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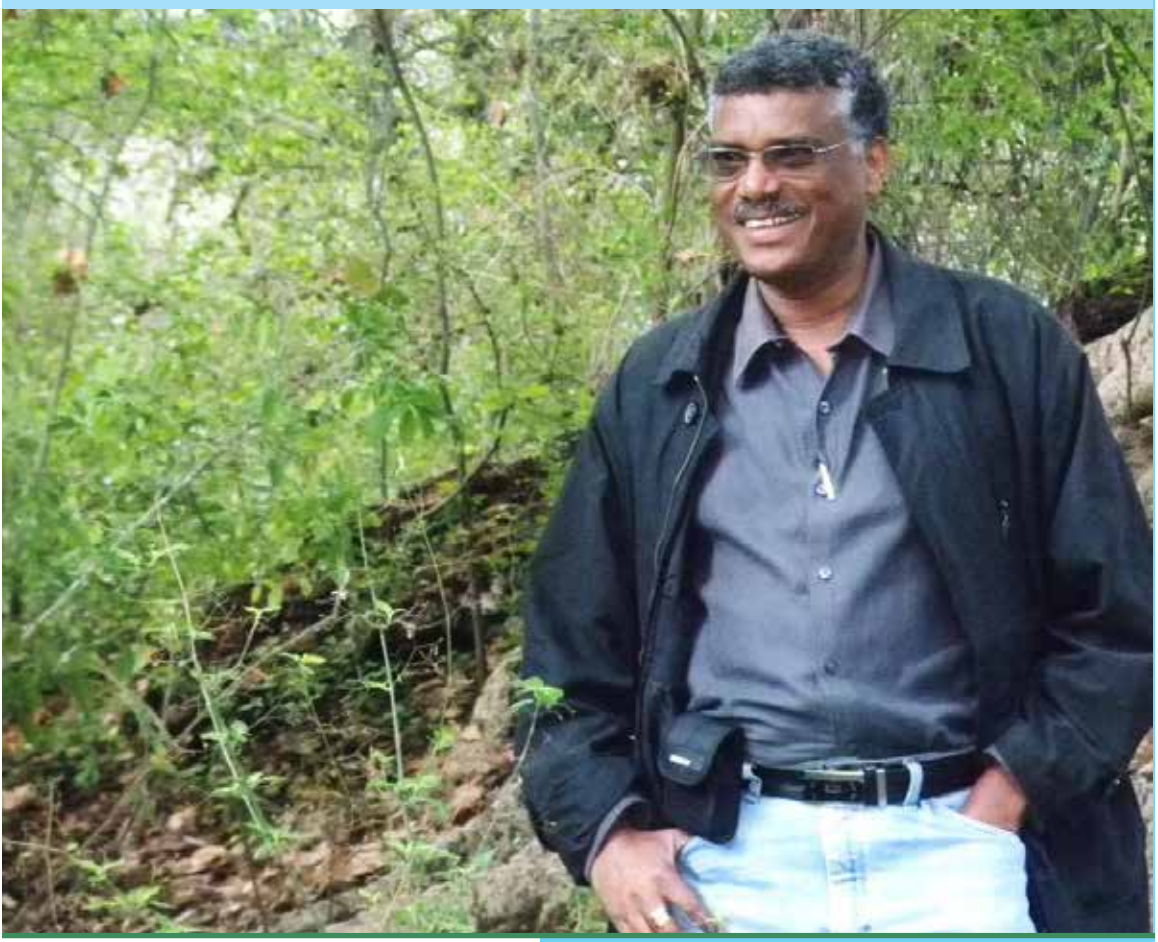
GIZ Ethiopia:

Lessons and Experiences in Sustainable Land Management

Dedication



This work is dedicated to **Dr Tesfai Mebrahtu,** who initiated its preparation and coordinated the task team until his sudden death in March 2014.

Preface

It is an honour and a privilege for me to write the preface of this book, since the major work on it was initiated and led by my esteemed colleague, the late Dr. Tesfai Mebrahtu.

The book is motivated by the desire to document Deutsche Gesellschaft für Internationale Zusammenarbeit's (GIZ's) collective experience and lessons in Ethiopia from years of supporting sustainable land management (SLM) practices in general, and soil- and water-conservation measures in particular, through community-based watershed development. Each contributor is a specialist with long GIZ experience: Dr. Tesfai Mebrahtu, Dr. Zerfu Hailu, Ato Tewodros Gebreegziabher, Ato Habtamu Wubeshet, Ato Samson Sisay, Ato Belayneh Adugna and Ato Amare Worku.

GIZ's support to SLM is part of a nationwide Ethiopian strategy whose main objective is to reduce land degradation and to improve agricultural productivity. The Ethiopian Government, with the support of its development partners including World Bank, IFAD, European Union and the Governments of Germany, Canada, Finland and Norway, is successfully scaling up sustainable land-management measures and implementing them in six regional states (Amhara, Tigray, Benishangul-Gumuz, Gambella, Oromia and Southern Nations, Nationalities and Peoples' Region).

We are very grateful for the advisory services of GIZ Ethiopia, which aim to improve the legal frameworks for sustainable land management and to support Ethiopian agricultural extension services and the decentralised structures of the Ministry of Agriculture. The implementation of SLM measures has improved the lives of millions of rural people through income-generating activities on rehabilitated land.

Before embarking upon the writing of this volume, detailed consultations were held with federal and regional GIZ-SLM officials and senior advisors from the Ministry of Agriculture. In these discussions the gaps and lessons learned from the gamut of GIZ projects – Integrated Food Security Project (IFSP), Sustainable Utilization of Natural Resources for Food Security (SUN), Sustainable Land

Management Program (SLMP), and others – were identified. Most saliently emphasised in the discussions was the absence of comprehensive reference material regarding GIZ-SUN / SLM's experiences and lessons in Ethiopia. The team that was subsequently formed and tasked to fill this gap was spearheaded by Dr. Tesfai. He compiled the first draft and shared it for review, with input from the senior advisors listed above, and with support from GIZ-SLM Management.

The book responds to identified gaps in the documentation of best practices and optimum SLM technologies. All of the practices have been tested and proven in both project communities and other areas. Each one is explored herein, and the possibilities for its scale-up presented. The book also documents tried-and-tested technologies and approaches introduced with GIZ support over two decades, especially in Tigray, Oromia and Amhara Regional States. The document is designed to serve as a reference manual for planning and implementation of SLM, as well as a contributory research document for GIZ staff, for government partners, for policy makers, agricultural practitioners, researchers and students, and for implementing governmental and non-governmental institutions.

May this publication serve well all readers, while keeping the legacy of Dr. Tesfai Mebrahtu alive.

'Oh heart, if one should say to you that the soul perishes like the body, answer that the flower withers, but the seed remains.' – Khalil Gibran

H.E Ato Sileshi Getahun
State Minister
MoA
Government of Ethiopia

Acknowledgements

The preparation and finalisation of this book would not have been possible without the initiative and effort of our late colleague Dr. Tesfai Mebrahtu, who coordinated the work from its very beginning. We are very grateful.

The authors would also like to extend their appreciation to GIZ-SLM Federal and Regional Offices for their unreserved logistical, time and financial support given generously to the team members. The thoughtful guidance of Dr. Johannes Schoeneberger, GIZ-SLM Programme Manager, has also been instrumental in motivating the team.

All partners and colleagues who have contributed their ideas, information materials and pictures to enrich this document are gratefully acknowledged. The authors also express their gratitude to those who have given their precious time to read and comment upon the drafts, thereby providing invaluable improvements to the study.

The authors sincerely believe that all the contributors to this study should share the rewards of their effort, seeing the scaling up of SLM practices and approaches throughout the country and thereby the improved livelihoods of stakeholders.

About the book

The book comprises ten sections. The first four sections describe the watershed development concepts employed by GTZ-SUN, GIZ-SLM and their predecessor projects, as well as the capacity-development services provided to partners, and the planning tools and procedures put in place.

The book has been designed to aid selective reading. Sections 1 and 2 are recommended for their presentation of fundamental concepts, principles and approaches of watershed development which lay the ground for understanding the subsequent chapters. Sections 3 and 4 may be particularly helpful for watershed-development practitioners, quality-assurance professionals, students and researchers in their discussion of technical processes. Sections 5 and 6 detail approaches to implementation and technologies which have been tested and verified as part and parcel of integrated watershed development. The remaining four sections outline the approaches followed in facilitating sustainable watershed development and the techniques employed in scaling-up technologies, whilst addressing cross-cutting issues during intervention. As has been mentioned, the book's regional focus upon watershed development draws primarily upon experiences from Amhara, Oromia and Tigray Regional States.

Sections 6, 7 and 8 will be of particular interest to technical managers who seek a coherent approach to implementation supervision, monitoring and evaluation procedures, and organisational aspects of watershed development.

Although some parts of the material have a more technical focus than others, readers may skim it first to get a big picture, and then return to it for specific reference as necessary. For those designing watershed-development programming, the interplay of technical and non-technical issues in this field must be recognised. Students, practitioners, and technical managers with a basic background in watershed development and soil and water conservation will find the material accessible without additional preparation.

In order to ensure that the book presents reliable, relevant, and scientifically sound information, each chapter has undergone extensive peer review by the senior advisors as well as by an English editor from the GIZ Ethiopia Country Office.

Contents

Acronyms

ATVET	Agricultural, Technical and Vocational Education Training
AWP	Annual work plan
BoA	Bureau of Agriculture (regional level)
BoFED	Bureau of Finance and Economic Development
BoLEP	Bureau of Land and Environmental Protection
BoWR	Bureau of Water Resources
CBPWDG	Community-Based Participatory Watershed Development Guideline
CC	Community contracting
CFW	Cash for work
CIDA	Canadian International Development Agency
CIM	Cadastral Index Map
CPA	Central Personnel Agency
CRGE	Climate-Resilient Green Economy
CWT	Community Watershed Team
ECBP	Engineering Capacity Building Program
EPLAUA	Environmental Protection, Land Administration and Use
ESIF	Ethiopian Sustainable Investment Framework
FAO	Food and Agriculture Organization of the United Nations
FSCO	Food Security Coordination Office
FTC	Farmers' Training Centre
GIS	Geographic infromation system
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit[1]
GCCA	Global Climate Change Alliance
GDC	German Development Cooperation
IFSP-SG	Integrated Food Security Program – South Gonder
ISLA	Information System for Land Administration
JMM	Joint Monitoring Mission
KWT	Kebele Watershed Team
LAUC	Land Administration and Use Committee

[1] GIZ began operation on 1 January 2011, bringing together the long-standing expertise of the Deutscher Entwicklungsdienst (DED) GmbH (German Development Service), the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH (German Technical Cooperation), and InWEnt Capacity Building International, Germany. Throughout this book the term GIZ encompasses reference to these predecessor organisations of GIZ. Reference to a specific former organisation is made only where necessary.

LLPAA	Local-Level Participatory Planning Approach
MoA	Ministry of Agriculture (federal level)
MoU	Memorandum of understanding
MfM	Menschen für Menschen
MTR	Mid-term review
NAPA	National Adaptation Plan of Action
NGO	Non-governmental organisation
NRM	Natural-resource management
OoA	Office of Agriculture (woreda level)
OoLAUA	Office of Land Administration and Use Authority
OoLEP	Office of Land and Environmental Protection
OoH	Office of Health
OoWA	Office of Women's Affairs
PCU	SLM-Programme Coordination Unit
PFM	Participatory Forest Management
P, M&E	Planning, Monitoring and Evaluation
PRT	Planning and Reporting Tool
PSNP	Pastoral Safety Net Program
PWDP	Participatory watershed-development project
SLM	Sustaniable land mangement
SLMP	Sustainable Land Management Program
SNNPR	Southern Nations, Nationalities and Peoples' Region
SUN	Sustainable Utilization of National Resources for Improved Food Security Project
SWC	Soil and water conservation
UNCCD	United Nations Convention to Combat Desertification
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
WAJIB	Forest-Dwellers Association PFM approach in Oromia Region
WARDO	Woreda Agriculture and Rural Development Office
WB	World Bank
WFP	World Food Program
WWT	Woreda Watershed Team

1. Historical Background

Existing research comprehensively shows that loss of land productivity is a serious problem in Ethiopia. Several studies deal with land degradation at the national level, including EHRS, the Ethiopian Highlands Reclamation Study (FAO 1986), studies by the National Conservation Strategy Secretariat (Sutcliffe 1993), the Ethiopian Forestry Action Plan (MNRDEP 1993) and The Effect of Soil Degradation on Agricultural Productivity in Ethiopia (Keyzer and Sonneveld 2001). Although conclusions from these studies vary in detail, the EHRS concluded that water erosion (sheet and rill) was the most important process and that in the mid-1980s 27 million ha – almost half of the highland area – were significantly eroded, 14 million ha seriously eroded and over 2 million ha beyond reclamation. Erosion rates were estimated at 130 t/ha/yr for cropland and an average of 35 t/ha/yr for all land in the highlands.

Efforts have been made by the farming communities to mitigate land degradation by developing local practices of conserving soil and water. Not withstanding these practices, there were also efforts to introduce other soil and water conservation interventions to control erosion and retain the eroded soils. Since the early 1980s numerous campaigns have been carried out to build terraces in farmlands and sloppy areas. Emphasis was given to structural technologies over vegetative measures. Apparently these interventions were introduced without prior investigation of the detailed problems or the conservation needs of the local population.

Formal planned development of watersheds in Ethiopia began in the 1980s. At that time a planning unit for developing large watersheds comprised 30-40,000 hectares and held the primary purpose of implementing natural resource conservation. Large-scale efforts remained mostly unsatisfactory due to a lack of effective community participation, a limited sense of responsibility for assets created, and unmanageable planning units. The lessons learned from this experience encouraged the Ministry of Agriculture (MoA) and supporting agencies such as the Food and Agriculture Organization of the United Nations (FAO) to initiate pilot watershed planning approaches on a bottom-up basis, using smaller units and community-based approaches. As a result minimum planning and sub-watershed approaches were introduced. This involved a shift from larger watersheds to smaller sub-watersheds. The new approach was piloted with FAO assistance under the MoA in 1988–91.

Following this, MoA and United Nations World Food Programme (WFP) staff developed participatory and community-based watershed planning guidelines known as the Local-Level Participatory Planning Approach (LLPPA). These guidelines were developed with a practical focus for the benefit of development agents. Their emphasis was upon integrated natural-resource management (NRM) interventions, productivity-intensification measures and small-scale community infrastructure such as water ponds and feeder roads.

During the same period several non-government organisations (NGOs) and bilateral organisations also adopted participatory land use-planning approaches to their respective areas of intervention – always in close collaboration with government partners. For instance, GIZ[2] followed a Participatory Land Use-Planning (PLUP) approach with some success in South Gonder Zone, North and West Shoa Zones of Oromia Region, and in some woredas of Tigray Regional State. It introduced and mainstreamed the participatory element into land use-planning and natural-resource management approaches, as well as introducing biological and physical soil and water conservation measures, crops and farming practices.

The German Development Cooperation (GDC) has been supporting the efforts of the Ethiopian Government towards improvement of the Ethiopian natural-resource base since 1994. Effort has been made to improve the capacity of government staff at different levels of function and operation. Support has been provided through the Integrated Food Security Program (Shire), Integrated Food Security Program (South Gonder), Integrated Forest Management Project, the Social Forestry Project in Tigray, Advisory Support to the Forest Administration, Household Energy, Land Use Planning in Oromia, support to Forest Genetic Resources and Food-Security Capacity-Building Project.

The invaluable experience gained from these projects has been the basis for support provided to stakeholders in the Sustainable Utilization of Natural Resources for Improved Food Security (SUN) Project, as well as informing other GIZ-supported programmes such as SLM. A significant number of innovative approaches and technologies were also added during the implementation of SUN. The development programmes mentioned above, in addition to SUN, have supported watershed-development interventions in woredas (districts) of the

[2] GIZ began operation on 1 January 2011, bringing together the long-standing expertise of the Deutscher Entwicklungsdienst (DED) GmbH (German Development Service), the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH (German Technical Cooperation), and InWEnt Capacity Building International, Germany. Throughout this book the term GIZ encompasses reference to these predecessor organisations of GIZ. Reference to a specific former organisation is made only where necessary.

Tigray, Amhara and Oromia Regional States – see also the geographical map of intervention woredas on the back inside cover of this book.

The watershed-development activities undertaken were designed to contribute to the ultimate objective of improved food security for households. Technical support was provided towards the planning and implementation of SUN in order to improve the skills and capacity of experts, development agents and farmers. Of the aforementioned approaches introduced during the programme, most notable was the organisation of watershed associations for the continued and equitable distribution of benefits from watershed development.

The scaling up of best practices in watershed development and agriculture has been a government priority during recent years. Regional governments are successfully scaling up soil and water conservation measures tried around the country.

Cumulative experience, combined with the need to have a more standardised and effective approach to watershed and agricultural development across the country as a whole, have led to the publication of the Community-Based Participatory Watershed Development Guideline (CBPWDG). Following both the completion of this national document and the international agreement on the Paris Declaration of Aid Effectiveness, the Ethiopian Government expressed its commitment towards developing a country-wide programming framework for Sustainable Land Management (SLM), and has undertaken important steps in this direction. The framework sets out the key priorities of SLM investments in the country. It details the strategies for scaling up SLM (i.e. key objectives, outcomes, activities and indicators), and defines the approaches and mechanisms for coordination, consultation, participation and P, M&E. The framework describes a more programmatic approach for addressing land degradation which facilitates the harmonisation and coordination of both present and future sustainable land management investments.

In order to avoid duplication and to promote synergy, the Government established in 2006 a mechanism for coordinating all SLM investments in Ethiopia. The mechanism is steered by a national inter-agency technical committee. Chaired by the State Minister of Agriculture, the committee comprises representatives

from government, civil society, development agencies and an SLM Support Unit within the MoA which provide administrative and technical support. Similar SLM platforms are replicated at regional level.

The Sustainable Land Management Program (SLMP) is one of the instruments designed under the long-term Ethiopian Strategic Investment Framework (ESIF) for Sustainable Land Management adopted by the Government in September 2008. ESIF is the framework that underpins domestic and foreign support for addressing issues related to the pervasive challenges to land and water resources. Similarly, SLMP is being implemented by the Ethiopian Ministry of Agriculture (MoA) through its decentralised agencies at regional, zonal, woreda and kebele levels since October 2008.

Current funding for SLMP comes from the International Development Association (IDA-World Bank), Global Environment Facility (GEF), German Development Cooperation (GDC) implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and KfW Development Bank, Canadian Department of Foreign Affairs, Trade and Development (DAFTD), the European Union (EU), the Government of Finland, Royal Norwegian Embassy and the Government of the Federal Democratic Republic of Ethiopia (FDRE).

This document compiles the lessons learned and the recommendations made following SUN, its predecessor projects, and SLMP. The document explores all of the areas of watershed development supported by GIZ projects, including initiation and planning, implementation, monitoring and evaluation.

The order of chapters presented herein mirrors the sequential stages of watershed development interventions. The first three chapters describe the concepts of watershed development, based upon the experiences of previous projects and of the current SLMP. Chapter 2 outlines general concepts and principles of watershed development. The modalities of technical advisory services delivered by GIZ-SLM advisors are then dealt with in Chapter 3. Chapters 4-7 cover the planning, implementation, monitoring and reporting processes which are considered essential to watershed development interventions. They draw upon the experiences of previous projects, as well as the contemporary SLMP. Other central elements to be considered in watershed development projects are dealt with in Chapters 8-10. Chapter 11 compiles best practices and recommendations for implementation and scaling up, based upon the cumulative experience gained.

2. Watershed Development: Concepts, Principles and Approaches

2.1 Concepts of Watershed Development

A watershed is any area from which runoff resulting from rainfall is collected and drained through a common point. Synonymous terms are 'drainage basin' and 'catchment area'. The common drainage point for the water is known as the outlet or confluence point. All watersheds share the components of outlet, drainage network and boundary / ridge. The watershed boundary is defined by the highest elevations surrounding its water stream; this is of course influenced by the topography (or 'hilliness') of the landscape. A drop of water falling outside this boundary will drain into another watershed.

Watersheds come in all shapes and sizes and can cross national, regional, zonal, woreda, district and community boundaries. Every watershed is categorized as either a basin, sub-basin, major watershed, critical watershed, sub-watershed or a micro-watershed, depending upon its size. Figure 2 depicts a typical example of a watershed.

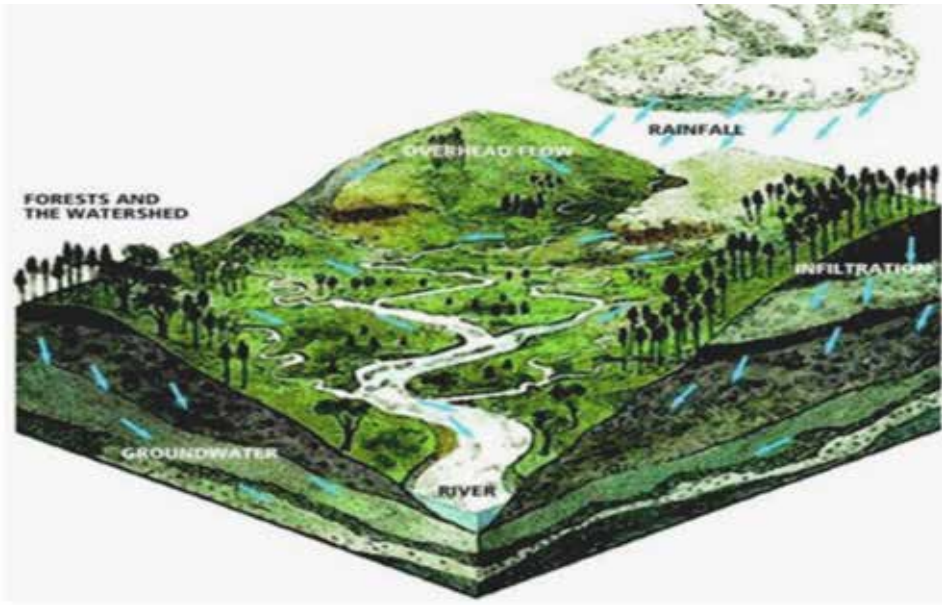


Figure 1. A pictorial representation of a typical watershed

Almost every land surface can be said to belong to a watershed. Whilst each watershed is of course unique, there exist enough shared hydrological, geomorphologic and ecological characteristics for them to serve as non-ephemeral landscape units for planning, management, maintenance of environmental quality and the overall pursuit of sustainable development.

Watershed development should integrate three interrelated but separately involved concepts, namely (a) multi-faceted development activities, (b) the active role of a functioning watershed unit, and (c) the promotion of social wellbeing. Management of watersheds requires the application of scientific methods and principles of welfare economics within a framework of public policy which can accommodate multiple objectives, the ultimate objective being improved human welfare.

Careful management of watersheds is a core element of good agriculture and forest management because it can minimise land degradation, stabilise water-stream flows, reduce sediment load, and recharge groundwater stores. In this way effective watershed development integrates the management of water resources, land, welfare, healthcare, and yet other aspects of development.

In the past watershed development plans were made with relatively straightforward objectives in mind. Nowadays, however, activities have more complex direct and indirect relationships. The planning and implementation of watershed interventions takes a variety of comprehensive, integrated and holistic forms.

2.2. Principles of Watershed Development

The guiding principles followed at all stages of the watershed management cycle are widely accepted as the following:

Participation: Stakeholder communities need to be actively involved in all stages of planning, implementation and management of watershed development activities. This is a continuous process rather than a one-off exercise.

Gender sensitivity: Women are the most severely affected by environmental hardships. Their involvement in watershed-development planning, implementation and management is the key to their rightful benefit from development measures undertaken.

Building upon local experience, strength and proven success: Local knowledge is essential to improving existing technologies, to adapting new ones and to managing natural resources and other measures once they are introduced and established.

Realistic, integrated, productive and manageable goals: Planning for watershed management activities should be realistic, based upon local capacity, locally available resources and other forms of government and partner support. Integrated conservation and development of the natural-resource base is a guiding principle, together with the optimum use of social resources. As far as possible, watershed development activities should provide tangible and quick benefits to households. This is possible if measures are designed to accommodate both production and conservation requirements. Some measures, however, need some time before the full benefits can be achieved. In this case a combination of measures with short and longer-term benefits is essential. This can be achieved if quality criteria and integration aspects of the interventions are met.

Inclusiveness: Watershed development planning and implementation should follow a holistic approach which considers the entire watershed system for the full projected lifespan of the given programme. Pursuing a holistic approach examines how components, people, planners, and mangers interact at all levels. Indeed, holistic approaches extend beyond integrated participation to deal with strategic levels of planning and management, and the whole is considered greater than the sum of its parts.

Comprehensiveness: Watershed development is controlled on a system-analysis basis, considering the interrelation of land and water resources.

Watershed logic and respected-potential approaches require that watersheds are divided and managed by reasonable size, including via the 'ridge-and-valley' method. Recognition of land use and land capability is also key. Simple descriptions of features facilitates optimal development activities while also respecting environmental and human factors. Emphasis is placed upon optimising productivity per unit of area, per unit of time and per unit of water for both land owners and landless families. The reclamation and rehabilitation of degraded and marginal lands through alternative productive land-use systems is promoted. In semi-arid and arid areas, great attention must be paid to effective water harvesting, both in situ and off site.

Flexibility is a key criteria required in participatory watershed-development projects (PWDPs) in order for an intervention to suit local conditions. Flexibility is needed during the selection of community watersheds, their size - slightly smaller or larger than the ranges agreed - and clustering. Similarly, flexibility is essential when considering the choice and design of measures according to agreed criteria for quality and integration.

Costsharing and empowerment: Cost sharing by stakeholders promotes the assumption of responsibility for resource management by local stakeholders. Exploitation of social networks and existing group dynamics, in addition to the creation of new networks and groups, further contribute to this process.

Related developmen tpillars: Watershed-development planning is strengthened by the recognition and / or inclusion of health, education and social issues into the framework.

The Watershed Development Approach

The interaction between land and water management necessitates planning based around watershed divisions. This 'Watershed Approach' has received wide acceptance in its ability to restore land and minimise water degradation. To be more specific, the Watershed Approach includes considerations such as soil erosion, siltation management, flood abatement, water supply improvement, wildlife conservation, fishery protection, forestry and agro-forestry management, protection of native vegetation and development of infrastructure. This comprehensive view recognises human presence, including the fact that changes in human activity themselves trigger diverse impacts.

The Watershed Approach explicitly requires the partnership and collaboration of all stakeholders – those people affected by land and water management decisions – in order that their economic, social, and cultural concerns can be considered and integrated. It is expected that collaborative problem identification and decision making should bring about long-term improvements to land and water management.

Expected benefits of the Watershed Approach include improvements to natural resources, cost savings following cumulative resource development, improved coordination of activities, reduced duplication of effort, and long-term community development - including reduced risk of conflict. Application of the Watershed Approach should of course be based upon a reliable basis of site-specific data or research so that it is conducted as appropriately and efficiently as possible. Where it is successful the Watershed Approach can be taken up and integrated into law and policy by the regulatory, administrative and technical arms of government. Planning and implementation of watershed development programmes should follow the following steps:

- Identify and organise stakeholders;
- Identify and analyse existing problems;

- Define the objectives of the programme;
- Prepare an inventory of resources;
- Analyse the resource data;
- Formulate potential solutions;
- Evaluate the potential of these solutions;
- Determine a course of action;
- Implement the plan;
- Monitor progress;
- Evaluate results and impact.

Effective and sustainable watershed management depends upon educating and fully engaging beneficiary communities, their representatives, and government agencies, in planning, implementation, monitoring and evaluation. Engagement must therefore ensure community acceptance and adoption of management decisions from the outset. Capacity and skills building can begin before project implementation and can be incorporated into the early planning phases of the project. The key features of watershed development are:

- Identifying all stakeholders and clarifying their roles;
- Livelihoods orientation;
- Participatory planning;
- Recognition of and alignment with institutional frameworks;
- Incorporation of community organisations;
- Capacity building;
- Results-oriented monitoring and evaluation;
- Encouraging and seeking innovations.

In Ethiopia a Community-Based Participatory Watershed Development Guideline (CBPWDG) was issued by the Ministry of Agriculture (MoA) in 2005. It was developed by a team of experts drawn from the MoA and a select group of experienced development partners. It was produced in English, Amharic, Oromifa and Tigrigna and distributed to woredas (districts) across the country. It has been expected that the guideline be adhered to in watershed-management projects across the country. Training on the contents of the manual was provided to regional, zonal and woreda experts over successive years. Following this, district (woreda) offices and their communities were then expected to develop watershed plans regardless of the availability of external support. As a result numerous micro-watershed plans have been prepared, although their quality and applicability vary from place to place.

2.3. Phases of Watershed Development

The interventions in a watershed development programme are typically divided into three phases: initiation, implementation and consolidation / economic development - see Figure 2 below. Although distinct in terms of timing, these phases usually overlap as dictated by realities on the ground. This is particularly the case with implementation and consolidation.

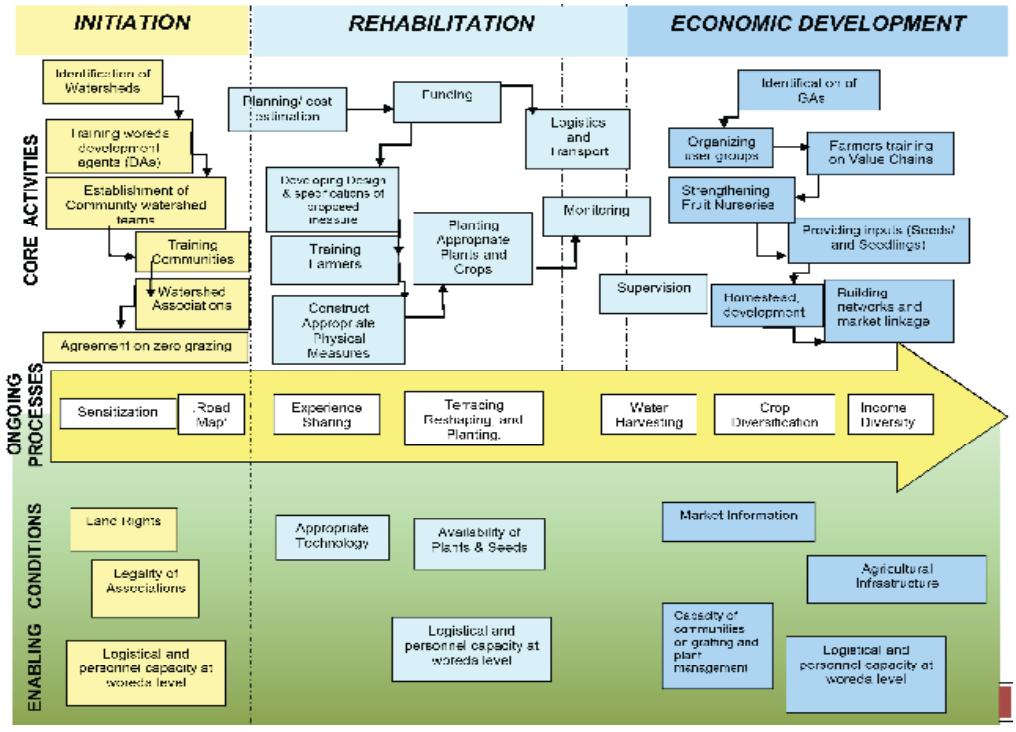


Figure 2. Phases of watershed-based development activities

Initiation (Preparatory Phase)

The Initiation or Preparatory Phase sets up a framework for the design and implementation of the development activity. The mechanisms put in place include the adoption of participatory approaches, consultation with all stakeholders, and establishment of local institutions if they do not already exist.

