricultural field.

Annex 3. Types, amounts and sources of improved seeds distributed in the pilot woredas.

Woreda	Crop	Variety	Amount (qt)	Source	
Lay Gayint	Wheat	HAR - 1868	23.25	Adet Agricultural Research Center	
		HAR - 1522	3	Ethiopian Seed Enterprise (Bahir Dar)	
	Triticale	Mayinet	19	Adet Agricultural Research Center	
	Faba bean	CS-20-DK	2	Adet Agricultural Research Center	
		CS-20-DK	3	Ethiopian Seed Enterprise (Bahir Dar)	
	Teff	DZ-01-974	5	Ethiopian Seed Enterprise (Bahir Dar)	
		DZ-01-196	4	Ethiopian Seed Enterprise (Assella)	
	Field pea	Tegegnech	3	Ethiopian Seed Enterprise (Bahir Dar)	
	Barley	Abay	1.7	Adet Agricultural Research Center	
	Linseed	Geregera	0.06	Adet Agricultural Research Center	
	Potato	Tolcha	6	Adet Agricultural Research Center	
	Sekota	Wheat	HAR - 1685	30	Adet Agricultural Research Center
		Triticale	Sinan	17	Adet Agricultural Research Center
Teff		DZ – 01 - 196	5	Adet Agricultural Research Center	
		X – 37	1	Adet Agricultural Research Center	
		X – 37	8	Ethiopian Seed Enterprise (Bahir Dar)	
Haricot		Mam - 41	2	Adet Agricultural Research Center	
		Roba - I	1	Adet Agricultural Research Center	
		Awash	2	Adet Agricultural Research Center	
Garlic		Local	5	From the environs of Woreta	
Potato		Local	6	From the environs of Woreta	
Tehuledere	Wheat	HAR – 1522	3	Ethiopian Seed Enterprise (Assella)	
		HAR – 1522	7	Ethiopian Seed Enterprise (Bahir Dar)	
	Maize	Katumai	1	Melkassa Agricultural Research Center	
		Melkassa I	1	Melkassa Agricultural Research Center	
	Sorghum	Meko	3	Srinka Agricultural Research Center	
	Belessa	Maize	Katumai	1	Melkassa Agricultural Research Center
Katumai			1	Ethiopian Seed Enterprise (Bahir Dar)	
Melkassa I			1	Melkassa Agricultural Research Center	
Teff		X-37	2	Ethiopian Seed Enterprise (Bahir Dar)	
Sorghum		Gambella 1107	1	Ethiopian Seed Enterprise (Bahir Dar)	
Chick pea		Shasho	1	Debrezeit Agricultural Research Center	
		Marye	24	Adet Agricultural Research Center	
Gubalafto		Wheat	HAR-2501	2	Srinka Agricultural Research Center
	HAR-2501		6	Adet Agricultural Research Center	
	HAR-2501		4	Ethiopian Seed Enterprise (Bahir Dar)	
	HAR – 2508		4	Adet Agricultural Research Center	
	HAR – 1685		15	Ethiopian Seed Enterprise (Bahir Dar)	
	Sorghum	K- 6295-4A	30	Ethiopian Seed Enterprise (Assella)	
		Gambella 1167	1	Srinka Agricultural Research Center	
		Yeju	1	Srinka Agricultural Research Center	
		Teshale	1	Srinka Agricultural Research Center	
		Abshir	1	Srinka Agricultural Research Center	
		Birhan	1	Srinka Agricultural Research Center	
Gobiye	2	Srinka Agricultural Research Center			
Meko	1	Srinka Agricultural Research Center			

Annex 3. (Continued). Types, amounts and sources of improved seeds distributed.

