

ICARDA-Ethiopia Project "Unlocking the potential of rainfed agriculture in Ethiopia for improved rural livelihoods", 3rd annual Planning workshop, 6-8 February 2012, Gonder
----- Summary -----



Workshop Participants

The 3rd annual planning workshop on ICARDA Ethiopia Rainfed project entitled “Unlocking the potential of rainfed agriculture in Ethiopia for improved rural livelihoods” was held from 6-8 February 2012 at Gonder University meeting hall in Gonder, Ethiopia (See Annex III for workshop program).

A total of 44 people from ARARI, ICARDA, BOKU, Bureau of Agriculture (BoA), North Gonder Zone Office of Agriculture (ZoA), BoA-SLM, Sustainable Water Harvesting & Institutional Strengthening in Amhara (SWHISA), Bahir Dar Agricultural Mechanization and Food Science Research Center, and Gonder Agricultural Research Center attended the workshop (See Annex IV for participants list).

Following a field-visit during the first day of the workshop, on the second day the workshop started with a welcoming address of Dr. Yigzaw Dessalegn (Deputy Director General of ARARI) and Sitot Tesfaye (Center Director of Gonder ARC).

Experiences and research results of activities similar to the project were presented by scientists from ARARI, ICARDA, and SWHISA. Dr. Birru Yitaferu, Soil & Water Management Research Director of ARARI, presented a case study from Debre-Mewi Watershed, Upper Blue Nile Basin, Ethiopia on the topic ‘Understanding the factors of Landscape Transformation for an Integrated Watershed Management’. He covered the following topics in his presentation:

- The specific nature of land degradation in the highlands of Ethiopia
- Nature of the biophysical environments
- Political and economic history of the highland areas
- Problems associated with agricultural land management
- Other socio-economic, cultural, and political factors
- Rationale of the move to Soil and Water Conservation and Community Forestry in Ethiopia
- The SCRIP program- The pioneer watershed based research in Ethiopia
- Lessons learnt in the Integrated Watershed management research at Debre-Mewi

Dr. Ahmed AL-Wadaey, from ICARDA, shared research methodologies and results on the ‘Impact of Soil and Water Conservation Interventions on Soil Erosion in the Mountains of Syria’. He talked about implementing water harvesting and soil conservation measures that improve land productivity and therefore improve the income of farmers with the participation of farmers. He shared the experience on the approaches and methods in the development of community base-maps using GIS applications, design of interventions at watershed level, field implementation of the water-harvesting and soil conservation interventions, monitoring and evaluation, and dissemination of technologies.

Dr Selamyihun Kidanu shared SWHISA’s experience on water harvesting and management. He talked about the experiences of SWHISA on the planning, designing, implementing and managing sustainable water harvesting schemes and the use of water for irrigated agricultural production. He indicated that the project is fully operational in 6 food insecure districts with 65 HHWS and 15 SHDW and 14 irrigation schemes in on-farm trials and demonstrations.

Following the experience sharing presentations Dr. Fawzi Karajeh, Regional Coordinator, NVSSAP, gave an overview on IFAD funded project entitled ‘Improving the Livelihoods of Rural Communities in the Nile Valley and Sub-Saharan Africa Region: Sustainable crop and livestock management Regional Project’. He indicated that the project objective is to identify, adapt, and evaluate technical, institutional and policy options for integrated crop and livestock management by farming communities for sustainable increases in productivity and rural incomes and reduced vulnerability to climate variability and change. The project will be implemented in Egypt, Eritrea, Ethiopia, Sudan and Yemen.

Overview on the status of the 2011 project accomplishments of the “Unlocking the potential of rainfed agriculture in Ethiopia for improved rural livelihoods” was presented by the National Project Officer, Wondimu Bayu. Following this, detailed results of the 2011 activities were presented by the respective researchers. Prof. Andreas Klik presented preliminary results on the hydrology, sediments, plant growth, spatial distribution of runoff, sediment yield, and crop yields estimated by applying the SWAT Model to Gumara-Maksegnit Watershed. The model estimated the following values: Main Outlet Discharge is 50×10^6 m³/year (average annual Q = 1,7 m³/s), Surface Runoff is 27×10^6 m³/year, Baseflow is 23×10^6 m³/year, Lateral Runoff is 0.4×10^6 m³/year. Main Outlet Sediment Yield is 1×10^6 ton/year (Upland only – no Gully Erosion), and Crop Yield is 3×10^3 ton/year.

Muuz G/Tsadik presented results on the assessment of runoff, sediment and nutrient (N, P an organic carbon) loss in the Gumara-Maksegnit watershed. He reported the results indicated in the Table below for the two sub-watersheds and for the main outlet.

Parameter	Ayaye (treated) sub-watershed	Abakaloye (untreated) sub-watershed	Whole watershed (main outlet)
Surface runoff loss (mm)	23	24	93.76
Total sediment loss (ton/ha)	3.7	4.5	4.7
Total N loss (Kg/ha)	8.3	5.2	1.99
Total P loss (kg/ha)	0.04	0.05	0.10
Total organic Carbon (kg/ha)	33.6	68.8	65.8

Hanibal Lemma presented the results of the research activity entitled 'Evaluation and Demonstration of Water Harvesting and Supplementary Irrigation to Improve Agricultural Productivity in Gumara-Maksegnit Watershed'. He reported that supplementary irrigation experiments were conducted on garlic, pepper, and shallot on four water harvesting ponds and wheat-chickpea double cropping on one water harvesting pond. Unfortunately, only the experiment on pepper was reported as successful experiment. Experiments on garlic, shallot, and wheat-chickpea double cropping were reported as failure due to disease and poor management reasons. It was reported that application of 50 kg N ha⁻¹ with 1/3, 2/3 and full level of supplemental irrigation and application of 100 kg N ha⁻¹ with 2/3 of the supplemental irrigation water application have given significantly higher pepper yields.

Results of the rate determination on the combined use of compost and chemical fertilizer on the yield of wheat and chemical properties of Vertisols were reported by Sitot Tesfaye. Sitot reported that the interaction effects of compost and mineral fertilizer had significant effect on wheat grain yield, where he reported that application of 8 t ha⁻¹ compost along with 50% of the recommended mineral fertilizer gave the highest significant grain yield.

Worku Biweta reported results of the on-farm evaluation and demonstration of animal drawn moldboard & Gavin plows. Moldboard plough was found to make a maximum width of 23 cm on both Vertisol and light soil. It was reported that significant differences on soil moisture, bulk density and penetration resistance between the tillage implements and the zero tillage treatments were not observed. The preliminary result on the profitability analysis showed that no-till was profitable than conventional tillage for wheat, whereas for teff no-till was found less profitable than the conventional tillage.

Results of the promotion of improved food barley varieties with their production packages in the watershed was presented by Andualem Tadesse. Stayish food barley variety selected from the 2010 adaptation trial was planted by 40 participating FREG members. A total of 5.2 ton seed has been produced which will be redistributed to farmers by the coming season. The variety was popularized for the watershed community through field days.

Tewodros Tesfaye presented preliminary results of the chickpea participatory variety selection in the watershed. In this study, five improved chickpea varieties (Arerti, Habru, Shasho, Monino, and DZ 10-4) with the local variety were evaluated. FREG members have evaluated the varieties and selected Arerti and Shasho.

Kibruyesfa Sisay presented results on the selection of tree/shrub species for the rehabilitation of degraded lands and demonstration of mobile nursery using bamboo box. He indicated that species like *Acacia abyssinica*, Kirkira, *Acacia saligna*, and *Gravillea rubusta* had the highest survival rate. It was reported that 10 bamboo boxes were distributed to eight women and two men farmers and also training was given on nursery operations, pot filling, species choice and nursery management. Seedlings of *Olea europaea*, *Cordia africana* and *Eucalyptus camaldulensis* were reported raised by participating farmers in the first year.

Nurhussen Mohammednur presented preliminary results on the prediction of soil attributes for environmental applications using DEM and remote sensing techniques. He reported that SRTM DEM, having lower resolution was better for the study area. These indicated lower resolution DEMs could have better accuracy (26.2 m) than higher resolution DEMs (28.1 and 37.8 m). Similarly, Kibruyesfa Sisay presented preliminary results on the detail land use and land cover mapping using multi-temporal and multi-spectral satellite images at Gumara-Maksegnit watershed where he talked about land cover conditions of the watershed, the land cover changes, and the accuracy assessment.

Subsequently, planning of new research activities for the year 2012 started. Plans were made following the three thematic areas identified in 2010 (Figure 1), plus new interventions in small ruminant (goat) research. Planned research activities are summarized in Annex I.

Minutes of the workshop including questions and answers raised during discussion are included in Annex II.

Finally, the workshop was concluded with closing remark by Prof. Andreas Klik.