The most relevant local institutions in the Ethiopian context are the Woreda Watershed Team (WWT), the Kebele Watershed Team (KWT) and the Community

Watershed Team (CWT). Sensitisation of community members and community discussions about existing problems are key components of this phase which must take place before the details of the watershed development plans can be decided upon. The maximum time for this phase should not exceed six months under normal circumstances, but may take up to a year in exceptional circumstances.

The initiation of watershed development plans should generally include the following:

- General background information about the watershed in question;
- Detailed maps showing present land use and development plans;
- Detailed descriptions of land use, divided by sub-watershed;
- Description of the constraints of each land use type;
- Proposed interventions for each land-use type;
- A detailed activity plan and corresponding budget for input, labour, community contribution and transport costs;
- Institutional mechanisms for the implementation of the proposed interventions;
- Community organisational system or user groups for the implementation of the activities, and management of the results;
- Identification and justification of the inputs required to execute the proposed interventions;
- Descriptions of expected outputs and outcomes;
- Roles and responsibilities of stakeholders clarified;
- Determination of training and other capacity-development requirements;
- Full lists of community, kebele, and woreda watershed team members and signed letters of commitment;
- A land-use concept note detailing the planned utilisation and management of the land after rehabilitation;
- Mechanisms for Results-Oriented Monitoring and Evaluation.

Implementation / Rehabilitation Phase

This period of the project begins with an evaluation of the preparatory activities undertaken during the preceding phase. Actual implementation of most (if not all) proposed interventions included in the micro-watershed development plan prepared during the initiation phase are undertaken herein. The preparations for the last phase of watershed development are made before the end of the phase. The time required for this phase varies depending on the size and complexity of the watershed, its degradation level, quantity of planned activities, availability of labour, availability of resources and so on. The sufficient rehabilitation and development of a watershed to render it self-sustaining will require at least three years. A mid-term evaluation of this phase should be undertaken one year before its end, ie. before entering the subsequent final phase. Expected achievements during this phase are:

- Improved community awareness about the community-based watershed development concept;
- Organisation of people in a way that maximises their participation;
- An increased sense of ownership;
- Effective demonstration and application of the introduced technology;
- Rehabilitation of the natural-resource base;
- Tangible benefits gained and demonstrated as a result of interventions;
- Implementation capacity of the community and woreda experts improved;
- Mechanisms for revolving fund management established.

Consolidation / Economic Development Phase

The implementation of watershed development plans constitutes the foundations upon which the conditions for improved natural-resource bases, sustainable livelihoods and agricultural development can be fostered. The objective of the rehabilitation phase is to increase agricultural productivity and production – fruits, vegetables, crops, livestock, trees, forage, and spices – within the target watershed(s). This is achieved by attempts to sustainably reverse degradation, to restore hydrology and to increase land productivity.

Rehabilitation of degraded sites promotes the development of small-scale irrigation: this gives an opportunity for community members to grow a range of

crops. It is observed that hillside- and gully-treatment interventions undertaken in several parts of the country are contributing to the recharging of groundwater and inducing shallow wells and springs. In some areas farmers are currently growing vegetables and fruits by developing springs, diverting gully water and excavating shallow groundwater sources. Rehabilitation of watersheds also increases forage biomass: this can facilitate improved livestock productivity.

Development plans which stimulate action such as value chains, value-generation packages and training courses on economic development interventions have to be executed as a successful component of this Consolidation Phase. The main activities during this phase are:

- Completion of any unfinished activities from the Rehabilitation Phase;
- Introduction of improved agricultural technologies / inputs and approaches which have been proven beneficial;
- Further capacity development of local institutions at woreda, kebele and community levels;
- Further strengthening of user groups;
- Value chain development and networking;
- Up-scaling of successful experiences;
- Promotion of marketing.

2.4. Roles and Responsibilities of Institutions

As with most development projects, the implementation of watershed development within programmes such as SLMP requires the active participation and contribution of many stakeholders, all of whom should feel that they know exactly what their roles are or should be. Sometimes these roles are written and defined in project documentation without other stakeholders knowing about them. It is essential from the outset that roles and responsibilities of all stakeholders are clarified and shared in order to minimise the risk of confusion or gaps in coordination of activities. This issue has not received adequate attention during past projects, often creating confusion and delays to implementation. The roles and responsibilities of stakeholders involved in SLMP are detailed in Annex 2.

3. Capacity Development & Support Services

3.1. Capacity Development

Capacity development is often the most crucial component of any development project since it so comprehensively encompasses the development of human resources, institutions, networks and systems of implementation. Within the field of watershed development, capacity strengthening involves diverse sets of interventions in crops, livestock, forestry, conservation, irrigation, income generation, energy and social organisation.

Most people associate capacity development with training of personnel and farmers only. Of course, training is important since knowledge and know-how are often limiting factors. However, capacity development also involves removing the constraints to efficient and effective development results. For example, if a development agent does not have the transport means for travelling to the villages and providing advisory services to farmers, this capacity limitation has to be rectified.

Both implementing agencies and recipient beneficiaries must have up-to-date knowledge about each area of engagement for the improvement of productivity and livelihoods. High staff turnover is one compelling justification for continuous implementation of capacity development in project areas. The Ethiopian Government's establishment of Farmers' Training Centers (FTCs) in each kebele is a good entry point for technology demonstration and dissemination. FTCs are expected to improve the capacity of farmers whilst supporting their agricultural activities. Farmers have to travel to woreda centres for training, a requirement not liked by some. Demonstration plots at the FTCs are expected to demonstrate improved agricultural technologies but only very few of the thousands of FTCs built over the years currently serve this purpose. Their revitalisation is one way of improving development agents' capacity for service delivery. Experience has revealed that farmers are much more convinced by farmer-level demonstrations and farmer-to-farmer technology transfer than by demonstration plots managed (often under ideal conditions) at FTCs or by grander efforts. Farmers' capacity development therefore needs to consider technology demonstrations at their own level. However, since it is not practical to establish demonstration plots to demonstrate all of the

technologies which require display, FTCs could also incorporate farmers' plots directly for demonstration of best practices and / or new technology.

GIZ's experience of planning the Food Security Capacity Building Project indicates that the incorporation of new technologies and approaches into the curricula of higher learning institutions such as Agricultural, Technical and Vocational Training (ATVET) Colleges does improve Ethiopia's agricultural extension system. However, this noble idea has yet to be implemented as planned: it could be implemented together with other SLMP interventions provided that all stakeholders are in agreement.

Capacity-development support has been provided to partners and farmers by various GIZ development programmes. Support has typically taken the form of more practically-oriented training, including specified training courses, information and awareness, exposure visits, technical backstopping and logistical support. The regional offices have developed a bank of training manuals in particular subject areas, allowing them to streamline and facilitate their provision of training. GIZ-SLM is frequently requested to provide support and/or training and materials which are outside original development plans. In numerous instances the organisation goes 'beyond its call of duty' to meet the demands expressed. Logistical support is highly appreciated by the partners as it reduces the time and effort that they require to do their job.

GIZ-SLM's capacity-development efforts, although often responding to pressing, ad-hoc demands for implementation, have not been systematically undertaken with proper needs assessments or delivery strategies. Similarly, the preparation of appropriate modules and training materials had been overlooked. Whilst it is assumed that the modules should respond to the constraints identified in needs assessments, it must nevertheless be recognised that individuals will have different expectations of, and responses to, a given module of capacity development, however uniform its design or its delivery. Preparation of manuals, training and learning in local languages is essential for capacity development since it facilitates use by development agents and farmers.

Training and learning materials are prepared by specialist GIZ-SLM experts in collaboration with other stakeholders to ensure the adequate input of relevant expertise. GIZ-SLM has good experience in field-level practical training and is developing demonstration sites in model watersheds. A major challenge to the knowledge and skills development of partners is high staff turnover of trained

government experts and thus the unsustained institutional effectiveness of training. GIZ-SLM is supporting the establishment of cascading approaches which effectively strengthen timely and coherent training delivery to communities. The approaches prioritise thematic issues relevant to every stage of watershed development, training and coaching trainers in the partner system.

In addition, experience from SUN and other projects indicates that focus on community-level institutions such as FTCs and influential persons (such as religious leaders and elders) tends to enhance technology dissemination and its acceptance by the community. In addition, cyclic training of experts and development agents does attempt to address the problem of the high staff turnover. GIZ-SLM, in collaboration with the former Engineering Capacity Building Program in Ethiopia (ECBP) and the Ministry of Education, is also working on setting the occupational standards for ATVET trainees so that development agents and experts gain shared levels of knowledge regardless of their individual educational backgrounds.

Figure 3. Capacity development involves discussion with communities and awarenessraising

In general, capacity development must follow a designated strategy in order to minimise diversion by ad-hoc requests or poor organisation. The following elements should be considered when designing a capacity-development strategy.

Needs assessment: A comprehensive needs assessment at the beginning of a project intervention can indicate existing levels of stakeholder capacity. Brief needs assessment may also need to be undertaken in successive years as needs change with new areas of intervention.

Designing an appropriate strategy: Capacity development aims to enhance the implementation capabilities of the community at grassroots level. Once

capacity gaps at different levels have been identified, the programmes should design efficient ways of filling these gaps. This includes targeting local institutions, model farmers, influential persons for technology transfer, and establishing demonstration sites for the technological packages to be displayed. The identification and selection of appropriate communication channels and media which suit the experience and knowledge of the stakeholders should also be considered at this stage.

Institutional arrangement and allocation of appropriate personnel: Experience shows that activity backstopping, training and planning of watershed development interventions is undertaken by surprisingly few thematic area advisors – in most cases natural-resource specialists. As a result the area of influence has been limited to natural-resource conservation. The institutional setup for delivering the support also needs to be carefully designed into the strategy. This includes the number of personnel and resources to be deployed for the implementation, as well as the organisation of people and capacity-development mechanisms. Modalities of support to be followed, such as the regularity of training and levels of support also need to be decided upon.

Networking with resource persons and institutions: Training is usually provided using existing human resources. In most cases this constitutes GIZ-SLM advisors and experts from federal-, regional- and zonal-level institutions. Capitalising upon GIZ's own human resources has many advantages such as lower cost, short-notice response and knowledge of realistic constraints. Where the required expertise is not available 'in-house', other institutions or individuals who can deliver the services at a reasonable cost must be approached. Research institutions, higher learning institutions, consultants and NGO experts have a wealth of experience which can be tapped by SLMP. The involvement of external partners also has the added advantage of bringing new perspectives.

Contracting trainers: A capacity-development strategy should compile its list of potential trainers or institutions from outside the project by listing their areas of expertise. In the meantime GIZ-SLM can also compile and continually update its own list.

GIZ-SLM shall aim to improve its ongoing delivery of capacity development, taking into consideration the aspects indicated above. The first activity in this regard is to collect the training modules, manuals, brochures and leaflets prepared at

the regional offices. A big effort should be made to harmonise the approaches and messages of these informational materials.

Moreover, GIZ-SLM has developed a well-structured advisory service to satisfy increasing demands from partners. These services are designed to fit into the SLMP implementation structure so that structural arrangements, staffing and thereby service delivery can be more effective.

3.2. Advisory Services

3.2.1. Principles

Seeking or giving advice upon any development endeavour is often crucial to its success. Advisors have to be acquainted with tools and skill on the subject matter so as to facilitate achievement of designed programme objectives. Whilst advice is different from implementation, it also complements it. Benefiting from the cumulative professional experience of the SUN Project and exposure to international knowledge on sustainable land-resource management, GIZ-SLM advisors at both federal and regional levels are expected to advise their respective partners at the Ministry and Bureaus of Agriculture (MoA and BoAs) on the approaches, systems and tools which facilitate implementation of the programme, from planning to monitoring and evaluation.

GIZ-SLM advisors are expected to initiate new ways of doing things which enhance the performance of the implementers from community to federal levels. In other words, the advisors should come up with technology options, new inputs and approaches to achieve every designated programme objective. In principle advisory services should be demand-driven, but advisors should also encourage partners to request advice whenever they need it. Assuming that there exists a desire to acquire new ideas and approaches, there should also exist a demand for advisory services from recipients - as long as the approaches and technologies are new, innovative, interesting and simple to understand. Advisory services should be supported by reference materials and practical training sessions which represent an investment in sustainability to counteract the effects of high staff turnover.

Principles to be followed by GIZ-SLM advisors when supporting watershed-development activities are as follows:

Cooperation

- Technical cooperation services delivered by GIZ support the efforts of the government, communities and individuals towards the rehabilitation of the natural-resource base, with the ultimate aim of improving livelihoods of community members;
- Implementation of project activities is the responsibility of both the government and communities;
- Technical Cooperation should provide demand-based services but also advisory support based upon identified gaps;
- Modalities of cooperation should fall in line with existing government procedures, strategies and policies;
- Government personnel, community members and leaders must all be capacitated and mobilised to adopt active and effective roles in the process;
- The interventions supported are gender-sensitive, HIV/AIDS-preventive and environmentally sound.

Approaches to delivery

- A choice of technologies to address a given issue should be provided, along with the benefits, pre-conditions, inputs and risks of each choice.
- Advice on innovative and appropriate technologies should be identified.
- With little room for risk, trial or error, the technologies and approaches with the lowest risk of failure should be employed.
- Perverse incentives, which undermine the self-initiative of communities and households, must be avoided at all costs. Lasting positive change only takes place if communities and households are truly desirous of it rather than being encouraged to jump at short-sighted, unsustainable opportunities.
- Integrated approaches should be publicised and encouraged. For example, planting of fodder in gullies should be linked with animal rearing or fattening.
- Active community participation is always crucial for successful watershed development, as discussed in the CBPWDG. The active participation of community members in all aspects of watershed development should be aggressively pursued.

- The role of advisor should be geared towards a transfer of technical and watershed management knowledge at the community level in order that the likelihood of sustainability is maximised. Meanwhile, guidance in coordination and facilitation of meetings and activities should be transferred to woreda (district) experts and development agents.
- Free animal grazing / ranging is the main reason for the reduced impact of the vast land rehabilitation activities undertaken in Ethiopia. Effort should be made to encourage communities towards controlled livestock grazing and improved livestock management systems which complement watershed development interventions.
- Benefits to households should be broken down into tangible short- and long-term benefits.
- Simple technologies, which can be replicated by communities themselves, should be encouraged.
- Systems of implementation and monitoring must contribute to replication of technologies in an effective manner without external support and in a way which assures sustainability. This actually requires the organisation and implementation of activities for different land-use types, at watershed level, which win the confidence of the community.

3.2.2. Structure

GIZ as an institution is mandated to provide technical advisory services to partners. The organisation's long years of expertise in natural-resource management, qualified professionals and good international networking make it well placed to provide technical advice and support where they are needed. The historical development of GIZ-SLM has seen its advisory service pass through different phases of structuring and staffing. SUN and other past projects were staffed with two to three advisors from specific thematic areas who were responsible for planning, backstopping, coordination and advising. Meanwhile GIZ-SLM's advisory service structure has developed so as to meet expected demands at federal and regional levels. The service is organised to mirror the major engagements and responsibilities required by the SLMP.

Component managers are assigned to coordinate support from GIZ-SLM

advisors – as detailed in Annex 2. Advisors working in the areas of soil and water conservation, forestry, crop production, livestock management, irrigation and infrastructure, organisational development and participatory agricultural extension systems, are directly accountable to the watershed management up-scaling components.

A diverse range of interventions is implemented in watershed development; this should be reflected in the structure of advisory services. GIZ-SLM advisors should play two roles. The first must draw upon their professional background - as agricultural engineer, forester, sociologist, agronomist or livestock manager. For example, the agronomy advisor is responsible for communication and management advice with partners at different levels in the areas of best practice, constraints, innovative ideas, training, training materials, strategy development, policy recommendations and other issues relating to agronomic interventions. The second function of the advisor is to assist the Woreda Watershed Team as a contact person for the kebele cluster, who can advise upon coordination, planning, implementation, monitoring and evaluation.

The advisor must also communicate to the team the major agreements reached within the advisory team regarding strategy, ways forward, new developments and systems of activity integration, as well as gaining feedback from them. Outside these two roles, technical matters related to watershed development are handled by the other experts. The coordination role initially taken by the advisor needs to be taken up by the watershed management up-scaling manager.

The advisors on P, M&E, organisational development, knowledge management, socio-economic and policy / frameworks are responsible for all outreach activities. One advisor can take responsibility for a number of critical watersheds depending on their geographical distribution. In some regions a number of thematic area advisors group together to take responsibility for full technical issues of their collective woredas. The thematic area advisors again can similarly share the woredas among each them – three to four woredas per advisor, for example. In this role the advisors serve as focal points for any communication and bridging between woreda and regional GIZ-SLM office.

3.2.3. Planning for Technical Support Services

A huge amount of money has been allocated to GIZ by the German Government, and in turn most support provided by GIZ translates into contributions to human resources, equipment and the like. GIZ-SLM advisors are expected to create this understanding among partners whilst avoiding unrealistic expectations of financial support for operational issues on the part of the government or implementing body.

In the past GIZ-SLM advisors supported partners in the implementation of SUN with investment resources from KfW Development Bank. The advisors and all the offices were expected to draw up their own monthly, quarterly and annual plans of service delivery for implementation of SUN / SLMP. The plans had to cover both the thematic area (subject matter) and cluster contact-point responsibilities. The plan for technical support services was mainly based upon the annual work plan of the region, consolidated from woreda plans and micro-watershed plans. The advisors had to add related activities on top of this, such as participation in workshops and study tours organised by SLMP. The plans of the individual advisors were consolidated to make up the regional technical support plan, using the planning form shown in Annex 5.

3.2.4. Forums for Exchange of Information and Experience

GIZ advisors nowadays are expected to transfer knowledge and experience to staff of partner institutions. There exists the need for advisors to learn from the experience of other regions and projects. Different forums should be organised for this exchange of experience to take place. In addition to institutional meetings such as Steering Committees and SLMP platform meetings, the regions can devise their own forums. Below are some suggestions:

- **GIZ-SLM advisors' meetings**: efforts have been and will continue to be made to harmonise the approaches followed by advisors in their support of partner systems. However, the experiences of the advisors in the three regions is expected to vary, as do the constraints, socio-economic conditions, priorities of the communities, bio-physical conditions, policy environment, and working conditions in each region. Consequently, the

advisors may have experience in different approaches and technologies. The main objective of the advisors' meeting is to generate peer learning. The meetings should be organised on a rotational basis once every six months, with the participation of all regional advisors. The meetings are coordinated by the capacity-development component managers at federal level, in cooperation with the regional office which is responsible for hosting a designated meeting. The meeting should include a field visit followed by discussions at office level. Field visits to other projects are encouraged in order that learning is generated from direct experience.

- **Experience exchange for partners** forms part of a capacity-development effort. The main objective of this exercise is to allow partners to visit areas within and outside their project regions, and for peer learning to take place. The advisors are expected to identify thematic areas and watersheds for potential visits well in advance of organising a trip. Effort should be made to give opportunities to regional, zonal, woreda experts and development agents who are directly involved in the implementation of SLMP. These exercises should be conducted at least once a year.

- **Workshops and meetings** are excellent forums for the exchange of experience with other connected projects. One mandate of the GIZ-SLM advisors is to support and conduct studies within all components of SLMP. A workshop must be organised at the end of the study, during which results and feedback can be shared between stakeholders. GIZ advisors should also participate in workshops organised at regional and federal levels, sharing the main elements of each meeting by filling in the Annex 4 form.

- **SLMP Platforms**: SLMP has established structures for its own alignment, harmonisation and coordination of up-scaling efforts. Platforms are the best means for exchange of experience nationally, regionally and at woreda level. People from different projects, government institutions and NGOs participate in the platform. The use of such forums for exchange of experience has not been properly exploited until now, and work remains for the process to be better strengthened.

3.2.5. Support from Federal-level Advisory Teams

GIZ managers and advisors at federal level have the following responsibilities to:

- Provide adequate support to the federal SLMP Coordination office in their respective areas;
- Ensure the support of regional GIZ advisors to the partner system in implementation of SLMP;
- Ensure a harmonised approach in service delivery including communication, capacity development and delivery approaches;
- Provide backstopping to regional GIZ advisors;
- Determine the need for recruitment of additional advisors and consultants, as deemed necessary by needs assessments;
- Approve the request for recruitment of additional staff and consultants at regional level;
- Gather feedback from the regions regarding topics for discussion at federal level within GIZ and with external stakeholders;
- Suggest strategies for enhancing implementation;
- Support the regional advisors in the acquisition of reference materials and inputs, as well as lists of suppliers and technology updates in a given sector;
- Update GIZ management on the progress and constraints on implementation and Technical Cooperation service delivery, including recommendations;
- Organise forums for exchange of project experience;
- Organise capacity-development activities which help the regional advisors to upgrade their skills.

Federal advisors have to travel to the regions regularly to observe progress in implementation and service delivery, and to advise upon it accordingly. Advisors should visit the regions at least three days per month. Pictures and back-to-office reports are expected after each field visit, following the standard reporting format.

Working relationships and communication lines between federal and regional levels have to be clear and healthy in order for effective service

delivery to take place. There have been incidents in the past in which regional component managers have not communicated with their corresponding federal-level managers, exposing a need for clarification of relationships. The federal component managers have the responsibility to support the regional component managers to handle their responsibilities appropriately. The major tasks of regional component managers include:

- Support to partners with planning;
- Inclusion of GIZ-SLM support in regional SLMP planning;
- Development of Technical Cooperation plans based upon regional SLMP plans;
- Follow-up with implementation of plans;
- Reporting according to agreed timing and formats;
- Development of training materials as necessary;
- Development and dissemination of innovative ideas.

Regional-component managers can request support from federal component managers in order to accomplish their tasks as well as to provide suggestions for modifying procedures of service delivery. Regional GIZ-SLM managers should be copied into all communications between federal and regional SLMP offices.

4. Planning

4.1 Awareness Creation

Most inhabitants of rural areas understand the contemporary scope of land degradation and its dire environmental and livelihood consequences. At the same time, some farmers perceive that land degradation is imposed by nature or a higher force, and that it is thus difficult or futile to rehabilitate degraded land and make it productive. Of course, most people realise that physical soil and water conservation measures alone cannot bring change. Such measures have to be integrated with other development activities, focusing upon tackling the causes of degradation rather than trying to eliminate the effects or symptoms of degradation.

Having said this, the potential rehabilitation of degraded land is still not well understood. General solutions like soil and water conservation activities have been suggested by farmers during community-action planning. As a result, training and experience exchange visits (as shown in Figure 4) have been planned for the community watershed team (CWT); selected farmers were to obtain full participation of the community during implementation of various land development measures. Farmers can easily convince others after a convincing exchange visit to a demonstration site. Visitors should comprise different social groups (women, youth, elders and ordinary farmers). The genuine change in perception of the farmers is gained after implementation of the various measures and observation of the results. Examples of improvements witnessed include reduced runoff, increased crop yields, rehabilitation of existing vegetation and the seeding of new species resulting in increased biomass. The development history of a watershed selected for experience sharing should be explained by the community members themselves.

Farmers are easily convinced when they share practical experiences with other farmers. Exchange visits must therefore be well organised, starting from the selection of participants – reluctant and model farmers, community leaders, woreda experts and administrators – to the selection of demonstration sites. Accordingly, preparations for each visit such as making appointments and logistical discussions should be made about two weeks before departure. Times must be chosen which suit both visitor and host communities in order to guarantee the participation of all concerned.

Figure 4. Exchanges of experience between community members, community leaders and experts

In general, experience-exchanging efforts need to concentrate on convincing farmers of the practical benefits that can be gained from a change or a streamlining of practice. The results should outweigh the inputs made from their side in order to trigger changes in habits. This requires a lot of effort, especially from the experts' side, in properly understanding the actual problems associated with each land-use type, with proper identification of cost-effective mitigation measures, and with a devised system of activity implementation which leverages the desired benefits and minimises cost. Since project interventions are limited to small areas, technologies have to be cost-effective and replicable at community level so as to radiate to a wider scale. The community has to be empowered to understand the problems affecting their respective area and helped to define possible solutions. The community must differentiate and prioritise measures needing project support, as well as activities which can be implemented by themselves. Furthermore, communities have to be aware that they own every project: external support exists only for a short time and for specific interventions. As the owners of the development projects, the community is responsible for maintenance and sustainability: this has to be reflected in the development plan of the watershed.

The choice of measures undertaken in watershed development depends upon how the community is going to apply them – based upon existing land use and their intended production from the land. In other words, the community has to be aware that for every one birr invested, at least the same return is made in a sustainable manner. Cost-benefit analysis is thus crucial to integrated interventions applied to all land-use types, carried out in a way which is logical, understandable and attractive to farmers.

First and foremost, all stakeholders in the target area must be thoroughly enlightened about the nature of activities and what is expected from them. Familiarisation workshops about the programme objective and roles and responsibilities of each stakeholder is invaluable. Participants include woreda and zonal administrators and department heads from concerned institutions. They should be informed in good time so that all can be presented and able to participate and benefit.

4.2 Selection of Micro-Watersheds

Support for implementation of watershed activities begins at the stages of selection and delineation of bigger (critical) watersheds – measuring at least 10,000 ha. These are then sub-divided into micro-watersheds using topographic maps. This selection and delineation needs to respect the basic definition of a watershed, even if woreda and kebele boundaries are crossed. In the latter case collaboration between the woredas or kebeles concerned is essential.

The optimum size for critical and micro-watersheds is defined in the Community-Based Participatory Watershed Development Guideline (CBPWDG) as an area between 5,000-10,000 and 200-500 hectares respectively. However, experience from SUN has shown that the area of most micro-watersheds exceeds this upper limit of 500ha. This is an acceptable practice as far as the watersheds can be managed within a reasonable time frame. The main factors for determining the upper limit of a watershed size are (1) the proportion of the area which needs treatment, (2) settlement patterns, (3) available resources for support, (4) the time frame for support, and (5) the diversity of land use and its potential. For example, in areas of high diversity investment costs and types of activities to be carried out are greater. Similarly the reverse is also true for less diverse areas. It is assumed that the maximum time required to treat a micro-watershed does not exceed five years, but three to four years should be the target if feasible. Note also that some areas have already been treated earlier, and additional support from other organisations, as well as regular extension and the self-maintenance activities by community members, may be underway.

The selection of critical and micro-watersheds is the responsibility of the woreda Office of Agriculture (OoA), operating through the Woreda Watershed Team (WWT). GIZ advisors offer guidance on the establishment of the WWT if it has not already been established. They can also facilitate the availability

of topographic maps for the watersheds identified. They are also expected to coach the whole process of watershed development. Major criteria applied to the selection of a watershed are:

- Severity of land degradation;
- Major topographic, agro-climatic, land-degradation and land-use features;
- The potential for agricultural development;
- Potential suitability as a centre for demonstration of watershed development interventions;
- The potential of the area for rapid improvement within a short period of time;
- The community's working culture and attitudes towards adoption of new interventions such as controlled grazing;
- Accessibility for supervision and monitoring;
- Low involvement of other organisations in watershed development or NRM in the area, in order to avoid duplication of effort;
- The kebele administrations should agree upon the importance of establishing technical committees which are responsible for coordinating and managing activities at the watershed boundaries. Furthermore, they should commit to a mandate for the watershed committees to do their job as they see fit.

With primary facilitation undertaken by the woreda Office of Agriculture (OoA), ideas for selection and development of a watershed are shared with the woreda council. The woreda OoA Head is then assigned by the Council to collate basic information allowing for selection of target watersheds. The WWT, led by the NRM Process Owner, organises this information qualitatively and quantitatively before a target watershed is selected.

Based on secondary information and woreda extension contentions, the WWT outlines and screens priority watersheds. Respective kebeles are listed out and primary data are collected, in discussion with development agents, kebele administrations and the communities.

Once important information has been collated, members of the woreda council and the WWT participate in a meeting. The head of the Office of Agriculture or the WWT team leader presents background information proposed by the WWT, and the target watershed is selected collaboratively. This process can last over ten days.

4.3 Entry Point

The quantity of work to be undertaken in the area of sustainable land management is enormous. Nevertheless, projects have limited resources and work must begin somewhere! An entry strategy is therefore needed for selecting the areas of planned cooperation.

Resilience of a community can be considered as an entry indicator for development support. Wiebke Foerch has developed indicators which can serve as a basis for determining levels of community resilience; the following eight are some of the most important:

- **Peace, conflict resolution and good governance** are interrelated and complementary. Good governance comprises effective, reliable, responsive local leadership and administration. Leaders are expected to have good knowledge about how to govern a community, treating all sub-groups within a community equally whilst remaining loyal and accountable to the community. Leaders have to be good communicators with the community as well as with the woreda administration.
- **Giving women opportunities** is necessary for effecting lasting change. Specifically, the encouragement of women to participate more actively in household and community decision making, as well as giving women's needs more attention and providing livelihood opportunities geared towards them. This is especially important in the numerous areas of Ethiopia in which large proportions of households are female-headed.
- **Maintaining a vision for the future and planning** towards realistic achievement of goals is a key part of motivation and efficient, constructive action.
- **Positive competitions and cooperation** triggers not only experience sharing but also the desire to achieve success as positive role models in the community who are upheld and supported (rather than being resented or marginalised out of jealousy). Cooperation leads to joint problem solving on a continuous basis, while mobilising people to pool their resources leads to greater collective achievements than can be attained by the individual.
- **Preserving culture, food security and sensible natural-resource management (NRM)** are essential, interrelated contributors to long-term environmental, social and livelihood security.
- **Livelihood diversification, hard work and autonomy from aid activities** are more important than any development intervention in effecting sustained

improvements in one's life – even though they can be direct outcomes of the development intervention.

- **Accepting and implementing innovations whilst having access to and benefiting from extension services** can be hugely beneficial. Under the latter, development agents give technical support and provide training on innovations, fertiliser use, veterinary services and family planning.
- **Access to infrastructure** such as roads, transportation, health facilities, schools, market access, electricity and telephone services, plays a huge role in facilitating development of quality of life.

Considering these indicators, a beneficiary community may fall into any of the following four groups.

Group 1: Communities with High Resilience

Communities in this category have made a lot of progress by themselves towards achieving resilience, as reflected in all of the above eight indicators. Resilience is reflected in strength under the first four, while the other four have been addressed by the community, and progress is being made. The community overall is characterised by good internal channels of communication and understanding, including with the local leaders, which is manifested in low levels of conflict and effective problem solving. A community in this category can cope with unexpected circumstances on its own, with an established capacity to continuously seize opportunities for development and innovation. Resilience means that this community is continuously innovating and adapting itself rather than considering itself to have reached an endgoal.

Development interventions in highly resilient communities are least likely to be necessary, as the community should itself be able to plan and effect its own development. Therefore, interventions here should be driven by community requests, with outside agencies providing only minimal support.

Group 2: Communities with Medium Resilience

Communities in this group are making progress towards achieving resilience with regard to the eight indicators above. Communities in this category have not yet achieved the same level of sustainability or resilience as those in Group 1 and are not typically resilient enough to cope with unexpected circumstances entirely on their own.

It is recommended that interventions in partially resilient communities focus upon strengthening existing community-led development efforts. Development interventions here should be driven by community identifications and requests based upon the assessment of individual factors. A focus on natural-resource management interventions is feasible here, while special attention should be given to the sustainability of efforts as well as to institutionalising the community's problem-solving capabilities.

Group 3: Communities with Low Resilience

These communities make limited and slow progress towards achieving resilience. For a community to be considered in this group it is only making progress in two of the first four indicators above; for the last four indicators some progress is visible but only on a limited scale.

Interventions herein must focus upon strengthening community efforts towards resilience in all of the factors, as appropriate. Emphasis needs to be given to building community capacity according to the weaker indicators; similarly, strengthening existing capacities in good factors must be achieved. A focus on natural-resource management interventions alone will not be sustainable.