Woreda	Crop	Variety	Amount (qt)	Source
	Maize	Katamani	2	Srinka Agricultural Research Center
	Chick pea	Marye	20	Adet Agricultural Research Center
	Teff	DZ-01-196	6	Adet Agricultural Research Center
		DZ-01-196	1	Ethiopian Seed Enterprise (Assella)
		DZ-01-196	2	Debrezeit Agricultural Research Center
		X-37	4	Adet Agricultural Research Center
		X-37	1	Ethiopian Seed Enterprise (Bahir Dar)
	Haricot	Roba	1	Adet Agricultural Research Center
Total			293	

Annex 4. Extension activities conducted in the five pilot woredas during 2004.

No	Activities	Unit	Lay Gayint	Sekota	Gubalafto	Tehuledere	East Belessa	Total
1	Crop							
1.1	Introducing improved varieties of different crops	Q	70	71	106	15	31	293
	Wheat	Q	26.25	30	61	10		127.25
	Barley	Q	1.7					1.7
	Teff	Q	9	14	14		2.1	39.1
	Faba bean	Q	5					5
	Field pea	Q	3					3
	Chick pea	Q			20		25	45
	Triticale	Q	19	17				36
	Sorghum	Q			8	3	1	12
	Haricot bean	Q		5	1			6
	Maize	Q			2	2	3	7
	Linseed	Q	0.06					0.06
1.2	Promoting horticultural crops production							
	Vegetable seeds (carrot, swiss charge, beet roots, etc)	Kg	39.2			68	8.7	115.9
	Garlic	Q		5				5
	Potato	Q	6					6
	Sweet potato cuttings	No				1,250,000		1,250,000
1.3	Promoting fruit production							
	Seedlings of fruit trees (sweet oranges, mango, avocado,...)	No		10,000				
1.4	Encouraging coffee production							10,000
	Seedlings of coffee plants	No				14,000		14,000
1.5	Establishing and assisting horticultural nursery sites	No					2	2
1.6	Assistance in tools to encourage horticultural crops production (rakes, hoes,...)	No	358		325			683
1.8	Introducing farm tools, pumps, and cheaper irrigation sets							
	Tie –ridger	No	5					5
	Tenkara kind	No	5					5
	Pedal pump	No	5	2				7
	Rope and washer pump	No	5					5
1.9	Supporting small size improved model stores	No	25					25
2.	Livestock production							
2.1	Beekeeping							
	Model Kenya Top Bar beehives	No		40	48			88
	Top bars (models)	No	6,372	3,612	1,500	4,020	1,088	16,592
	Queen excluder	No				290		290
	Various apiary tools	Set		20		16		36

Annex 4. (Continued). Extension activities conducted in the five pilot woredas during 2004.

No	Activities	Unit	Lay Gayint	Sekota	Gubalafto	Tehuledere	East Belessa	Total
2.2	Poultry							
	Introducing hay box brooders	No	15		20			35
2.3	Forage production							
	Introducing forage seeds	Q		43	60			103
2.4	Training and equipping Community Animal Health Workers	No			3			
3.	Natural Resources							
	Planting seedlings on rehabilitated degraded lands	No			200,000		72,000	272,000
	Check dams	km			5			5
	Tree seeds of MPTs	Kg			210	91		301
	Poly ethen tubes	Kg				1297		1297
4.	Extension and Home Science							
	Establishing FREGs	No	3					3
	Establishing and supporting weaning/spinning groups	No	2					2
	Establishing family planning and anti-HIV/AIDS clubs	No	5	3				8
	Introducing improved spinning technology	Set	9					9
	Establishing and assisting weaver groups	No	3					3
	Frames for improved stoves	No		1		3		4
5	Training of DAs and farmers							
5.1	Training of DAs in							
	Technological packages	No	28					28
	Highland fruits production	No	50					50
	Hay box brooder technology	No	20					20
	Community organization and leadership skills	No		5				5
	Compost making practical	No	6		17			23
5.2	Training of farmers in							
	Compost making	No	44	82	1178	23		1323
	Water harvesting and irrigation	No	44	82		55		181

Annex 4. (Continued). Extension activities conducted in the five pilot woredas during 2004.