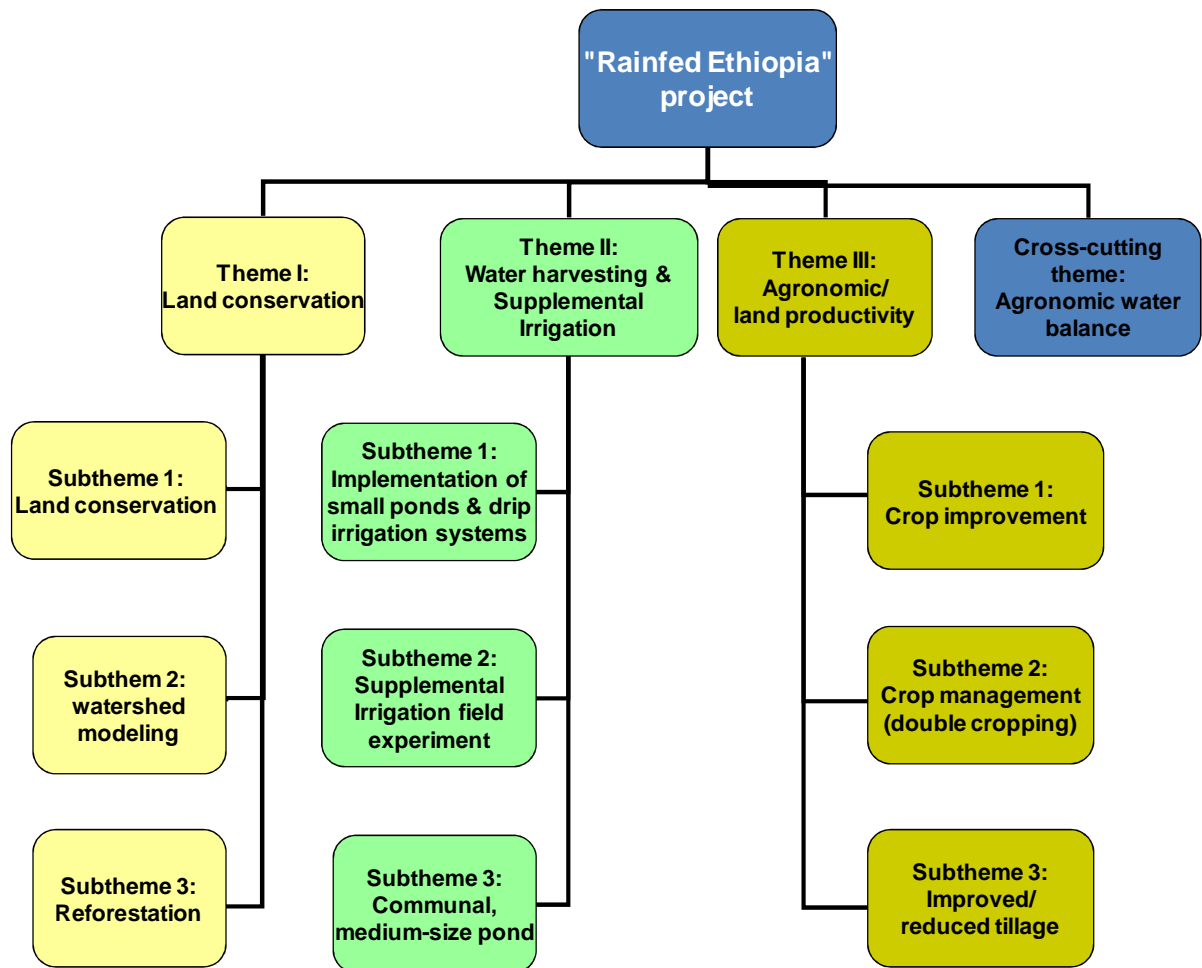


Figure 1. Thematic areas

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Annex I. Research Activities planned for the year 2012

Theme I: Combating land degradation & watershed modeling

Sub-theme 1. Land conservation

Sub-theme 2. Watershed modeling

Sub-theme 3. Reforestation

Output(s)

- Hydro-meteorological data collection
- Monitoring system operated (precipitation and discharge gauging stations)
- Participatory land use and intervention plan will be developed
- Conflict among land users will be resolved

Addressing which farmer's priorities (PRA results)?

Natural resources degradation

Sub-theme 1. Land conservation activities

Activity 1. Land Capability classification and Participatory Land use planning for Integrated Watershed Development

Focal point Researcher

Ashenafi Tekle

Objective

- To develop participatory land use and intervention plan by considering both land capability and farmers interest
- To generate alternative land use plan for Gumara-Maksegnit watershed

Materials and methods

Materials to be used for the study are: 1: 50,000 topographic maps, Global Positioning System (GPS), Landsat image, Soil map of the study area, 20 years monthly max. and min. T^o, and 20 years average monthly rainfall data. Different Software such as ArcGIS 9.3, ERDAS 9.1, & ILWIS 3.4 will be used in the study.

Expected Outcomes

- Participatory land use and intervention plan will be developed
- Conflict among land users will be resolved

- The following maps will be developed: Hydro-geomorphology map, Slope map, Soil map, Community land use map, Land use map, Land capability map, Suitability map, Major crop suitability map, Alternative land use map.

Work Plan

Activities	J	F	M	A	M	J	J	A	S	O	N	D
Prepare workshop	X	X										
Team formation and discussion with farmers and stakeholders			X									
Current land use survey				X								
Data inputs (photo, satellite image analysis)					X	X	X	X	X			
Discussion with stakeholders to evaluate and give feedback for new land use								X	X	X		
Implementation the new participatory land use plan										X	X	X

Activity	Quantity	Unit cost (Birr)	Total cost (Birr)
Team formation 2 days	4	200	400
Current land use survey 5 days	4	200	1000
Data inputs (photo, satellite image analysis)			6,000
Labor			3,000
Lab and GIS analysis			5,000
Software			1000
Fuel and lubricant			3400
Per dim			1350
Stationary			500
Sub Total			21,500
Contingency (10%)			2150
Total			23,650

Sub-theme 2. Watershed Modeling

Focal point Researcher

Muuz G/Tsadik (GARC), Hailu Kindie (GARC), Feras Ziadat (ICARDA), Birru Yitafaru (ARARI)

Team members

- Hailu Kindie (GARC)
- Muuz G/Tsadik (GARC)
- Ashenafi Tekle (GARC)
- Dr. Birru Yitafaru (ARARI)
- Dr. Gizaw Desta (ARARI)
- Prof. Andreas Klik (BOKU)
- Prof. Hans Peter Nachtnebel (BOKU)
- Dr. Feras Ziadat (ICARDA)
- Dr Ahmed Al-Wadaey (ICARDA)
- Tadesse Demessie (Gonder Soil lab)
- Dr. Wondimu Bayu (National Project Officer)

Activities

Activities	Responsible person	Duration
Monitoring system		
1. Gauging station (buying instruments) such as water table inst, and turbidity meter	George	March-April,2012
2. Continue measurement of gauging station	Muzz/Ashenafi	Until Nov. 2012, next year IFAD will continue support
3. Quality assessment and data analysis - Preliminary - Comprehensive	Muzz Andreas	End of March 2012 May of 2012
4. Install water sensors in two ponds	Muzz/Hanibal/Ashenafi	Install before the rain
5. Maintenance of gauging station	Muzz/Ashenafi/Wondimu	End of March 2012
Watershed modeling		
1. Run and calibrate the model for large watershed	Hailu	July-August 2012
2. Modeling virtual slope	Hailu	End of April 2012
3. Run and calibrate the model for the sub-watersheds	Hailu	July-August 2012
4. Design and Monitoring of the efficiency and impact of SWCs	Two MSc students from BOKU/ET funded by BOKU, ADA & IFAD	2012-2013
5. Detailed topographic mapping for sub-watersheds	Muzz	Mid-March 2012
6. Evaluate of scenarios using SWAT (IFAD)	Hailu	2013
7. Evaluate effect of soil and land use data on the model	Ahmed	June 2012
8. Comparison of SWAT and other models	Hanibal	October 2012

Indicators of success ("measurable")

- The monitoring system is operational
- The model is set up and ready for calibration

Work plan

Activities	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Gauging station maintenance			X	X								
Installation of runoff measuring sensors and turbidity meter				X	X							
Data collection (runoff, sediment load and nutrient)					X	X	X	X	X			
Follow up and monitoring				X	X	X	X	X	X			

Detailed model watershed characterization				X	X							
Purchasing the 30m resolution DEM of Maksegnit watershed				X	X							
Sediment & nutrient laboratory analysis						X	X	X	X			

Budget requirement

Activity	Quantity	Unit rate	Total
Guarding of rain gauges	4month*12	150	7200
Data collectors on gauging stations	4month*3	768	9216
Guarding gauging stations	6month*6	450	16200
Maintenance of gauging structures (main gauging)			
Gabion (2x1x1)	40	850	34000
Stone (>40cm diam.)	80 m ³	500	40000
Labor (skilled and un skilled)	300 md	35	10500
Follow up & data capturing (per diem)	80 md	135	10800
Fuel and Lubricant	Lump sum	Lump sum	12000
30 m resolution DEM	Lump sum	Lump sum	3000
Laboratory analysis of Runoff, sediment and nutrient	Lump sum	Lump sum	30,000
Salary of field technician	12	2000	24,000
Car maintenance (annual service, wheel)	LS	LS	30,000
Cost of Water Sensor battery, turbidity meter battery, raincoat/umbrella, boots shoe	LS	LS	23,000
Sub total			249916
Contingency			24991.6
Grand total			274907.6

Sub-theme 3. Reforestation

Focal point Researcher

Behonegn A. (GARC) (Team Leader for species selection), Hadera K. (Team Leader for the mobile nursery)

Team members

- Behonegn A. (GARC) (Team Leader)
- Kibruyesfa Sisay (GARC)
- Hadera Kahsey (GARC)
- Ambachew Getnet (GARC)
- Abate T. (GARC)
- Dr. Teshom Tesema (ARARI)

Activities

- Data collection on the activity started in 2010-selection of different trees/shrubs species for rehabilitation of degraded land
- Data collection on introducing mobile nursery and training
- Collecting undergrowth vegetation data (Type of species & Amount of biomass)
- Analyzing the data by using qualitative and descriptive statistics
- Data collection on the mobile nurseries
 - Socioeconomic data
 - Survival rate (count)
 - Number and type of species raised using (Questionnaire)
 - Water management at household level (Questionnaire)
 - Species preference (Questionnaire/preference ranking)
 - Social interaction and technology diffusion (questionnaire)
 - Time allotted for nursery management
 - Labor division and management
 - Cost/benefit analysis
 - Cost –Benefit analysis and social survey will be conducted.
 - Further training will be given to the already established FRG members

Indicators of success (“measurable”)

- Tree/shrub species surviving and doing well will be identified
- Type of species & amount of biomass for the undergrowth vegetation will be quantified
- Farmers trained on establishing and using mobile nursery

Work plan (Species selection)