Group 4: Communities with No Visible Progress towards Resilience

Communities in this section are characterised by a lack of visible progress or activity towards achieving resilience. The community is stuck in its existing condition with a heavy reliance upon external assistance. There is no or little progress according to any of the indicators. Communities lacking any visible resilience are not easily able to solve their problems and suffer ineffective governance, lack of planning and high levels of internal conflict and mistrust.

Interventions herein have to be carefully planned, ideally following an in-depth assessment by a team of social scientists. Interventions must concentrate on soft issues. Community coherence must be increased by strengthening local leadership, improving participatory planning procedures, by helping to build trust within the community, and reducing local conflict in order to facilitate future cooperation and joint decision making. Natural-resource management interventions in this group may have to be postponed until the community has first made progress in soft issues.

The following criteria facilitate the selection of micro-watersheds by the WWT.

- Communities interested in cooperation should have a clear vision of watershed development and its benefits. They should be able to fulfill the commitments required from their side, the level of assistance that they are getting, and the actual long-term effects upon their livelihoods and upon the environment. Furthermore, the commitment of administration for the indicated concept must be high, and expressed in an organised and rational way. It would be even more constructive and rewarding if communities demanded cooperation having understood that watershed rehabilitation was benefiicial for them;
- Communities willing to contribute in-kind labour and materials should be given priority, although a minimum 20% investment has to be assured;
- The community must agree to avoid or considerably reduce free grazing in the developed watershed areas by applying 'cut-and-carry' methods;
- The community must agree to establish legal watershed associations once activities have begun;
- The community must agree to guarantee usage rights of the developed communal land;
- Communities with good leadership can be evaluated during the early assessment of the sub-watersheds;
- The woreda should support the efforts of their communities with support personnel and approval.

4.4 The Planning Process

The planning process defines the interventions to be prioritised by communities regarding the support required. Although designed on a case-by-case basis, the process adheres to the following procedures:

- A detailed watershed exploration of biophysical and socio-economic characteristics, potentials and problems;
- Discussion with the community about existing levels land degradation and poverty in the area, supported by audiovisual or any other means of visualisation;
- Selection of a Community Watershed Team;
- Familiarisation visits;
- Sharing experiences on rehabilitation of degraded areas and improved livelihoods in model watersheds within the region;
- Planning with the community:
  - ✓ Identifying problems and their root causes;
  - ✓ Identifying opportunities;
  - ✓ Prioritising problems;
  - ✓ Deciding upon possible solutions based on the scope of the programme.

The responsible body for spearheading the planning process is the WWT. The GIZ advisorsneed to equip the WWT and development agents with the procedures and basic planning tools to do their job. Training has to be organised for WWT and development agents on participatory watershed development approaches and techniques. Trainees are oriented or refreshed with the general concept of watershed development; learning and practising watershed delineation and map-reading techniques; biophysical data-collection techniques; the community taking into consideration participatory planning tools, identification of land-use problems and the respective cost-effective integrated measures; identification of treatment units with respective measures, and thereupon formulating detailed plans of operation.

The WWT, capacitated with core concepts and techniques, takes responsibility for identifying and delineating community watersheds as well as formulating plans of operation with the active participation and endorsement of the community. The planning process normally takes one week, depending on the availability of community leaders.

Figure 5. Participation of community members in planning

The main document that guides the planning procedure is the Community-Based Participatory Watershed Development Guideline (CBPWDG). Watershed development planning should follow the CBPWDG as far as possible, unless improvements have been made in agreement with regional authorities. For example, the SUN Project has developed a modified and brief planning process called the Planning Road Map, which has rendered it more adaptable to the Financial Cooperation financing procedures (as laid out in Table 1 on p.50).

For SUN, the CBPWDG clearly stated that the watershed classification and prioritisation needed to be done at woreda level. The SUN Road Map did not include the assumption that classification and prioritisation had already been done at the woreda level. It only focuses on the selection of the watershed as per the priority set by the woreda. The woreda experts did actually take into account the CBPWDG. Also, the SUN Road Map did not include the steps of resource identification. Activities such as establishing community organisational structures and participatory monitoring and evaluation were not included, whereas they are considered in the CBPWDG. The Road Map included issues such as approval procedures for Application for Funding (AFF), farmers' action-plan preparation, and establishment and submission of AFFs. In fact, the Road Map for planning applied by the SUN Project built upon the successive steps defined in the guideline. As can be seen from Table 1, every step was taken care of by one of the involved actors, leading to a particular output.

Of the ten steps followed in the SUN Road Map for planning, validation of the proposed measures with the community was crucially important. The proposed measures needed to be discussed with representatives of different interest groups from across the watershed communities.

The kebele chairman and CWT called for a community meeting together with the WWT. The discussions revolved around the watershed development map. A poster-sized development map was prepared for the meeting. CWT and WWT presented the base map and the proposals for the development interventions of their watershed (to be funded by SUN) to the community. The presentation led to discussions about the suggested measures. The meeting started with an introduction on objectives, introduction of participants, followed by a thorough explanation of the development map.

These community meetings are of key importance: it is during them that the community agrees upon how collaboration with SUN shall look. Priority ranking, done during the General Assembly, is reviewed and modified, and priorities in time and space ultimately defined. At the end the community gives a mandate to the CWT and the WWT to apply for funding and to organise the implementation of the activities.

The meeting might last for more than a day, and it might be necessary to organise a number of working groups in which the different interest groups of the community can discuss separately and agree upon their priorities. These then have to be harmonised and agreed upon by the whole community. The process has to be facilitated and moderated by CWT and WWT. The SUN team has to be available to ensure that the expectations of the community are realistic with regards to available time, manpower, (local) resources and capacities of all stakeholders.

Table 1. Road Map of the SUN watershed development plan

STEP	ISSUE	CONCERNED BODIES	OUTPUT
1	Selection of woredas to be covered by SUN Project	BoA/Food Security Coordination Office (FSCO) in consultation with Steering Committee	The SUN intervention zone is defined or updated
2	Establishment of Woreda Watershed Team (WWT)	Woreda Agriculture and Rural Development Office (WARDO)	Concerned woredaheads and experts are familiar with the SUN Project
3	Selection of watersheds within a woreda	WARDO in consultation with Kebele and SUN	The Community Watershed Team (CWT) in a prospective SUN intervention site is established and familiarised with the SUN Project
4	Elaboration of a watershed profile	WWT in consultation with CWT and watershed community	A watershed development map is produced, showing landuses and proposed measures
5	Pre-feasibility check	WWT in consultation with SUN	A shortlist of proposed measures that are found to be eligible and appropriate is written and made available
6	Validation of proposed measures by all interest groups of the CWT	WWT in consultation with CWT and watershed community	The shortlist of proposed measures is approved by the watershed community
7	Writing-up of an application for funding	WWT	An application is submitted by WARDO to FSCO/KfW Development Bank
8	Funds allocation	FSCO/KfW Development Bank	Funds are released after screening of applications and signing of a local subsidy contract between FSCO / KfW Development Bank and WARDO
9	Planning of 1st year activity implementation	WWT in consultation with CWT	Time schedule and responsibilities are worked out for use within the watershed
10	Implementation of the plan in the following years	WWT in consultation with CWT, WARDO, FSCO / KfW Development Bank	Fresh funds are allocated on the basis of a new annual plan of operations and another local subsidy contract

Training on the CBPWDG was provided mainly to the PSNP, SUN and SLMP woredas which have started implementing sustainable land management activities. However, experts in potential areas that are not yet reached by the SLMP may not have received training on this guideline. Even in those woredas where the training was conducted, there might still be a need for continuous training in order to cope up with staff turnover.

Even in project woredas the training was not to the required standard for the stakeholders. Decision makers such as woreda administrators and Office of Agriculture (OoA) heads were in most cases not trained. As a result they failed to provide the necessary support for implementation of the CBPWDG. New assignees are coming every time as a result of staff turnover or change in structure; new employees usually lack the required skills and knowledge. The community leaders and development agents need further training or a refresher course. Training needs assessment need to be undertaken before organising community and expert training.

The CBPWDG recommends the preparation of shelved projects which can be implemented when conditions are favorable - including the availability of funds. Woreda experts usually lack the courage to prepare shelved projects for fear of unfulfilled expectations from the communities. SLMP's case is different: one can definitely implement the plans prepared earlier as all micro-watersheds cannot be implemented fully in one year. Therefore, it is recommended that the plans of all micro-watersheds due for implemention in successive years are finalised provided that the woredas and Technical Cooperation advisors have time to support the process.

Micro-watershed plans should cover the interventions for the entire implementation period (3-5 years). This allows for the prioritisation of interventions and proper preparation of the required materials, as well as other organisational aspects. The preparation of the budget for the entire implementation period allows the planners to internalise the financial requirements expected for proper implementation of the micro-watershed development. This is what was lacking in planning for SUN, requiring the deployment of a consultant to identify the needs one year before the phasing out of external support.

4.5. Optimal Time for Planning

It is always advisable to spend time on the planning of micro-watershed activities but it should not take too long, since hard-working community members may not be able to afford much time. Planning time should also take into consideration the other responsibilities of the woreda experts and the Technical Cooperation advisors. Experience has shown that farmers could not spend more than two days for discussion on issues related to planning. It is only necessary to focus upon very important things such as the major problems of each land use type, proposed solutions, farmers' contribution, labour availability, and systems of community organisation for watershed development. Therefore, two days for the quantification of the activities identified by the community, plus an additional week to organise data and transfer into detail planning tools for the first year planning should be sufficient. Later planning processes should be more efficient and take less time.

The optimal time period set aside for planning allows the availability of stakeholders in planning, but most importantly the availability of community members. Optimal participation in planning takes place when there are few farming activities - typically, during December to April. December is the time to optimise community participation not only in planning, but also in implementation, as the labour demanding watershed activities is dominated by physical soil- and water-conservation (SWC) measures which are otherwise carried over to between January and April. In case of a gap between planning and the physical activities, refresher workshops may be necessary.

In order to match planning with the Ethiopian fiscal year it could be carried over to April-May on condition that this time allows for optimum participation of the community. If this is the case, refresher workshops will be required for the following December in order for the physical activities to be completed in January to April.

4.6. Eco-Pop Software

The SUN Project has designed a computer programme called Eco-Pop, to help with the writing of micro-watershed action plans. Use of the software was made mandatory by SUN as it facilitated output-reporting and financial management. This made planning easier and faster for staff who could access and use computers. It also enabled a more uniform reporting and documentation system.

During the planning and implementation of SUN activities, Eco-Pop served very well for the annual micro-watershed plan preparation. Nevertheless, it was

weak in not being able to incorporate activity distribution on a quarterly basis. Furthermore, a concern regarding its inadequacy for making summaries, at woreda, zonal and regional levels, was pointed out. Despite these shortcomings it was considered to be effective overall, as long as the woreda experts were trained practically in its application. The tool has hence been modified and adopted for SLMP, with necessary adjustments which address the above limitations. Accordingly, a new and improved tool called the Planning and Reporting Tool (PRT) has been devised with the technical support of GIZ-SLM, in collaboration with the SLM-Programme Coordination Unit (PCU). The SLMP target woredas are currently using the PRT for their planning and reporting purposes. Although the PRT tool is far more adequate than Eco-Pop, it does require an internet connection. In areas where the internet is not yet available, remote internet USB sticks are being used. Feedback on the time and effort-saving benefits of the tool is very positive.

4.7. Preparing an Annual Plan of Operations

Micro-watershed planning at the community level incorporates most activities to be undertaken during the year. The following steps are to be included in every plan of action for SLMP.

◆ *At the Critical-Watershed Level*

The processes described above concentrate on micro-watershed level. Due to the limitations involved with budget, shortages of staff and insufficient logistics, it is not possible to intervene fully-fledged implementations in all of the micro-watersheds of a critical watershed**.** In a situation like this a strategy that considers prioritised activities should be designed. For example, during SUN activities were categorised into simple and complex technologies. The simple technologies were introduced and from the outset at critical-watershed level, while the complex ones were introduce in selected microwatersheds, to cover certain parts of the watershed in a trickle-down fashion. Production of the *Triticale* crop is a good example of a simple technology which can be started at the critical watershed level, while complex technologies like gully treatment with biophysical measures have to start at the micro-watershed level. The long term development plan (3-5 years) of a critical watershed should be developed with full consideration for this division.

◆ *Woreda-Level Preparation of Operations*

The woreda plan of operation is prepared with the participation of WWT, Woreda Steering Committee (SC) members, development agents and KWT chairpersons. The meeting, which should not take more than one day, is facilitated by a zonal expert, regional expert and/or a GIZ-SLM advisor. Facilitation is crucial to giving the right direction in preparation of plan and budgets.

The woreda-level plan of operation begins with the review and consolidation of different plans at micro-watershed level. The identification of other activities to be organised or conducted at woreda level is the main objective of the planning meeting. Such activities include platform functionality-strengthening measures, office equipment for facilitating SLMP implementation, financial management, trainings related to project management, training for KWT, CWT and individual farmers, training for woreda experts, purchase of equipment and materials, testing innovations and monitoring. The consolidated micro-watershed plans and the activities identified at the woreda level make up the woreda plan of operation. The other essential exercise for the planning team is the prioritisation of activities in light of the budget ceiling provided by the region. The woreda plan of operation has to be approved by the woreda Steering Committee before submission to the Regional Focal Person.

◆ *Regional-Level Planning of Operations*

The regional plan of operations is prepared with the participation of members from selected woreda Steering Committees and Technical Committees, zonal and regional offices, the SLMP Coordination Office, and other partners.

The regional-level plan of operation begins with the review and consolidation of the plans submitted by the project woredas. The identification of other activities to be organised or conducted at regional level is the main objective of this planning meeting. Activities included here comprise training for regional, zonal and woreda experts, procurement of materials at regional level, supervision missions, development of strategies and guidelines, testing innovations, identification of best practices, monitoring, and evaluation. The consolidated woreda plans and the activities identified at regional level constitute the regional plan of operation as a whole. The other essential exercise for the planning team at this stage is to prioritise activities with regard to the budget ceiling provided at federal level (SLMP Coordination Office). The regional plan of operation has

to be reviewed by the regional technical committees and finally approved by the regional steering committees before submission at federal level.

Regional-level planning is most likely to be based upon the allocated funds for the region from the financial contributors (such as WB, GDC through KfW Development Bank, and DAFTD). During this process the contribution of GIZ has to be clearly specified with regard to planning capacity development and technical backstopping.

◆ *Federal-Level Planning of Operations*

The federal plan of operation is prepared with the participation of members from the SLMP Coordination Office, regional focal persons, and other partners. It begins with the review and consolidation of the plans submitted by the project regions. The identification of other activities to be organised or conducted at federal level is the main objective of this meeting. Activities include training for federal, regional, zonal and woreda experts, procurement of materials at federal level, supervision missions, development of strategies and guidelines, identification of best practices, organisation of study tours abroad and in country, capacity-development measures, monitoring and evaluation. The consolidated regional plans and the activities identified at the federal level make up the overall plan of operation for SLMP. The other essential exercise for the planning team is the prioritisation of activities with regard to the resources available for the year, if limitations do exist. The SLMP plan of operation has to be reviewed by the federal SLM Technical Committee before submission to the Federal SLM Steering Committee for approval. Budget requests from the financing organisation are made based upon the approved plan. This final stage of planning should be completed by mid-June each year, in order that the woredas can implement from July onwards, as per the Ethiopian fiscal year.

4.8. German Development Cooperation (GDC): Planning for Technical Support

The GIZ–SLM Technical Cooperation plan is aimed at supporting the implementation of the SLMP Annual Plan. It is prepared by all advisors at the beginning of the Ethiopian fiscal year. The plan specifies the support provided by each advisor, as well as by the regional or federal offices, including budgets. The procedure is depicted in Table 2 below.

Table 2. The Technical Cooperation Planning Process

STEP	TIMING	ACTIVITY	RESPONSIBILITY	PRODUCT	FORWARD TO	COMMENT
1	December (1st and 2nd week)	Calculate the available budget for the coming fiscal year	GIZ SLM Programme Director/Director of Operations	Detailed budget for the federal components and the region, including main categories	Component Managers and Regional Programme Managers	The calculations should be based on the existing teams and the workload (watersheds, etc.)
2	December (3rd and 4th week)	Document as far as possible all upcoming major events for the coming year	SLM Programme Director/Events Manager	Preliminary events calendar	Component Managers and Regional Programme Managers, linked projects where applicable	These events shall be considered by all planners
3	January (1st and 2nd week)	All components and regions must establish a draft budget containing our own costs (GIZ SLM structure) and show the open amounts which can be used to support SLM needs on their respective levels	Component Managers, Regional Programme Managers and Administration head	Draft activity plan with budget	GIZ-SLM Programme Director, Regional and Component Managers	The information of this preliminary plan shall be commented and discussed via email
4	January (3rd and 4th week)	Draft preliminary GIZ plans	SLMP Technical Cooperation P, M&E Coordinator	Preliminary, harmonised internal GTC plan for the Ethiopian fiscal year	All concerned (internal)	The second half of the budget will be based on educated extrapolations and adjusted later when the necessary facts are available
5	February (1st and 2nd week)	Preparation for planning	Monitoring and Evaluation Component with Regional Technical Committee	Capacity building (training), verified planning tool, Detail planning checklist	Woreda BoA, WWT and TWT	

STEP	TIMING	ACTIVITY	RESPONSIBILITY	PRODUCT	FORWARD TO	COMMENT
6	February (3rd and 4th week)	Assist community (Kebele)/ community watershed teams and woreda in activity planning and Technical Cooperation plan preparation	Thematic area/cluster advisors with the facilitation of the P, M + E component	SUN / SLMP watershed management plans, GIZ support plans	Woreda SLMP Focal Person and Component Managers	P, M + E Component with SLMP Focal Person leads the whole process These plans will be discussed in the Regional Technical Committees and ultimately integrated into the regional plan of the SLMP
7	March (1st and 2nd week)	Assist woreda SLMP Focal Persons in compiling community watershed plans	P, M + E advisor and cluster advisors	woreda SLMP annual plan	Woreda Steering Committee and the Regional SLMP Focal Person	Woreda Steering Committee reviews and approves the plan
8	March (3rd and 4th week)	Assist Regional SLMP Focal Person in consolidating woreda plans	P, M + E advisor	Regional SLMP annual plan	Regional Technical Committee	The Regional Steering Committee reviews and approves the plan
9	April (1st and 2nd week)	Elaborate detailed component activity plans which are in harmony with the regional SLMP plan	Component managers	Full component annual plan for the Ethiopian fiscal year	Regional Managers, M + E Component, National Component Managers	It is evident that all necessary coordination and consultation with our partners are to be carried out in due time
10	April (3rd week)	Consolidation of the Technical Cooperation plan	P, M and E component	Consolidated Technical Cooperation plan	Regional Managers then to GIZ SLM Director	
11	April (4th week)	Present Technical Committee plan to the Regional Technical Committee for review and technical approval	M + E Advisor supported by Regional Programme Manager or Deputy and select GIZ-SLM advisors	Second draft regional SLMP annual plan	Regional Steering Committee through the SLMP Regional Coordination Office and M + E	The Regional Focal Person for SLM is the main coordinator supported by the GIZ-SLM regional team

STEP	TIMING	ACTIVITY	RESPONSIBILITY	PRODUCT	FORWARD TO	COMMENT
12	May (1st week)	Present Technical Cooperation plan to the Regional Steering Committee	Regional Programme Manager or Deputy and selected Regional GIZ-SLM advisors and M+E	Finalised and approved regional annual SLM plan	SLM PCU, approved (Technical Committee) plan to GIZ SLM M + E Advisor, Programme Director	The BoA/BoA SLMP Focal Person will be responsible to carry out this activity
13	May (2nd and 3rd week)	Consolidate regional Technical Cooperation plans and federal component Technical Cooperation plans	Federal M + E Advisor	GIZ SLM annual Technical Cooperation plan	National Technical Committee	The National Technical Committee reviews and technically approves the SLMP annual plan
14	May (4th week)	Present GIZ SLM Technical Cooperation plan to the National Technical Committee	M+E Advisor supported by official members of the GIZ federal level and possibly selected Regional Programme Managers/Advisors as resource persons if needed	Draft overall SLMP annual plan incl. all necessary annexes	SLM PCU, copy the GIZ SLM Programme Director and other major partners	The SLM PCU will then prepare all the documents for submission to the SLM National Steering Committee
15	June (1st and 2nd week)	Present the Technical Cooperation plan to the National Steering Committee	Programme Director	Approved annual overall SLMP plan	All concerned	The head of the PCU is responsible to finalise the document and to forward it.

5. Watershed Rehabilitation Measures

A watershed is a physiographic unit encompassing different land units such as hillsides, drainage lines, plains, grazing lands, farmland and homesteads - see Figure 6. Watershed rehabilitation projects have first to understand the *causes* of degradation rather than trying to address the effects of it. Untreated and/or deforested hillsides are always sources of flooding and erosion for lower-lying grazing lands and farmland; hence, treatment of hillsides should be carried out before starting gully treatment. Construction of terraces and trenches is becoming common practice in watershed rehabilitation. However, physical structures are only a short-term solution, until the vegetation cover of the degraded area, whether from natural regeneration or artificial plantation, recovers. In drier areas physical structures can also represent an important biological measure, since moisture harvesting is a prerequisite for vegetation to grow. In both dry and moist areas, biological measures constitute sustainable methods of watershed rehabilitation: they provide cost-effective, long-term solutions and render prompt benefits for either human consumption or animal feed.

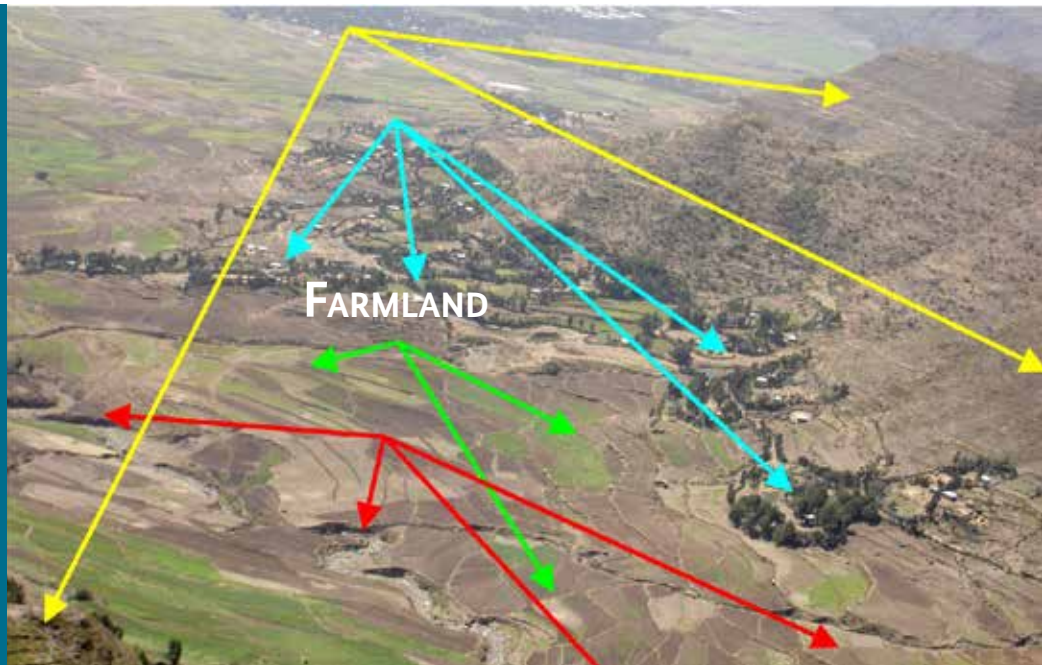


Figure 6. Varying land use within a watershed

The logic described above is generally applied to most watershed rehabilitation projects. However, it is unfortunately common to see rehabilitated areas devoid of vegetation after a project's phase-out, and sometimes even during the life of the project. This is mainly due to uncontrolled grazing and open access, or the Tragedy of the Commons. Unless the community agrees upon controlled grazing systems and defined users for rehabilitated area, one has to question whether it is worth rehabilitating an area at all. Watershed development projects during the Integrated Food Security Program (IFSP), SUN and SLMP have shown that community agreement on controlled grazing, free labour contribution to maintenance, protection, even new contributions of structures, and defined user groups or associations are key indicators of success.

Some of the watershed-rehabilitation measures applied by SLMP include:

- Soil- and land-resource management;
- Water-resource management;
- Livestock management;
- Crop management;
- Reforestation;
- Pasture/forage management;
- Rural biomass and energy saving;
- Community road construction;
- Establishment and development of community-level institutions;
- Community skills development.

These interventions are implemented to suit a variety of land uses, as discussed below.

5.1. Farmland

Different studies indicate the low productivity of the Ethiopian agricultural production system, particularly in the highlands. Physical, biological /agronomic and socio-economic barriers are considered to be limiting factors to agricultural productivity. These limiting factors can be described as follows:

- **Physical factors** include soil erosion, temporary water logging, hard soil pan, degraded soils, land fragmentation and unfavorable moisture regimes. Moisture scarcity particularly affects small-scale irrigation.

- **Biological / agronomic factors** include poor access to improved seed, pests and diseases, poor soil fertility management, poor crop husbandry, soil acidity and lack of integration of land management practices such as agro-forestry, mixed-, alley- or strip cropping, and fallowing.
- **Socio-economic factors** include poor livestock management, free grazing, land leasing, communal use of land during the dry season, a lack of facilities and a lack of enforcement or community by-laws for land management.

Studies have indicated that the highest soil loss is induced by the mechanical disturbance of the soil during plowing and livestock trampling. Hence, improvement in agricultural productivity of farmland by addressing this constraint directly contributes towards improvement of the livelihood of millions of households in the highlands – since the majority of rural dwellers depend upon agriculture for their livelihood. Thus, sustainable land-management projects should give special attention to the treatment and sustainable management of farmland.

Accordingly, watershed development interventions during IFSP, SUN and SLMP tried to address the above-listed constraints on farmland, as related to physical, agronomic and socio-economic factors. The solution to the constraints could be technological and/or policy-related. GIZ's experience suggests that interventions should be based upon a proper analysis of the most important constraints of the farming system in a specific area, including the agro-climatic conditions, socio-economic conditions and cultures. It should not be taken for granted that whatever activities promoted can lead to the achievement of at least one of the objectives.

In some cases farmland-development measures have been evaluated only from the point of improved production or productivity, regardless of negative environmental effects and thus unsustainable development. Cases in point are excessive pumping of groundwater for irrigation or the continuous application of fertilisers and pesticides. Thus, it is essential to also evaluate each activity from the point of sustainable development parameters.

5.1.1. SLM Measures Promoted on Farmland by SLMP

Experience from the SLMP indicates that farmland rehabilitation measures have been supported by the projects in order to enhance productivity of the farmland in a sustainable manner and to reduce the constraints listed above. The activities supported in order to alleviate the constraints are categorised into physical, biological, and policy measures.

A. Physical Soil- and Water-Conservation Measures

The physical measures supported include construction of trenches, soil bunds, stone bunds, terraces, *fanyajuu* (a Swahili word meaning 'moving soil upwards'), cut-off drains and waterways - see Figure 7. Physical conservation structures, especially stone or soil bunds, were implemented based upon the local conditions and availability of construction materials. Stone bunds are aimed at dissipating the energy of the runoff and filtering the soil transported between the terraces. Stone bunds are recommended in upper catchments of dam sites, semi-water logged areas, poorly drained and shallow-profile soils. It is unlikely that much runoff can be harvested through stone bunds. Soil bunds, meanwhile, are constructed in areas where there are not enough stones for terracing; where deep and well-drained soils exist, and in areas where moisture is much needed for crops to grow.

It has been noticed in some places with moist, cultivated land and small land holdings, that farmers complained about bunds, for three main reasons. Firstly, the structures used up scarce land, particularly on the slopes of 10-20%. Secondly, the structures host rodents, especially the stone bunds, which damage up to 30% of crops. Thirdly, the stone or soil bunds pose difficulties to plowing with oxen. The structures are too easily damaged and in most cases not repaired. There exist ample examples that show that physical structures, if not well constructed and maintained, can create more damage than good, indeed major disasters – see Figure 8. Our experiences in farmland treatment in different agro-climates and slope ranges indicate that different bio-physical measures need to be combined in a way which gives maximum benefits to the smallholder farmers. In addition to these controversial and bold remarks it must also be stated that without serious attempts by way of physical soil- and water-conservation (SWC) measures in the past, the situation in the Ethiopian Highlands could have been far worse. The SLMP in the past have tried to avoid problems using better designs and adopting bio-physical measures.

Figure 7. Terraces (left) and trenches (right) represent common soil and water conservation activities on farmland.

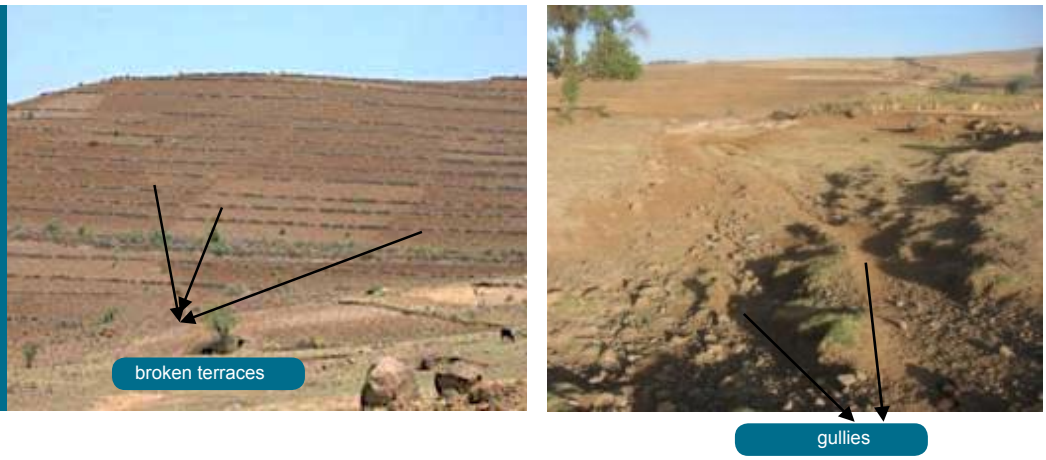


Figure 8. The damaging effects of improperly built, degraded or unmaintained physical structures

Biophysical measures, which are a combination of physical and biological treatment (planting trees, shrubs, legumes and grasses), have had very encouraging results, most importantly in the provision of immediate benefits to farmers. The guiding principle here is to have water infiltrate into the soil as much as possible where it falls, so as to increase the water-holding capacity for the benefit of crops and natural vegetation, as well as for groundwater replenishment. Any excess runoff must be safely disposed of from the land, but needs to be managed within the watershed by constructing sinkholes or percolation pits along the drainage canals. Soil in solution with water needs to be filtered out and re-deposited as close as possible to its original location.

B. Biological Soil-and Water-Conservation Measures

Biological measures which can stand alone, or in combination with physical structures, have been implemented by the projects in order to reduce farmland degradation and to increase land productivity. Applications may vary depending on slope type and the agro-ecological zone. In semi-arid areas emphasis was given to biological treatment with a drought tolerant plant mix. Biological and/or agronomic and agro-forestry measures such as vetiver hedge, alley cropping, cash crops (chat, fruits, *Gesho*, pigeon pea) and tree plantations on bunds, deep plowing, triticale, improved seed production, grass hedge rows and crop rotation were applied in different watersheds of the project intervention area. The adoption of vetiver and triticale in larger areas was considered to be an innovative solution to land management.