No	Activities	Unit	Lay Gayint	Sekota	Gubalafto	Tehuledere	East Belessa	Total
5.2	Training of farmers in (Contd.)							
	Coffee production	No			109			109
	Highland fruits production	No	194		40			234
	Pest assessment/IPM	No				27		27
	Farmer participatory research	No	43					43
	Energy saving stoves	No			60	30		90
	Improved spinning & pottery	No	9			75		84
	Family planning & HIVAIDS	No	105					105
	Food processing	No	105					105
	Beekeeping	No	45	26		49		120
	Improved forage production	No		49				49
	Fish net making	No				60		60
	Community organization and leadership skills	No		75				
6	Capacity building							
	Supporting energy saving stoves producing women groups			√		√		
	Assisting AI service delivery of Woreda ARDOs						√	
	Assisting mobile clinic service delivery of Woreda ARDOs		√	√	√		√	
	Support to fishery groups					√		
	Support to beekeepers		√	√	√	√	√	
	Refreshment training of DAs					√		
	Woreda expert training in hay box brooder technology		√					
	Training of Woreda experts in on-farm research and in training methodologies		√				√	

Legend: √ designates the planning and implementation of activities and provision of materials that were necessary to conduct the stated extension activity

Annex 5. Lenche Dima Watershed 2004 plan achievement

No	Activity	Unit	Activity		Budget	
			Target	Achievement	Planned	Actual
A Crop Production and protection						
1	Provision of improved seed	Qt			6900	7,163
1.1	Chick pea-marye 10 ra	Qt	8	8	2400	2936
1.2	Maize katu mane 10 ha	Qt	2	2	700	360
1.3	Teff- 20 ha	Qt	6	9	2400	
1.3.1	DZ- 01-196	Qt	3	3	1200	918
1.3.2	Cross 37	Qt	3	6	1200	1836
1.4	Sorghom- 30 ha	Qt	3	3	1400	
1.4.1	Teshale	Qt	0.5	0.5	150	125
1.4.2	Yesu	Qt	0.5	0.5	150	125
1.4.3	Meko	Qt	0.5	0.5	150	125
1.4.4	Abshir	Qt	0.5	0.5	150	110
1.4.5	Gobeye	Qt	0.5	0.5	150	110
1.4.6	Birhan	Qt	0.5	0.5	150	110
1.5	Cotton	Kg	50			--
1.6	Haricot bean – 1 ha	Qt	0.8	1	200	408
1.7	Sweet potato – 1 ha	Cutting	55550	25.000	200	--
2 Farm implement			14,400		8,603	
2.1	Tie ridger	No	10		750	
2.2	Tenkara kind	No	5		500	
2.3	Row planter	No	5		1000	
2.4	Shovel	No	100	100	1150	1600
2.5	Digging hoe	No	100	100	2000	2600
2.6	Rake	No	50	165	1500	2835
2.7	Watering can	No	50	50	2000	1568
2.8	Pot purchase	No	150		1500	---
2.9	Drip irrigation	No	5		4000	---
3 Training on ICM					9,605	
3.1	3 DAS	PD	15		705	
3.2	100 farmers	PD	500		8000	
3.3	Stationery	LS			200	
3.4	Trainers fee	PD	10		700	
4 Training on farm implement			2,737			
4.1	3 DAS	PD	9		423	
4.2	3 expe 75	PD	9		630	
4.3	16 farmers	PD	48		864	
4.4	2 trainers	PD	6		420	
4.5	Oxen rent and expenses				400	
5 Equipping ICM farmers					2500	
6 Experience sharing					12760	
6.1	3 DAS	PD	30		1410	
6.2	3 experts	PD	30		2100	
6.3	15 farmers	PD	150		5250	
6.4	Transportation	LS			4000	
7 Monitoring Evaluation					7568	
7.1	Perdiem	PD	108	6	7568	420