Activities	Jul	Au	Se	Oc	No		Ja	Fe	M	Ap	M	Ju
Wire fencing									X	X		
Guarding	X	X	X	X	X	X	X	X	X	X	X	X
Construction of micro basin & check dam									X	X		
Regeneration assessment		X	X									
Experience sharing											X	

Work plan (Mobile nursery)

List of Activities	2012				2013			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Social survey			X	X	X	X		
Data collection/survival rate of seedling			X	X		X		
Cost/benefit analysis				X	X	X		
Training for established FERG member			X		X	X		
Monitoring & follow up			X	X	X	X		
Reporting (monthly, quarterly, annual)			X	X	X	X		

Data analysis and final reporting							X	X
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Budget requirement (species selection)

Activity	Cost (Birr)
Wire fencing (maintain ace)	2000
Guarding	3600
Maintenance of micro basin & check dam	3000
Regeneration assessment	2400
Soil nutrient analysis-laboratory service	10,000
Per diem	2560
Stationary	3000
Fuel & lubricants	4000
Total	30560

Budget requirement (Mobile nursery)

Items	Unit	Quantity	Unit cost (Birr)	Total cost (Birr)
Seeds				1500.00
Fuel & lubricants	lt	350		5000.00
Stationary				3000.00
Transport				1500.00
Per diem	day	50	130	6500.00
Training of FREG (2 days)	day	2	50	2000.00
Field days	day	1		2000.00
Subtotal				21500.00
Contingency (10%)				2150.00
Total				23650.00

Theme II: Water harvesting & supplemental irrigation

Output(s)

Supplementary irrigation water amount and frequency developed for different crops.

Addressing which farmer's priorities (PRA results)?

Poor Irrigation management

Focal point Researcher

Ertiban Wondifraw (Team leader), Hanibal Lemma, Theib Oweis, Gizaw Desta

Team members

- Ertiban Wondifraw (GARC)
- Hanibal Lemma (GARC)
- Dr. Theib Oweis (ICARDA)
- Dr. Gizaw Desta (ARARI)
- Muuz G/tsadik (GARC)
- Prof Andreas Klik (BOKU)
- Prof Hans-Peter Nachtnebel (BOKU)
- Dr. Selamyihun Kidanu (SWHISA)

Activities

Activities	Responsible person	Duration
Ponds maintenance	Ertiban/Hanibal	
-Buying geo-membrane		March 2012
-Install geo-membrane		May 2012

-Install safety measures and fencing		ASAP
-Consider health issue (malaria etc)		ASAP
-Purchase of drip lines		ASAP
Experimental data	Ertiban/ Hanibal	
-Select appropriate crops		October (main crops) January 2013 (alternative crops) IFAD
-Implementation of experiment		
-Data collection and analysis		

Indicators of success ("measurable")

The WH/SI systems are running and operational

Work plan

Activities	J	F	M	A	M	J	J	A	S	O	N	D
Pond maintenance			x	x								
Meteorological data collection			x									
Determination of IR and scheduling			x	x	x							
Land Preparation				x	x							
Planting					x							
Weeding						x	x	x				
Harvesting									x	x		
Data Analysis and Report Writing	x	x	x								x	X

Budget Requirement

No.	Description	Unit	Quantity	Unit price (Birr)	Total price (Birr)
1	Maintenance of pond & drip system				
1.1	Compression elbow 32*32	Pcs	2	70	140
1.2	Compression elbow 32*1"	Pcs	2	70	140
1.3	Compression tee 32*32*32	Pcs	4	70	280
1.4	Compression tee 32*1"*32	Pcs	1	70	70
1.5	Compression cup 32	Pcs	4	70	280
1.6	Off take connector 16mm	M	100	3	300
1.7	Valve 1"	Pcs	5	150	750
1.8	Teflon	Pcs	80	4	320
1.9	Pe pipe 32mm	M	50	24	1200
1.10	Cutter	Pcs	2	30	30
1.11	Compression elbow 25*25	Pcs	2	65	130
1.12	Compression elbow 25*1"	Pcs	2	65	130

1.13	Compression tee 25*25*25	Pcs	4	65	260
1.14	Compression tee 25*1''*25	Pcs	1	65	65
1.15	Compression cup 25	Pcs	4	65	260
1.16	Pe pipe 25mm	m	50	22	1100
1.17	Lateral	m	3200	3.75	12000
1.18	Geo-membrane	No	2	4450	8900
2	Fuel & lubricant	Lt	500	18	9000
3	Wage	Md	30	1000	25000
4	Per diem (Researcher 70 days, TA 50 days, Driver 50 days)	Pd	135	170	20000
5	Fertilizer	Qt	1150	2	2300
6	Pesticide	Lt	10	100	1000
7	Seeds and seedling preparation	Ls			2000
7	Land compensation	Ls			6000
8	Office supplies				2250
9	Field day				3000
10	Soil samples analysis	Ls			5000
	Total				101905
	Contingency (5%)				5095
	Total				107000

Theme III. Land productivity

Sub-theme 1. Crop Improvement

Activity 1. Chickpea participatory variety selection on the Vertisol of Gumara-Maksegnit watershed (Ongoing/continuing activity)

Objective

- To select best adaptive and high yielding improved chickpea varieties through farmers participation.
- To demonstrate early planting of chickpea.
- To evaluate the effect of rhizobial inoculation on the productivity of chickpea Varieties.

Design

Seven chickpea varieties will be evaluated in split-plot design with rhizobial inoculation in the main plots and varieties in the subplots, replicated thrice on farmers' fields.

Focal persons/Responsible persons

Tewodros Tesfaye (Gonder ARC)

Team members

- Tesfaye Wossen (GARC)
- Asfaw Azanaw (GARC)
- Yonas Worku (GARC)
- Fasil Mekuanent (DA)
- Yeshitila Merne
- Dr Yigzaw Desalegn (ARARI)
- Dr. Rolf Sommer
- Dr. Geletu Bejiga
- Dr. Wondimu Bayu

Work plan

Activities	J	F	M	A	M	J	J	A	S	O	N	D
Site selection				x	x							
Seed and chemical preparation							x					
Land preparation						x	x	x				
Sowing								xxx	x			
Trail management									x	x	x	x
Field data recording								x	x	x	xx	xx
Monitoring and evaluation											xx	
Arranging and conducting field days											xx	xx
Report writing	x	xx										

Budget Requirement

No.	Item	Unit	Quantity	Unit Price (Birr)	Total (Birr)
1	Land rent	ha	0.3267		2250
2	Seed	Kg	24.75	13	311
3	Chemical (Apron star)	gm	300	1.25	375
4	Fuel & lubricant	Lit.	200	15	3000
5	Wage	Man day	50	35	1750
6	Office supplies	Lump sum			1500
7	Field days	Days	35	105	4800
8	Training	Days	16	105	3360
9	Per diem	Days	20	135	2700
	Total				20046

Activity 2. Participatory evaluation and selection of improved lentil varieties in the Gumara-Makisegnit watershed (New activity)

Objective

To evaluate and identify adaptive, high-yielding and disease resistant lentil varieties.

Materials & Methods

Ten improved lentil varieties including local check will be evaluated for their adaptation and yield in 2012 and 2013 in four farmer's site (mother baby trial) in the watershed. The experiment will be replicated thrice using RCBD.

Focal persons/Responsible persons

Tewodros Tesfaye (Gonder ARC)

Team members

- Tesfaye Wossen (GARC)
- Dr Yigzaw Desalegn (ARARI)
- Yeshitila Merne
- Dr. Rolf Sommer
- Dr. Geletu Bejiga
- Dr. Wondimu Bayu

Work plan

Activities	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Seed preparation			X									
Land Preparation				X								
Planting							X					
Weeding							X	X	X			
Harvesting										X		
Threshing												X
Data analysis												X
Report submission												X

Budget Requirement

Activities	Budget (Birr)
Seed preparation	2000
Land preparation	3000
Planting	2000
Weeding	2500
Per diem	5000
Fuel & lubricants	5000
Field day	3000
Land rent	3000
Harvesting	1500
Trashing	2000
Stationary	1000
Total	30000.00

Activity 3. Pre-scaling up of improved food barley varieties with their production packages at Gumara-Maksegnit watershed (Ongoing/ Continuing activity)

Objective

To improve the livelihood of the watershed community through introducing improved crop production technologies.

Methodology

Scaling up of the production of food barley variety 'Estayish' will be conducted on a 0.25 ha of land each on 40 FREG member farmers' fields.

- Selection of farmers will be carried out in collaboration with DAs
- Farmers will acquire the required amount of fertilizer by themselves and food barley seed will be delivered to farmers (farmers will return it back after harvest).

- Training will be given to farmers and development agents on the production and management of food barley.
- 2-3 field days will be organized on member and non-member farmers will participate

Expected output

- Farmers knowledge on new production packages will be enhanced
- Community-based seed system will be established
- Farmers income will increase
- Finally, farmers livelihood will be improved

Focal persons/Responsible persons

Andualem Tadesse (Gonder ARC)

Team members

- Mele Tilahun (GARC)
- Asfaw Azanaw (GARC)
- Yonas Worku (GARC)
- Fasil Mekuanent (DA)
- Dr Yigzaw Desalegn (ARARI)
- Dr. Rolf Sommer
- Dr. Geletu Bejiga
- Dr. Wondimu Bayu (NPO)

Work plan

Activities	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Participant and Site selection		■	■									
Stake holder identification and networking				■								
Joint action planning				■	■							
Preparing inputs				■	■							
Preparing leaf lets				■								
Training					■	■						
planting							■					
Monitoring							■	■	■			
Field days								■	■			
Evaluation meeting										■		
Reporting and Documentation											■	■

Budget Requirement

Item	Unit	Amount	Unit price (Birr)	Total (Birr)
------	------	--------	-------------------	--------------

Barley seed	Quintals	8	500.00	4000.00
Labor for loading and unloading		Lump sum	-	600.00
Training				
Trainers	Days	20	105.00	2100.00
DAs, woreda experts, drivers	Days	20	105.00	2100.00
Coffee & tea during training		Lump sum	-	3000.00
Per diem-Organization & planning	Days	20	105.00	2100.00
Per diem-Field day	Days	50	105.00	5250.00
Per diem-Monitoring & evaluation	Days	30	105.00	3150.00
Fuel and lubricants	Liters	260	19	5000.00
Stationary	Lump sum	-	-	3000.00
Contingency				3030.00
Total				33330.00

Activity 4. Demonstration and Promotion of improved bread wheat technologies in Gumara-Maksegnit watershed (New activity)

Objectives

- To popularize improved bread wheat production system in the Gumara-Maksignet watershed.
- To increase accesses of the improved technology through farmer to farmer seed dissemination in the area.