I. Promotion of Triticale

The introduction of triticale as an alternative crop to wheat and barley in soil moisture-deficient highlands was one of the notable contributions of the projects supported by GIZ (then GTZ-IFSP South Gonder Project) for improved land management and agricultural production. The yield potential and attributes of the crops were attractive to experts and farmers since their introduction. All trials initially conducted on farmers' fields since 1998, with or without the application of fertiliser, resulted in outstanding yield and stands compared to wheat or barley. The most interesting aspect of the crop is its tolerance to harsh growing conditions and hazards such as hailstorms, infertile soil, frost, water-logging, pest damage and acidic soils, deep and dense rooting (Figure 9 right picture), high tilling (Figure 9 left picture), and long and dense spikes (Figure 9, middle picture).

However, there was fierce resistance from some researchers during the introduction of the crop; this was countered by government officials with a vision. The researchers did not take the time to understand that the crop has been improved since its initial introduction into Ethiopia in the 1970s. They had the wrong notion that the introduction of the crop was a replacement for wheat and barley, which was not the case.

Field experiences of farmers on the crop revealed that the crop needs special knowledge on when to harvest and how to thresh. The crop needs to dry very

well in the field before harvest, and the farmer needs to put some moisture during threshing so as to easily separate the crop from its cover. Some farmers harvested the crop at a time when they would harvest wheat and barley and thus usually faced difficulties during threshing. Many farmers, especially beginners, complained about the threshing problem of the crop. However, with experience most farmers learnt that triticale is the last crop to be harvested, in order to make threshing as easy as possible.

Currently the crop is spreading, indeed becoming dominant, in some farm landscapes (see Figure 10). It exhibits a robust root system, abundant biomass and high yielding capacity.

Figure 9. Characteristics of triticale which contribute to its high yield

Figure 10. Triticale grown over large areas of Gonder Zone

II. Vetiver Grass Planting

Vetiver Grass was widely adopted in the western part of Oromia Regional State through a project supported by the NGO Menschen für Menschen (MfM). Hundreds of nurseries in other parts of the country had vetiver stocks which had not been introduced to the farmers. GIZ-IFSP-SG (Integrated Food Security Programme – South Gonder) introduced the species to its project area. The main attraction of the species was its repellent effect against crop-attacking rodents. Unlike the stone bunds, vetiver grasses cannot host rodents either. The combination of physical structures and vetiver planting had the best results in trapping soil, as well as the growth of the grass – see Figure 11.

Vetiver has several advantages over other grasses:

- Evergreen;
- Drought tolerant, as its roots penetrate meters deep into the soil;
- No seed production (thus does not interfere with crop growth);
- Very effective for soil and water conservation (dense growth);
- Fills gaps very fast;
- Easy to propagate;
- Diverse uses (thatching, medicinal, incense, animal feed);
- Rodents are not attracted to it.

There was very strong resistance from agricultural experts during the early stages of vetiver introduction. The main concern of the experts was associated with the myth that it is not palatable to animals and has a low nutritive value. After practical experience from field demonstrations in different sites, the experts were convinced of the merits of the species and have established vetiver nurseries for production of seedlings for their watersheds. Currently, vetiver is being widely used for conservation on various types of land.

Figure 11. Dense hedges of vetiver grass aid soil and water conservation

III. Agro-Forestry

Like many parts of the world, Ethiopia has centuries-old experience in traditional land-use practices involving combined production of trees and agricultural species on the same pieces of land. The Sidama and Gediyo peoples of the Southern Nations, Nationalities and Peoples' Region (SNNPR) integrate trees into their farming systems, an age-old practice that continues sustainably today. An area of 0.25ha can contain more than fifteen crop species,. The upper story is always a multi-purpose tree species, the middle is followed by coffee, various fruit trees and enset or false banana (*Ensete ventricosum*); the lower stratum covers multi-faceted herbaceous crops.

Agro-forestry is a new name for an old set of practices. Impressive efforts have been made by the Government, GIZ, WFP, NGOs and other development

practitioners to promote agro-forestry practices across the country. However, compared with expectations and token benefits, what has been implemeted yet has been found to be insignificant. The prevailing free-grazing livestock management system is one of the main contributors to the deviation. Farmers and indeed all development actors should consolidate their efforts to effectvely promote agro-forestry practices in all parts of the country. It should not be considered as the only solution to problems of land and water degradation or to shortages of food, fuelwood, cash income, animal fodder or building materials. However, agro-forestry should be taken as one of several approaches for improving land use in any given situation– see Figure 12.

Figure 12. Agro-forestry measures implemented upon segregated farmland

The SLMP has ample experience of biomass intensification on farmland as a result of alley planting of the following along the farm bunds: *Sesbania sesban* (sesbania), *Cytisusa proliferus* (tagasaste or tree lucern), *Cajanaus cajan* (pigeon pea), *Helinathus annaus* (sunflower) *Carthamus tinctorius* (sufflower) and fruits. These planted hedgerows increase the economic return of the bunds and terraces constructed along the farm bunds, reducing farmers' concern surrounding competition for land.

Trials of planting fruit trees along the soil and trench bunds, supplemented with watering, were well received by the farmers and incentivised them to build soil bunds and to protect the farmland from open livestock grazing throughout the year. Since the bunds serve as a source of additional income on top of their function of soil conservation, they became known as 'cash bunds'. The hedgerows were mainly meant for forage development, as access to animal feed is a major ongoing concern for farmers. Furthermore, the hedgerows enhance soil fertility and access to firewood as well as serving as a wind break – see Figures 13 and 14.

Encouraging results and sound economic and ecological benefits have been recorded under the project interventions. In general the technologies implemented and promoted by the SLMP (see Table 3, p.73) look impressive, but in fact considering the large untreated areas, a lot needs to be done to scale up these proven experiences. Expansion and sustainability of the practice is constrained by the high cost of protection and guarding induced by open grazing of farmland after crop harvest, as well as unfair benefit sharing. (Collection and use of the forage from the shrubs is the syndrome of the Tragedy of the Commons.) Furthermore, the monoculture hedgerows were susceptible to plant disease and pest and hence were simply dried out.

The social dimension of the farmland development was also detrimental to successful implementation of constructive measures. Social issues such as the organisation of user groups for farmland closure and conservation, work organisation, by-law establishment and promotion of cut–and-carry systems needs to be addressed before implementing farmland development measures at group and individual levels can be started.

Furthermore, clear policy directions which encourage groups and private investors are needed. For example, tenure security, preventing cash–for-work on communal lands, in-kind support (seedlings and construction materials) for private farmland terracing, and yearly campaigns for farmland treatment and area closure, are all helpful measures. A lot more needs to be done in order to effectively address sustainability concerns for the farmland. Farmers are occupied throughout the year with campaign and project activities such as communal hillside, gully and pastureland treatment: hence little investment is being made in the treatment of farmland.

Figure 13. Alley cropping with Sesbania sesban (left) and sunflower (right) are being adopted by farmers

Figure 14. Cash crops growing in trenches or 'cash bunds'

Although GIZ-SLM advisors have tried to apply correct treatment to project farmland, there remain doubts as to the proper analysis of constraints and priority interventions made prior to subscription into the activity. The GIZ-SLM advisors must assist the Offices of Agricultural (OoAs) and farmers to have a thorough analysis of the farming system within a watershed in order for priority interventions to be properly determined. Rudimentary cost–benefit analysis may also be necessary.

IV. Conservation Agriculture

The main principle of conservation agriculture is the application of minimum (or zero) tillage or disturbance, creating permanent soil cover, rotational cropping and weed-control mechanisms. Conservation agriculture has been piloted by

the SLMP in different parts of the country. Application of the *Tenkara Kind*[3] plough in Amhara, reduced livestock grazing In Tigray, and farmland and crop-residue management in Oromia and SNNPR, are some of the practices related to conservation agriculture. Research shows that crop yields and biomass production from fields adopting conservation agriculture enjoy significant increases. However, application of reduced or no tillage and maintaining permanent soil cover was found to be uneasy for farmers for two main reasons. The first challenge was weed infestation in untilled lands. Farmers used to plow their fields two to three times to get rid of weeds, depending less on herbicides - which are not necessarily accessible or affordable to them anyway. The second challenge was that farmers do not want to leave crop residues in the field, as it is the main source of animal feed. (Studies indicate that in the highlands of Ethiopia, crop residue covers 40–50% of feed for smallholder farmers.) So, even if individual farmers can manage their animal feed demands from other sources, the open grazing system after crop harvest adopted by the community cannot allow for individual-based adoption of the practice.

Projects need to address the two aforementioned challenges in order to adopt conservation agriculture. Farmers also need to have access to alternative sources of animal feed, access to herbicides (at least in the first two years), and they need to be organised into groups in order to apply the practices and share experiences. Conservation agriculture is well considered as part of the climate-smart agricultural practice; different packages of activities are being tested to ensure adoption of the system for better crop and biomass harvest.

Conservation agriculture can be applied under almost all soil-climate-crop combinations, but is perhaps most effective in increasing and stabilising yields where low or uneven rainfall limits crop production.

C. Small-Scale Irrigation

Water being the critical element in agricultural production, special emphasis has to be given to its efficient and sustainable use. The name 'watershed development' is somewhat self-explanatory, implying water flow-based area development. Labour-intensive watershed rehabilitation projects in different areas have shown that water resources in project areas did increase over time;

[1] *The Tenkara Kind is a plough designed specifically for deep ploughing and thus increased water infiltration. Its literal Amharic translation is the surname of its inventor, Gavin Armstrong.*

springs and streams which had disappeared due to degradation started to reappear and flow. In these areas agricultural production is increasing not only due to reduced degradation but also due to increased irrigation agriculture which supplements rain-fed agriculture and allows production of crops twice a year. However, the efficient use of available water remains a task to be addressed. Reports indicate that 40 to 50% of irrigation water is lost to evaporation and seepage in the conveyance and irrigated fields. This implies that improving irrigation efficiency by 30% could proportionally increase the productivity of irrigated areas without requiring any additional infrastructure.

Irrigation efficiency can be enhanced by selecting appropriate conveyance systems (using water-tight materials, proper canal gradients and so on), as well as appropriate water application system (such as drip irrigation or furrowing) and improved irrigation calendars (such as managing deficit irrigation and selecting proper cropping patterns such as double-row planting). Construction of irrigation infrastructure has been well considered by SLMP. The programme has allotted 25% of project funds to irrigation-infrastructure construction. A lot still has to be done, however, in terms of water-use efficiency and the establishment and strengthening of irrigation-water user groups.

Special care and emphasis must be given as to when and where to construct irrigation infrastructures, without compromising the core objective of the programme to reduce land degradation.

The following strategic issues and principles should be considered during planning and development of small-scale irrigation:

- Full participation of beneficiaries and stakeholders in the planning, study, design, construction and management of small-scale irrigation work;
- Following multi-disciplinary approaches;
- Catchment-based planning and development;
- Institutional capacity building;
- Building upon existing knowledge and institutions;
- Establishment and strengthening of irrigation-management institutions;
- Strengthening local contractors;
- A focus upon technical, social and economic sustainability;
- Community awareness-creation workshops.

In areas where drinking water is a critical problem for the community, it is difficult to give serious consideration to rehabilitation of watersheds or to increased agricultural production. Solving the issue of access to potable water is of course an absolute priority for any community. Thus roof-water harvesting, spring development and sand-storage dams could be considered for such areas.

5.1.2 Up-scaling through SLM Programmes and Projects

Activities which hold the potential for uptake and promotion by SLMP need first to be identified and enabled by the programme's knowledge-management system. GIZ-SLM advisors must then thoroughly document them in order to facilitate transparency, communication and up-scaling. Table 3 depicts technologies which currently feature under SLMP, at varying stages of scalability, but which possess a marked potential for scaling-up on farmland. The activities have been classified into varying levels of scalability based upon the strength of evidence about them and their general applicability.

Table 3. Technologies implemented on farmland under SUN / SLMP

Physical measures/ infrastructure	Biological measures	Other measures
Soil bunds	Mixed cropping of tomato with teff, wheat and barley	Termite protection
Stone faced soil bund	Planting grasses and fodder trees on the embankment	Vertisol management
Stone bunds	Multiple cropping	Soil-acidity rehabilitation
Faanyajuu	Improved crop production	
Tenkara Kind plow	Compost application	
Diversion ditches	Relay cropping	
Waterways	Green manure	
Farm pond	Intercropping of haricot bean, cowpea, and lablab	
Stream diversion	Vetiver hedge	
Spring development	Phalaris hedge	
Trenches	Triticale	
Cut of drain	Improved crop varieties; lley cropping with leguminous vegetation	

5.1.3. Approaches to Supporting Farmland Development

During the planning of farmland treatments, clear criteria are required for the selection and prioritisation of land. In principle, all farmland within a given watershed is eligible for treatment - as long as the intervention is actually deemed necessary in the first place. Criteria should include watershed logic, farmers' agreement, degradation levels, potential for reclamation and ownership conditions. Farmers need to be involved in the development process based upon their interest and willingness; all members should be invited through public announcements, and should initiate their own requests to participate.

The government guidelines on compensation for farmers' contribution to farmland labour (not including gullies) are clear. Farmers are expected to work on farmland activities individually and collectively without payment. The project should only provide materials which are beyond the reach of farmers such as hand tools, planting materials, training, and technical backstopping.

A concept was developed during the SUN Project in Oromia Region to encourage farmers to participate in farmland treatment without payment. Needless to say, people are usually reluctant to participate in activities without incentives. The concept developed for SUN Oromia, in which farmers who have treated their farmland or are involved in farmland treatment are the only ones eligible to participate in cash-for-work activity, was a novel idea. Unfortunately it was not closely respected, duly undermining the project's achievements. Similar concepts need to be further developed for application in future SLMP.

The project document for SLMP foresees the support for interventions on farmland and homesteads not exceeding 25% of project costs. However, different interpretations of the concept were observed by different project areas. Some areas were given a top up of 25% to inputs received by a farmer, while others were contemplating to pay 25% of the labour as compensation. The major assumption during the design of the project was that there do exist needs for farmland and homestead interventions which require inputs beyond the capacity of farmers: the project has to pay for those inputs.

One example of this is the construction of an irrigation infrastructure which requires inputs such as cement, gabion, reinforced bars and skilled labour. In such cases the project should cover the cost of the industrial items while labour and other materials have to be contributed by the farmers. The irrigation infrastructure serves many households and thus the asset should be considered

communal. Other inputs required by individual farmers such as seeds can be paid for by the project, but the farmers have to pay back 100%. This debt should be managed in a revolving-fund scheme or similar mechanism.

The 25% allocation for support to farmland and homestead interventions should be understood as a proportion of budget that can be allocated for these interventions out of the total cost of interventions for that particular year. This has to be made regardless of decisionsabout farmers' versus the project's contribution. The decision on what farmers are expected to pay should be based upon government guidelines. As mentioned in the earlier example of irrigation construction, the expected contribution of the farmers and of the project must be clear from the outset. The provision of seedlings for planting on conservation structures and on agro-forestry setting, meanwhile, should be provided free of charge as these interventions need more promotion at the beginning. A list of activities and items to be provided by the project should be identified and freely communicated to all stakeholders.

In areas of hill-slope farmland, experts are concerned that land treatment without incentives may not be possible since the work can be more difficult. The main reason for allowing compensation in uncultivated lands is the need for collective work as it will not be initiated or completed by single individuals. Similarly, an incentive should be provided for participation in conservation activities on sloping farmland, especially on slopes of over 30%. The reluctance of a farmer to treat his or her land for lack of motivation would cause much damage if other gradients were treated. The compensation therefore encourages farmers to participate in treatment, following a watershed logic. Other farmland types which require compensation are shallow soils, acid soils and farmland with rocky outcrops beyond a given percentage – say, 25%.

5.2. Gully Rehabilitation

Gullies are abundant features of the Ethiopian landscape. Some gullies reduce considerably the size of cultivated and uncultivated lands, thus negatively affecting crop and plant production – see Figure 15. Gullies are usually formed when there is high runoff and low infiltration into the ground – this particularly occurs when the area is devoid of vegetation. Improper design of cut-off drains and waterways, and unsafe disposal of concentrated water flow through road

culverts and fords, significantly contribute to gully formation throughout the country. Similarly, plowing close to gully embankments and overgrazing are aggravating the erosion process and widening existing gullies.

Figure 15. Gullies dissecting farmland in Tigray Region

Shrinkage of land size due to dissection by gullies is the most critical cause of reduced agricultural production in Ethiopia. Gullies also represent barriers to mobility and communication and a source of livestock injury and death. Gullies are widely considered wastelands, as well as threats to safety. However, once treated, gullies become areas of high potential due to their fertile soil and the water stored beneath which can permit vigorous plant growth.

5.2.1 Gully Rehabilitation Techniques

Although gully treatment, mainly using physical structures, started a long time ago in the country, effective gully rehabilitation (or conversion into productive areas) started with the support of GIZ's Integrated Food Security Programme – South Gonder (IFSP-SG). IFSP-SG has made concerted efforts and availed resources to develop new and innovative measures of gully treatment using physical and biological methods. The innovations from IFSP-SG apply biophysical measures for gully rehabilitation and rely heavily upon biological methods which are effective and long lasting. The approach provides short-term and sustainable benefits to participating farmers. 56 species of grasses, shrubs, annuals and trees were tested on the different locations of gullies and were found to flourish. This successful and novel experience has spread to other SLMP areas throughout the country.

Efforts in gully rehabilitation, supported by SUN / SLMP, used a combination

of methods suited to the characteristics of the gully, hydrological factors, gully ownership and cost. Gully rehabilitation under SLMP aims to not only arrest soil erosion but also to produce crops, including food crops, in gullies. The following methods have been applied in various combinations:

- Construction of physical structures (such as gabion check dams, loose-stone check dams, arch-weir check dams, sandbag check dams and brushwood check dams);
- Biological check dams (organic gabion boxes, reinforced bundling, poplar/willow boxes);
- Reshaping of gully sides and construction of trenches;
- Planting of gully bottoms and side walls;
- Planting on gully off-set areas;
- Construction of retaining walls in dry gullies;

The conventional method of gully rehabilitation is through construction of physical structures during the dry period and planting of gully beds and sides with seedlings at the beginning of the rainy season. The latter is not assured as plants may be washed away by runoff. The problem is grave in reshaped gully walls and areas with poor access to water sources during the dry season. SUN / SLMP in Tigray Regional State has developed a novel way of tackling this problem in which planting is completed during the dry season. This is possible in areas where a water source is available for watering of the newly planted seedlings during the dry season. SUN-Tigray managed to get water after digging a few meters inside some gullies. Most gullies have potential water availability after digging a few meters. This approach was very successful and assures communities an early benefit from the treated gullies. The approach is recommended as widely as possible. Planting could also be carried out at the onset of the rainy season, but this requires the construction of retaining walls at the lower edge of the gully side, and trenching along the gully offset in order to protect the loose reshaped soil from being washed away by runoff.

In the past, IFSP-SG was aware of the limitations of its approaches, as it always required external financing to support the procurement of industrial materials and the huge labour requirements per unit area. Experience from SUN-Tigray shows that the investment per kilometer of gully with a 10-meter width is 135,000 to 180,000 birr (~$6,750 - $9,000), depending upon availability of stone and the required external inputs. Therefore, selection of technology which exploits locally available materials, as well as proper screening of gullies for necessity of treatment, are

indispensable. Gullies which are actively expanding both side and length-ways,and gullies emerging on farmland need more urgent response than smaller, older and/or more stable gullies. Some of the small gullies could also be rehabilitated by individual farmers and/or communities without external support. Experience from SUN / SLMP suggests that in order for effective rehabilitation and maximum control of (and benefit from) gullies to be possible, gully beds, gully sides and gully offsets need to be treated differently. Some innovative approaches which have been applied with success under various SUN / SLMP are described below.

5.2.1. 1. Gully-Bed Treatment

Gullies get deeper and wider when the erosive capacity of the runoff along the gully bed is high and surface roughness of the gully bed is low. Gully beds can easily be treated and be used for productive purposes when the runoff coming from the catchments is significantly reduced. A combination of physical and biological measures have been applied to reclaim gully beds in the SLMP. Some of these innovative measures applied for gully bed treatment are described as follows.

A. Biological measures

I. Locally available 'organic' gabion boxes

Gabions are boxes made from locally available bamboo and reed strips, which are woven and then tied together to form cubic permeable boxes that can be filled with stone. Similarly, a reed mat can be effective in retaining the sidewall of the gully.

The organic gabion boxes are strategically placed across gully floors and buttressed downstream for stability (Figure 16). The characteristic of the gully determine the height, placement, and number of gabions required. It is intended that the velocity of the runoff is reduced and that sedimentation is created which favours the establishment of more permanent biological structures.

As soon as an adequate volume of sediment has accumulated along the check dams, appropriate vegetative structures will be put in place so as to strengthen, and eventually replace, the 'organic' gabion that will rot over time. The plants intended for use in this strategy will provide relatively prompt benefits to farmers in the form of livestock forage; at the same time they will serve to reinforce the temporary physical structures.

Figure 16. Organic bamboo gabion boxes and reed mats used in gully treatment

II. Poplar / Willow Boxes

These are *in-situ* structures used for the stabilisation of gully floors and the sedimentation of silt. Poplar and willow stems / trunks, with a diameter of 20-40mm and a length of approximately 70cm, are inserted 20cm deep next to each other across the gully floor in two rows, spaced 50cm apart. The vacant space between the two rows of poplar and willow trunks is then filled with soil and layered with poplar and willow stems. This is effective up to a reservoir level of 50cm and a gully width of more than 5m. Also required is a network of weaving in between the trenches with dense materials such as reed, willow and poplar which can quickly grow as vegetation.

The rapid rooting ability of the poplar and willow trunks ensures that the soil within the structure is quickly bound in place and stabilised by the mass of roots. The quick and profuse growth of stems also serve to break the velocity of the water flow, and at the same time provide benefits in the form of livestock fodder for farmers.

Poplar and willow boxes can only be utilised at the beginning of the rainy season, and in situations in which soil is present. The boxes should have a maximum height of 50cm and should be positioned across the gully bed in order to break the velocity of the water flow and to trap sediment.

III. Reinforced Bundling (or Wattling)

Bundling or wattling is a technique in which fresh stems of plants (such as elephant grass, bana grass, green gold, Spanish reed, elderberry, poplar and willow) are bound together, horizontally planted and covered by soil (Figure 17). To economise planting material the bundles may be supplemented with other bulky organic matter (filler) such as dry grass, straw, or the dry stems of plants such as *Acacia salignaor* or *Sesbania sesban*.

Reinforced bundling requires that mature poplar or willow stems or trunks, 70cm in length, be inserted 20cm deep next to each other across the gully floor in two rows, spaced 50cm apart. Downstream buttressing should be provided for stability. The space between the two rows of trunks should then be filled with bundles of 30% vegetative (fresh) bundling material and 70% filler. The bundling material should then be lightly covered with moist soil to avoid its drying out.

As soon as the poplar or willow stems have exhibited adequate vertical growth, the space between them can again be filled with bundling material. There will thus be an incremental 'growth' in the height of the structure, which will in turn add to the level and amount of siltation. Wattling can also be applied by bedding it into the sediment. This will eventually grow into a check dam.

The techniques described above can be applied before or during the rainy season; however, close follow-up is required after each bout of rainfall in order to avoid damage and allow for immediate maintenance.

Figure 17. Reinforced bundling as an effective gully-rehabilitation measure

IV. Layering of Vegetative Material

Layering is the horizontal planting of fresh stems of plants (such as elephant grass, bana grass, green gold, Spanish reed, elderberry, poplar, willow) across the gully floor or at the base of gully walls (Figure 18).

The technique is applied when a satisfactory level of sedimentation along the gully bed has occurred for rooting and anchorage. The stems of these plants root very readily, after which shoot growth is self-initiated. Sedimentation occurs and increases as the shoot growth progresses and forms a dense barrier which disturbs and breaks up the velocity of flowing water. This leads to a gradual build-up of the gully floor. Planting via layering can be applied on hillsides and along bunds / terraces on farmland. Harvesting of the growing material also aids farmers by providing livestock forage.

Figure 18. Treatment of degraded areas by layering vegetative materials – in this case, elephant grass

V. Planting Cuttings, Splits and Seedlings

The planting of water-loving or tolerant trees, shrubs and grasses such as Paraserianthes lophantha, numerous species of Salix (willow), Acacia melanoxylon, Phalaris aquatica, Pennisetum clandestinum, Pennisetum riparium and green-gold grass on the gully bed, adequately spaced, breaks the flow and velocity of runoff, traps sediment, and protects the gully bed from erosion – see Figure 19.

Talfesque, poplar tree, mulberry, kukuyu grass, riverian grass, elderberry, water-loving tamarix, stink bean, vetiver grass and bana grass can also be planted.

The most important thing, however, is that the plantation needs to be undertaken in a story at which creeping, and erect types of grass are planted in the bottom of the story, in a manner which allows creeping plants to blanket the area while the erect grasses form a hedge. The second story will be composed of shrub legumes while the third story is planted with trees. All of this vegetation needs to be planted in combination.

This strategy also provides forage and construction material for farmers. Gully-bed planting is particularly appropriate when done immediately after the rainy season, to optimise the available moisture whilst giving plenty of uninterrupted time for growth. In big and active gullies, bed planting must be supported by check dams in order to reduce the erosive power of the run off.

Figure 19. Gully-bed plantation for rehabilitation and biomass production

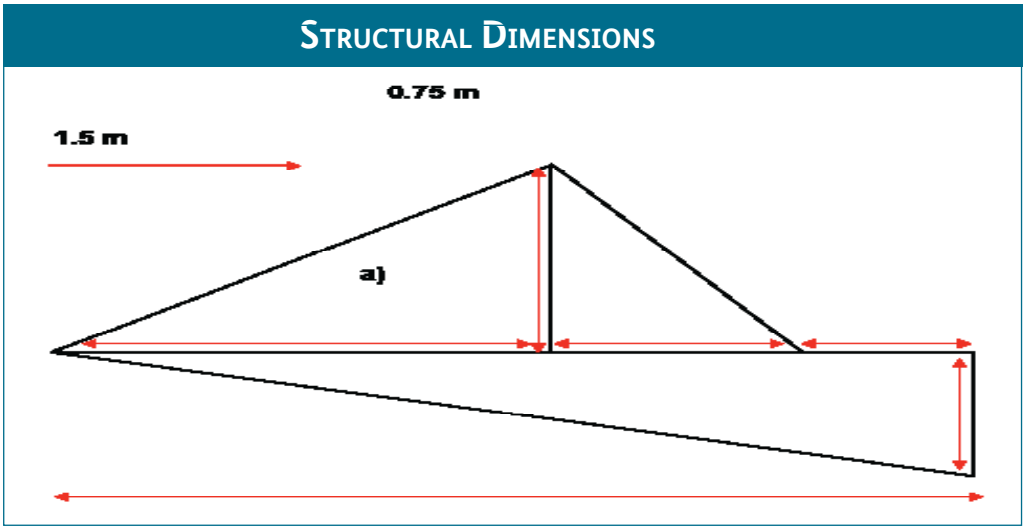
B. Physical Measures

In areas of critical moisture needs for rapid plant growth and thus fast stabilisation of the gully before the rain, supporting physical structures may often be needed. Arc weirs (Figure 22) and gabion check dams (Figure 23) have been proven to be effective structures for stabilising heavily flooded gullies. However, economic considerations are necessary here: such structures should only be implemented if other physical and biological structures cannot withstand the flooding and if large areas or community infrastructures are potentially at risk. Efficient mix ratios between arc-weir / gabion check dams and loose-stone check dam / sand bags also need careful consideration in order to optimise effectiveness.

Figure 20. Arc-weir check dams constructed in big gullies

Figure 21. Gabion check dams as gully treatment

Loose-stone check dams are recommended in areas where enough stone is available. Box-shaped, trapezoidal, arc-shaped and wedge-shaped loose-stone check dams have been implemented in different SUN intervention sites. Of these, wedge-shaped loose check dams (as in Figure 24) were considered the most effective in terms of stability and cost effectiveness - see design below.



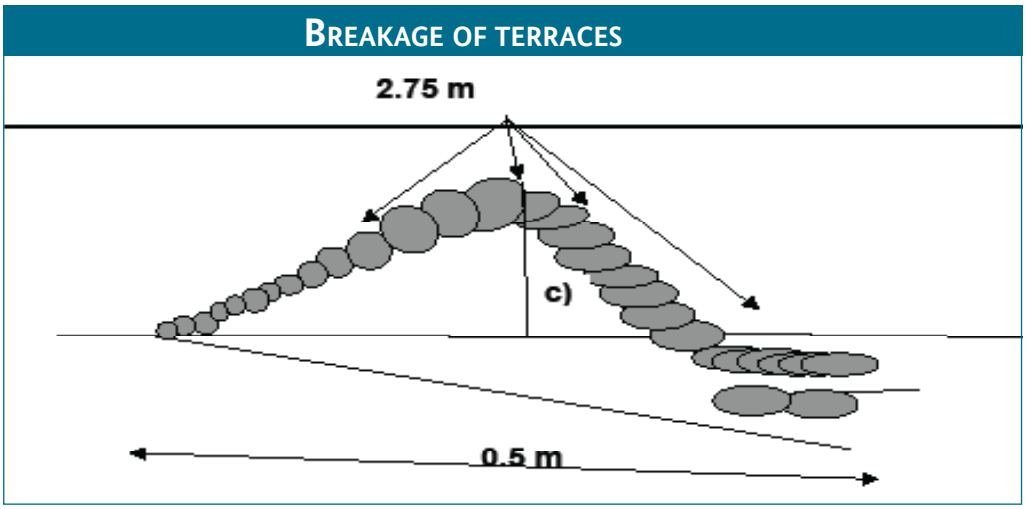


Figure 22. Wedge-shaped loose-stone check dams are particularly effective for erosion control

Sandbag check dams are constructed from bags / sacks filled with sand and / or soil material and placed in layers one over the other across the gully bed. The principle and working procedures here are similar as for other types of check dams. The sandbags dissipate the energy of runoff and trap sediment in the gullies. They can be used to treat small and tributary gullies in areas devoid of stones for gabions or loose-stone structures. As can be seen in the picture below (Figure 25, right picture), sandbags can protect gully heads and hence can hinder gully advancement.

Figure 23. Sandbag check dams

5.2.1.2. Gully-Wall Stabilisation

One of the most difficult aspects of gully treatment is the stabilisation of gully walls. Gullies quickly expand laterally and consume large volumes of productive farmland if their walls are unstable.

Figure 24: Rapid lateral gully expansion due to unstable gully walls

Different biophysical gully-wall stabilisation measures have been applied by SLMP throughout the country. Some of them are described below.

A. Physical Measures

I. *Reshaping Gully Walls*

Gully walls can be repeatedly reshaped until their slopes are conducive for planting and growing - usually a minimum slope of 45% - see Figure 25. However, the practice requires the mass movement of soil, is thus labour-intensive, interferes with natural systems and can consume arable land. Farmers are therefore usually reluctant to accept this method of intervention. On the other hand it has been proven in many locations under SUN-Tigray that reshaping is the most successful way of stabilising gully walls. Building retaining walls along the gully wall using masonry and mats can reduce the volume of reshaping and area to be reshaped. The process of convincing farmers to approve and assist in reshaping gully walls includes identifying the owners, organising familiarisation visits to model sites, and declaring ownership of the reshaped land after rehabilitation. During the training owners of the land are helped to understand that reshaping is not reducing land but is reducing the risk of side collapsing and shrinking, thereby facilitating crop production of the steep eroding part of their land. Familiarisation visits organised in Tigray convinced farmers of the improved production from the reshaped land in the form of forage, vegetables, fruit and spices.