Annex 6. Lenche Dima Watershed Livestock sub-sector 2004 achievement

No	Activity	Unit	Annual Target	Annual budget	Annual Achievement	Budget utilized	Remarks
B	Livestock			124449			
<i>1</i>	<i>Goat Restocking</i>						
1.1	Goats	No	300	45000	135	21142	
1.2	Farmer training	No	50	4000	29		
<i>2</i>	<i>Poultry production</i>					17,869.1	
2.1	Farmer training	No	91	1820	44		
2.2	DAS	No	2	470	3	296.1	
2.3	Trainer	No	2	1404	1	282	
2.4	Stationery			818		818	
2.5	Chicken Purchase	No	3000	6000			
2.6	Chicken feed Purchase	Qt	8	1200			
2.7	Brooding	No	65	15600	31	16473	
<i>3</i>	<i>Apiculture</i>			23,095		11,901	
3.1	Farmers training	No	8	320	17	816	
3.2	Purchase of bee colonies	No	100	13000			
3.3	Provision of bee keeping Equip	Ls		9775		11085	
<i>4</i>	<i>Forage development</i>						
4.1	Purchase of forage seed	Qt	15	1250	1.2		
<i>5</i>	<i>Community Animal health workers</i>			1873			
5.1	Trainees per diem	No	3	810	2	490	
5.2	Drug purchasing			6000		6000	
5.3	Equipment			10000		10152.25	
5.4	Trainer's per diem			1920		490	
<i>6</i>	<i>Livestock development M&E</i>						
6.1	Per diem	Ls		3000		164.5	
6.2	Stationery			1000		170.27	
	Extension						
<i>1</i>	<i>Introduce improved stoves</i>						
1.1	Cement	Qt	10	900	7	700	
1.2	Mold	No	4	1000			
1.3	Addition Materials			1500		896	
1.4	Farmer training	Pd	280	2240	210	3780	
1.5	DA Training	Pd	21	987	14	658	
1.6	Trainers per diem	Pd	14	812		1978	
<i>2</i>	<i>Spinning nutrition & home mag't</i>						
2.1	Purchase of modern Spinning tool	No	10	1500			
2.2	Farmers spinning training	No	30	540			
2.3	Training on nutrition and home management	Pd	500	9000		3780	Trainer data 1028
2.4	Training material purchase	Ls		500		2026	
<i>3</i>	<i>Experience sharing</i>						
3.1	Farmers	Pd	70	2450			
3.2	DAs	Pd	21	1218			
3.3	Experts	Pd	28	1960			
<i>4</i>	<i>Monitoring & Evaluation</i>			9360			
4.1	Baseline data collection			6000			
4.2	Per diem			3360			

Annex 7. Lenche Dima Watershed Natural Resource sub-sector 2004 achievement

No	Activity	Unit	Annual target	Annual budget Birr /ms	Annual Achievement	Budget utilized Birr (ms)	Remarks
C	Natural Resources						
I	Forestry & Soil & water conservation						
1.1	Area closure	Ha	75	9.0	75	9.0	
1.2	Micro basin	No	125000	37.5	15115	9.069	
1.3	Trench	No	3000	1.8	4445	2.667	
1.4	Pitting	No	10,000	2	80350	16.07	
1.5	Hillside terrace	K.m	19	14.3	52.52	39.015	
1.6	Gully revegetation	Ha	1.5	0.675	1.5	0.675	
1.7	Seeding plantation	No	150000	9.0	72004	4.32	
1.8	Purchase of plastic tube	Qt	15	28000	1520	43420	
1.9	Purchase of tree seeds	kg	85	4700			
1.10	Purchase of watering can						
II	Farm land conservation						
2.1	Farm boundary soil bund	Km	25	1.2	10		
2.2	Farm gully conservation	Ha	4	2.1	1		
2.3	Ss Dam Construction	M3	700	1.5			
2.4	Stone purchase	Truck	35	8750	25	5600	
2.5	Sand bag checkdam	Km	1	6.0	1.3305	7.983	4500 Birr for sack
2.6	Purchase of wood	M3	2.2	13.2	1.3635	8.181	3000 birr for
2.7	Wooden checkdam constant						
2.8	Purchase of nail	Kg	100	700	55.5	500	
2.9	Farm tree planting	No	10000	4.48			
2.10	Tree planting on soil	No	90,000	4.32	50000	3	
2.11	Bunds, gully areas etc						
2.12	Grass strip	Km	0.3	0.48			
2.13	Carpenter Lab our cost	Ls	70	2000		420	
III	Infrastructure structure dev't						
3.1	Dome construction	No	5	40000	5	7000	
3.2	Roof water Harvesting	No	1	80000			
3.3	Up grading water system	No	1	24734	1	24734	
3.4	Pond maintenance	No	13	39.0	13	7.977	
3.5	Feeder road constriction	Km	7	63.0	2.388	3.582	
IV	Training						
4.1	Agro forestry	No	20	2550			
4.2	Gabion production	No	15	2700	15		
4.2.1	Gabion working board and hand foos	Ls		1500		1300	
4.2.2	Purchase of gabion wire	Kg	700	7000	685	8733.7	
4.2.3	Working shade			600		650	
4.3	Experience sharing	Ls		11640			
4.4	Management and leadership training to WAM	No	32	5352	29		
4.5	Management trainer fee			5000			
4.6	Stationery			5000		1500	
4.7	Monitoring & Evaluation						
4.8	Bi- annual review workshop	Ls		30000			
4.9	Baseline data collection			40000			