Materials and Methods

Bread wheat variety *Tay* selected by farmers during the 2010 participatory variety selection will be delivered to 20 interested FREG members. FREG members who will afford to cover the cost of recommended amount of fertilizer and all other costs for managing the production will be selected by development agents. Seed enough for 0.25 ha will be delivered to each farmer. Participant farmers at each site are expected to host on their field the production and promotion of the selected variety using the recommended practices. Outsider farmers will be invited to attend field days for evaluation and benefit from the established farmer to farmer seed exchange process. At harvest farmers will return back the amount of seed they received from the center.

Expected output

- Farmers knowledge on new production packages will be enhanced
- Community-based seed system will be established
- Farmers income will increase
- Finally, farmers livelihood will be improved

Focal persons/Responsible persons

Andualem Tadesse (Gonder ARC)

Team members

- Mele Tilahun (GARC)
- Dr. Yigzaw Desalegn (ARARI)
- Dr. Rolf Sommer
- Dr. Geletu Bejiga
- Dr. Wondimu Bayu (NPO)

Work plan

Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Input preparation				X	X							
Site/Farmers selection					X							
Training					X							
Planting						X						
Weeding							X					
Field day								X	X			
Harvesting										X		
Report writing											X	

Budget Requirement

Budget Category	Unit	Quantity	Unit cost (Birr)	Total cost (Birr)
Seed	Quintal	8	900.00	7200.00
Per diem for training	days	50	105.00	3000.00
Per diem for field day	days	100	105.00	10500.00
Reception	Lump sum	-	-	4000.00
Fuel and lubricant	Liter	263	19.00	5000.00
Stationery	Lump sum	-	-	3000.00
Contingency (10%)				3270.00
Total sum				35970.00

Activity 5. Demonstration and Promotion of Improved Faba bean Technologies in Gumara-Maksegnit Watershed (New activity)

Objectives

- To popularize improved faba bean production system in the Gumara-Maksegnit watershed
- To enhance faba bean production through farmer to farmer seed dissemination.

Materials and Methods

Faba bean varieties (*Degaga & Welqi*) selected by farmers during the 2010 participatory variety selection will be delivered to 20 interested FREG members. FREG members who will afford to cover the cost of recommended amount of fertilizer and all other costs for managing the production will be selected by development agents. Seed enough for 0.25 ha will be delivered to participating farmers. Participant farmers at each site are expected to host on their field the production and promotion of the selected varieties using the recommended practices. Outsider farmers will be invited to attend field days for evaluation and benefit from the established farmer to farmer seed exchange process. At harvesting farmers will return back the amount of seed they were delivered.

Expected output

- Farmers knowledge on new production packages will be enhanced
- Community-based seed system will be established
- Farmers income will increase
- Finally, farmers livelihood will be improved

Focal persons/Responsible persons

Andualem Tadesse (Gonder ARC)

Team members

- Tewodros Tesfaye (GARC)
- Dr Yigzaw Desalegn (ARARI)
- Dr. Rolf Sommer (ICARDA)
- Dr. Geletu Bejiga (ICARDA)
- Dr. Wondimu Bayu (NPO)

Work plan

Activity	Jan	Feb	Mar	Apr	May	June	July	Au	Sep	Oct	Nov	Dec
Input preparation				X	X							
Site/Farmers selection					X							
Training					X							
Planting						X						
Weeding							X					
Field day								X	X			
Harvesting										X		
Report writing											X	

Budget Requirement

Budget Category	Unit	Quantity	Unit cost	Total cost (Birr)
Seed	Quintal	5	1500.00	7500.00
Per diem-training	days	50	105.00	3000.00
Per diem-field day	days	100	105.00	10500.00
Reception	Lump sum	-	-	3000.00
Fuel and lubricant	Liter	360	19.00	5000.0
Stationery	Lump sum	-	-	3000.00
Contingency				3200.00
Total sum				35200.00

Sub-theme 2. Crop Management

Activities	Responsible person	Duration
Compost and chemical fertilizer	Sitot/Nigus	June-December
Adaptation of green manure spp.	Sitot/Ertiban	June-December
Micro-dosing of nutrients	Nigus	June-December

Activity 1. Rate determination on the combined use of compost and chemical fertilizer on the yield of bread wheat on Vertisols in the Gumara-Maksegnit watershed (Ongoing/Continuing activity)

Focal persons/Responsible persons

Sitot Tesfaye (GARC)

Team

- Dr. Birru Yetaferu (ARARI)
- Dr. Gizaw Desta (ARARI)
- Muuz G/tsadik (GARC)
- Dr. Rolf Sommer (ICARDA)
- Nigus D. (GARC)
- Dr. Wondimu Bayu

Objectives

- To determine the optimum rate of chemical fertilizer and compost combination for wheat
- To see the effect of compost on the physicochemical properties of light vertisols
- To determine the amount of compost that substitute or complement chemical fertilizer

Methodology

Ten treatments (Control, 8 tone compost, 6 tone compost, 4 tone compost, 8 tone compost with 69 kg N and 23 kg P₂O₅, 8 tone compost with 34.5 kg N and 11.5 kg P₂O₅, 6 tone compost with 69 kg N and 23 kg P₂O₅, 6 tone compost with 34.5 kg N and 11.5 kg P₂O₅, 4 tone compost with 69 kg N and 23 kg P₂O₅, 4 tone compost with 34.5 kg N and 11.5 kg P₂O₅) will be studied in a randomized complete block design with three replications. The experiment will be done for three consecutive years on permanent plot. Size of the experimental plot will be 6m by 6m. The experiment will be done in two sets-one set will be to see the residual effect.

Work Plan

Activities	J	F	M	A	M	J	J	A	S	O	N	D
Compost preparation		x	x	x	x							
Site selection					x							
Land Preparation					x							
Planting						x						
Harvesting										x		
Data Analysis and Report Writing											x	x

Budget Requirement

Activity	Cost (Birr)
Land rent	8000
Compost preparation	15000
Planting	4000
Weeding	4000
Harvesting	3000
Fencing	5000
Laboratory analysis	21000
Per diem	5000
Fuel & lubricants	6000
Inputs	1000
Stationary	3000

Total	75,000
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Activity 2. Adaptation of potential green manure species in Gumara-Maksegnit Watershed (New activity)

Objective

To study the adaptability of different green manure species in the Gumara-Maksegnit watershed.

Materials and methods

Green manure species such as *Dolichos lablab* (Lablab), *Crotalaria grahamiana*, *Lupine*, *Mucun pruriens*, *Tephrosia candida*, *Tephrosia vogelii* will be planted in RCBD with three replications.

Focal persons/Responsible persons

Ertiban Wondyfraw (GARC)

Team Memebers

- Ertiban Wondyfraw
- Sitot tesfaye

Indicators of success (“measurable”)

Adaptable green manure species will be identified.

Work Plan

Activities	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Planting material preparation				X	X							
Site selection					X							
Land preparation & planting					X	X						
Data collection						X	X	X	X	X	X	X
Data analysis and reporting	X	X										

Budget Requirement

Budget Category	Unit	Qt	Unit cost (Birr)	Total cost (Birr)
Sacks	No	150	10	1500.00
Cloth bags	No	150	10	1500.00
Plastic bags	Kg	10	50	500.00
Labor	Man days	400	25	10,000.00
Land rent	Lamp sum		1000	1000.00
Per diem	Days	40	135	5400.00
Laboratory analysis service	Lamp sum	-	-	10,000.00
Fuel & lubricant	Liter	150	18	4000.00
Office supplies	Lamp sum	-	-	3000.00
Total				36900.00

Activity 3. Determination of rate and time of nitrogen application on wheat (*Triticum aestivum*.) yield and yield components (New activity)

Objectives

- To determine optimum rate and time of application of nitrogen fertilizer for wheat production at Gumara-Maksegnit watershed.

Materials and Methods

The experiments will be laid in RCBD with three replications on farmers fields.

Treatments	Time of Nitrogen application and fraction to be applied		
	At sowing	At tillering	At knee height
Control (no fertilizer)	-	-	-
25%	1/2	1/2	-
25%	1/3	1/3	1/3
25%	1/2	-	1/2
50%	1/2	1/2	-
50%	1/3	1/3	1/3
50%	1/2	-	1/2
75%	1/2	1/2	-
75%	1/3	1/3	1/3
75%	1/2	-	1/2
100%	1/2	1/2	-

Work Plan

Activities	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Planting material preparation								x	x			
Land preparation									x	x	x	
Sowing												x
Harvesting				x								
Data analysis					x							
Report writing						x						

Budget Requirement

Category	Unit	Quantity	Unit price	Cost (Birr)
Fertilizer and pesticide		Lump sum	-	350
Sacks, cloth bags, plastic bags	No	Lamp sum	-	1000
Labor	Man days	150	25	3750
Per diem	Days	34	120	3960
Land rent	unit	1	1200	1200
Fuel and lubricant	Liter	Lamp sum		2500
Office supplies	Lamp sum		-	1000
Contingency			-	1376
Total				15136
For two sites				30272

Note: The experiment will be implemented on two sites. Therefore, the budget required for two sites will be $15136 * 2 = 30272$ birr.