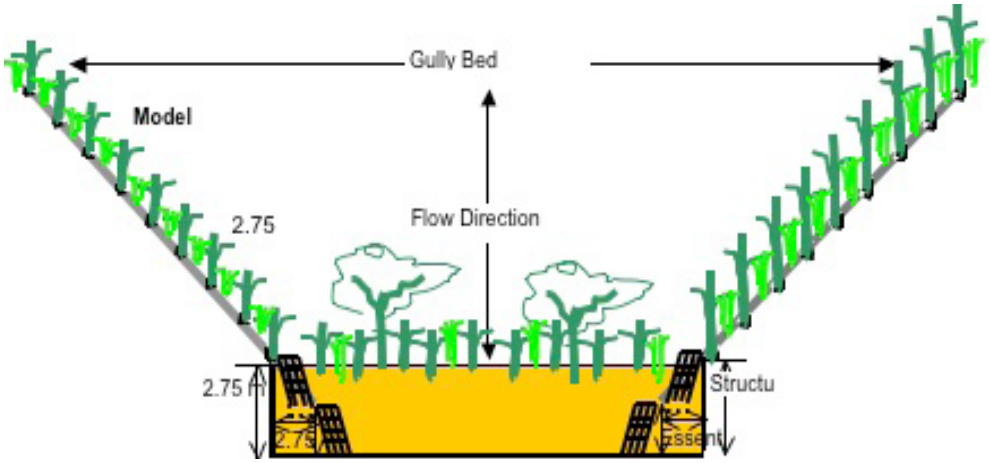


Figure 25. Cross-section of a typical gully, showing how both walls and bed can be stabilised.

Figure 26. Reshaping gully walls is labour intensive and consumes arable land but does increase stability

Previously, gully reshaping was not considered as a viable option for gully rehabilitation due to such strong resistance from farmers, as well as its high labour requirements. With persuasion and proof of success, however, the measure has become increasingly approved of and applied.

II. Protecting Gully Sidewalls with Mats and Retaining Walls

Mats constructed from weaved reeds or bamboo are pegged along the sidewalls of a gully - see Figure 27. The mats measure 50 cm to 1 m high and 1-4m long. For stability reasons at least one third of the mat should be entrenched into the ground. This kind of retaining wall is very important for supporting the sidewalls of a gully, particularly in areas where there are fragile or melting types of soil. The soil material which is then creped down from the flank of the gully is supported by the mat wall. As a result the gully wall will be reshaped gradually; similarly, a space is created behind the mat wall for planting seeds.

These techniques of protection are very simple, can be carried out by the farmers themselves, and bamboo and reed are available in most areas. Compared to gabion and stone-made retaining walls, mats are much cheap and can be applied in places where there is no stone close by. Single-row mats can also be installed across gully beds as check dams in order to treat smaller gullies - as can be seen in Figure 27 (right picture).

Figure 27. Bamboo and reed mats as gully treatment

B. Biological Measures

I. Bundling and Pegging along the Contour of Gully Sidewalls

Bundling and pegging follow the same principles as those used in reinforced bundling, but are adapted to varying circumstances such as slope gradient.

Where the gully wall meets or intersects with the gully bed, and along the contour of sidewalls of slopes of less than 75%, bundles are pegged in place with tree trunks for stabilisation.

Bundling and pegging should implemented with the onset of the rainy season as it accompanies the most conducive conditions for vegetative growth of both the tree stems and the plant materials of which the bundles consist. They serve not only as soil stabilisers but also produce livestock fodder. Bana, elephant grasses and *Eritriana* stems have proved to be appropriate plants for this technique. Poplar and willow can be used but their survival rate is low, particularly if they are not planted in the lower section of the wall.

Depending upon the circumstances, bundles, with or without pegging, should also be used for stabilisation and fodder production purposes in small soil and moisture pockets which are not large enough to stabilise in any other manner. *Arundo donax* and *Hyparrenia* stems, consisting of three to four nodes each, have proved particularly useful for this purpose.

II. Plugging Gully Sidewalls

Plugging consists of drilling small planting holes in gully sidewalls using a small auger which has been specially designed and built for this purpose. Plant 'plugs' are then inserted into the planting holes. Both operations are undertaken as soon as there is adequate moisture in the soil. Even vertical gully walls may be treated in this way due to the minimal soil disturbance. However, this method should only be promoted in areas in which reshaping is not possible for some reason, since gully walls may collapse due to the scouring effect of a flood or heavy flow. To reiterate, gully reshaping is preferable to plugging of sidewalls.

The plant Crown Vetch has proven to be highly effective for plugging due to its spreading growth pattern, which covers and binds the loose soil of the sidewall, protecting it from the erosive effects of rainfall and protecting the soil from drying out (Figure 28). Crown Vetch is a leguminous plant, enriching the soil by fixing nitrogen, and producing considerable amounts of livestock fodder. Due to its invasive properties, however, care should be taken not to plant Crown Vetch near cultivated fields. *Hyparrhenia*, which self-seeds freely and which can tolerate the dryness of slopes and the shallowness of soils, is also recommended.

Figure 28. Crown Vetch, a few weeks after planting (left) and after a year (right)

III. Planting Trees, Shrubs and Grasses on Gully Sidewalls

As with plugging, the long-term stabilisation of gully sidewalls also requires the establishment of legumes and grasses. Caution must be taken in planting perennial trees as their broad canopies make them susceptible to wind damage. Multipurpose trees are regarded to be adequate as they provide benefits in terms of soil stabilisation and enrichment, fodder, building materials, and the

creation of microclimates. The latter in turn promote the growth of neighboring plants. Among others, *Dodonea angustifolia*, *Acacia saligna* and *Teline* are recommended - see Figure 29 below. Excellent results have been achieved by planting bana grass and green-gold grass in rows across the gully slope, and biomass production is very high.

Figure 29. Gully sidewalls planted with grass and tree seedlings

IV. Direct Sowing or Broadcasting

The initial stabilisation of gully floors and walls, and the provision of basic soil cover, can also be achieved by direct sowing (broadcasting) the seeds of hardy and locally adapted species. *Eragrostis teff* and *Eleusine coracan*, for instance, are both drought-tolerant and fast growing, and their seeds are locally available and cheap. Triticale is also effective in this respect in all soil types, while teff is especially effective in black-cotton soil.

Direct sowing of gully beds and sidewall cracks during the rainy season results in almost immediate vegetation cover of fragile areas. This stabilises the soil, provides a foothold for windblown seed and debris from outside of the gully, and allows further work to be carried out on the sidewalls, with reduced risk of soil slippage. To assure efficient application and to avoid over-planting, seeds should be mixed with dry sand for sowing. This technique is important to cover large tracts of land, particularly when there is a shortage of seedlings, saving on labour and investment.

5.2.1.3 Offset Plantations

The gully offset is the area which extends five meters from the top edge of the gully wall. Generally speaking, gully offsets are moisture deficient and thus fragile; drought-tolerant multi-purpose species of trees, shrubs, grasses, and fodder legumes are therefore recommended for stabilising the offsets (Figure 30). Recommended species include *Teline canariensis, Teline madeirensis, Acacia saligna, Acacia eragrostis curvula, Lespedeza sericea, Medicago sativa, Coronilla varia, Atriplex nummularia abyssinica, Acacia angustissima, Paraserianthes lophantha, Chamaecytisus palmensis, Grevillia robusta, Sesbania sesban, Lupinus arboreus* and *Tamarix*.

Figure 30. Off-set plantations in South Gonder

The areas supported by GDC have tried various grass, herbal plants, shrubs and trees for planting on different parts of gullies. IFSP-SG was the first to test over 56 species and recommended for application in other regions.

5.2.2. Sustainable Management of Rehabilitated Gullies

A. Defined Ownership

Both cultivated and uncultivated lands fall under both private and communal ownership depending upon their locality. The decision to treat a gully, whether private or communal, is dictated by the location and severity of the gully's effects. The issue of which type of land possession is easier to handle varies from region to region, and even from woreda to woreda; either way, appropriate mechanisms have to be developed for sustainable gully rehabilitation. According to the SUN

/ SLMP experience, prior to the treatment of gullies in the watershed it was a prerequisite to distribute the communally owned gully to individuals, as dictated by regional rules and regulations for proper management and sustainable utilisation of resources. Thus the treated gully was owned by individuals who certified for it. The owners could be either those who inherited it, owners of adjacent farms, or landless young people.

Most gully treatment schemes are very costly as they require heavy labour inputs, biological materials and industrial materials (such as gabions and cement). Having said this, the return on investment is generally significant. As part of its operation, SUN / SLMP has been supporting the treatment of gullies owned by adjacent farms. As has been stated above, gully treatment requires huge investments in terms of labour and materials, and the question of investing so much for the benefit of relatively few farmers is always raised. This is especially the case considering that gullies can producehuge biomass for livestock feed or other economically valuable products; other community members may envy the few beneficiaries of this. Indeed, community members might also have contributed free labour during rehabilitation. Ownership by individual farmers who are used to farming makes sense and also ensures longer-term management and protection. Meanwhile other members of the community are likely to benefit indirectly from reduced flooding, bee foraging and the improved aesthetic value of the gullies. Sequestered carbon and increased water yields represent additional benefits.

It is compulsory to explain and demonstrate to all stakeholders that individual owners of gullies contribute more than other community members, but that they also share part of their products with the community. For example, planting can be undertaken by owners free of charge. Private gully owners may be obliged to provide planting material for other farmers or for the project. A programme-wide concept explaining the division of labour and benefits shared among communities needs to be developed by SLMP. In areas where there are legal watershed associations, the responsibility of rehabilitating gullies and usage rights are clearly defined in the bye-law documents which are binding to all members.

B. Developing a Management Plan

For many years government institutions and development partners like GIZ have engaged in massive gully rehabilitation interventions. Large tracts of land have been improved by different soil- and water-conservation measures. One of

the main bottlenecks of this development endeavour in the past, however, has been a lack of clear understanding on how to manage the land before, during and after rehabilitation.

As a result, most of the previous interventions have been destroyed or become obsolete within very short periods of time. Experience has already shown that the development of a usage concept and preparation of management plans is compulsory for capitalising upon rehabilitated areas and to ensure greater sustainability of interventions. Particular emphasis needs to be given to communally owned gullies. All users should think carefully and be clear on why local gullies will benefit from being treated.

A well-rehabilitated gully needs a management plan for its sustainable and equitable use. The main objective of a good management plan is not to just maintain the gully at any particular stage, but also to maximise the benefits from it. This might necessitate changes in the types of species to be planted. Most gullies produce huge quantities of forage: this should be linked with fattening, dairy development, rearing of small ruminants and apiculture.

Gullies are usually owned by more than one person: agreement has to be reached on how to see activities through to their conclusion, as well as the proper use of resources after completion. A rehabilitated gully may be destroyed very quickly if safe water disposal of runoff is not ensured. Sometimes there is a tendency to build check dams up to the level of the adjacent ground: this results in the formation of other gullies as water has to find its way down.

A management plan for a gully can be developed at the beginning of rehabilitation, but the ideal timing for it is at the end of the first year of rehabilitation. At this time most of the essential inputs have been made and one can easily see the potential of the gully and the remaining activities. A management plan should comprise a plan for harvesting resources, maintaining structures, planting, protection from animals and pests, value-chain development, and part-changing of plants grown.

The period for the plan depends upon the type of products available; a 10-year strategic plan is advisable. The responsible advisors / experts have to develop a model management plan which can be easily adjusted by woreda experts and development agents. Once the model management plan is known to development workers, the regional, zonal and project staff have to check the quality of planning and advise on changes if deemed necessary. The implementation of the management plan is the responsibility of the

beneficiaries of the gully. Sharing of responsibilities among individuals should be clearly shown in the management plan. The plans should be prepared in a way which can easily be understood and implemented by farmers. This includes translation into local languages. Farmers using a common gully should be organised into a gully user group to allowfor better implementation of the management plan.

5.3. Hillside Development

Most communally owned hillsides, especially steeper uncultivated land, are highly degraded because of the removal of vegetation and neglect of proper land management over many years. Theycover huge areas of Ethiopia - 62% of Tigray Region, for example – but do not produce much biomass, often being used only for communal grazing. The only exceptions are those set aside as enclosures. Many efforts to improve the productivity of these areas have demonstrated that some slopes can be rehabilitated to support diverse vegetation, including crops. Their rehabilitation/development should focus upon:

- Reducing run off which harms the hillside itself, as well as farmland and gullies in the lower area;
- Conserving or improving soils and moisture by enhancing the infiltration capacity of the slope;
- Reducing soil erosion;
- Improving vegetation for the purposes of forage, fuel wood and construction materials;
- Recharging sub-surface water for development of water resources in the valleys which can be used for domestic and irrigation purposes.

Although the areas highlighted above are worth pursuing, deliberate efforts must also be made to convert these areas into productive land units, particularly for those who do not have land orthose with only small land holdings. A good example in this regard is the conversion of degraded areas into productive areas through the construction of semi-circle terraces and planting of fruits, vegetables and grasses in Tigray Region of Northern Ethiopia. Furthermore, the construction of bench terraces for productive conversion of slopes in Tigray and Amhara Regions has provided access to land to landless young people – with support and endorsement from the rest of the community. No one would have imagined that such areas could have produced fruits and vegetables – see Figure 31.

Figure 31. Hillside development using bench terraces (top) and semi-circle terraces (bottom), before and after terracing (left and right respectively).

There is ample evidence from SUN / SLMP that rehabilitation of degraded hillsides reaps prompt benefits for farmers. This especially the case when land is assigned to individuals before being converted: new owners assume ownership and rehabilitate the land of their own initiative, reducing the input required from the project. Prior assignment to individuals also helps to avoid potential conflict over a newly converted area.

Improvements in quantity and quality of forage are the most observable impacts of interventions. Success in development of these slopes is also highly dependent upon levels of protection against human and livestock interference. According to SUN / SLMP experience, defining the users, development and legalisation of

by-laws is key to success and sustainability. On top of these economic and social benefits triggered by slope rehabilitation, the following ecological improvements have also been observed:

- The emergence or re-emergence of water springs;
- Increased discharge of water sources;
- Vegetation density increment and the emergence of new species;
- Increased wildlife;
- Reduced sedimentation of streams;
- Increased bee forage resulting in more honey production.

Since hillside degradation is the driving force of farmland erosion, grazing land and even some homesteads and slopes need to be converted prior to farmland and gully treatment. Certain physical and biological measures, as described below, also need to be considered when planning rehabilitation activities.

5.3.1. Physical Measures

The first intervention in the rehabilitation of degraded hillsides is to reach agreement with community members about closing off the area from human and animal interference. The enclosure will permit the improvement of the organic matter of the soils. As most communities use these lands for animal grazing, the area to be enclosed shall be limited to the area to be treated with physical and biological measures. The growth of grasses immediately after enclosure offers an opportunity to convince community members about the interventions, since grasses can be harvested as early as two years from treatment.

The most common physical soil and water conservation measures promoted by SUN / SLMP have been hillside terracing, bunds and micro-basins (see Figure 32, left picture), semi-circle terracing and trenches (Figure 32, right picture), infiltration pits, ponds and diversion ditches. The number and type of structures required for a specific area depends upon the actual problem, intended impacts, and cost feasibility. Similarly, some attempts have been made by communities and experts to put in extra structures in order to generate more cash-for-work opportunities.

The combination and number of structures required for the rehabilitation of a slope depend upon the landscape, levels of degradation and rainfall.

The investment per hectare of hillside also depends upon the expected returns and productive potential of the area. Experience from SLMP and SUN has shown that degraded hillsides can be changed into productive land in a very short time via the selective implementation of soil and water conservation structures. In the same way, fruit and forage are produced on previously marginal hillsides through construction of semi-circle terraces.

Figure 32. Micro basins (left) and trenches (right) are ideal structures for water harvesting

Torrential rains mainly occur during July and August. They cause the most severe erosion if the runoff is not properly managed. This situation is further accentuated by current climate-change impacts. Rain needs to be captured at its point of falling for plants during the dry spell, or safely disposed of to the natural waterway. Appropriate technologies need to be selected based upon the site situation, but with the aim of maximising the retention of soil and water.

A large proportion of project resources is devoted to the creation or strengthening of physical structures, since the areas to be treated are so large. In order to satisfy the project's purpose, proper planning for the appropriate structures minimises the costs of rehabilitation. Experience has shown that 15,000 birr (~$720 USD) is the figure used to rehabilitate a hectare of hillside. With proper planning of optimum structures and intervention approaches, however, this figure can be reduced to 2,500 birr (~$120).

SLMP's experience from Tigray shows that deep trenching has proven to be very successful for water and soil retention before the rehabilitation of farmland and gullies. However, one has to take into consideration that it may not be possible

or cost effective to dig trenches throughout the hillside, due to natural physical obstacles. In such cases the extra runoff from the undeveloped areas need to be captured by constructing water-harvesting structures so that as much runoff as possible can infiltrate into the ground.

Percolation tanks, sometimes called infiltration pits, have been developed to serve this purpose on slopes. The design and capacity of the structures depends on the size of runoff area, purpose and landscape of the run-on area. Percolation tanks are used for groundwater recharging in areas with irrigation potential from hand-dug wells or springs. In areas with tight clay soil, the infiltration rate of ponds is very slow. In this case infiltration-enhancing measures are needed to speed up percolation and reduce evaporation. Field-level tests into the application of gypsum to infiltration pits constructed at SLMP sites has enhanced percolation, as the gypsum renders the soil more permeable. Indeed, research literature claims that gypsum increases infiltration three-fold. In spite of these facts, physical structures alone may not last long unless they are aligned with logical, sustainable biological measures, as elucidated below.

Figure 33. Percolation ponds constructed on communal land

5.3.2. Biological Measures

Biological measures stabilise structures, reduce erosion, improve soil fertility soil and contribute to the production of forage, cash crops, fuel wood and construction materials. They have always formed an integral part of the watershed rehabilitation measures of SUN / SLMP, some elements of which

have been pioneeringwith regard to watershed rehabilitation. Various species of grasses, shrubs and trees have been planted into physically treated hillsides, as in Figure 34. Fruits and vegetables have also been planted on the semi-circle terraces promoted at SUN / SLMP sites. Climate, soil type, reasons for planting and management systems all influence the selection of species to be planted, as well as the planting system to be implemented.

Figure 34. Soil and water conservation structures on degraded slopes

One of the most important contributions of SUN / SLMP and predecessor projects has been the testing and inclusion of a diverse range of species – see Figure 35. The process has allowed for a screening of species before scaling up across different agro-ecologies. The type of plant species was decided based upon the potential of the site, needs of communities, and guidance from GIZ-SLM advisors and government experts. The biological materials used and proven effective to date are shown in Table 4 below.

Table 4. Species recommended for up-scaling

Trees	Shrubs	Undergrowth
Cordial Africana Acacia melanoxylon Croton macrostachyus Acrocarpus fraxinifolius Acacia decurreness Acacia abysinicca Moringa stenopetala Ficus carica Grevillea robusta Albizia lebbeck Paraserianthes lophantha Albizia schimperiana Olea europaea Acacia melanoxylon Casuarina equisitifolia Persea americana Morus nigra Casmiroa edulis Enset ventricosum Punica granatum Virgilia divaricata Virgilia oroboides Castanea sativa Ziziphus	Acacia saligna Sesbania sesban Accacia aungustisima Coffee arabica Cassia sturtii Sambucus nigra Tephrosia vogelii Gleditsia triacanthos Dodonaea angustifolia Leucaena leucocephala Rubus idaeus Atriplex nummularia Chamaecytisus palmensis Tamarix nilotica Teline canariensis Teline madeirensis Teline monspessulanus Morus alba	Pennisetum purpureum with Pennisetum typhoides Coronilla varia Pennisetum purpureum Pennisetum clandestinum Pueraria thunbergiana Ornithopus sativus Hyparrhenia rufa and other Hyparrhenia species Vetiveria zinzanioides Eragrostis curvula Lupinus luteus Ornithopus compressus
Purpose of the different strata		
Trees: Provide canopy, reduce the sun intensity for undergrowth, have a littering effect, improve the organic matter content of the soil, provide forage, firewood and construction material, create good microclimatic conditions for apiary farms, and boost carbon sequestration.	Shrubs: Reduce the erosive capacity of raindrops, improve soil fertility, provide forage for livestock and bees and improve the bio-eco system.	Undergrowth: Provides cover for the ground, protects against land dissection by concentrated runoff, providesquality forage for livestock.

Figure 35. Salt bush (upper photographs) and pigeon pea (lower) were important introductions under the SUN Project

In general, biological treatment of hillsides by SUN / SLMP has not been extensive when compared to the potential of the available sites. The major reason for this has been the limited access to plant-material production centres and thus appropriate planting materials. At the same time there seemsto have been inherent problems with the planning process. Let us take the forestry operations as an example to illustrate the need for improved planning, implementation and management. This is reflected through the selection of species, planting techniques, follow-up activities, tending operations and the performance of the plantations.

The number of seedlings planted (reported) was much less than the potential for planting. The species at one site were all mixed together: this was difficult to

manage as each species has different growth habits. Plant tending was reported to have been carried out at some locations but was not adequate.

The inclusion of indigenous trees and shrubs was tried at some locations, meanwhile. Here again however, effort was not sufficient either considering the availability of hundreds of species. The growth rate of most of the indigenous species was slower than the exotic species. The conclusion here was thus that exotic species often allow farmers to gain quicker benefits.

The long years of adaptation and suitability trials for salt bushes in Tigray Region demonstrated its adaptability to moisture stresses and its appeal to small ruminants. A mix of salt bush and cactus makes excellent animal feed in drought-prone areas.

5.3.3. Issues for Consideration in Hillside Development

Hillside-treatment activities begin with clarification of ownership since most uncultivated slopes are considered communal. The importance of this cannot be overstressed because clearly defined ownership issues avoids many associated problems later on. Advice on the distribution of communal lands to individuals or groups, following traditional systems and / or regional policies, must be given to local inhabitants. Recognition of the site's contribution to downstream areas of the watershed, traditional and improved means of mitigating damage or flood, commitments to maintenance and organisational issues, all need to be addressed by the community, with assistance from the project.

Proper planning of physical and biological works is a delicate process, taking into consideration the identified problems, economic and ecological aspects, farmers' level of interest and sustainability issues. Physical measures recommended for hillside terracing depend upon slope type, gradient, and its ability to break runoff velocity and safely dispose of excesses runoff. Digging a mix of trench and micro basins at a rate of 250-300 per hectare for each structure between terraces helps to improve percolation and retention of water. The combination of structures to be consideredshould also be determined by the planting system and its purpose. For fruit production it is advisable to have semicircle terraces of 2 or 3m radius (depending on the slope gradient) at rate of 250-300 per hectare.

Tree planting should be planned as part of a comprehensive forestry operation which includes the accurate selection of species to meet site conditions and

community needs. Selection of species and planting systems also needs to be undertaken in consideration of the economic activities to be attached with it. The most beneficial economic activities to be associated with rehabilitation of hillside treatment are fattening, apiculture, and recreation areas. Recommended plant species to consider for plantation at different stories are indicated in Table 4 on p.100. Additional species not listed can be incorporated as long as site-specific consideration to the location, context and planned use is made.

A common forestry operation undertaken after the planting season and periodically during the first two years is the **survival count**. This must be determined right after the onset of the dry season (November or December) and before the following rainy season. It is also advisable to determine the major causes of seedling mortality. The survival count helps to improve future timing of planting, seedling quality, changes of species, better site preparations, and so on. The determination of survival rate does not require technical knowhow: it just comprises counting the seedlings that have not died. Development agents, with the support of Community Watershed Teams (CWTs), can undertake the operation if appropriate orientation is provided.

The woredas should be supported by GIZ-SLM advisors on species selection, seed procurement and seedling production, site preparation, planting and tending operations. A management plan which addresses issues such as the management of the plantation, timing of activities, responsibilities, measures to be taken in case of defaulting, time frames for the different species, and the purpose of utilisation, should be developed in a participatory way during the second year of the plantations (similar to Section 5.2.2b above). Woreda experts are expected to provide training on the management plan to the communities.

The inclusion of more indigenous species (trees, shrubs and annuals) at sites suited for this purpose should be given increased emphasis. There exists a need to include more exotic species with proven success in different site conditions. The determination of the species to be recommended for different purposes should be guided by evidence of their successful performance under different conditions. Hundreds of species have been tried in Ethiopia since the introduction of eucalyptus. The Forestry Research Institute, higher learning institutions, the government development sector, and other projects and programmes have vast experience in planting. Documentation of these efforts exists but is not readily available to anyone. The first task of the GIZ-SLM advisors, in order to prepare themselves for provision of proper advice

on planting, was to access the documentation on available experience from the different institutions. In addition, the documentation of the performance of species in their own area can be systematically observed and evaluated. The work can also be outsourced to consultants or competent government institutions. The Forest Research Centre and Wondo Genet College of Forestry are potential collaborators herein.

Moringa, a multi-purpose tree, should be promoted on hillsides for its forage and medicinal values. Landless youth in Alamata and Shewarobite Woredas are organised intoa Moringa powder sales group. The current price of Moringa powder, which is used for medicinal purposes, is ETB 120-140/kg. Similarly, bamboo is a fast-growing, multi-purpose plant which can grow both in the highlands and the lowlands and is most widely used as a construction material - but also makes food, perfume and pens. Bamboo also sequestres huge amounts of carbon.

5.4. Pasture / Grazing Land Management

A persistent problem in pastoral areas is the deterioration of feed quality due to overgrazing and changes in moisture conditions, which combine to reduce the yield of pastures. Very little emphasis has been given to pasture development by SUN / SLMP since rehabilitation of gullies and degraded hillsides has always been favored.

The pasture improvement activities undertaken at Kanat, near Debre Tabor, are a good illustration of the potential for improvement. The Kanat pastureland, which spans 85 hectares inclusive of the gully areas, was once a productive pastureland which fed hundreds of households. The productivity of the pasture declined following heavy overgrazing, trampling and resultant land degradation. 'Free grazing' is an age-old traditional system which allows owners to indiscriminately graze their livestock on communal land. There is no limitation on the number of livestock an individual household can own. Especially during the cropping season, all livestock are confined to the scarce grazing lands – which for 5–6 months of the year are subject to immense grazing pressure.

A livestock count conducted on three consecutive days in August 2004 showed that the Kanat pastureland held 580 cattle, 220 equine (horses, donkeys and mules) and 760 sheep. This data suggests an overstocking factor here of between 10 and 20% – the Tragedy of the Commons. In other words there are 10 to 20 times too many animals grazing on the land. As a result the animals cannot

get enough fodder to stay healthy and in good condition; similarly, the natural vegetation has no chance to recover at any time of year. There is no reseeding effect, the most palatable grasses and legumes have disappeared, and bare patches have developed, giving room for accelerated soil erosion and severe dissection by rills and gullies.

In March 2004 Kanat community representatives presented a request for support from the then IFSP-SG as they knew of the project's reputation. After detailed discussion and agreement, the treatment of 4 hectares of gully area and 5ha of offset area was worked on in April 2004, through the joint effort of the project and the community. As per the agreement, the total area was fenced off with local materials and grazing was restricted. Simple check dams (loose stones, reed mats and plastic bags filled with soil) were constructed to dissipate the energy of runoff. Gully beds and walls were planted with various grasses, legumes, trees and shrubs – see Figure 36. On the offsets fast-growing grass species and multi-purpose trees were planted. Trenches were constructed around the fence to increase infiltration and reduce the pressure of the lateral flow into the gully sidewalls. Gullies were also reshaped in order to stabilise the vertical walls quickly and to create more space for planting. The indigenous grasses were allowed to self-seed.

Figure 36. The transformation of Kanat pastureland from degraded (left) to productive (right)

A total of 235 households benefited from the rehabilitated rangeland, with communal by-laws on utilization in place. In October 2004 a total of 106 oxen (Figure 37) were fed twice a day for six weeks from the rehabilitated

area, constructing a feeding trough next to the gully fence (9 hectares) using the cut-and-carry system. By the end of the 2005 rainy season a remarkable increase in biomass production was observed: 280 oxen had been fattenedby the supply of forage from the area, and farmers generated an estimated addtional collective income of 140,000 birr (~$7,000).

After this time the feeding regime was then changed: groups of 60 households each began alternating every four weeks to cut and carry for stall feeding at their homesteads. The cut-and-carry system proved preferable over in-situ feeding due to its reduced damage of forage by trampling and thus faster regeneration of fodder crops by up to 50%.

Figure 37. Oxen feeding using a cattle trough beside the fenced gully, Kanat

The area was rehabilitated in just a year and the communities were offered more land for similar treatment. The area was being looked after with additional measures, even without the support of the then GIZ-IFSP South Gonder. The site is well recognised as a flagship intervention, serving as a demonstration site of zero-grazing management systems for many local training programmes and experience exchanges (Figure 38), both from within Ethiopia and from Sudan, Egypt, Uganda and Burkina Faso. This recognition emanates from the fact that the community has been accustomed to open grazing systems for centuries. Furthermore, it happened in a country in which so-called successful development projects leave no trace soon after their phase-out.

Figure 38. Experience-sharing visits from different partner organisations with Kanat community members

The Kanat community remain encouraged by the results they have achieved, and are trying to replicate their success in other degraded areas. The size of the treated areas in the locality is thus increasing with time. Community members are receiving forage biomass to cover the feed demands of their livestock, and even to sell extra biomass to others. The community members are well organised into user groups and have formulated universally binding by-laws.

5.5. Homestead Development

There exists great potential for the integration of interventions such as fuel-saving stoves, improved forage, small-ruminant rearing and fattening, wood-lot establishment, beekeeping, poultry, fruit trees, spice and vegetable at homestead level. Homesteads are relatively productive entities because of the organic matter from plant and animal residues which accumulate; similarly, crops here are easy to protect from animal grazing / browsing. The other important aspect of homesteads is their tenure security, which promotes investment.

Farmers in Ethiopia do not generally utilise homesteads to their full potential. Cereals, potatoes, gesho, fruits, livestock, cabbage, onions, and tomatoes are grown using rain-fed water supplies but very few farmers produce key crops using irrigation supported by homestead ponds. Homestead interventions such as improved forage, vegetable seeds, improved bee hives, improved small

ruminants, fruit seedlings and fuel-saving stoves are good entry points for community development projects. Similarly, linkages to existing credit schemes, revolving funds and advice services need to be considered during the project planning of household-based development.

5.5.1. SUN / SLM-supported activities

SLMP and SUN have to some extent supported homestead-development measures, as depicted in Table 5 below. The main objective of interventions was to improve the income of the households, with heavy focus upon female-headed households. Although the list of activities supported shows a diversity of activities, most of them are limited to a few demonstrations or trials. Activities such as livestock promotion have started lately: their success is thus difficult to evaluate. Most of the interventions were very successful in the areas in which they were tried - according to the GIZ-SLM advisors. The most impactful technologies here have been apple and enset (false banana) promotion: these are described in detail below.

Table 5. Homestead-level interventions promoted by the SUN Programme

Amhara	Oromia	Tigray
Triticale Fruit trees Vegetables Forage development Drip irrigation Triddle pump Sheep rearing Poultry Bee keeping Fattening Spices Enset production	Triticale Fruit production (apple, mango, pitch, mango) Vegetables Forage development Compost preparation Fuel wood production Shade and wind breaks Multi-story agro-forestry Bee keeping Enset production	Triticale Fruit production Vegetables Forage development Compost preparation Agro-forestry Pond construction Spring development Shallow well construction Hand pumps for pond water lifting Sunflower andsafflowerpromotion

Apple cultivation began in Ethiopia in the 1970s but was insignificant until the late 1990's. Apple production in Oromia was promoted through GIZ from 1997, when the Oromia Regional Government financed the import of seedlings from the past years. The varieties which proved successful in the highlands of Ethiopia, at altitudes of 2200-2800m, were Apple Ana and Apple Princesa, grafted on the rootstocks of MM 106 and MM 111. Princesa is used as a pollinator of Ana.