Annex 8. Lenche Dima Watershed Land Administration 2004 achievement

No	Activity	Unit	Annual target	Annual budget	Annual Achievement	Budget utilized	Remarks
1	Land registration	PAS	3	10504	---	---	
2	Demarcation of	PAS	3	13000	---	---	
	Communal land	PAS	3		---	---	
	Provision of 1 st stage land certificate		3	2188	---	---	
	Office supply and stationery	LS		5000		392.30	
	Basic field equipment			12000			

Annex 9. Lenche Dima Watershed Operational Cost

No	Cost item	Unit	Annual target	Utilized budget			Remarks
1	Office supply (stationery)	Lump sum	17,900	11,751			
2	Fuel, oil, lubricant	Lump sum	10,300	7,043			
3	Miscellaneous	Lump sum	7000	6,860.9			

Annex 10. Yeku watershed 2004 activity report

No	Activity	Unit	Annual Target	Annual Achievement	Annual finance (Birr)	Finance used (Birr)
1	Crop				43,100	18,634.54
1.1.	Provision of Field Crops		34		16,000	7,522.64
	Teff - Cr - 37	Qt.	2	3	1,500	7,522.64
	- Oz - 01-196	Qt.	-	1		
	Tritical	Qt.	4	2	1,500	
	Wheat - HAR - 1685	Qt.	18	5	8,000	
	Haricot been	Qt.	5	-	3,000	
	Cow Pea	Qt.	5	-	2,000	
1.2.	Provision of Vegetable Seeds and Fruits				6,100	1,600.00
	Avocado	No	100	-	500	1,600.00
	Mango	No	100	-	500	
	Onion	Qt.	0.30	5	600	
	Potato	Qt.	20	-	4,500	
1.3.	Fertilizer demonstration				1,800	1,278.00
	UAP	Qt.	6	2	1,300	736.00
	Urea	Qt.	2	2	500	542.00
1.4	Irrigation Techniques Supports	Participant	10	-	2,000	-
1.5	Provision of Tie-rigger	No.	16		6,000	
1.6	Storage Structure Supports	No.	4		1,200	
1.7	Transport cost	Qt.	-		3,000	1,811.00
1.8	Farmers Training		110	103	7,000	6,422.90
1.8.1	Compost Preparation	No.	50	103	3,000	6,422.90
1.8.2	Moisture Conserving and Far, tech.	No.	50		3,000	
1.8.3	Irrigation	No.	10		1,000	
2	Livestock development				121,359	92,134.29
2.1.	Poultry Production	No.	110	-	12,055	-
2.2.	Small Ruminant Animal Production	No.	176	174	19,360	19,140.00
2.3.	Small Ruminant Fattening	No.	100	96	11,000	10,560.00
2.4.	Bee Keeping Production	No.			47,690	47,688.50
2.4.1	Colony purchasing	No.	150	150	15,000	15,000.00
2.4.2	KTB hive purchasing	No.	120	62	6,000	24,800.00
2.4.3	Improved hive purchasing	No.	30	-	9,000	-
2.4.4	Protective tools purchasing	Lump sum	40	-	1,200	-
2.4.5	Hive tools purchasing	Lump sum	40	-	3,840	-
2.4.6	Top Bar purchasing	No.	4200	1753	12,600	788.50