Sub-theme 3. Improved tillage

Activity 1. On farm evaluation and demonstration of animal drawn moldboard & Gavin plows in the Gumara-Maksegnit watershed (Ongoing/Continuing activity)

Objectives

- To evaluate the technical performance of the moldboard & Gavin plows against the traditional plow.
- To evaluate the effect of improved plows on soil infiltration and crop productivity.
- To assess farmers' evaluation on the system compatibility of the implement.

Design

The experiment will be done in randomized complete block design with three replications. Farmers' field will be used as replication. The experiment will be done on two soil types (vertisol and light soil). There will be four treatments. i.e., traditional plow, reduced tillage, Gavin plow, & Mold board plow.

Focal persons/responsible persons

Worku Biweta (B/Dar Agric Mech. & Food Sc RC)

Team members

- Zewdu Ayalew (ARARI)
- Gessesew Likeleh (BD Ag. Mech. & Food Sc.)
- Dr. Rolf Sommer (ICARDA)
- Dr. Wondimu Bayu (Project NPO)

Work plan

Activity	J	F	M	A	M	J	J	A	S	O	N	D
Site selection				X								
Training					X							
Soil sampling						X						
Experiment execution						X						
Weeding							X					
Demonstration								X				
Harvesting										X		
Data analysis										X		
Report writing											X	

Budget Requirement

Item	Unit	Quantity	Unit price (Birr)	Total price (Birr)
Office supplies				175
Fuel	lt	500	19	9500
Lubricant (10% of fuel cost)				950
Vehicle maintenance (50%)				4525
Urea	kg	150	10	1500
DAP	kg	150	12	1800
Seed (Wheat)	kg	100	1000	1000
Herbicide (Roundup)	lt	1	350	350

Per diem- Experiment implementation & monitoring (3 researchers + 1 driver)	days	60 x 4	135	32400
Daily laborers (10)	days	25	20	5000
Total				57200

Activity 2. Demonstration and evaluation of Jab planter for planting maize (New activity)

Objective

- To increase production and productivity of small farmers by promoting improved planters.
- To evaluate the performance of Jab planter and collect farmers view on the technology

Material and Methods

The experiment will be carried out on farmers' field in RCBD with three replications.

Treatments

1. Farmers practice, broadcasting, with animal drawn moldboard plowed land
2. Row planting, using Jab planter, with animal drawn moldboard plowed land
3. Row planting, manually. zero tillage, with Gavin plow opened furrow
4. Row planting with zero tillage using Jab planter, with Gavin plow opened furrow

Focal persons/responsible persons

Worku Biweta & Gessesew Likeleh (B/Dar Agric Mech. & Food Sc RC)

Team members

- Zewdu Ayalew (ARARI)
- Dr. Wondimu Bayu
- Dr. Rolf Sommer (ICARDA)

Work Plan

Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Production		**										
Site selection				**								
First plowing						**						
planting						**						
Weeding 1 st							*					
Weeding 2 nd							*					
Demonstration									*			
Harvesting										**		
Threshing										**		
Data analysis												**
Final writing	*1											

*1 activity for next crop season

Budget Requirement

Item	Unit	Quantity	Unit price (Birr)	Total price (Birr)
Office material				175
Experimental setup & monitoring				11200
Urea	kg	50	12	600
DAP	kg	50	10	500

Selected seed (Maize BH-540)	kg	12.5	20	246
Roundup (herbicide)	lt	1	157	157
Premagram (herbicide)	lt	5	20.2	1010
Per diem-Experiment implementation & monitoring		20x3	135	8100
Daily laborers (10)	“	5	20	1000
Field day				
Farmers (25)	“	1	43	1075
BoA expert & others (10)	“	1	135	1350
Grand Total				25,413

Theme IV. Livestock research

Sub-theme 1: Feed and Nutrition

Activity 1. Introduction of forage species

Objectives

- Improve the fodder bank of individual farmer in the watershed
- Identify the best forage development strategies and species for Gumara-Maksegnit Watershed

Materials and methods

Forage species that are highly productive and adaptive to similar agro-ecologies comprising of both grasses, legumes and browse species with special emphases on perennial species will be introduced for the respective villages (Sesbania, Leucena, Pigeon pea, Napier grass, Lablab, Cowpea, Stylosantus, Oat, Vetch). Seedlings will be prepared prior to the planting time for the perennial tree legume species. Farmers participating in the project will take part in most of the forage development /production strategies compatible with their crop production/ farming system. Entry points to be utilized include backyard, live fences, under sowing and strip/bund forage development strategies. Eventually, farmers will evaluate the newly introduced forage species and will put their perception, related opportunities and constraints as source of animal feed option in the watershed.

Work Plan

Activities	2012											2013						
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	
Site selection		x	x															
Seed preparation	x	x																
Identifying appropriate entry points			x	x	x													
Seedling preparation			x	x	x													
Planting and fencing				x	x	x												
Data collection				x	x	x	x	x	x	x	x	x	x	x	x			
Field Day								x	x						x	x		
Report writing															x	x	x	

Budget Requirement

Category	Budget for 2012/13 (Birr)
Forage seed purchase	2,500.00
Fertilizer purchase	1,000.00
Land rent	3,000.00
Wage	5,000.00
Office supplies	2,000.00
Per diem	10,580.00
Fuel & lubricants	4,000.00
Sub Total	28,080.00
Contingency	2808.00
Total	30888.00

Activity 2. Feeding Experiment

Objective

- To generate best cost forage based fattening feed formulation for rainfed area.

Materials & method

Animal management

A total of 48 entire yearling male goats will be used. The experimental animal will be from participant farmers. The animal will be dewormed and sprayed for internal and external parasites and vaccinated for common diseases of the area during two week adaptation period. The experimental animals will be allocated randomly for six feed treatment groups after stratified by their body weight. The feeding period will be 105 days including adaptation period. The treatment will be:-

1. Browsing alone
2. Browsing + recommended level of concentrate
3. Browsing + cowpea hay
4. Browsing + cowpea hay (50%) + recommended level of concentrate (50%)
5. Browsing + cowpea hay (75%) + recommended level of concentrate (25%)
6. Browsing + cowpea hay (25%) + recommended level of concentrate (75%)

Phase 1: Feed Cultivation and Preparation

For feed cultivation purpose about 0.7 ha land will be rented from farmers. This is to produce the required 17 quintal of dry matter to feed 32 goats for 105 days of feeding period. Accordingly, the required agronomic practices will be undertaken. Finally, the feed will be collected, properly dried and stored till commencement of feeding trial. Moreover, concentrate to be fed for four of the treatment groups will be purchased from agro-industries and will be made ready prior to feeding period.

Phase 2: Feeding period

According to the treatment, out of the 48 goats, only 32 will be fed with cowpea hay twice a day, half of the recommended amount in the morning and half after browsing at evening.

Work Plan

	2012	2013

Activities	Mar	Apr	Ma	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Ma	Jun	Jul
Seed preparation and Site selection	x	x	x														
Land preparation and sowing cowpea			x	x													
Agronomic practices, harvesting, proper drying and storage					x	x	x	x									
Feed purchasing (concentrate)								x	x								
Feeding and data collection											x	x	x				
Field day														x			
Report writing															x	x	x

Budget Requirement

Category	Budget for 2012/13 (Birr)
Forage seed purchase	2,000.00
Concentrate	5,000.00
Land rent	10,000.00
Wage	7,000.00
Office supply	2,000.00
Per diem	10,000.00
Fuel & lubricant	5,000.00
Veterinary drug supply	4,000.00
Sub Total	45,000.00
Contingency	4500.00
Total	49500.00

Activity 3. Forage Adaptation trial (cactus, vetch, etc)

Objective

- To evaluate the adaptation of different cactus and vetch cultivars for fodder production in model villages.

Materials & method

Cactus Species

The experiment will be conducted in RCBD using five cactus varieties with three replications. Cactus varieties will be collected from Amhara and Tigray regions and will be planted at area closures in the regions.

Vetch Species

The experiment will be conducted with five species of Vetch (*Vicia dasycarpa*, *Vicia villosa*, *Vicia atropurpurea*, *Vicia benghalensis*, and *Vicia sativa*) in RCBD with three replications. The forage

harvested at 50% blooming from all the plots will be measured for its fresh biomass yield. Individual samples of forage from all plots will be taken for DM yield analysis.

Work Plan

Activities	2012											2013						
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	
Site selection		x	x															
Collection of Cactus cultivars and Vetch varieties	x	x	x															
Land preparation, agronomic practices and data collection			x	x	x	x	x	x	x	x	x	x	x	x	x			
Report writing															x	x	x	

Budget Requirement

Category	Budget for 2012/13 (Birr)
Wage	7,000.00
Forage seed and cactus cuts purchase	3,000.00
Land rent	8,000.00
Office supplies	1,000.00
Per diem	7,000.00
Fuel & lubricants	5,000.00
Sub Total	31,000.00
Contingency	3100.00
Total	32,000.00

Sub-them 2: Goat Health

Activity 1. Identification and Control of Major Goat Diseases

Objectives

- Identifying risk factors which favors diseases
- Estimation of the mortality of goat population
- Development of controlling strategies

Methodology

Disease investigation will be implemented when the outbreak occurs, which is between May and June. During the investigation, sample will be taken from the diseased animal based on the symptoms. The treatment response will help to list the disease from differential to lead to final diagnosis list which some diseases are responsive and some are for postmortem findings. The sample will be preserved in different solution, sterile phosphate buffer saline and saline with and without glycerol 50% for Virology, Stuwarts transport media for bacteriology and formalin 10% for parasitology. Then it will be transported to Bahir Dar regional laboratory for the laboratory finding. Up on investigation and laboratory work, we will work with Bahir Dar disease survey and regional laboratory team. Risk

factors, which are favorable for disease causative agent will be identified during the disease occurrence. Control strategy will be developed based on the nature of the disease.