Training and pruning of branches, pest control and proper watering techniques, are crucial management practices.

The relative income generated from apple production in Oromia Region today is considerable. A single apple tree provides an average of 20kg of fruit. A farmer with ten trees can easily generate a reasonable annual income of approximately ETB 6,000 (~$500).

So far all seedlings have been imported from Spain, although there have been some attempts to encourage smallholder farmers to produce grafted seedlings in Oromia. The production of apple seedlings by private individuals and state nurseries should be encouraged in all regions, for sustainable promotion and scaling up of the practice. One crucial aspect to be tackled is protection of the fruits against bird infestations.

Figure 39. Apple production

Enset (false banana) is a staple food for nearly nine million people in south and south western parts of the country. It is commonly referred as the 'anti-hunger tree' since it is drought tolerant and high yielding.

Research findings have shown that dry yield is more than 50 quintals per

hectare per year, and rich in calories. Enset is mainly used for qocho bread and 50% blended for injera.

SUN / SLMP introduced enset to grain-based, drought-affected and food-insecure areas parts of Oromia Region in which the crop was previously unknown. The project organised farmer-to-farmer experience exchange visits, allowing influential farmers to live with enset producers. The influential farmers were then used as mediators to convinceother farmers to try enset production. Training sessions on cultural practices, management and food processing were organised using farmers from enset-producing areas as trainers. The practice of enset production did spread, leading to improved food security, land-use changes from annual to perennial crops, and improved income from the sale of products and seedlings.

The major lesson from the introduction of enset to areas in which people did not previously grow or eat the crop has been proof of farmers' flexibility towards changed food and farming habits – providing the right approach is followed. Many projects have tried to introduce the crop to the northern part of the country with minimal success - with the exception of enset leaves for making bread and wrapping chat.

Multi-story agro-forestry is a system in which various crops comprising fruit trees, shrubs like coffee, undergrowth like spices, and shade-tolerant root crops are planted in levels – see Figure 40. The purpose of the system is to maximise the benefit from multiple productions in a vertical area, as well as providing **landcover and recycling nutrients**. The best indigenous system of multi-story agro-forestry is found in Gedeo Zone of SNNP Region, where efforts are being made to register it as a UNESCO World Heritage Site.

Multi-story agro-forestry systems have been established under SUN / SLMP in Wet, Woyna and Dega climatic zones of Oromia Region. The most effective system in the test areas was comprised of avocado and mango trees as a dominant layer, with coffee, papaya and banana as a second layer, and spices and root crops as undergrowth. The farmers who established the system have obtained a 50% increase in annual income from a 400m^2 area – as observed by GIZ staff implementing in Mettu Woreda of Ilubabor Zone. Furthermore, erosion was considerably reduced and the fertility of the area increased by the augmented quantity of organic matter.

Figure 40. Multi-story agro-forestry measures in homesteads hold great potential

Backyard vegetable production (as in Figure 41), supported by roof-water harvesting, has been tested and proven successful in Tigray Region. This type of homestead development was found to be particularly beneficial to women who can easily manage the crops and gain additional income from vegetable sales whilst upholding household activities. Compost preparation in Tigray was not as successful as had been hoped, meanwhile, due to a critical shortage of biomass in the region. Similarly, apple, enset and spice production were not successful in Amhara, either due to a lack of interest from farmers, or a lack of sustained effort by the GIZ-SLM advisors to convince farmers about the benefits of these crops.

Figure 41. Homestead vegetable production (left) and use of storage ponds (right)

5.5.2. Issues for Consideration in Homestead Development

Aside from the successful interventions mentioned so far, there is a need to look into other interventions which increase the income of households. Examples are the promotion of live fencing, wood production (e.g. *Cordia Africana*), fish ponds, grafted mangoes and avocados, and improved varieties of potato (Figure 42). Moisture conservation and harvesting structures such as modified trenches, ponds (see again Figure 32, p.97) and spring development also improve homestead production, especially in drier areas.

Figure 42. Enset plantation (left) and potato production (right) at homesteads

Honey production in homesteads is also a promising practice to be promoted and its huge market potential exploited. Availability of bee for age is guaranteed all year round, with the adoption of fruit, vegetable and tree plantings at homesteads. Honey production can be particularly useful for landless youth and farmers with small holdings. It has been observed that experts from different professional disciplines tend to promote the introduction of technologies from their own areas of expertise. This is understandable but it also generates an overwhelming variety of recommendations considering the limited scope for different types of interventions. As a result, the technology or approach to be promoted to a given household must be carefully analysed based upon the size of the homestead, preferences of the indviduals, experience, labour availability, accessibility to technology, comparative advantages of the area and productivity of the land. It is dangerous to simply follow advice of experts without first conducting one's own sound analysis. A criteria has to be developed for help this decision-making process according to the variables mentioned.

5.6. Safe Disposal of Water from Roads and Embankment Stabilisation

The contribution of road construction to land degradation is significant in Ethiopia. Design and construction do not always consider environmental factors such as the consequences of unsafe water disposal into the natural drainage system. As a result, runoff from road constructions is transferred from one drainage area to the other, overloading natural waterways with excess runoff. There are several areas where huge gullies have been created on productive farmland - see Figure 43. Road embankments in most cases are also left for natural stabilisation, leading to embankment erosion and, in the worst cases, landslides.

Figure 43. The destructive effects of road drainage upon land in Oromia Regional State - West Harerghe (left) and Ghimbi (right)

These negative consequences can be avoided or at least minimised by more considerate road design. This can include the application of economically feasible biophysical measures, as in Figure 44. According to SUN / SLMP experience, the problems associated with road construction are effectively reduced through the construction of structures like gabion retaining walls or stabilised embankments with constructed bunds and planted biological materials. The biological materials required here are mainly grasses such as vetiver, *eragrostis*, kukuyu, green gold, bana and deep-rooting grasses. Plantation techniques vary based upon potential dangers and soil structures. Embankments with stable structures but which are prone to erosion require techniques to reduce soil erosion. Embankments

susceptible to landslides require the planting of deep-rooting grasses in a way which ensures that root biomass increases in the soil in an interwoven manner.

Figure 44. Bio-physical stabilisation of roadsides on the Bahir Dar–Gonder road (upper) and Assosa–Nekemte road (lower)

5.7. Planting Materials

Experience from SUN / SLMP and predecessor projects has shown that the production of planting material of all types, quantities and quality, was the most important factor for successful and timely implementation of watershed development. The problem is acute for grasses, which are required in large quantities to be planted under close spacing and on all land-use types. This specific limitation has resulted in delays in the completion of watershed-development activities. The problem became so acute after the widespread introduction of biological measures that implementation success was limited. Constraints comprised accessing the planting material and seeds, as well as

production capacity such as restricted nursery space. The GIZ-IFSP South Gonder attempted to address this issue of limited nursery space by leasing land from individual farmers, with varying levels of success.

Ultimate responsibility for production of planting materials rests with the woreda OoAs, kebele administrations and the communities themselves. GIZ-SLM advisors are responsible for providing the necessary support for the production of sufficient planting material to meet the project needs. This support includes identification of needs, preparation of seed procurement plans, decisionsabout multiplication area, preparation of contractual documents (with farmers), preparation of guidelines, on-the-spot training and supervision of production. GIZ-SLM advisors also need to devise systems or approaches which improve the multiplication rate of various species. These could include improvements in the propagation systems or transformed production modalities, either through the participation of farmers in production of planting materials undercontractual agreements, or through their purchasing of planting materials from well-established farmers of fields and gullies. These complexified development systems can ultimately improve farmers' income-generating capabilities, their sense of ownership and their mechanisms of knowledge transfer.

The GIZ-SLM regional offices should supply initial planting materials for vegetation-based support projects. This has been the normal practice in past years, but there emerged a tendency by woreda OoAs to plant everything and then to request initial materials again at the beginning of the following season, a demand which could not be met due to limited production capabilities.

Despite attempts by GIZ-IFSP/SG advisors to find alternatives to 'woreda nurseries', the latter remain the only providers of plant material for large-scale gully stabilisation and watershed treatment schemes (as in Figure 45). They do have the merit of having worked very well towards all achievements to date, but their drawbacks are becoming limiting when it comes to up-scaling. In general, continuously subsidised production is bound to impair the development of an otherwise perfectly viable economic enterprise, a pertinent example of this being eucalyptus seedling production. Instead of using this cash crop to contribute to generate income, its potential is wasted against letting projects and public services fulfill production objectives. Nurseries need access to roads, to establish a sufficiently long time span for their establishment, and for the

funding of a salaried labour force. Unfortunately event these inputs are still no guarantee of productivity since extension staff have a high turnover and are often poorly equipped.

Following are suggested solutions for boosting the production of suitable planting material. Some of them are drawn from the experience of SUN and predecessor projects. The decision about which strategy to follow depends upon the context at woreda level, but advisors are expected to analyse the advantages and limitations of each strategy and advise the best solution accordingly. The factors to be considered in the selection of the best strategy are availability of suppliers, readiness of groups or individuals to be engaged, existence of adequate nurseries, the project objectives to be met, and availability of land for expansion.

Figure 45. A properly managed vetiver multiplication nursery ensures successful implementation of bio-physical measures.

5.7.1. Planning Seed- and Planting-Material Supplies

Limited access to quality seeds applies to all plants - trees, shrubs, fruits, vegetables, spices, grasses and legumes. The main reason for this lack of adequate seed or planting material is poor procurement planning. A good procurement plan which specifies the needs, sources, costs, time needed and responsibilities of individuals, can significantly improve the availability of quality seeds over time.

The GIZ-SLM Coordination Office should compile institutions and individuals who can potentially supply the required seed - if the requirements are known. Regional GIZ-SLM offices should assist in the compilation process based upon their past experience.

5.7.2 Contracting Out to Private Individuals or Groups

A government office of agricultural and resource development (OoA) can make contracts with individuals or groups of farmers who have irrigable plots in order to produce various planting materials. For the contract, details like the cost of each species, quality standards and time of delivery can be fixed, and agreements made between the contracting parties. As part and parcel of the agreement the OoA, in collaboration with SLMP, should prepare mother stocks and / or starter seeds of different species, and distribute them to contracting farmers to begin with. If the species to be produced are indigenous ones, it is up to the farmer to collect healthy seeds in his vicinity. In fact, the quality of the seeds collected needs to be checked by the engaged woreda experts.

Figure 46. Nurseries operated by individual farmers

There is ample experience from SUN that individual farmers can successfully produce and deliver quality seedlings to a project. It only requires good training, provision of essential equipment and supervision of the production system. Farmers are currently getting up to ETB 20,000 (~$1,000) a year from the production of seedlings under SUN / SLMP Amhara-supported watersheds. The idea of rotating the contracted farmers every year or two in order to benefit more individuals is also a novelty. There are farmers in Tigray who are selling

elephant-grass cuttings for communal gully rehabilitation. This strategy provides opportunities for groups of landless farmers from each community to establish livelihood improvements.

The arrangements mentioned above have additional benefits to rural development. By enabling the woredas to secure their own sustainable planting material supplies, farmers will develop their skills and knowledge about managing seedlings, contributing for the production of indigenous species and generating income for community members. The main problem observed so far is the low quality of seedlings, which results from the low experience and skill of the farmers. This can be improved through training and cumulative experience over time, but it also requires the availability of interested farmers or groups who possess sufficient land, labour forces, water sources and minimum skills of seedling production.

5.7.3. Exploiting Under-Utilised Space in Existing Nurseries

Many nurseries in project (and neighbouring) woredas are not fully utilised due to insufficient finances for production or to limited demand for planting materials. These nurseries are generally well organised and have reliable water supplies, as in Figure 47 below. Production of grasses requires large spaces but is possible, and does not contradict with farmers' existing production strategies. The nurseries could be used for species and production systems which require higher expertise (such as grafted fruits), species which require longer gestation periods in the nursery, or for new and demanding species.

Figure 47. A government-run nursery established in the 1970s

5.7.4. Temporary Nurseries

Experience from Tigray Region shows that temporary nurseries can be established if water is available near the site. Gully bottoms at the lower end have a big potential for digging wells. Production at such nurseries holds the advantage that no transport costs are required during the planting stage. This strategy can be deployed until more permanent arrangements, such as contracting out to private farmers, can be organised.

5.7.5. Partial Treatment of Land

Another alternative to solving planting-material shortages is to make an agreement with individual farmers and communities to treat the rest of their land on their own in coming years. The project has to support the provision of planting materials to cover given rows in the upper part of the land to be treated. More planning material can then be produced from the established plots, and more community members can be more involved and contribute.This applies to plants which can be propagated from cuttings or splits, such as vetiver, bana grass, populus and willow.

5.7.6. Establishing Seed Production Areas

Seed supplies can be improved by establishing arboretums at government nurseries and on treated hillsides or gullies. The latter represent potential sources of planting materials required for the intervention; however, proper technical backstopping is still required to avoid overplanting or misuse. Experience has shown that people are used to buying seeds of forest trees, grasses and shrubs for production of seedlings in nurseries. These have compromised the production of seedlings and led to smaller quantities produced and of lower standard quality. This has both caused and resulted in purchasing costs rising over time and quality of seedlings on the market decreasing, while demand grows.

This challange has been effectively addressed by the establishment of arboretums within nurseries, which can serve for the sole production of seeds and the planting materials required for seedling production. Arboretums have proven their ability to reduce declines in seed quality by shortening storage periods – during which some seeds lose their potency.

5.7.7. Production of Plant Material by Communities for New Watersheds

Community-supplied plant material could initially be paid for by development or governmental bodies at a level high enough to provide incentives. These bodies could then gradually do away with costly, unproductive and tiring nursery production. Nursery budgets could be reallocated to buy in plant material from well-performing watershed communities. Thus, seemingly valueless plants such as vetiver would become cash crops and watershed treatment would contribute directly to income generation. Even if such a scheme turns out to be just as costly as nursery production in the short term, outsourcing in this way would also be a consequential development contribution. It may take some years before the exchange between communities of watershed treatment plant material could develop into a commodity market. To get to this point successfully, meanwhile, land-use rights and other framework conditions have to change in parallel. A contract written with the committee fixes the types of plant material to be provided, the quantities to be deposited at a specific time at a certain roadside point, and the guaranteed price for specified quality standards. The committee should then organise its own collective campaign and remuneration of individual work contributions. The campaign should be closely monitored, especially with regard to destructive extraction of plant material from treated gullies or terraces.

5.7.8. Purchasing from Producers

The purchase of planting materials from individuals and businesses capable of supplying at woreda levels should be encouraged. An inventory of large suppliers should be organised for decision making. Efforts should also be made to encourage entrepreneurs, including farmers, to produce planting materials for the market in large quantities.

5.8. Assessing the Impact of Interventions

The reduction of erosion is a primary objective of most SLM interventions. The technologies selected for soil and water conservation aim at reducing runoff. Information on the effects of the different measures in reducing runoff is widely available in academic and technical literature. However, there has been no

systematic effort to measure the effects of the different measures on reducing runoff, on increasing agricultural production or on combating soil degradation.

The economic benefits of interventions can be calculated if we have some figures on changes following the application of a given measure. Project management should encourage the undertaking of such studies for justification of the measures in terms of economic benefits. A collaborative agreement can be made with research institutions to undertake a study. The invitation of graduate students from higher learning institutions also presents a viable option for undertaking studies.

One example for these studies is the measurement of runoff from areas treated with different measures, versus a control - as shown in Figure 48. The measurement provides information on how much soil and water is being retained on-site due to the conservation measures undertaken. This information can be extrapolated into savings in terms of the nutrients retained and eventually into improvements in crop production.

Figure 48. Measurement of runoff from exposed and treated areasat the ICARDA compound in Aleppo, Syria

Investments in watersheds are huge, and the expected returns should be carefully thought through before any investment is made. In truth it is difficult to make accurate economic predictions relating to natural-resource management since a variety of issues must be taken into account. These issues include gains by farmers, levels of carbon sequestration, groundwater recharging and bio-eco system maintenance, all of which are challenging to valuate. Also to be considered are the economic returnson investment from

the application of alternative technologies. Up-to-date information on cost-benefit analysis facilitates the provision of appropriate advice to farmers during the selection of technologies and approaches.

Until now economic considerations have not been given adequate attention during the implementation of the SUN / SLMP, with the exception of some efforts in Amhara (GIZ-IFSP / SG) and Tigray Regions on the benefits of gully stabilisation and semi-circle terracing. In sum, more economic analysis is needed for all projects.

5.9. Innovations

Most of the problems identified during the watershed planning exercise can potentially be solved by technical-support personnel. However, there are occasions when issues need resolution from outside the realm of existing experience or at least need some verification with external testing. The agricultural research systems in Ethiopia - federal and regional - have hundreds of species varieties, types of technology and approaches which can potentiallly improve the working conditions of farmers. These outputs are expected to be evaluated by the existing national agricultural-extension system and then incorporated into extension packages and training manuals. However, there are complaints that this is not the case. GIZ-SLM and other development partners are in an excellent position to collect, review and select outputs which can be further tested for adoption. GIZ-SLM should systematically document the research outputs which are relevant for further testing. Federal as well as regional advisors should contribute to this effort as it eventually serves as an input to the knowledge management system of the Ministry of Agriculture.

Other potential sources of innovation are GIZ-SLM advisors's observations, other projects, higher learning institutions, and academic or technical books, journals and websites. Every institution which claims to be invested in the shared goal of Ethiopia's improved land management is responsible for trying to find innovative solutions to the problem whilst also engaging with the institutions and information sources which foster deeper understanding.

The main source of innovation which is actually underexploited is the industrious farmer. Some of the traditional soil and water conservation and

agro-forestry techniques practised by them across Ethiopia are potential sources of innovation. There is ample proof that this wealth of indigenous knowledge is under-used in project implementation. This is due to lack of proper documentation and thus insufficient acknowledgement of indigenous practices. A project implemented by Mekelle University which can be taken as an example was the designated identification and documentation of innovative approaches developed by farmers in Tigray Regional State. It revealed that some farmers and even communities have developed technologies which cannot even be replicated by big institutions! Although fellow farmers may be aware of centuries-old indigenous knowledge, ideas may not be spread further afield or disseminated beyond a certain area, kebele or watershed. SLM activities should systematically document such indigenous knowledge, in collaboration with other institutions where appropriate, allowing for diversified sources of innovation for testing, approval and dissemination.

Innovations in technology and methodologies have always been important to SUN, IFSP and other predecessor projects. The current results chain of SLM foresees interventions in this area. Efforts will be made to systematically handle the identification, testing and developing of innovations as opposed to the spontaneous paths that have been more erratically followed so far. The testing of innovations is undertaken via four major processes:

A. Scoping

Scoping is a search for innovation. Where are things really on the move? Where do the participating actors see a need to innovate? In which thematic area does innovation seem to be taking place? Is anybody promoting the innovation? If so, who? What experiences with innovation do the participating actors have? What support would beneficiaries be interested in receiving?

B. Implementation

An action plan is drawn up for the selected innovative processes which contains the three steps of innovation: knowledge, implementation and steering. The following questions are posed:

(i) What knowledge are we able to draw upon; how do we obtain additional knowledge, and how do we utilise and share it?

(ii) With whom is the innovation being introduced, and what preconditions, decisions and resources do we need?
(iii) How do we intend to coordinate and steer the implementation process?

C. Impact Assessment

Once an innovation has been introduced an impact assessment then has to be conducted as promptly and as straightforwardly as possible.
The assessment should separate the perspectives of the participating actors from those of the users.
(i) What benefits or added value has the innovation generated, and for whom?
(ii) What lessons have we learned from implementation?

D. Scaling Up and Mainstreaming

If the innovation is to be disseminated and mainstreamed the question first arises as to what constitutes that innovative core which is to be disseminated and mainstreamed. The nature of the innovation, and the participating actors, can then be ascertained.

Selection of Innovations

The idea for testing innovative solutions for a given problem observed during the implementation of watershed activities should form an integral part of the planning process. A system of managing and developing innovations needs to be installed at the woreda level, with the assistance from federal and regional level advisors. In this way the continuation of innovation and its evolution into proven best practices can be maintained even after the project has phased out. Selection of innovations should consider the criteria for best practices from the outset. An innovation might be a solution for a particular problem, but might also prove useless if certain conditions are not fulfilled for its wider application.

Consultation Before Implementing An Innovation

Regional and woreda experts should be consulted about the innovative ideas proposed for testing, as well as their possible scale-up. Development agents and land users also have to be involved since they shall be involved in site selection, implementation, follow up, evaluation and reporting. Meanwhile,

the owners of the identification, testing and implementation of innovations are first and foremost the farmers themselves, followed by the woreda experts and development agents. For approaches which need more in-depth knowledge for implementation, a practically oriented training course should be organised for all stakeholders.

Contributions of Farmers and Other Stakeholders

Government and non-government institutions must provide the materials which farmers do not possess such as hand tools, industrial materials and planting materials. In turn the farmers are expected to contribute labour and any materials available to them. Since tested innovations which fail can put the farmer in a disadvantaged position, stakeholder involvement must be clearly defined in a contract. Agreement is needed on the roles and responsibilities of each stakeholder, and compensation is due where a farmer's plot serves as a learning ground to improve or adjust the application of innovations or techniques.

Implementation Responsibilities

Institutions of higher learning or research are the best testing grounds for the evaluation of innovations as they are able to assign qualified researchers and skilled graduates for assignments. They can also develop detailed methodologies for testing which include design and sampling.

Procedures for Testing Innovations

- ***Develop a protocol*** for the testing of the innovation. This includes selection of sites, selection of farmers, organisation of materials, identification of stakeholders, and schedules of work.
- ***Identify innovations*:** compile all ideas and prioritise innovations, including specifying a set number per year and per region.
- ***Discuss with partners*:** this is only necessary at the beginning as all innovation testing should be included in the annual plan.
- ***Site selection*:** where do you implement it - how many farmers are participating, in which agro-ecology field, and to which socio-economic group? The main principle is to test adequately with representative agro-ecology, socio-economic situations and growing conditions.

- ***Selection of farmers*** should be undertaken by the Kebele or Community Watershed Team (KWT / CWT) and responsible development agents, based on guidelines provided by the responsible person for testing of innovations.
- ***Organisation of required inputs*** must be in place before testing commences.
- ***Discussions with selected farmers and KWTs*** will help to identify the objectives of the undertaking and the procedures to be followed, as well as the roles and responsibilities of those involved - development agents, KWTs, CWTs and participating farmers. The meeting should be organised by the woreda focal person or his / her designate. A short training session can also be organised if it is seen as a prerequisite to testing of the innovations, particularly for the development agents and farmers.
- ***Implementation*** testing can commence as planned in the protocol.
- ***Supervision:*** the respective regional, zonal and woreda experts should supervise the implementation of the testing, providing support and advice to development agents and farmers as necessary. Similarly, farmers and development agents are expected to give information regularly on the overall situation of the technology being tested.
- ***Data Collection:*** this has to be carried out by the responsible individual(s), with support from development agents, according to the protocol prepared.
- ***Evaluation*** is needed at the end of the proposed time, including conclusions about whether the innovation is ready to be scaled.
- ***Reporting up***on the findings of the testing is expected after the event. This helps to communicate the findings concisely to all stakeholders. An outline for reporting will be prepared and agreed up on among the stakeholders ahead of time.
- ***Farmers' days*** should be organised during the different stages of testing, from site selection up to the final stage of the innovation, so that more people are familiarised with implementation procedures.
- ***Documented reporting,*** supported by digital cameras and / or a video camera, should cover each step of the process. Finally, a leaflet should be prepared on working procedures in order to support the scaling up process.

5.10. Phasing-Out Strategy

The sustainability aspects of investments into watershed developments must be considered from the beginning of watershed planning. Mechanisms have to be developed from the outset which install lasting systems. Of course, external support cannot continue without limits,and is often not structured to continue for more than, say, five years. Similarly, land owners will always be responsible for treating their areas individually or communally, depending upon the agreed ownership of resources, and caring for land in which they have personally invested.

In Ethiopia the responsibilities of individuals and communities are widely supported by public funds due to the historically severe poverty situation. People are not motivated to work on their land more than what they feel is necessary, unless external support is organised and made available. The reluctance of rural people to treat their land mainly emanates from the lack of resources (including labour), but could also arise from a lack of awareness that investment in land can actually improve productivity and income. Therefore, public funding is only appropriate to convince farmers that such improvements are possible with appropriate interventions.

A convincing demonstration of the benefits from investment in land is expected to stimulate the self-initiative of farmers in areas in which labour is available for land management.

Most agriculture-focused projects and programmes aim at some time to demonstrate new ways of working, with the assumption that good practices will be adopted even without external support. However, experiences so far have not been very encouraging, with many projects needing longer periods of support than was initially anticipated. Regardless of these unpromising experiences, effort should always be made to encourage communities to take land management into their own hands as purposefully as possible.

A key point to be addressed is the optimum time required for external financial and technical support for watershed activities. A project may cease after three or five years: if activities do not continue afterwards, self-sustained, achievement of the project's original objectives is jeopardised. Based upon the context of a given watershed, strategies for the sustainable scaling up of each activity by its

own are essential. Cases in point, according to experiences of most SUN project watersheds, are technologies like vegetable gardening, triticale introduction, beehives and fattening. These activities are implemented by about 20% of the community with project funds in an exemplary manner. Others who are interested to adopt similar practices could have access to a revolving fund mechanism established for the purpose. Technologies like grass hedges and agro-forestry are demonstrated to 20% of the watershed community on 30% of their farmland. 80% of the big gullies which cannot be treated without external support are funded by the project, while the remaining manageable gullies are left for treatment by farmers, once they are aware of the benefits that can be gained from bio-physically treated gullies.

The development plans for micro-watersheds have to be prepared based upon realistic assessments of the available financial and human resources and the timeframes given for implementation of plans. Prioritisation of the most essential activities is necessary since demand is usually much more than the resources and time available. In most cases watershed plans are prepared in a way which addresses each parcel of the watershed. However, this type of planning is not realistic since resources are limted and there are certain things that can be addressed by the community themselves without external support. Thus it is essential to do proper planning which addresses the most pressing problems which cannot be addressed by the community themselves. This phenomenon creates the warped impression that the project has failed to achieve its objectives because of unrealistic planning targets. The following points are typical characteristics of a priority gully for rehabilitation:

- Located in the upper part of a watershed, posing a threat to downstream areas;
- Frequent land sliding of the sidewalls;
- The gully bed has soft soil with a potential for depth to be increased;
- Lots of cracks in the gully offsets;
- Deep, wide and active gullies which receive high volumes of flow;
- Significant soil transport within the gully through runoff;

As has been mentioned, adequate preparations should be made from the onset to enable communities to continue on their own after the close of scheduled watershed-development activities. For example, interventions in Gerersa (Oromia

Region) began in 2007; it was possible to treat less than 40% of the area by the end of 2009. External support expired at the end of 2010. The question to be raised here was, would implementation of the planned activities continue without external support. Are the communities and woreda experts prepared for this eventuality?

It is essential for a project to develop a phase-out strategy so that proper preparations can be made by the communities take over and continue activities. The capacity development of community organisations is the core for sustainable exit from watersheds. A phase-out strategy should include the following:

- Clear chains of communication set up for the duration of the project which avail information on scope and processes of external support;
- A management plan for the watershed which specifies the required activities, utilisation of resources and contribution from members;
- Mechanisms for maintaining the assets built or created;
- Mechanisms for equitable distribution of benefits accrued under the project;
- Capacity-development requirements of the community organisations specified;
- Establishment of functional watershed associations and user groups;
- Decision criteria for the phasing out of external support;
- Continued support and coaching from the extension system;
- Development of NRM-based income-generating activities;
- Establishment of effective revolving-fund management schemes which can be used during and after the project. This can help the community to manage any other funds in the same way.

Combining the following together, the phase-out strategy provides an outline of the mechanisms to be created in order to ensure sustainability of the investments made on watersheds. Projects must establish indicators for monitoring, whether or not the mechanisms put in place are on track. If communities fail to adhere to the mechanisms outlined, an early exit from support should be strongly considered if corrective measures are ineffective: it does not make sense for any implementer to invest knowing that sufficient efforts or organisation is being undertaken to maximise the sustainability of interventions.

Taking these factors into consideration, GIZ, together with other stakeholders, has developed an exit strategy which is based on watershed development performance criteria of social, economic and ecological responses to the implmented measures as well as the commitment of woreda, kebele and community leaders to implement SLM. By monitoring respective milestones, a gradual withdrawal of external support can be realised depending on the development stages of the watershed.

5.11. Generating Added Value

There are indications that effort was made to incorporate 'added value' during the implementation of the SUN Project, while others feel that the effort was minimal, disorganised and ineffective.The efforts made in Tigray Region for the promotion of fruits and vegetables on semi-circle terraces, or the successful promotion of apples and enset (false banana) in Oromia, are both good examples of the notions of added value – ie. attempts to enable beneficiaries to go beyond implementation objectives to generate their own income from the land. Most of the initial focus of SUN was on soil and water conservation measures: this was for good reason since most of the intervention areas were degraded and focus had to be given to rehabilitate them before 'value' could be 'added'.

The situation in SLMP target woredas is different from SUN in two ways. The site conditions are not initially as challenging as under SUN, as levels of degradation are generally more moderate. Secondly, the SLMP concept includes more holistic support approaches covering livestock, horticulture, irrigation and agronomy.

In spite of the above observation, the inclusion of a given activity for just a few target households is not enough to trigger significant change. The promotion of any promising intervention has to have the potential for effective scale-up. Regional GIZ-SLM project offices are encouraged to evaluate tested or promising interventions and to develop proper value chains for them. As has been mentioned, SLMP gives emphasis to biological measures for rehabilitating different land-use types; as part of this, the production of planting materials is mandatory. Past experience has suggested that large-scale seedling production

cannot be sustainably attained in the central nurseries, meanwhile. In other words, it is not possible to satisfy the needs of planting material at central nurseries alone. Experiences of SUN in contractual seedling production can therefore be scaled up to SLMP target watersheds. By doing so, farmers engaged in seedling production can generate income from the sale of planting materials. Similarly, the biological materials growing in treated gullies and bunds can later be used for planting in other areas. The owners, whether groups or individuals, can again sell the materials and generate earnings. Similarly, the forage produced on the rehabilitated ground can be used to feed livestock.

Figure 49. Homestead gardening and fattening are good examples of 'added value' generation

Interventions such as triticale multiplication, fish production (fish ponds), bamboo production, cassava, sweet potatoes, vegetable production, fattening, dairy and beekeeping activities also contribute to the transfer from watershed development towards self-generating economic advancement - as in Figure 49. The diversity of interventions mentioned above, as well as related activities, add value to the overall scheme of watershed management. Activities upstream benefit downstream areas by enhancing the groundwater and support springs, facilitating irrigation development.

6. Implementation and its Supervision

The support provided by Technical Cooperation advisors in implementation of planned interventions is crucial for the success of SLM. GIZ's demand-oriented and needs-driven Technical Cooperation support is based upon the organisation's definition of capacity development. The GIZ handbook describes 'the process of strengthening the abilities of individuals, organisations and societies to make effective use of resources, in order to achieve their own goals on a sustainable basis.'

GIZ manages its capacity-development support to SLMP under the consideration of five critical success factors, as defined in the organisation's Capacity WORKS Model:

Source: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH (ed.), 2014. *Cooperation Management for Practitioners: Managing Social Change with Capacity WORKS*. Germany: Eschborn.

- **Strategy**

  Supporting partners in developing a clear and plausible strategic orientation for scaling up SLM.

- **Cooperation**

  Creating a clear understanding about cooperation potentials between SLM development partners, programmes and governmental institutions for most effective and efficient programme implementation.

- **Steering Structure**

  Supporting an operational steering structure for effective and timely coordination of SLM implementation.

- **Processes**

  Creating coherent joint understanding of key strategic processes.