Annex 10. Yeku watershed 2004 activity report (continued)						
2.5.	Forage Seed Purchasing (different)	Qt.	6.5	16.33	4,900	4,899.00
2.6.	Animal Health Care (Mobile clinic)	Birr			2,000	97.75
2.7.	Training Farmers		64	136	24,354	8,875.04
2.7.1	Poultry	No.	64	-	8,610	-
2.7.2	Small Ruminant Production	No.		16	984	925.00
2.7.3	Fattening	No.		29	1,230	1,044.00
2.7.4	Beekeeping	No.		10	2,460	900.00
2.7.5	Forage	No.		81	7,380	6,006.04
2.7.6	Animal Health Care	No.		-	3,690	-
3	Extension				35,500	51,920.09
3.1.	Base line data collection	HH	130	55	2,000	116.00
3.2.	Impact assessment	HH	130		2,000	
3.3.	Experience sharing tour	LS	1		15,000	
3.4.	Farmers field day	No.	2		15,000	
3.5.	Workshop	No.	2	1	4,000	645.00
3.6.	Fuel saving stove /mold/	No.	1		500	
3.7.	Farmers Training				10,500	39,225.59
3.8	In nutrition and feeding	No.	40	40	3,500	3,322.40
3.9	Family planning and HIV/AIDS	No.	50	50	3,500	3,500.00
3.10	Avoiding bad culture	No.	50	50	3,500	3,500.00
3.11	DA - Training - in new topics	-	-	92	-	28,903.19
4	Natural Resources management					
4.1	Hillside terracing	Ha	28	79		
4.2	Stone check dam	m3	225	1,007		
4.3	Farm terrace	Ha		13.4		
4.4	Stone collection	m3	1,000	347		
4.5	SS dam	No.	12	16		
4.6	Rock fill dam	No.		30		
4.7	Trench	No.	30,000	4,087		
4.8	Bund with trench	No.	2,000	1,702		
4.9	Eyebrow basin	No.	10,000	2,500		
4.1	Trapezoidal water tank	No.	16	4		
4.11	Hemispherical water tank	No.		2		
4.12	Shallow hand dug well	No.	50	1		
4.13	Area closure	Ha	28	28		
4.14	Plantation on terraces	Km	15	20		
4.15	Soil bund terrace	Km	10.8	5		
4.16	Gully rehabilitation	No.	1	1		
4.17	Compost Preparation	No.	32	14		
5	Operational Cost				30,000	11,933.50
5.1	Office supply /stationary etc.	Lumps			5,000	4,656.47
5.2	Monitoring and follow-up	Lumps			18,000	920.80
5.3	Fuel oil and lubricants	Lumps			5,000	4,671.28
5.4	Miscellaneous	Lumps			2,000	1,684.95

Annex 11. Synopsis of graduate students research work:

Amy S. Collick Research Summary, Yeku, 2004

January – December 2004

Amy Collick has been in the Yeku watershed as of March 2003. Her research focuses on the hydrological assessment and various community research activities in the Yeku Watershed, a pilot watershed of the AMAREW project. As of January 2004, she had completed the collection of data from the 2003 rainy season and was doing more community-based research in Yeku and GPS trainings in Sekota.