Work Plan

Activities	2012											2013					
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Development of linkage between actors and stakeholders		x	x														
Site selection		x	x														
Purchase of veterinary drugs and supply		x	x														
Survey and sample collection			x	x	x												
Treatment and control of major Goat diseases in model villages			x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Report writing															x	x	x

Budget Requirement

Category	Budget for 2012/13 (Birr)
Office supplies	2,000.00
Veterinary drug supply and laboratory work	40,000.00
Fuel & lubricant	6,000.00
Wage	5,000.00
Per diem	10,000.00
Total	63,000.00

Sub-them 3:Goat Breeding

Activity 1. Characterization of production system and Goat population

Objectives

- To characterize production system and goat population in the watershed
- To define and prioritize farmers' breeding objectives and selection criteria

Methodology

Survey will be undertaken using semi-structured questionnaire to collect information on composition of livestock mix, flock ownership patterns, flock demography, importance and function of goats in the system and use of goat products, reproductive performance (age at first lambing, lambing interval, age at first mating, life time lambing and productive life of the does), current breeding practices (management of males and females, herd structure, gene flows, including exchange of new breeding animals) farmers' breeding objectives and selection criteria, housing system, management practices, feed resources and utilization, health related information (major goat diseases, their symptoms, major causes of goat mortality, vet services and constraints), fattening practice, production constraints and improvement options and socio-economic conditions (farm household characteristics, resource endowment and uses).

Work Plan

Activities	2012										2013						
	Ma	Apr	Ma	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Ma	Apr	Ma	Jun	Jul
Production system characterization	x	x	x														
Community meetings	x	x															
Linear measurements	x	x	x														
Report Writing				x	x	x											

Budget Requirement

Category	Budget for 2012/13 (Birr)
Office supplies	3,000.00
Per diem	10,000.00
Wage	8,000.00
Fuel & lubricant	5,000.00
Sub Total	26,000.00
Contingency (10%)	2,600.00
Total	28,600.00

Activity 2. Establishment of Simple Sire Selection and Exchange Scheme in Model Villages

Objectives

- To establish simple sire selection and exchange scheme
- To establish a model village for testing, demonstration and promotion of goat improvement technologies

Methodology

Community Mobilization

Prior to commencement of the actual field work, the community will be sensitized about objectives, intentions and possible outcomes of the project for their genuine participation during data collection. Accordingly, community meetings will be organized at the village.

Sire Selection

Selections will be undertaken based on farmers' selection criteria identified by the survey and PRA with some technical support and scientific background by researchers. Selection will be undertaken at different stages. The first stage will involve culling of animals with undesirable phenotypic characteristics (e.g. tail type, coat color, horns, conformation, and general appearance) and clearly observable and genetic defects (e.g. testicle deformation and undershot or overshot palates). The retained individuals will then further be judged based on morphometric and body weight. The stages at which the selection process takes place will depend on both the existing traditional practices of ram selection and use, as well as on scientific requirements.

Sires Management and Follow-up

To restrain goats and facilitate selection of superior sires by farmers, temporary wooden crashes (holding yards) divided to small pens will be constructed at each model village. Enumerators will be employed at each village for day to day follow-up of activities to be done by participating farmers. Selected sires will be ear tagged to differentiate them from unselected ones and to control mating. Moreover, farmers' perception and other relevant data will be continuously collected throughout the experimental period. Undesirable males will be culled before they reach puberty (i.e. before they can serve). Culling will be done by castrating, selling or slaughtering. Culled animals will be fattened to add value before selling and the animals will be pooled together for targeted markets to increase their

market value than selling them individually. The selected sires will be shared among farmers for mating.

Work Plan

Activities	2012											2013					
	Ma	Apr	Ma	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Ma	Apr	Ma	Jun	Jul
Model village selection	x	x	x														
Community mobilization and Training for farmers		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Sire Selection, purchasing of selected sires and exchange							x	x	x	x	x	x	x	x	x	x	
Collecting farmers' perception & field day											x	x	x	x	x		
Report writing															x	x	x

Budget Requirement

Category	Budget for 2012/13 (Birr)
Office supplies	1,000.00
Per diem	6,000.00
Wage	3,000.00
Fuel & lubricant	5,000.00
Sire purchase	30,000.00
Vet. Supplies & equipment	10,000.00
Workshop with farmers & DAs	5,000.00
Sub Total	60,000.00
Contingency (10%)	6,000.00
Total	66,000.00

Sub-them 4: Marketing

Activity 1. Identifying Constraints and Niches

Objective

- To characterize the production and marketing system
- To evaluate goats market value chains
- Identify constraints and opportunities for enhancing the efficiency of local markets

Methodology

Both informal and formal methods of data collection will be employed for the study. Key informant and focus group discussions will be used for the informal survey. For the collection of primary data, multi-stage sampling will be employed from random sample of goat producers, collectors, traders and consumers. Rapid Marketing Appraisal (RMA) technique modified for the purpose of goat marketing study will be used to understand and characterize goat value chain. Questionnaire survey will be conducted on market participants (producers, collectors, traders, and consumers) from each Wereda. Producers will be identified using systematic random sampling technique and Probability Proportional to Size (PPS).

Work Plan

Activities	2012											2013					
	Mar	Apr	Ma	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Ma	Jun	Jul
Secondary data collection	x	x	x														
Checklist preparation		x	x														
Pretesting and formulation of questionnaires		x	x														
Data collection			x	x													
Report Writing				x	x	x											

Budget Requirement

Category	Budget for 2012/13 (Birr)
Fuel & Lubricant	5,000.00
Office supplies	3,000.00
Per diem	8,000.00
Sub Total	16,000.00
Contingency (10%)	1,600.00
Total	17, 600.00

Activity 2. Market Linkage and Value Addition

Objective

- To create input and output market linkage for goat producers in the way to enhance market gains and to improve income
- To devise marketing strategy which improve the sustainability of gain from goat production

Methodology

Discussion with the zone and Woreda officials and market-concerned offices will be done to get common understandings about the work. Information on marketing value chain will make available to users. Trainings for producers will be delivered on the consumer preferences, market assessment, input provision system, goat production management and marketing strategies. Potential markets and agents will be linked producers for the provision of inputs for the production process and products outlet. The same will be done with producers using their cooperatives or their own groups for collection action of products. Discussion will be done by the two groups (producers and market agents) on the progress of market performance towards the issue of satisfying consumers' needs on iteration mode.

Work Plan

Activities	2012											2013					
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Market assessment and identification of potential markets				x	x	x	x	x	x								
Farmers training							x	x	x								
Market linkage									x	x	x	x	x	x	x	x	
Report writing															x	x	x

Budget Requirement

Category	Budget for 2012/13 (Birr)
Fuel & Lubricant	4,000.00
Office supplies	1,000.00
Per diem	3,000.00
Enumerator wage	5,000.00
Sub Total	13,000.00
Contingency (10%)	1,300.00
Total	14,300.00

Sub-them 5: Capacity Building

Activity 1. Training for farmers on improved animal husbandry practices in model villages

Objectives

- Improve the traditional animal husbandry practices in model villages

Methodology

Trainings on improved animal husbandry practices will be given for farmers of model villages participating in the project at different stages of implementation of research activities and interventions. The major areas on which trainings will be given include animal feeds and nutrition, health, marketing, breeding and other management practices. To assist this different brochures will be prepared and distributed for farmers additional to using available training manuals.

Work Plan

Activities	2012										2013							
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	
Training Manuals and Brochure preparation		x	x	x	x	x	x											
Training			x	x	x			x	x				x	x	x			
Feedback assessment												x	x	x	x	x	x	

Budget Requirement

Category	Budget for 2012/13 (Birr)
Training and workshop	5,000.00
Manual and brochure preparation	2,000.00
Office supplies	2,000.00
Pre diem	3,000.00
Fuel and lubricant	2,500.00
Sub Total	14,500.00
Contingency (10%)	1,450.00
Total	15,950.00

Annex II: Minutes of the workshop

Chair person: Dr. Rolf Sommer

Rapporteur: Hanibal Lemma

1. Understanding the factor of landscape transformation for integrated watershed management: case studies from Debre-Mewi watershed, Upper Blue Nile Basin, Ethiopia

by Dr Birru Yitaferu

Question 1. What is the main lesson learnt or recommendations for integrated watershed management?

Answer: We have to participate all stakeholders including the local area administrators from planning to implementation to make a combined effort. We have to also target on technologies that have short-term benefits. Moreover, we have to know or characterize the target area/watershed very well in order to select appropriate technologies for that specific area.

2. Impact of soil and water conservation interventions on soil erosion in the mountain of Syria

by Ahmed Al-Wedaey

Question 1. What is the temporal resolution of the rainfall measurement?

Answer 1: 10 minutes

Question 2. Did you take the soil moisture measurement?

Answer 2: No

Question 3. How did you account the interception and the soil type effect on erosion?

Answer 3: The farms were randomly sampled and the soil was analyzed to characterize to see the effect on soil erosion. The interception is also accounted by measuring the canopy and modelling it to evaluate how it affects erosion. Moreover, we measure the soil moisture interception from nearby university for comparison.

Question 4. Rather than giving the loan, did you ask them to construct the conservation structures by themselves?

Answer 4: Since it is the priority area, we have to do that.

Question 5. Is it enough to conserve the soil? What about the maintenance?

Answer 5: Some farmers are innovative and maintain the structures. However, still we are doing the structure maintenance. This work is also serving as an experience to maintain the structures and constructing new based on the size of the Olive trees.

Question 6: Have you done the economic benefit analysis?

Answer 6: We analyzed the short-term benefit. The farmers see the benefit directly by seeing the accumulated soil. Since the semi-circular structures give benefit after 5 years, we are monitoring the benefits.

3. Water Harvesting and Management: SWHISA experience

by Dr Selamyihun Kidanu

Question 1. How many years data do you use ?

Answer 1: We are in the seventh year since we start intervention. We did on-farm research and intervention for three years and four years for up-scaling the technology.