- **Learning and Innovation**

  Development and implementation of measures to ensure systematic learning for consistent improvement of capacities.

GIZ's support is based upon the careful consideration of existing structures and systems, their potential for maximum exploitation, and the requirements for improvement needed to achieve this. Hence, structured analysis of stakeholders, organisational and institutional settings, guidance structures and SLMP processes are conducted at all levels of GIZ's sphere of intervention. A prioritisation of activities is then defined which results in focused interventions which hold the potential leverage to generate the greatest possible impact.

GIZ support follows the logic of a sequential watershed-development phasing model which takes the following into consideration:

- The **initiation (preparatory) phase:** this creates community awareness on SLM, supports the formation of watershed associations and user groups, defines watershed boundaries for intervention and engages participatory planning for the implementation of watershed-development measures.
- The **rehabilitation phase** focuses upon rehabilitation and stabilisation of communal lands and farmland. Site-specific measures include slope conversion using physical and biological measures, area closures for controlled and/or zero grazing, gully rehabilitation and farmland treatment against soil loss and towards improved soil fertility.
- The **economic development phase** promotes improved farming practices and integrated animal husbandry systems along with homestead-development activities. It also introduces community-managed and natural resource-based livelihood options for income generation.

Support from technical-committee advisors, therefore, begins during the planning of watershed activities and follows established criteria. Experience suggests that technical advisors do actually support the implementation of planned interventions (including monitoring and evaluation) to regional and woreda government staff, development agents, grassroots committees and farmers. The type of support varies depending on the prior experience of stakeholders in watershed-development activities. Less time is generally required if implementers have practised the interventions in preceding years.

As for new intervention areas, woreda offices require designated support during the first two years. Even in woredas rich in watershed-development experience, assistance in intervention refinements is required to some extent. Advice from Technical Cooperation advisors should mainly concentrate on subjects in which a given advisor has sufficient experience so as not to undermine his or herself and his / her role. In order to fulfil the core task of strengthening government capacity and encouraging policy adoption, GIZ-SLM provides advice and consultation, training, experience exchanges, coaching and facilitation.

6.1. Advisory Support

Provision of professional advice to partners is a **core task** of GIZ. Indeed, advisors' mandate is to support the governmental programme implementation structure as a whole.

GIZ-SLM advisory services aim to improve institutional structures by streamlining procedures, increasing the quality of SLMP implementation, and strengthening the overall performance of the SLMP's implementing bodies.

In accordance with GIZ's principles for sustainable advisory services, advisors are considered as facilitators of change. Hence, they are neither supposed to take over implementation functions within the partner system nor to substitute personnel gaps. If the need does arise for GIZ advisors to fulfill line functions within the partner system, arrangements are of a temporary nature and must comprise 'on-the-job-training' of an implementing-partner staff member.

Technical Cooperation advisors, in planning support to watershed-development interventions, will mainly focus on field visits to give backstopping support. Advisors' additional duties comprise report writing, preparation of training

materials, acquisition of materials on behalf of woredas, conducting workshops, carrying out joint-assessment missions, gathering information, holding internal meetings and other duties. The time required to complete these responsibilities should also be planned as far as possible and shared with partners. Having said this, support provided must be demand-driven rather than excessively available. Advisors should respond to specific requests from partners in order to avoid dependency and encourage autonomy.

The nature and intensity of GIZ advisors' support depends up on the phase of watershed development currently underway. The initiation phase requires more support from GIZ advisors - particularly in new woredas, as mentioned, for awareness creation, skills development and planning. The economic development phase may require a different input of expertise from advisors with the relevant expertise. Advisory services require continuous effort in refining technologies, systems and approaches in order to maximise the benefits drawn from each phase.

The frequency of field visits is dictated by the demands and requests put in by the woredas, as well as the nature of activities, capacity at woreda level, and so on. Advisors should, however, avoid intensive hands-on implementation, or replacement of partner staff in routine activities. It should be understood that advisors are only assisting the implementers, and that support must decrease through time. For example, support towards development of watershed plans should be limited to simply checking the appropriateness of plans already prepared. Government staff, development agents and CWTs must be able to carry on planning for additional watersheds after two or three attempts at it, with only guiding support from the GIZ-SLM advisors, and more general support from zonal government staff if necessary. Advisors' focus should be upon fostering knowledge at the community level; of course, this should be undertaken in collaboration with woreda and zonal government staff and development agents too.

The optimum time period dedicated to supervision backstopping varies depending on the conditions of the woreda; however, it should not exceed four days per month per watershed during the first year, and this frequency must decrease in successive years. Woredas with adequately trained staff and good experience will need fewer visits. Visit frequency should be discussed and agreed with partners, to be adjusted with more or less days to justify the need.

Logically, then, advisory roles must steadily transferred to the zonal and regional levels, for the purposes of sustainability and easier scaling up. Woreda-

level staff are responsible for the supervision and guidance of communities' implementationof activities. The role of the GIZ Advisors, zonal and regional experts, is to enable the woredas to do their work effectively. In GIZ-SLM Oromia, the responsibility for technical backstopping to woredas implementing SUN was taken over by experts of the Zonal Departments of Agriculture and Rural Development: this sequence facilitated the likelihood of scaling up advisory services and allowed the GIZ advisors to dedicate their resources and time to new SLMP woredas. Similarly, the zonal offices could then be supported with minimum running costs. Conclusions here were that the work can be done properly and sustainable arrangements can be adopted if strong zonal structures do exist.

When Technical Cooperation advisors manage to reach this advanced stage across operational areas, proper scaling up of government efforts becomes a realistic and attractive possibility.

Woreda-level systems for identification and testing of innovations across different land use types needs to be promoted, supporting new innovations and making them best practices. GIZ-SLM experience in this regard, then, needs to be tapped effectively by SLMP.

6.2. Focusing Support

GIZ-SLM advisors are tasked with capacity development of the regional, zonal and woreda government staff (experts), development agents and community leaders, so that communities can ultimately take on and manage watershed development on their own. The skills transfer includes technical innovations, own-work plan preparations, discussions with communities, logistics arrangements, procurement planning, networking, documentation, monitoring, reporting, presentation, social issues and conflict resolution. Generally, GIZ-SLM advisors should support partner staff in designing, organisation, facilitating and conducting training courses which cover a wide range of technical, managerial and institutional development topics relevant to SLMP. The training must be planned on the basis of systematically identified needs and conducted in sequential coherence to the logic of watershed development phasing and of government's SLM-implementation calendar. This means that all training takes place just before being practically applied by participants in implementation. Similarly, selection of training participants, both in number and function, should be facilitated by the GIZ-SLM advisors.

Most training is designed as 'Training of Trainers' (ToT) in order to address government SLMP implementation staff from multiple levels, with the ultimate aim of developing competency for target groups at grassroots level, both directly and as a trickle-down effect.

Specific training courses on SLMP-related management issues include project-cycle management, participatory monitoring and evaluation, and financial management. These courses are usually designed for end users but with a focus on regional and woreda SLMP staff. GIZ-SLM develops standardised training packages addressed to the requirements of the different levels supported, ranging from technical manuals for regional and zonal experts, to didactic materials for woreda experts and development agents to informational posters and brochures for community members. The training packages are extracted from the wealth of existing material available, and are enriched by documented good practice from ongoing SLMP implementation.

GIZ-SLM proactively encourages training participants to develop action plans on how the newly acquired skills or knowledge will be put to use by them in their practical work. Besides ensuring a high level of practical orientation for all trainings as such, a systematic follow-up on the utilisation of training inputs by the participants is undertakenby GIZ-SLM advisors during regular field visits. Findings from these assessments are then discussed as part of internal learning in order to reflect upon and improve the quality of future trainings. As an additional service upon request, GIZ-SLM also provides highly experienced personnel to facilitate training sessions planned and organised by the partner structure.

Experience-exchange visits are a proven and successful tool for creating awareness and getting a tangible impression of specific SLM practices, successfully implemented innovative methods and approaches on a peer-to-peer basis. They are especially commonly used for SLMP partner staff and target groups of new intervention areas. GIZ-SLM facilitates the visits by selecting model sites on the basis of the thematic message to be addressed, and by supporting the selection of suitable participants.

In addition, GIZ-SLM advisors coach partner-staff in giving follow-up training and the cascading of skills and knowledge. Coaching of government SLMP implementers is also given according to SLM specifications. Popular training sessions deal with planning and reporting at woreda level and coaching skills.

The focus of the GIZ-SLM advisors' technical support to partners should be the micro-watershed planning process. A good plan is easy to implement and can achieve its intended objectives. Design and coordination of activities for cost effectiveness, timely implementation, schemes for maintenance of established structures and systems which can be maintained by the community are the areas requiring the strongest assistance. Planting of woody plants and propagation of new planting materials (particularly grasses) is also an area needing focus.

It is worth noting here that one GIZ advisor in Gonder has developed a tool to assist woreda administrations and OoAs to follow up on activities implemented by SUN. The tool proposes that all watersheds be coordinated by a focal person based at woreda level who can serve as an expert in one discipline of agriculture and rural development. Similarly, one focal person can coordinate the watershed at woreda level. Every week, representatives of each watershed, the GIZ advisor, the vice-head of the OoA and the GIZ-SUN Technical Committee should sit together in a meeting chaired by the head of the OoA. Achievements made during the previous week, problems encountered, and lessons learnedcan be briefly reviewed. To conclude the discussion, motion and agreements should be made, responsible individuals designated and deadlines for accomplishing responsibilities agreed upon for the coming week. The following week's meeting then follows up on the previous meeting's motions and continues with a similar agenda. Brief documentation of meeting contents will help with monitoring and allows the critical contents of meetings to be shared with absentees and spread to all relevant stakeholders.

6.3. Procedures for Field Visits

The following procedures suggest a logical modality of field-visit support:

STEP 1: Preparations

Field visits by GIZ-SLM advisors have to be planned each week and approved by management. Following this, receiving partners or community members, as well as woreda office staff, can be informed and allowed to approve and accompany the planned visit. Kebele and community watershed teams should also be informed by the woreda SLMP focal person about a planned visit.

STEP 2: Travel to the Woreda

Advisors should confirm availability of visitors and hosts the day before the scheduled field visit. Transport arrangements must be planned and confirmed in advance of the visit, and spare vehicle space should be used as an opportunity to transport any materialson the day as necessary.

STEP 3: Meeting the Focal Person

The first meeting at woreda level should be with the SLMP Focal Person, and if appropriate, with the respective woreda too. The involvement of WWT members will enrich any discussions held, since they will then be in a better position to contribute their expertise as well as disseminate outcomes to others. The focal person has to report on the achievements, constraints and issues which need further discussion since the last visit.

STEP 4: Meeting with Officials

Out of courtesy, GIZ-SLM advisors should visit the woreda administration and heads of OoA and land offices, informing the relevant members about the planned watershed-site visit. Similarly, it is advisable to also visit the zonal administration office every quarter (or even more frequently if they welcome it). A plan for a watershed site visit as well as discussions with Kebele or Community Watershed Representatives should be jointly held first.

STEP 5: Site Visits

Visits to beneficiary communities are arguably the only way to observe and properly understand the reality at ground level in terms of community organisation, sense of ownership, quality and quantity of work in progress, effectiveness of financial utilisation, understanding concerns and effective systems of watershed development. Advisors are thus encouraged to organise field visits regularly.

It is always advisable to take along the SLMP focal person and the relevant technical personnel (WWT) on visits. Effort should also be made to invite the Woreda Steering Committee, particularly the Woreda Administrator, OoA Head and the Head of Land Administration to join once in a while.

Most important discussion, resolution and capacity building takes place through these collaborative visits. The importance of advance preparation in the planning, approval and invitation of others to a site visit cannot be underestimated. The focal person must have sufficient time to manage visits whilst also achieving general watershed-development work.

The visiting team should have a brief meeting with the kebele and community watershed teams (KWTs and / or CWTs) right after arrival at the watershed site. The meetings could be organised in their offices, at the Farmers' Training Centre or under a tree. development agents are expected to be available throughout such visits. The main objective of the meeting is to listen to the report of the committees on achievements, constraints and issues needing further discussion.

Visits to intervention areas should nourish the interest, involvement and understanding of visitors. The visits are thus best conducted during periods of implementation so that they can demonstrate practical progress, as well as to demonstrate the results of their advisory service, of quality work undertaken, progress achieved, social mobilisation and delivery of agreed inputs. The last part of a watershed-site visit is to agree upon activities to be completed going forward, with clear identification of responsibilities all round.

STEP 6: **Feedback to Partners**

Every GIZ-SLM advisor is expected to provide feedback to the Head of the OoA, the Head of the Office of Land Administration and Use Authority (OoLAUA), and / or the Woreda Administrator on observations made, discussions held with experts, agreements with communities on upcoming steps, concerns, areas for improvement, and tentative next-visit schedules.Discussion with these crucial stakeholders should be held jointly with the woreda SLMP focal person. Advice should be given to the Head of the Steering Committee to gather all Steering and Technical Committee members for a meeting if there are issues which need the attention of all members. A discussion should also be arranged periodically with the SLM steering committee in the presence of the technical committee, facilitated by a team of GIZ-SLM advisors. The meeting should detail the support required by the Technical Committee from the Steering Committee.

Feedback to the regional level should be provided through a forum or special meeting if warranted, as organised by GIZ-SLM management. Written feedback should also be given to the focal person and steering-committee chairperson after field trips, so that the same issues will not be re-discussed on future visits.

STEP 7: Feedback to Management

The advisor should report upon his trip immediately after return, whether via oral or written feedback, submitted to head-office management. The advisor is also required to fill out a back-to-office report using the standard format (Annex 3). This information is then to be shared with colleagues in monthly meetings. In urgent cases the advisor should contact management and relevant partners by phone so that he can follow-up the issue before leaving the woreda. The advisor should take copies of the form and produce the report in two copies so that he can give a copy to the project focal person. The latter can then inform other stakeholders using the report information.

7. Planning, Monitoring and Evaluation

7.1. Mechanisms of Monitoring

The history of GIZ's monitoring and evaluation system is one of evolution. During SUN more emphasis was given to monitoring activities and outputs. Reporting, technical implementation as follow-up, joint-assessment missions and periodic review meetings were the main tools used to measure the quantity and quality of implemented activities. Results-based P, M&E has been since developed to also track higher-level changes, ie. outcomes and impacts. SLMP is also using activity reporting, technical implementation as follow-up and support, joint-monitoring missions, biannual support missions and periodic review meetings as tools. Baseline data is also collected and analysed to provide a benchmark for measuring outcome- and intermediate-outcome indicators.

Results-based management is a participatory and team-based management approach which seeks to:

- Focus upon the organisation's efforts and resources towards achieving expected results;
- Uphold effective operations whilst aiming always to improve sustainability;
- Maximise accountability for all actions taken and resources used;
- Shift away from focusing on inputs and activities towards measurement of results and impact;
- Focus upon changes in the behavior and the livelihoods of beneficiaries.

The following are details of P, M&E mechanisms being used to assess SLMP's implementation status:

- **Monthly technical meetings** discuss the issues related to advisory services, implementation, strategies and concepts. This forum provides the opportunity for advisors to learn from each other, since all have been assigned implementation-support responsibilities. The advisors are expected to input into discussions with reports on the status of implementation, challenges faced, and suggestions for improvements. One

day should be more than adequate for this meeting - unless particularly detailed or serious agenda points are foreseen, and more in-depth discussion is needed. Minutes of meetings should be prepared, including the follow-up steps to be taken. Meetings should comprise the regional SLMP focal person and representatives from regional offices involved in direct implementation of SLM activities. GIZ advisors and members of project-funding organisations should also participate.

- **Steering-Committee coordination meetings** are held at federal and regional levels. Regional and federal SUN Steering Committees were instrumental in guiding implementation of the programme. Federal SLM Steering Committee members are drawn from the Global Development Coorporation, the Ethiopian Ministry and Bureaus of Agricultural and Rural Development (MoA / BoAs), the World Bank and the Embassy of Finland. A bi-monthly meeting followed by a one-day field visit is adequate. The meetings should be held on a rotational basis between different programme regions.

- **Quarterly review meetings** are similar to steering-committee meetings, but with the participation of more stakeholders. The main goal of these meetings is to review the progress of project implementation and agree on next steps for improved implementation. Participants of the meeting include woreda focal persons, woreda administrators, zonal administrators, regional focal persons, regional process owners, GIZ-SLM regional component managers, the SLMP Coordination Office, and development partners such as the World Bank, KfW Development Bank and the Finland Embassy. Quarterly review meetings may need to be organised in clusters (zones) if the number of participants is too large, with the inclusion of additional SLMP woredas where necessary. The meetings are organised by the SLMP Coordination Office in collaboration with development partners and regional focal persons. Organised on a rotational basis by region, the meetings are expected to last three days every quarter. The first day is dedicated to visiting project watersheds followed by two days of reflection, regional reports, identification of critical issues and assessment of the quality of implementation.

- **Biannual Implementation Support Missions:** The World Bank has established a mechanism to follow up the implementation of a given project, aside from the regular P, M&E system. The mechanism is called the Implementation Support Mission. The main objective of the exercise is not only to monitor implementation, but also to support the implementing partners if there are any issues which hamper implementation. The participants in these missions, which last about ten days each, are representatives of the MoA, SLMP Coordination Office, WB, GIZ and other stakeholders at federal level. The findings of each mission are documented in an aide memoire which is binding to all parties. The aide memoire contains the agreed activities, with deadlines and responsibilities, for improving implementation of the project.

- **Annual review meetings:** should be organised at the federal and regional levels in June each year. Their main objective is to review project performance during the year and to make adjustments in planning for the following year. Each SLMP regional offices should conduct an annual review and a planning workshop, together with the representatives from SLMP woredas, and prepare the regional annual work plan. The period of May-June is suggested since planning meetings are also expected at federal and regional levels at this time. In June, review and approval of the plan of operation is prepared by the SLMP Coordination Office and consolidated by the regional plans of operation. The annual review meeting should precede the planning meeting; one full day is adequate for this purpose.

  Participants of the annual review meeting at regional level include the Bureau of Agriculture (BoA), BoLEP (Bureau of Land and Environmental Planning), GIZ-SLM, woreda representatives of the SLM OoA and the Office of Land and Environmental Protection (OoLEP). At federal level they include the Natural Resource Management Development (NRMD) Office, GIZ-SLM Coordination Office, World Bank, KfW Development Bank, Embassy of Finland and regional focal persons. The SLMP woreda focal persons are expected to present annual plan operations at the beginning of the meeting. The regional focal persons and the federal SLMP Coordinator are expected to prepare a report on the achievements of the annual plan of operation at the beginning of the meeting.

- **Joint Monitoring Mission (JMM):** The main objective of introducing this tool was to provide decision-makers at all levels – both within the Ministry of Agriculture (MoA) and Bureaus of Agriculture (BoA), and within development organisations' management structures – with valuable insights and recommendations for action in sustainable land management. The outputs of a JMM should include information related to the current status, progress, challenges and recommendations for action upon SLM-related matters. The results offer a realistic picture of the most urgent needs which prevail within the beneficiary communities. The results of this study should therefore be disseminated to all of the beneficiary communities of the Sustainable Land Management (SLM) Program that have participated in the JMM.

  The overall idea of this monitoring and evaluation tool is to share insights that serve as a basis for decision-making. The tool provides first-hand information on potential and room for improvement which has been gathered during both bio-physical checks in the field and from direct conversations and discussions with beneficiaries of the SLM Program. Direct action can be derived from the lessons learned and specific support measures can be tailored to the beneficiaries' needs in all SLM intervention regions.

  The JMM has been designed to assess the reported results and to assess both quantity and quality of outputs and selected outcomes – such as indicators related to the increase in agricultural productivity. The JMM is an instrument to monitor to what extent outputs are correctly reported and delivered to a level of quality which assures sustainability of outputs – in particular physical and bio-physical measures like quantity and quality of physical and biological soil and water conservation (SWC) measures and community infrastructure. Also, JMMs can also be used to assess the extent to which these outputs are used (ie. adoption rates) by the target groups and their direct benefits for farmers (ie. outcomes). In addition, JMMs are useful for revising the extent to which different strata of the target groups (particularly women) are involved in Watershed Development Processes, and how they benefit from them. In sum, the JMM serves as a valuable amendment to existing MoA Reporting Formats, whilst also allowing for impact-progress revision at higher strategic levels.

The major instruments for communication within GIZ-SLM comprise the following:

- **Regional GIZ-SLM weekly management meetings** promote the exchange of information and planned engagements on a weekly basis. The participants of this meeting are the Regional Manager, Deputy Manager, Component Managers and P, M&E Advisor. The meeting should not take longer than a half a day and should be scheduled on a Monday morning or a Friday afternoon.
- **GIZ-SLM Programme Management Meetings** are similar to weekly management meetings but at federal level. The meeting takes place once a month and lasts up to half a day. Participants include the GIZ Country Director, Deputy Director, Director of Operations, Component Managers and the P, M&E Coordinator.
- **German agencies' management meetings:** various German Development Cooperation agencies work together in support of SLMP. Although they are represented by one agency, a periodic meeting is needed to discuss recent developments in their respective agencies, missions, visits of senior officials and reviews of their support to SLMP.

7.2. Reporting

Periodic reporting of project achievements was expected by GIZ during SUN implementation. GIZ-SUN advisors were in turn responsible for collecting information and preparing periodic reports. In fact this was the logical process for SUN since partners were responsible for implementation and thus had to report what they had done. Reporting for SLMP is, however, quite different from SUN since responsibility for reporting rests upon the partner system; procedures and formats are provided accordingly. The GIZ-SLM advisors assist the partners in the preparations of reports. In fact, partner offices also need assistance in report-collecting mechanisms. The advisors should design and explain the correct report-collecting mechanisms. This starts from farmers, field technicians and foremen up to the woreda planning section. Examples of this are mechanisms like registering farmers' names and the amount of work executed in their respective fields, the actual amount of work done by the farmers and / or groups, and cross-checking by the development agent for

the accuracy of data by taking samples from the registration book and finally submitting the aggregated figures to the woreda.

GIZ-SLM advisors are expected to report based upon the plans for technical support which they have originally submitted to their offices. They are then expected to report on monthly activity progress in the technical advisory services and quarterly outputs, indicating how their own advisory service has contributed to programme objectives. Their reports can input to programme-level monitoring and evaluation but are not part of the wider P, M&E system. Other aspects to be included are positive outcomes from implementation, constraints faced, and proposals for solutions (or descriptions of how constraints have been dealt with). The regional offices should then consolidate their report from each advisor and submit it to the regional focal person and the GIZ-SLM Monitoring and Evaluation Team.

7.3. Checking Quantity and Quality of Outputs and Assessing Selected Outcomes

GIZ's regular-reporting system yields information on the quantity of outputs but not necessarily on the quality of those outputs. A specific participatory tool, Joint Monitoring Mission (JMM), evolved and developed from the Joint Assessment Mission of SUN, is in place for the following objectives:

- **Checking up on reported quantity** and **assessment of quality** of the achieved outputs could comprise:
  - The quantity and quality of soil- and water-conservation (SWC) measures, both physical and biological, which have been applied;
  - Descriptions of the areas treated and of the impact of the applied measures upon the land and the community;
  - Quality of planning (e.g. participation of individuals or gender issues);
  - Quantity and functioning (quality) of water-user groups, including the application of by-laws (quality);
  - Quantity of biological materials planted and surviving grazing (quality);
  - Number of trees planted and surviving the dry season (quality);
  - Area under irrigation, but also the quality of irrigation structures.

- **Assessment of selected intermediate outcomes** with JMMs which could include the following:
  - Changes in agricultural productivity from dialogue with farmers;
  - Adoption of SLM practices and other innovative farming practices;
  - Investment in land due to increased tenure security;
  - Reduction of land conflicts due to increased tenure security;
  - Satisfaction of farmers with support from services providers. (For details see Annex 2: Roles and responsibilities of stakeholders involved in SLMP.)

Responsibility for follow-up on quality of work undertaken within target watersheds ultimately lies with the government.

The role of the GIZ-SLM advisors is to enable partner experts to guide farmers in undertaking activities in the best ways that they can. The advisors are also expected to assist the partners in developing mechanisms for quality control. One of these mechanisms is the establishment of micro-enterprises comprising landless youngsters who are trained in basic management of quality employed for to monitor it. They can also assist the development agent in coordination and communication with farmers. (The modality of this mechanism could be presented in an upcoming meeting). A tool was developed in SUN-Amhara for determining quality of infrastructure before certification of work for payment.

Different infrastructures and soil- and water-conservation activities have been executed across the country, and specifically in Amhara Region, with the involvement of the community, government and non-government organisations. Most of these massive achievements did not last long or achieve sustainability. Low-quality outputs was one bottleneck which contributed to the rapid disintegration of the conservation measures. To overcome the problem, technical manuals and guidelines were prepared and trainings delivered to concerned experts in the community. This still did not completely eliminate confusion since so many activities require individual, subjective decisions.

According to the experience of SUN-Amhara partner woredas, the tasks of quality control and output monitoring were particularly challenging, leading to disagreements and sometimes disputes between farmers, development agents and SUN staff. One reason for this was that quality control had been

undertaken simply by personal judgment. A structure which is 100% secure in one person's eyes may not be so for another person. There was no standard quality measurement criterion which everybody could follow, or at least come close to. This long-standing needed careful reflection and new quality measurement criteria had to be devised for SUN.

With this in mind, the SUN-Amhara came up with quality-determination criteria for the main soil and water conservation activities. The goal here was to be in line with the established standards of World Food Program working norms, to enable Technical Cooperation and woreda partners to use similar standards and to avoid subjective estimation, to uphold the quality of the SWC activities and to respect agreements between different parties.

The criteria were presented and comments forwarded from participants. They were then tested at field level and refinements were made. The final criteria, once agreed, were then used in the project watersheds to objectively assess the quality of structures. More work would still be needed to refine the criteria for their wider application.

Accordingly, the Joint Monitoring Mission Teams have been established for each woreda comprising members from all levels. Assessment takes place quarterly, including after the rainy season in October and before the rainy season in May. The main method of information collection during JMMs is field observation, ascertainment of quantitative information, assessment of quality, individual and focus-group discussions with villagers, and community meetings. Details of the team composition and JMM procedures are presented in GIZ-SLM's JMM Manual.

7.4. Documentation

Documentation of project sites and activities before, during and after intervention is crucial for learning, for sharing information and for gauging ideas for change. Although SUN regional offices captured constructive feedback and positive learning, most initiatives were personal or not thoroughly planned. Past programme documentation did not serve the internal needs of GIZ but instead served those of partners' systems. Conscious effort should thus be made to develop a documentation system which favours GIZ first and foremost. The following types of documentation should be considered:

Photo documentation

GIZ-SLM advisors should document the status of project-watershed areas at the beginning of intervention. Photo documentation should then be carried out periodically during implementation in order to capture changes over time. A good example of pre- and post-intervention documentation by GIZ IFSP-SG is shown in Figure 50. Photos are invaluable additions to promotional material, publications, fact sheets and reports. Photos should be well taken, with high resolution – not with a mobile-phone camera, for example. This means that careful consideration must be given to light levels, the angle of the sun or light source, the angle from which the photograph is taken, and the composition of the photograph (ie. exactly who and what features in the picture). Advisors will benefit from training in quality photography by experienced colleagues or partners.

Figure 50. Photos from before and after implementation demonstrate impressive changes

Photos should be edited by deleting all of the unwanted photos and then labelling those to be kept with a logical naming system in correctly labelled folders, with captions if necessary. A picture depository should also be organised by the Knowledge Management Unit at federal level, to whom regions are to send their edited photos.

Video Documentation

Documentation of activities in watersheds using a video camera can capture attitudinal changes. It is better for farmers to express themselves about changes that they have directly experienced than for an 'expert' to articulate in their own words the changes that he or she has 'observed'. Video documentation can also be used for awareness raising and training in other communities. Meetings organised with communities should be recorded by advisors where possible. The woreda communication office, which actually provides information to Ethiopian Television (ETV), could pass video footage of watershed progress to important communication channels. Better documentation has to be organised directly with professionals at ETV, the WALTA Information Center or other film makers, by the SLMP Coordination Office or by regional SLMP Offices, and coordinating regional partners. Many woreda Offices of Information also have the equipment and personnel to video document implementation: strong links should be built with them too, and copies of all video footage shared with the Knowledge Management Unit.

Documenting Lessons Learned

This documentation must be coordinated with the people responsible for GIZ-SLM Component 3 of knowledge management. Material is collected by advisors but coordinated by the up-scaling component manager, depending on the subject matter, the area of assignment and the advisor's ability and competence. Information guiding documentation practices will be provided to support the advisors.

Documenting Case Studies

Case studies are very good at capturing changes in livelihoods of individuals and groups of people. Since SLMP intends to improve livelihoods, documentation of both typical and unique, but overall interesting and relevant case stories is vital. Changes in livelihoods captured by case studies, which might otherwise go unnoticed, can be registered by the P, M&E system.

Perspectives of Development Agents

Development agents live among the community and have a wealth of experience on how farmers perceive their area, its potentials, culture and community structure. Development agents know what has been tried and what was successful and not successful, and the reasons for outcomes. Their perspectives should be documented systematically in order that important lessons can be captured. The experiences of other development workers in the community, such as health extension workers, must also be included here.

8. Approaches to Facilitating Watershed Development

Watershed development is the sole responsibility of the members living within a given watershed; this should be backed up with a reasonable level of support from the public sector. There are individual, group, community and government responsibilities attached to the process. Government agricultural systems are expected to provide advisory support to community members; watershed development is also a lifelong engagement for the community, since improvements in land management and agricultural production will always be something that they aim for and can benefit from.

Projects and programmes often support the efforts of the government to provide advisory services, capacity building and other inputs which aid watershed-development activities for communities, but which also encourage them to take full responsibility for their own development with minimum external support – since the latter is always time-bound and limited in resources. After a given time period communities are expected to continue the development activities by themselves.

Below are listed some approaches, based on GIZ-SLM's experience, which can be used as a guidance template.

8.1. Legalised Watershed Users' Associations

It is common to have a local by-law for the management of those communal areas which receive external support. The by-law is usually discussed and agreed upon by the community, but may not be documented in detail.

Meanwhile, problems surrounding the protection and equitable use of common resources are often overlooked, underestimated or ignored during the life of a project, and they may grow more severe after phase-out. Numerous examples of post-project negligence or even destruction of infrastructure or rehabilitated land exist all over the country, including in areas previously supported by GIZ.

For example, alarming degradation was observed in rehabilitated areas of South Gonder Zone following the phase-out of GIZ-IFSP / SG. Cases of land damage and neglect at formerly 'successful' implementation sites (which had been very popular with communities during the project) prompted the SUN-Amhara management to seek lasting solutions to such damaging problems.

Their search for solutions led to a workshop being organised, the conclusion of which was consensus on the need for official recognition of the watershed association as a legal entity, giving it both full responsibility and a mandate to manage the watershed's natural resources by formulating and legalising enforceable by-laws. In this way SUN-Amhara subsequently supported the establishment of 25 legal watershed-users' associations within two years. Degradation and destruction have since decreased to a large extent, and investments in natural-resource management, especially gullies and other communal properties, have been better protected.

Described below are some of the changes observed to date:

- Negligence towards communal properties has decreased as a result of repeated awareness creation and the presence of legalised associations;
- The elected committees in particular, and the total watershed members in general, are satisfying their collective and individual roles and respecting their obligations;
- Offenders will no longer get away with violations of by-laws since fines can be levied against them;
- The watershed association recognises and is responsive to the needs of the community. In this way it can work efficiently to solve problems directly and locally.

Community organisation is one of the core components of SLMP in watershed development. Land owners, landless people, women and other groups must find the confidence to step up and to act as owners of the project. Participation will demand their involvement in planning, implementation, and protection of their valuable land from destruction or exploitation.