The community research included an investigation into the potential of household wastewater for irrigation of horticultural crops. Twenty-five women from 5 different villages in the Yeku watershed were recruited and measured the amount of water that they discarded from their house on a daily basis for 30 days. The women were visited weekly to answer any questions and review the data that had been collected. At the completion, women were surveyed about their household water use, and seedlings were provided for planting around their homes.

In addition, Amy worked with a community committee to write a proposal and eventually get funding for the connection of the Weleh Health Clinic and School to the healthy and clean water supply that was supplying two villages, Fandika and Adderu, with water. The majority of the funding came from the AMAREW project while a small amount came from Cornell. The system is currently operating on both facilities.

In Sekota, trainings were held for more people interested in GPS use and application. Organizations involved included ARARI-Sekota, BOA-Sekota, and the Wag Himra Zone Rural Development Office.

As the 2004 rainy season drew near, Amy and her assistants prepared for upcoming stream gauge measurements, rainfall collection, and infiltration tests. Thirty fourth-grade students were recruited for daily rainfall measurements, while infiltration tests in previously designated sites were repeated for the second and third times. Furthermore, four more families joined with the evaluation research being done on the water harvesting structures implemented by the Agricultural Office. This research involved daily measurements of the water stored in the structures and the completion of surveys about their implementation, use, and value.

The results of her research will be compiled and distributed to the necessary people during 2005 while she is coordinating a partnership project between Bahir Dar and Cornell Universities (USAID-ALO funded) and teaching at Bahir Dar University.

Annex 12. Synopsis of graduate students research work: *Oloro McHugh Research Summary, Lenche Dima, 2004*

January – December 2004

During 2004 household survey, watershed characterization, watershed hydrology, and on-farm experimental studies were conducted within the Lenche Dima watershed. A survey of 87 households throughout the watershed collected water resources, household labor and income, and local environmental perspectives information. A survey report summarizing the water resources situation and development options was prepared and distributed to BoA Woldiya and ARARI Sirinka. The report revealed the nature of the pressing water needs in the Lenche Dima communities. Forthcoming there will be a report on household labor and income in the Lenche Dima watershed to also be distributed to the agencies involved in development work within the watershed.

Characterization studies for the watershed continued during 2004 building on the base data collected during 2003. Rainfall, temperature, pan evaporation, soil infiltration rates, and soil compaction data were collected. Daily rainfall was collected at 18 locations in addition to 15-minute rainfall distribution at 3 locations within the watershed. Hourly ambient temperature and daily pan evaporation were measured at the Hara weather station setup during 2003 at Hara Elementary School. Soil infiltration rate and soil compaction at numerous sites throughout the watershed were collected to obtain information that can be used for better soils management.

Watershed stream outflows were monitored during both the belg and kremt 2004 seasons. Water and sediment outflows were measured for the watershed as a whole as well as for the Hartibo sub catchment. These data give baseline information on the present hydrological condition of the watershed. The information is useful for water resources development planning and to assess future effects of current watershed development activities.

On-farm water harvesting and tillage trials were conducted during both cropping seasons of 2004. Local variety chickpea was grown during the belg and early maturing drought- and striga-resistant goby sorghum cultivated during kremt. Subsoil tillage and open and tied-ridges were the treatments tested and compared to conventional tillage using Maresha plow. In addition, during kremt zero tillage with 2.5 tons per hectare sorghum stalk mulch was tested. During kremt cattle manure (0, 5, 10, and 20 tons per hectare) and chemical fertilizer (20.5-0-0, 20.5-46-0, and 41-46-0) nutrient additions were tested in a split plot design with the tillage and water harvesting treatments listed above. These trials measured plot runoff, erosion, soil moisture, soil infiltration rate, soil compaction, plant biomass development, root growth, and grain yield. The results will produce recommendations on improving soil and water management for crop production in Lenche Dima.