Question 2. What is WUE? Would you explain?

Answer 2: WUE mean water use efficiency. It is the marketable yield divided by total water used for production.

Question 3. You show the experience on horticultural crops. Is there any experience on perennial crops?

Answer 3: We have to follow the strategies where ample amount of market is available. That is why we are focusing on commercial horticultural crops.

Question 4. Do you have a strategy or procedure to select sites, type of structures or crops?

Answer 4: Based on the experience from other regions, we have followed participatory approach including the local administrators. We also look in to the farmers to share the cost. Hence, there is a well established methodology to select and development of the packages. We also follow up closely than the normal extension activities.

4. Improving the Livelihoods of Rural Communities in the Nile Valley and Sub-Saharan Africa Region: Sustainable crop and livestock management Regional Project

by Dr. Fawzi Karajeh

Question 1. Do you have any package of intervention to livestock researchers of GARC?

Answer 1: We have 36-40000 USD that 65% will be allocated for this project. The main intervention areas are to improve the livestock's productivity. It is also to see how to integrate livestock with crop production.

Comment 1: If we know exactly the financial situation, we can develop a better plan.

5. Unlocking the potential of rainfed agriculture in Ethiopia for improved rural livelihood: overview of the status of the 2011 project accomplishment

by Dr Wondimu Bayu

Question 1. One of the important things is publication. How is the progress?

Answer 1: It is not the duty of the coordinator only. Everybody participating and working in the project should consider and try to publish their output.

6. Sediment and runoff modelling Gumara-Maksegnit watershed using SWAT

by Prof. Andreas Klik

Question 1. Why do you use lumped or representative soil type, slope, etc to evaluate the trap efficiency of the conservation structures?

Answer 1: We did not do it yet. However, we will try.

Question 2. What are the two dots representing?

Answer 2: They are the outlets of the mini-watersheds. However, using the DEM with 90m resolution, we cannot develop the stream line on one mini-watershed.

7. Rate determination of the combined use of compost and chemical fertilizer on the yield of bread wheat on vertisols of Gumara-Maksegnit watershed

by Sitot Tesfaye

Question 1. What kind of compost did you use?

Answer 1: It is compost made from crop, tree and fruit residues.

Question 2. Do you have the clear proportion of the composting materials?

Answer 2: Rather than the proportion of composting materials, we have the initial nutrient analysis of the compost.

Question 3. Don't you think 8 ton/ha recommendation is difficult for farmers? What about the economic analysis?

Answer 3: The price of chemical fertilizer too high and the amount of compost is also high. The farmers are complaining on both sides.

Question 4: How do you see the residual effect?

Answer 4: We will use the same plot with the same treatment application.

Comment 1: We have to see some plots without adding compost for the second time so as to see the residual effect, and for how long it can be used once it is applied.

Chair person: Fawzi Karajeh

Rapporteur: Sitot Tesfaye

8. Design and data collection options in the gauging stations

by Georg Schuster

Question 1. What is your suggestion about the accuracy of measurements with this weir morphology?

Answer 1: Concerning accuracy there is always uncertainty, however for our activity

- i. We can use the existing weir
- ii. No excavation is required
- iii. But new ultrasonic sensor will be brought and installed

9. Assessment of Runoff, sediment and Nutrient (N, P & OC) loss in G-Maksegnit Watershed

by Muuz

Question 1. The presented Peak discharge value of the main gauging station is overestimated, is it really 168m³ l/s?

Answer 1: The peak discharge of the main gauging station is not really the result of actually measured velocity. It is a calculated value using the Manning's' equation. So the result should be estimated with a velocity measuring device so that precise velocity values could be obtained.

Question 2. The sediment load in the main gauging station seems underestimated. Is it really the value stated in your presentation?

Answer 2: Since the employed runoff data collector does not measure runoff at the higher runoff rates, the sediment load is low. Hence sediment load measuring device (turbidity meter) should be installed.

10. Evaluation of Water Harvesting and Supplementary Irrigation to Improve the Livelihoods of Smallholders in Gumara-Maksignet Watershed

by Hanibal

Comment. There is no success story, experiment in chickpea failed because of damage by animals, others attacked by disease. Initially some experiments during the field day were ok except shallot and some disease in Garlic. Most of the failures are not justifiable like damage by animals of the experiment and drippers eaten by rats. For the future we should go with maximum care.

Reactions:

For Garlic if we have protective measures we can continue.

Shallot, it is a high value crop but we do not have strong research on shallot

We have gone to Garlic and shallot because we cannot go for cereals, if there are other alternative test crops we should consult researchers from protection and crops in general for the selection of the test crop.

Chair person: Birru Yetaferu

Rapporteur: Getnet Zeleke

11. Rate determination on the combined use of compost and chemical fertilizer on the yield of bread wheat on Vertisol in Gumara–Maksegnit Watershed

by Sitot Tesfaye

Comments

- The content of compost should be analyzed
- The residual effect should be seen this year
- The data should be analyzed exhaustively
- Addition of compost should be seen from farmers side whether they are willing to prepare and add such huge amount of compost
- Split the effect in to two to see the residual effect
- The addition of compost should not be every year in the same plot

12. On-farm evaluation and demonstration of animal drawn moldboard and Gavin plows in Gumara–Maksegnit Watershed

by Worku Biwota

Comments

- Clay soil content in Vertisol and light soil types need to be seen again (Tables 3 and 4), need to be seen again
- There should be a clear recommendation depending on the result achieved
- The work is comprehensive and it requires a clear analysis, probably with other researchers (for this ICARDA need to assist the researcher to attach with professionals and write a paper)

13. Promotion of Improved Food Barely variety with production packages

by Andualem Tadesse

Comments

- Different approaches have been used by Solomon from Sirinka research center and it is better to use that approach and document for the next time.

14. Chickpea participatory variety selection on Vertisols of Gumara-Maksegnit Watershed

by Tewodros Tesfaye

Comments

- The level of participatory approach need to be clearly indicated
- There is a double cropping practice in the watershed area by using residual moisture, so need to consider the practice to maximize land productivity
- For variety selection FRG members should be involved
- Consider the works done by the EIAR at national level for pre-scale up works so that you need to bring the best performing varieties for the watershed areas.

Chair person: Prof. Hans-Peter Nachtnebel

Rapporteur: Zewdu Ayalew

15. Selection of different tree/shrub species for rehabilitation of degraded land and demonstration of Mobile Nursery as income generation in Gumara-Maksegnit watershed

by Kibruyesfa Sisay

This project is composed of two activities:

Activity 1. Demonstration of Mobile Nursery using Bamboo box and evaluation of its adoptability

This activity is reported to be progressing well. About 10 nursery boxes were constructed and distributed; training has been given in different topics and seedlings distributed for users in the first year. Two species were selected by users so far.

Activity 2. Refers to Selection of different tree/shrub species for rehabilitation of degraded land

According to the report soil physical property analyses is underway. Some species are seen to be vigorously growing.

Question 1. How can you block / what is the method you use for blocking/ as you use RCB design in the experiment?

Answers 1. The required block (RCB design) will be determined in consultation with other senior researchers.

Question 2. Have you consulted farmers for their preference? They may prefer species which have forage value as well. Have you devised any system to follow the real status of all distributed mobile nurseries? They may end up burned by farmers.

Answer 2. We collect data progressively. We have information on the current status of the technologies, the economic gains obtained by using the boxes and selling seedlings. By now the trend is that farmers are constructing new mobile boxes resembling ours by their own interest.

Question 3. Why is the nursery made from bamboo? Why is it mobile? Is bamboo available in the area? These all has to be clearly answered.

Comment: You need to define and threshold what data need to be collected

Answer 3. Bamboo is light in weight and easy to shape and transport. It is also cheap in price. It is assumed that by raising high value crop nursery the users can benefit themselves. The watershed will also be protected by planting raised seedlings.

16. Study on soil attributes for environmental applications using GIS & Remote Sensing technique

by Nurhusein Mohammednur, MSc theses presentation

General comments -

- Use small number of slides
- The thesis work is good and good data has been collected. But the presentation is awesomely long. Presentation should be prepared in more summarized style.

16. Detailed Land use/Land cover mapping using satellite images & data on the ground

by Kibruyesfa Sisay, MSc theses presentation

Question 1. Land use changes are presented but the future plan shows working out of land classes. NDVI measurement on the ground does it work for this case?

Answer 1. NDVI is not worked yet. Only the first phase is done. Further four images need to be taken to determine suitability classes for various field crops. Images may not be obtained for two seasons as the cost will be high. Yes, it works but images are also required.

Question 2. Land suitability classes are not described and which crop type is suitable not discussed on the paper. As a 2 phased research and only the 1st phase is described, what is the status of the 2nd phase? What are the new findings you obtained from your journey or visit to Jordan? What are the real challenges?

Answer 2. We have no intention of creating land-use-land cover study. The objective of the study is not determination of suitability classes. My trip to Jordan is supervised classificationand reliability NDVI classification and others and developing characteristics curves.

Question 3. Can we use simulations? When should images be purchased, selecting proper time for obtaining good images at reasonable price?

Answer 3. One in October and one in January may be sufficient, I think.

17. Potentials and constraints of goat production in the Gumara-Maksegnit watershed

By Tikunesh Zelalem

- The activity has to be implemented in 2 places taking 25 households from each place or village
- This project will be implemented as a participatory selection scheme. People will select a particular treat as they prefer
- The project will try to add value through fattening and creating market links
- Tailored trainings may be given according the requirement of the livestock rearing people
- MSc level studies will be supported and students will take some of the required activities

- Cactus as feed resource will be dealt with getting experiences from Tigray Region

Question 1. Why is that goats only are selected? What about the socio-economic issues that need to be included? Land degradation is caused by free grazing. What this project can do to improve the existing situation and improving the land use system? Forage development should go hand in hand with land rehabilitation.