Annex 13. List of AMAREW Project Staff in 2004

No.	Name	Gender	Education Level	Position	Remark
1	Brhane Gebrekidan	M	Ph.D.	CoP & Senior Research Advisor	
2	Kent Reid	M	Ph.D.	Integrated WS Mgt. Advisor	Until Dec. 2004
3	Fekadu Yohannes	M	Ph.D.	Research Associate Advisor	
4	Elias Zerfu	M	Ph.D.	Training Associate Advisor	
5	Habtemariam Kassa	M	Ph.D.	Extension Associate Advisor	
6	Yitayew Abebe	M	M.S.	WS Mg. Associate Advisor	
7	Taye Hailu	M	M.AC.	Program Administrator	Until June 2004
8	Daniel Nigussie	M	B.A.	Accountant/Ass. Administrator	Until July, 2004
9	Ahmed Ayele	M	B.A.	Ass. Administrator/Accountant	From August 2004
10	Saada Mohammed	F	Junior College Diploma	Senior Secretary	Until July, 2004
11	Aster Tekalign	F	Junior College Diploma	Ass. Secretary/Receptionist	
12	Workneh Yalew	M	Diploma	Driver	Until Sept. 2004
13	Beyene Negash	M	Diploma	Driver	
14	Nebiyu Mussie	M	Diploma	Driver	
15	Fasika Desta	F	12 th Grade Complete	Janitor	
16	Yehizbalem Gebeyehu	F	5 th Grade Complete	Janitor	
17	Tadesse Kassa	M	8 th Grade Complete	Security Guard	Until Sept. 2003
18	Dagne Derso	M		Security Guard	Until Sept. 2003
19	Alem Deribe	M	6 th Grade Complete	Security Guard	
20	Teshome Mengistu	M	12 th Grade complete	Security Guard	From Feb. 2004
21	Debebe Tadesse	M	12 th Grade Complete	Security Guard	From Sep. 2004

Acronyms

ACDI/VOCA	Agricultural Cooperative Development International/Volunteers in Overseas Cooperative Assistance
ACSI	Amhara Credit and Saving Institution
AHI	African Highland Initiative
AMAREW	Amhara Micro-enterprise development, Agricultural Research, Extension and Watershed management
AMSEIDB	Amhara Micro and Small Enterprises and Industries Development Bureau
ANRS	Amahra National Regional State
ARARI	Amhara Regional Agricultural Research Institute
BoA	Bureau of Agriculture
BoARD	Bureau of Agriculture and Rural Development
BoFED	Bureau of Finance and Economic Development
CAHW	Community Animal Health Workers
CIP	Centro International de la Papa
COLTA	Community Organization Leadership Training for Action
CoP	Chief of Party
CPB	Cooperatives Promotion Bureau
CRSP	Collaborative Research Support Program
CTDA	Coffee and Tea Development Authority
CWMO	Community Watershed Management Organization
DA	Development Agent
EARO	Ethiopian Agricultural Research Organization
EPLAUA	Environmental Protection, Land Administration and Use Authority
EWMA	Extension Watershed Management Advisor
FA	Farmer Administration
FFS	Farmers' Field School
FRG	Farmer-Research-Group
FSPCDPO	Food Security Program Coordination & Disaster Prevention Office
FTC	Farmer Training Center
GIS	Geographical Information System

ICM	Integrated Crop Management
IR	Intermediate Result
ISP	Integrated Strategic Plan
IWDMT	Integrated Watershed Development and Management Team
MED	Micro Enterprise Development
MoARD	Ministry of Agriculture and Rural Development
MoFED	Ministry of Finance & Economic Development
MoU	Memorandum of Understanding
NGO	Non Governmental Organization
NRM	Natural Resource Management
OIRED	Office of International Research, Education and Development
PA	Peasant Association
R2D	Relief to Development
REFAC	Research Extension Farmer Advisory Council
REST	Relief Society of Tigray
RHPP	Rural Household Production and Productivity
RIT	Regional Implementation Team
SGMP	Small Grants and Mentorship Program
USAID	United States Agency for International Development
VSU	Virginia State University
WA	Watershed Association
WARDO	Woreda Agriculture and Rural Development Office