Answer 1. The project deals with small ruminant improvement and goats are the most important in the watershed. Farmers have selected goats as they are very important for them. PRA has been carried out before we pick goats. Goats are not the only animals taking part in land degradation. They are not to be blamed for what so ever reason in this regard.

Comments

These 25 farmers to be selected from each village should preferably be those participating in other, say crop related interventions so as to improve the overall land use system. Forage development should be correlated with overall land rehabilitation and social changes should come as the result of many interrelated watershed activities including crop selection. The problem that goats may pray on soil conservation structures during open grazing should be considered. We need to plan for improving the technology use level of the society. We should include value adding and processing technologies (as feed block development) from agricultural mechanization research.

Chair person: Dr. Feras Ziadat

Rapporteur: Nigus Demelash

18. Soil and water Research

- Pond maintenance
 - ✓ Drip and geomembrane maintenance
 - ✓ Health issues should be considered around the community /malaria/
- Soil Fertility
 - ✓ Detailed plan for every activity should have been written for every proposal. Every responsible person should develop proposal based on the proposal format that will developed by some representative group of researchers.
 - ✓ Proposal format should be developed in some representative researchers.
 - ✓ Instrument installation used for the experiment should be installed carefully and rationally. For installation responsible person should be assigned for MSc students from BOKU/ICARDA/ and in Ethiopia for ‘design and monitoring of the efficiency and impacts of SWCs. Dr. Feras shall develop the title of the experiment that has to be done by the MSc students.
 - ✓ The sensors installed in the watershed should be replaced by the ultrasonic instrument.
 - ✓ Dr. Wondimu takes all the responsibility for all activities that has to be done properly.

- ✓ Garlic and shallot should be replaced by other appropriate crop due to disease problem on garlic and shallot. Selection of appropriate enterprise choice should be considered for the gumara-maksegnit watershed by considering the cropping system for supplemental irrigation.
- ✓ Economic analysis should be done for the importance of ponds to the community in the area.

19. Crop research

- Maize variety adaptation trial
 - ✓ 9-materials including local check
 - ✓ Number of farmers that will participate should be clearly indicated in the proposal
 - ✓ Responsible person should be indicated.
 - ✓ There is mix of hybrid maize varieties and some varieties are not suitable to the area and should be discussed further with national breeders about the varieties
- Demonstration of bread wheat
 - ✓ Detailed proposal is needed
 - ✓ To give further choice for farmers' additional variety shall be added.

Activities that has to be done for this year or next years should be related to the previous year as far as the project is concerned to see changes for the community not to get disjoint result at the end of the project duration even though the watershed has different components that might need different interventions in all disciplines /crop, livestock, and soil & water/.

20. Agricultural mechanization Research

- Demonstration of Jab planter for planting maize. No comments

21. Livestock Research

- Integrating improved livestock management for sustainable land management.
 - ✓ All the activities should be continued after the projects /IFAD duration /end of IFAD/ with governmental budget by Gondar Research center. Characterization of goat population should be done as simple characterization because Ethiopian goats are already characterized.

22. Forestry Research

- Demonstration of Jatropha spp
 - ✓ This experiment is rejected

- Demonstration of Moringa spp
 - ✓ The budget should be revised even if after the end of the project life time/ phased out for few months.

For the ongoing research activities forestry researchers should have detailed data for mobile nursery and forest tree species adaptation.

General Discussion

- Research materials should be purchased timely.
- The instrument which will be purchased out of Ethiopia should be imported officially by ARARI/ICARDA.
- There should be coordination and integration between activities in the different disciplines. Each team leader should understand the goal of the project and responsible for the community as a team.
- Publication of research output should be considered.
- There should be efficient use of harvested water
- Developing model watershed
- Follow up the project for sustainable development and integration with donors.
- Selecting suitable interventions for targeted watershed area should be considered
- Documentation of development transformation

Annex III. Workshop program

ICARDA-ARARI-EIAR-BOKU-SASAKAWA Project

Unlocking the potential of rainfed agriculture in Ethiopia for improved rural livelihoods

3rd Planning Workshop, 6-8 February 2012, Gonder; Venue: Gonder University Hall

Time	Topic	Responsible scientists	Chair person	Rapporteur
Monday, 6 Feb. 2012				
7:00-12:30	Visit to the Watershed	Muuz/Wondimu		
Tuesday, 7 Feb. 2012				
Welcoming & Experience Sharing Session				
8:30-9:00	Registration			
9:00-9:10	Program Introduction	Wondimu B.		
9:10 -9:20	Welcoming Address	Yigzaw D.		
9:20 -9:25	“	Sitot T.		
9:25-9:50	Opening Remark	Rolf S., Hans-Peter N.		
9:50-10:00	Introduction of participants			
10:00-10:25	Understanding the Processes of Landscape Transformation for an Integrated Watershed Management: Case Studies From Debre-Mewi Watershed, Upper Blue Nile Basin, Ethiopia	Birru Y.	Rolf S.	Hanibal L.
10:25-10:50	Impact of Soil and Water Conservation interventions on soil erosion in the Mountains of Syria	Ahmed A./Feras Z.	“	“
10:50-11:15	Coffee/Tea Break	<i>Organizers</i>		
11:15-11:25	Group Photo			
11:25-11:50	SHWISA's experience on water harvesting research	Selamyihun K.	“	“
11:50-12:15	Overview on IFAD project	Fawzi K.	“	“
12:15-12:30	Overview on the status of the 2011 project accomplishments	Wondimu B.	“	“
12:30-13:25	Lunch break	<i>Organizers</i>		
Result Evaluation Session of the 2011 activities				
13:30-13:55	SWAT modeling – preliminary results	Andreas K.	Fawzi K.	Sitot T.
13:55-14:20	Runoff, sediment and nutrient loss assessment in the Gumara-Maksegnit watershed	Muuz G.	“	“
14:20-14:45	Water harvesting and supplemental irrigation research in Gumara-Maksegnit watershed	Hanibal L.	“	“
14:45-15:10	Determination on the combined use of compost and chemical fertilizer on the yield of bread wheat on Vertisols in the Gumara-Maksegnit watershed	Sitot T.	Birru Y..	Getnet Z.
15:10-15:35	Onfarm evaluation and demonstration of animal drawn moldboard & Gavin plows in the Gumara-Maksegnit watershed	Worku B.	“	“
15:35-16:00	Coffee/Tea Break	<i>Organizers</i>		
16:00-16:25	Results of pre-scaling up of improved food barley variety in Gumara-Maksegnit watershed	Andualem T.	“	“
16:25-16:50	Chickpea participatory variety selection on Vertisols of Gumara-Maksegnit Watershed	Tewodros T.	“	“
16:50-17:15	Selection of different tree/shrub species for rehabilitation of degraded land and demonstration of Mobile Nursery as income generation in Gumara-Maksegnit watershed	Kibruyesfa S.	“	“
Wednesday, 8 Feb. 2012				

Time	Topic	Responsible scientists	Chair person	Rapporteur
9:00-9:25	Study on soil attributes for environmental applications using GIS & Remote Sensing technique	Nurhussein M.	Hans-Peter N.	Zewdu A.
9:25-9:50	Detailed Land use/Land cover mapping using satellite images & data on the ground	Kibruyesfa S.	“	“
9:50-10:15	Highlight on planned livestock research activities	Tikunesh	“	“
10:15-10:40	Coffee/Tea break	Organizers		
Planning Session for the Year 2012				
10:40-11:10	Soil & water conservation research plan	Feras/Ahmed/Muuz	Feras Z.	Kibruyesfa S.
11:10-11:20	Discussion		“	“
11:20-11:50	WH & SI research plan	Hanibal L.	“	“
11:50-12:00	Discussion		“	“
12:00-12:30	Soil & water management research plan	Ashenafi	“	“
12:30-13:25	Lunch break	Organizers		
13:30-13:40	Discussion		“	“
13:40-14:10	Crop research plan	Tsedalu J..	“	“
14:10-14:20	Discussion		“	“
14:20-14:50	Agricultural mechanization research plan	Worku B./Gessesew L.	“	“
14:50-15:00	Discussion		“	“
15:00-15:30	Livestock research plan	Tikunesh	“	“
15:30-15:40	Discussion		“	“
15:40-16:05	Coffee/Tea break	Organizers		
16:05-16:35	Forestry research plan	Kibruyesfa S.	“	“
16:35-16:45	Discussion		“	“
16:45-17:30	Wrap-up discussion		“	“
17:30-17:40	Closing Remark	Andreas K.		

Annex IV. List of Participants

ICARDA-Ethiopia Project

Unlocking the potential of rainfed agriculture in Ethiopia for improved rural livelihoods

3rd Planning workshop, 6-8 February 2012, Gonder Workshop attendants

No	Name	Institution	Profession	E-mail
1	Worku Biweta	B/Dar Agr. Mech. & Food sci. research center	Researcher	workubiweta@yahoo.com
2	Gessesew Likeleh	B/Dar Agr. Mech. & Food sci. research center	Researcher	likeleh@yahoo.com
3	Muuz Gebretsadik	Gonder ARC	Researcher	muuzgg@yahoo.com
4	Alemu Tarekegn	Gonder ARC	Researcher	aletartir@yahoo.com
5	Alayu Kidane	Gonder ARC	Researcher	Alayu.kidane@yahoo.com
6	Baye Ayalew	Gonder ARC	Technical assistant	Ayalewbaye@yahoo.com
7	Elias Cherenet	Gonder ARC	Researcher	eliachent@gmail.com
8	Surafel Melaku	Gonder ARC	Researcher	Surafelmel_2020@yahoo.com
9	Tikunesh Zelalem	Gonder ARC	Researcher	tikuzel@gmail.com
10	Nigus Demelash	Gonder ARC	Researcher	d.nigus19@gmail.com
11	Hadera Kahesay	Gonder ARC	Researcher	kahesayhadera@yahoo.com
12	Ertiban Wondifraw	Gonder ARC	Researcher	ertiban@yahoo.com

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