Within Amhara Region, GIZ-SUN Amhara (then known as GTZ-SUN Amhara) took the initiative to come up with tangible and helpful action points based upon their experience. Three of these are presented below. They strengthen the rationale behind establishment of watershed-user associations in the first place.

'Why do we need a separate users' organisation?'

A voluntary association or organisation is a group of individuals who agree of their own accord to form a body (or organisation) to which they are affiliated and from which they gain no financial nor material benefit. Watershed communities benefit from organising themselves into associations because:

- They are the actual and first-hand beneficiaries of watershed development: if a watershed's degradation is allowed to continue, they are the first to suffer;
- They have higher interest than anyone in the kebele micro-watershed's development and are best placed to take direct and focused action 'on the doorstep';
- The kebele administration or *iddir* can assist in development activities, whilst of course not having the same time availability or self-interest as the users' association engage in watershed-development activities;
- A watershed users' association can efficiently facilitate day-to-day participation of members in development activities;
- Management and protection of communal property can be handled by the users' organisation in a sustainable manner;
- As a consequence, a users' association maximises the likelihood of achieving sustainability.

Developing a Users' Agreement or By-law

Users' agreements or by-laws are internal or subsidiary laws governing the internal organisation of the grouping. They are enacted by local bodies. They constitute an arena of power negotiation between decentralised bodies and traditional institutions or between government bodies and user groups. By-laws provide coordination for natural-resource management (NRM) by showing what can and cannot be achieved by a resource-mobilising collective. By-laws provide clarity and foundation for property rights, delineating the rules of resource use and their accompanying management rights.

Request for Legal Recognition

The watershed association is expected to fulfill and avail all the necessary requirements to be registered, acquiring legal recognition in accordance

with the Justice Offices at woreda level. An association should present its application, details and accompanying formalities to this office during the establishment of their association.

8.2. Participatory Management of Forests, Woodland and Enclosures

It is a common mistake to consider participatory forest management (PFM) as something outside or unrelated to the concept of the watershed. The question of scale should first of all be contextualised. For example, approaches developed for PFM may cover large areas such as the Adaba-Dodola Forest (which measures 53,000 hectares), while watershed development activities might be undertaken in micro-watersheds of 200-1000 ha. This difference does not mean that the same approaches are not applicable for forest as for micro-watersheds – especially those *within* micro-watersheds! Indeed, effort should be made to apply PFM methods for forest areas, woodlands and enclosures located within every critical project watershed.

To stay with same example, successful experiences were had in Adaba-Dodola, the large forest being managed with the participation of communities. The main initial problem here was unregulated access to the forest and thus wood extraction beyond sustainable limits, farming and overgrazing. Before the establishment of PFM, conventional forest-management approaches, such as hiring forest guards, were applied. No improvement in forest condition was seen after four years of intervention, and so a new approach was sought.

Oromeffa Waldaa Jiraatota Bosonaa (or WAJIB) forest-dwellers' association was designed in 2000. The creation of exclusive user rights for WAJIB was expected to boost a sense of ownership and responsibility for the forest. Members voluntarily organised themselves into a committee of 30 households and were given the responsibility of managing a forest area of 360ha. The group was given rights to harvest regulated quantities of forest products, but only while also allowing the forest to increase in growth. The rights and responsibilities of the group were specified in an agreement entered into with the woreda administration – who have since made annual assessments of the area allocated to each group in order to check compliance. Other complementary activities such as tree planting, triticale cultivation, eco-tourism, trophy hunting, bee-keeping and promotion of highland fruits have been supported by the project in order to supplement the incomes of forest inhabitants.

Figure 51. Adaba-Dodola Forest, where WAJIB Association has been active.

Sure enough this new approach regulated forest access and increased the forest cover. A study made in 2006 showed that areas managed under the WAJIB approach had increased 15.6% of their forest cover, while a reduction in 15% of cover was observed in non-WAJIB areas – see Figure 52. The increased forest cover was due to controlled grazing, natural regeneration and reduction in illegal harvesting. Additional impacts of this WAJIB approach included:

- Recognised access to land and forest products;
- Reduced risk of food insecurity through sustainable income from wood and non-wood products;
- Increased off-farm income from sales of grazing rights;
- Increased income from eco-tourism;
- Wiser utilisation of the forest;
- Reappearance of wildlife species;
- Forest-generated income for both government and villages.

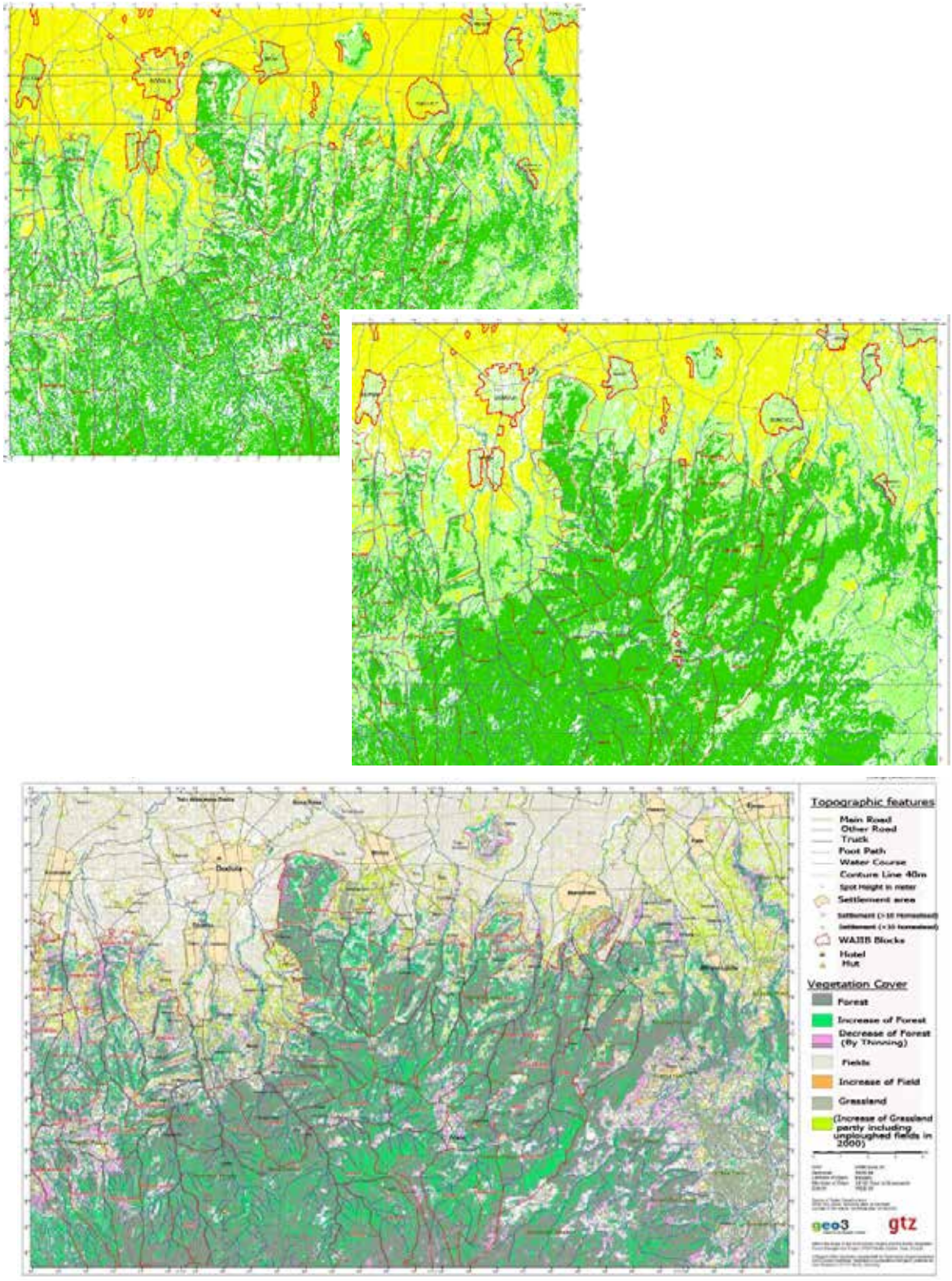


Figure 52. Changes in vegetation cover of Adaba-Dodola Forest in 2002 before (top) and in 2006 after (middle) WAJIB's implementation of PFM, and (bottom) a combined satellite imagine demonstrating the measured change.

Based upon its success the WAJIB approach is being scaled up in four other large forest areas - Suba-Sebeta, West Hararge, Chilalo Galama and Wellega - with support from GIZ. Along with its partner institutions, GIZ-SLM is currently promoting the PFM approach in Tigray, Amhara, Oromia and other regions, with the aim of sustainably conserving over 36,000 hectares of forest.

The approach followed for participatory forest management can be applied to any communal area, including to enclosures – see Figure 53. The main objective of participatory management of communal areas is active participation from all community members, equitable benefit sharing of rewards, and a sense of contribution to the development of the communal area. As the resources are communal there is no other option than putting effort in to consume them sustainably and equitably.

Figure 53. Management of enclosures is one the first steps of watershed development.

GIZ-SLM has ample experience in the management of enclosures which are properly governed by by-laws. As illustrated in the photograph above, a huge amount of grass biomass produces itself after only two rainy seasons.

8.3. Community Contracting

If the goal of watershed development is to ultimately empower communities to handle all developmental activities themselves, then the process of empowerment extends to financial management, of which community contracting is one modality.

Community contracting (CC) is an unconventional way of administering cash-for-work (CFW) funds. It intends to avoid the tiresome job of keeping timesheets by the development agent and of recording individual people's work contributions, based upon which CFW shares are then paid out. Rather, CC sets a fixed price for an output (such as gully rehabilitation), defined in terms of quantity, quality and execution period, and which is due for completion irrespective of the labour input actually provided. CC thus assigns payment based upon the task actually accomplished, rather than simply the time spent on it. The sharing of payments between casual and skilled labour tasks can be left to the community based upon their own timesheets.

Community Contracting is attractive for a number of reasons. One of them is cost-per-unit output, which decreases due to the nature of the task-based contracting arrangement.

Field-staff capacities can thus be put to better use, and the commissioning parties' simplified follow-up and accounting procedures pave the way for faster up-scaling. CC makes the community itself a contractor, rather than merely being used as a casual labour force. Beneficiaries come to perceive CFW as a subsidy for self-help efforts rather than as a sporadic, opportunistic income source. Similarly, the community's taking responsibility for implementation increases ownership and internal organisational capacity. At a later stage the casual labour force may even be overseen by supervisors and technicians sub-contracted by the community. The latter then assume the partial function of service provider. At an even later stage communities may become signatories of local subsidy contracts, entered into directly with donor agencies.

Against these benefits, community contracting also has a number of drawbacks which have to be recognised and compensated for in order for implementation to work well:

- Firstly, with a fixed price per defined unit of output, the contracted community will be tempted to try to rush to execute, at the expense of quality. The procedural simplification gained will then probably be offset by recurrent quarrels about standards being met - or not. In order to avoid such deadlocks, the contract to be entered into must provide for an irrevocable appraisal of quantity and quality by one or more independent experts. Their assessment would determine which proportion of the agreed lump sum is due for payment. A clear criterion of expected quality has to be developed for this purpose.

- Secondly, the community's organisational capacity may not be sufficient to properly administrate the contracted funds and to avoid misuse. Ensuing internal conflicts could potentially bring development work to a halt in a number of watershed communities. If the failure rate is not too high, this price paid for CC is probably worthwhile. Some negative showcases of 'collective punishment', with funding being withdrawn due to irregularities, would be necessary to encourage other watershed communities to do their best to be organised. However, the scheme can only succeed if complacency with failing communities can be avoided. To keep dropout rates low, rural service delivery structures and development bodies would have to increase efforts to provide organisational assistance to the contracted communities, including providing training in financial management.
- Thirdly, there is the question of who comprises the contracting party which is called the 'community'. Communities are known to be heterogeneous: as long as a social grouping is not given the status of 'legal person' according to official procedures it can hardly enter into contracts. Unless such a status is obtained, who would sign a 'community contract'? It would hardly be useful to have a contract which is signed by several hundred household heads who may or may not be residing within the watershed. Nor can a community representative do it if he or she is not legally invested with appropriate powers. Office holders such as kebele heads do not necessarily come from the watershed community, and they should not assume a multitude of non-subsidiary mandates. Consequently, for the purposes of CC, watershed communities have to become 'legal persons' whose representative can sign a contract, can account for the respect of contractual terms, and can be held responsible for violation of those terms.

8.4. Privatisation of Communal Areas

There exist vast areas of communal land (degraded hillsides, pastures, gullies) in most watersheds. The experience during the Derg Regime, under which communally developed areas were widely taken advantage of by local authorities and politicians, discouraged many people from having interest or participating in communal land management. The consequence of this lack of trust in working together for common benefits was the privatisation of communal areas - i.e. their partitioning into plots to be managed by groups of farmers. Before the decision is made to privatise communal areas, thorough discussion and analysis must be conducted by the communities entitled to use

them. Extension professionals and development agents, meanwhile, must play only a facilitation role: final decisions must be unprompted and agreed upon by the community members themselves.

There have been encouraging experiences in many parts of the country in which such practices have been tried and succeeded, including through GIZ-SLM interventions. Decisions are generally accepted by the government as long as they are supported by the community and lead to better management of the degraded areas. The provision of partitioned plots to youth groups is an experience in Amhara Region which resulted in better management than under communal ownership.

Before partitioning is undertaken, a site has to be treated with community-supported soil- and water-conservation measures. Farmers can decide on how they want to develop the areas further, but this should not require any financial support for the additional work. Technical support is almost certainly needed for the planning and execution of planting depending upon the objectives of the farmers. It is advisable to pilot the arrangement at a few sites so that it can be refined.

8.5. Incentives for Exemplary Performance

Rewards for good performance are a motivating factor for every person. A reward or acknowledgment of exceptional performance can take any form be it material ('in-kind'), monetary, certificate or verbal. The Ethiopian Government has been rewarding farmers who improve their production and livelihoods for many years. The yardstick for measuring success has traditionally been assets. Farmers, groups and communities who may be doing a marvelous job of rehabilitating degraded areas, however, are not included by this scheme. There are realities on the ground that reflect the dissatisfaction of many communities involved in watershed rehabilitation activities who have registered remarkable results. On this topic for example, a task force on watershed associations of the BoA of Amhara Region was confronted during a visit to a legally recognised watershed association in North Gonder in January 2010.

The chairman of the association complained that the kebele and woreda were not being recognised for the excellent watershed management activities that had been realised by the people. The committee, which has been assisting community members without remuneration, has never received a certificate acknowledging their work as an incentive. Such a gap, meanwhile, is acknowledged by higher-

level government structures. Non-Governmental Organisations, on the other hand, are going further to incentivise individuals, communities, investors, professionals, researchers and others who are performing exemplary environment activities. For instance, Forum for the Environment, a local non-government organisation, in 2009 awarded a certificate and a cup to Kanat community and to the OoA Head of Lay-Armachacho Woreda in Amhara Region. The award was given for the development endeavours undertaken by the community in rehabilitating a degraded rangeland, and for the coordination and management role delivered by the head during the integrated watershed development campaigns. The SUN Programme played a role by proactively advocating these achievements and by writing recommendations to the concerned bodies. Such examples should be considered in light of SLMP intervention planning too, since there are individuals and groups at different levels who are playing pivotal roles in the overall achievements of every project. Giving them awards or certificates motivates them towards even greater accomplishments as well as highlighting their example to others. Another original and accessible way of motivating people is to set up competitions for artists, musicians and poets to creatively denounce land degradation and promote NRM through songs, poems or art pieces which are judged and publicised.

8.6. Controlled Livestock Grazing

The unregulated free livestock grazing practised across most of Ethiopia is one of the main reasons for the unsuccessful rehabilitation efforts of the past decades. The country dispalys well-reported physical investments in forestry and soil conservation These have consumed significant resources, while positive results have not been sustained due to free-grazing practices exercised across the country. Any project, including regular extension activities, which is aimed at natural-resource conservation and development, has to take serious account of free livestock grazing traditions. Some of their disadvantages include:

- Destruction of natural regeneration;
- Destruction of soil-and water-conservation structures;
- Soil degradation;
- Complication of agro-forestry practices;
- Reduced animal productivity;
- Discouraged expansion of irrigated agriculture;
- Compaction of wetlands and reduction of water-holding capacity.

The up-scaling of SLM practices would be difficult without controlled livestock grazing since planting of trees, shrubs and grasses is a major activity - see Figure 54. Efforts to discuss controlled livestock grazing with communities rarely make much headway. A reason for this may be inconsistent or unsystematic efforts to try and convince communities away from free grazing. Exclusion of livestock from enclosures was also a major challenge in many parts of the country early on in SLM practices, but the practice of thorough exclusion is now more widely accepted, especially in northern Ethiopia. Availability of other areas for free grazing fortunately enables communities to agree to respect enclosed areas.

Controlling livestock movements within micro-watersheds, meanwhile, has met been successful in some places, such as under SUN-Tigray. Earlier efforts by the regional government to test controlled grazing in selected villages had facilitated the adoption of the approach, the tests showing that controlled livestock grazing is possible, even for goats, providing a proper study of the natural resources and socio-economic situation of the subject area is carried out. The critical lesson learned from SUN-Tigray's experience is that communities will agree to controlled livestock grazing if they are convinced that free grazing destroys their development efforts.

The next step towards institutionalising controlled livestock grazing is the design of alternative controlled grazing systems for the differing agro-ecologies, socio-economic conditions and resource endowments that exist. Issuance of legislation by regional governments on controlled livestock grazing is also necessary, incorporating accumulated experience and methodologies on how to go about controlled livestock grazing. Similarly, non-palatable over palatable plant species should be promoted for planting on water- and soil-conservation structures.

Figure 54. Uncontrolled grazing damages planted seedlings on farmland

8.7. Conflict Resolution

Land-rehabilitation projects are focused upon degraded areas which hold few utilisable resources. Before initiatives are begun, minimal attention is given to degraded areas. Conflicts arise when they have been rehabilitated and start to produce interesting outputs. Some communal land lacks clear demarcation of community or kebele boundaries: another common source of conflict. There were many examples of this nature in SUN-supported watersheds across three regions. The case of Kanat in South Gonder Zone (Amhara Region) is typical.

The communal pastureland in Kanat was totally degraded and bare before the GIZ-IFSP / SG-supported intervention. Within a short period the site had totally transformed and biomass had become abundant. The community members were sharing the grasses fairly and were happy with the intervention's outcomes overall. They consequently agreed to expand the rehabilitated area, starting with some planting activities.

The neighboring community, observing the changes and the community's benefits, then raised a historical background claim that the area was common property to both communities. They argued that the land was also theirs for grazing before it had become degraded and demanded similar intervention. The original community did not agree with the historical claim: the issue became a serious point of conflict and flared up to a level of antagonism which could not be resolved without the involvement of a third party. The issue was resolved after a long and difficult negotiation process involving zonal and woreda-level administrations and supported by GIZ-SLM advisors. The negotiation finalised with a peaceful win-win solution for both sides, as illustrated in Figure 55.

Advisors and partners should anticipate that conflicts may easily arise during watershed implementation and should thus develop conflict-avoidance mechanisms. The adage '*prevention is better than cure*' certainly applies here: considerably less time and resources are required to avoid conflicts than to solve them. GIZ-SLM's effective conflict-mitigation measures include, but are not limited to, the following:

- Proper benefit-sharing mechanisms, agreed upon by all community members;
- Periodic discussions with communities about anticipated conflicts;
- Wider discussions with communities about intended project interventions and their expected benefits;
- Agreed usage rights for communal resources;

- Legally recognised ownership of the target land, ensuring that the assigned owner(s) contribute(s) free labour and input to it;
- Communal land certification and implementation of land-related laws.

Although establishment of legal watershed associations serves as the platform for conflict resolution, associations also need to be helped in developing the tools to manage conflicts – with an emphasis on prevention and mitigation over resolution.


Figure 55. Conflict resolution in Kanat, South Gonder, was ultimately successful

8.8. Novel Ways of Facilitating Watershed Development

Approaches not detailed here such as input-for-work schemes, revolving-fund groups, micro-enterprises and oxen sharing have been developed and tried: further testing and evaluation is needed before they can be held up as exemplary. Project personnel are the best-placed actors to develop potentially important approaches due to their access to communities and thus reliable recommendations for relevant pilot schemes. Sources of new ideas include books, websites, personal observation and discussion with stakeholders.

In order to promote a novel idea which is judged to hold potential, a concept note should be prepared and circulated so that the idea can be discussed by the technical committee and other partners before being tested.

9. Land Administration

GIZ-SLM staff do not generally possess in-depth knowledge about land administration, since no components of past projects have dealt directly with it – even though land certification is a pre-condition for implementation of watershed-development interventions. Under the current programme, however, land administration is an SLMP component and so GIZ-SLM is expected to provide technical support relating to it. Below are outlined some concepts and steps suggested for technical support of land administration and land certification. They are based predominantly on experience from Amhara Region.

9.1. Basic Concepts of Land Administration

9.1.1. Land as a Variety of Entities

Land can be viewed from a variety of perspectives, depending upon the context within which it is being discussed. Land is considered here as a **physical reality**, a **legal entity,** and a **cultural entity** which holds economic value and potential.

Land provides the **physical space** in which we all live, work and play, and from which we obtain our material needs. Including water, which covers much of Earth's land surface, it can be said that all living creatures are dependent upon the land for food, shelter and social interaction. Land is the foundation of all human activity: its proper management is key to our very existence.

From an **economic perspective**, land is a basis for production and sustenance of material wealth. From land we obtain food and water, precious minerals, materials to build our homes, our shops and factories, as well as oil, coal, gas and other useful commodities and sources of energy. Indeed, land can be considered as a commodity which varies from country to country based upon political ideology and to which value is assigned before being traded through land markets. Land as a commodity can be taxed to produce revenues which in some cases are reinvested into improvement of the land.

As a **legal entity** land falls under the frameworks of property laws and rights. From a legal perspective this abstract set of property rights provides security of

tenure, governs the way in which the land may be used, and how land dealings can be transacted. These rights can extend from the centre of the Earth to the infinity of the sky: they may include what is below and above the surface of the Earth so that the minerals beneath the surface and the air above, including its contents, may be regarded as part of the land.

Unlike personal property and the ownership of movable objects, land is immovable and indestructible. Land's permanence and variety give it a cultural dimension that lies at the heart of people, race or nation. Throughout history nations have resorted to war over the possession of land, while at the local level citizens may fight to defend their own personal territories, sometimes with disputes over boundaries being resolved at a cost which far exceeds the economic value of what is actually involved. People often have an emotional relationship with the land that they claim to own and the locality in which they live, which is why proper administration of land is necessary for stable society and social justice.

9.1.2. Concepts of Land Administration

Land administration is commonly defined as the process of determining, recording and disseminating information about tenure, value and use of land. This includes:

- Allocation, registration, certification and adjudication of land-use rights;
- Surveying and mapping the extent of those rights along boundaries;
- Recording all transactions which appear to alter established land-use rights;
- Valuations for compensation and taxation;
- Providing public information about legal and procedural frameworks for land administration, including making registered information and maps accessible.

The administrational actions described above cannot be defined as land use planning as such, although the detailed recording of land-use information can be defined this way. Appropriate and predictable land administration systems are achieved only if they are accepted as legitimate and fulfil the needs of the people. Securing legitimacy is a prerequisite. Scientific land administration begins with the promulgation of policies, strategies, legal frameworks and institutional set-ups which define what is to be achieved, how to achieve it, and

the powers and responsibilities of those who will take part in the operation.

Once legitimacy is established, adjudication and first registration can take place. This is a process whereby all existing rights in a particular parcel of land are authoritatively ascertained. Adjudication identifies all existing land rights, in particular the exact legal boundaries. A piece of land, and the person who shall be using it, should be accurately identified, numbered and registered. It is essential to design 'parcel' and 'rightful possessor-identification' modalities.

When undertaking the initial registration, modes of adjudication are categorised as 'sporadic' or 'systematic'. Amhara Regional State, for, example, employs systematic adjudication. Similarly, scientific land administration divides into two institutional approaches. The first, called land registration or the land-book system, concentrates upon the abstract legal rights associated with the land. The second institutional approach is the cadaster: this is more fiscally orientated, containing information about the physical size and shape of areas as well as data on land values and land use. In some countries property registers and land registers are handled by the same institution – as with Ethiopia's Environmental Protection, Land Administration and Use Authorities (EPLAUAs). In other countries they are handled by different institutions.

Eviction of people from land upon which their livelihoods depend destroys any sense of responsibility that they might shoulder for the resource itself, the land. When a farmer is driven off his land, not only his material well-being is damaged, more importantly, his sense of self-worth and his desire for self-and family improvement can be permanently destroyed. Hence, land registration provides security of tenure for those whose land is registered.

A lack of tenure security is not only linked with carelessness towards land management. In Ethiopia today, as in many countries, the cause of much dispute, crime and corruption revolves around desire and competition for land. These negative phenomena are directly or indirectly related to tenure insecurity, which leads to weak governance. It could be argued, then, that land registration is indeed a component of good governance.

The essence of tenure security is certainty. The fundamental challenge to land registration is the maintenance of certainty about three questions: what rights exist, who holds them, and where these rights can be exercised. Incorrect information over one of these questions will cause uncertainty and can lead to

dispute. The function of a land administration system is therefore to accurately record, maintain and make available the information which creates security of tenure and supports the land market. (This is essentially a rental market in the Ethiopian context, since the government upholds ultimate tenure rights of all land.) Information generated through scientific land administration systems enlarges the tax base and contributes to overall economic growth.

9.1.3. The Rationale of Land Administration in Ethiopia

Ethiopia's federal government and regional bureaus have decided that all farmers should have, by law, long-term possession rights to land. This allows them to make long-term investments and thus to aspire to economic development. Long-term possession rights support food security and environmental protection, and more broadly, contribute to good governance and political stability. Ethiopia's land-administration system is, therefore, essentially a demand-driven initiative.

Ethiopia is Africa's tenth-biggest and second most populous country. Its rugged topography makes it difficult to conduct rural cadastral surveys of millions of rural properties - and hundreds of thousands of land parcels - within a short period of time. The need for further infrastructural investment also hinders the implementation of rural cadastral surveys. At the same time there exists a pressing need to register and certify rural lands so that users can be secured and good governance and rural development can be promoted and upheld.

In order to harmonise the conflict between urgent contemporary needs and operational limitations to shoulder such a comprehensive country-wide undertaking, an approach has been designed to have two levels of certification in Ethiopia. Having been trained, woreda-level staff are expected to be able to oversee and support the demarcation, surveying and registration of all rural lands in their woredas and kebeles. This way of working, tested in pilot projects, has shown that a comprehensive Land Administration System can be implemented in an efficient and cost-effective way, with full participation of the land users themselves.

Accordingly, the first level of registration is built on manual methods and local knowledge. The second level is focused on geodetic measurements using

modern surveying technologies. This dual system honours the importance of accurate human description of land parcels to accompany even the most accurate coordinates.

9.1.4. Implementing SLMP's Land Administration Component

9.1.4. 1. Procedures for First-Level Certification

I. Creating and Spreading Awareness at Woreda Level

Land-administration procedures must make stakeholders aware of system needs in general, and land laws in particular. The government sectors most likely to be involved in the building of rural land administration systems are those of Public Administration, Justice, Court, Police, Agriculture offices, City Administration and Revenues. In order for each and every stakeholder to be able to play their part in the establishment of a land-administration system, awareness creation workshops are to be conducted from regional to kebele levels.

II. Discussions with the Kebele Administration

The entry point here is to make an announcement, set up a meeting with the kebele administration, and introduce to them the plan for a full land-administration survey, as well as any other matters relating to tenure security. The regional land administration and use policies, the legal framework, the importance of land registration and its creation of legally binding tenure security should all be discussed in this first meeting. The legal duties and responsibilities of the kebele administration should also be reiterated. In a democratic and participatory manner, clarification must be provided based upon the questions, comments and suggestions which might be raised during the discussion.

III. Discussions with Kebele Members

Having established understanding and clarified all queries with the kebele administration, the next step is to organise a general kebele assembly meeting. The facilitator(s) herein give a more detailed explanation about the planned survey work, as well as the importance of registration and adjudication work

for establishing credible and legally binding tenure security. Emphasis is given here to the details of the legal framework, and participation of the kebele members should be welcomed and encouraged. This step may require repeated meetings and discussion until rapport and trust are built, and consensus reached. The kebele members are then requested to elect kebele and sub-kebele land administration committees - without any interference whatsoever from facilitators, government staff or any other stakeholders.

IV. Formation of the Land Administration and Use Committee (LAUC)

The general assembly, having elected representatives to facilitate establishment of the rural land administration system, then votes in Land Administration and Use Committee (LAUC) members via free election. The members voted should number five to seven individuals, including at least one woman. The elected representatives then assign a chairman and secretary: the kebele-level LAUC is then formed and ready for action.

V. Conducting Training

The new LAUC receives detailed training in kebele-level land administration, legal frameworks and directives, the economic importance of legally binding tenure security, approaches to collaborative working practices, and other matters deemed relevant. As with the kebele administration, duties and responsibilities of committee members are iterated, clarified and discussed.

VI. Preparation of Registration Forms

Registration forms for field-data collection is to be prepared at woreda offices and sent to the Kebele Land Administration Office. The latter then declares land adjudication and registration in the kebele, notifying the committee as well as kebele members.

VII. Declaration of Land Adjudication and Registration

These are declared to the kebele office by letter, while the LAUC disseminates the information to the local community. Notification is also made to the landholders, through the LAUC, that they should apply for registration of their holdings.

VIII. Kebele-Boundary Definition

Having completed land-administration training and other preparatory activities with the LAUCs, the survey work commences. Jurisdiction over the land has first to be defined by the Kebele Administration. The first step in adjudication and registration is to demarcate kebele boundaries. The institutions mandated to undertake this activity are the woreda administration, which coordinates the Kebele Administration Office, the Kebele Land Administration Office, Sub-Kebele Land Administration Committees and the Woreda Land Administration Office. Elders selected by kebele members can also facilitate the demarcation process. Participants from bordering kebeles should also be involved. This work may need repeated meetings and negotiations until consensus can be reached. If it cannot be reached – say, to demarcate shared communal lands – legal and political instruments will be applied to define kebele boundaries. Once the kebele boundaries are settled and the jurisdictional area of the kebele is fixed, sub-kebele boundaries are determined in the same manner. Any holdings of governmental institutions, non-governmental organisations or religious organisations are identified and delineated.

This survey work enables border disputes between kebeles or sub-kebeles to be addressed and resolved early on. Minutes of discussions and meetings must be prepared and distributed to all stakeholders.

IX. Adjudication and Measurement of Communal Land

Communal land is generally very common in rural areas of Ethiopia. It must be measured and the holdings of individuals adjudicated. The Kebele Administration and the Land Administration and Use Committee (LAUC) lead the process, while the kebele government representatives facilitates. Elders, who have local knowledge and are elected by the community, are invaluable to the process. Every encroachment of communal land is registered and its boundary demarcated. Minutes of the process must be written, distributed and filed for later reference.

X. Conducting Public Hearings on the Demarcation of Communal Land

The results of the adjudication of communal lands should be presented to the general assembly for their comment. Agreed amendments will duly be made, while minutes must be written, distributed to stakeholders and kept carefully on file for later reference.

XI. Adjudication and Measurement of Individual and Group Holdings

Identification and measurement of land parcels and their possessor is carried out in the presence of at least three parties: the surveyor, the possessor of the land parcel and the land-administration committee. Based upon the work plans drawn up, possessors of neighboring land parcels are also expected to be present.

The possessor shows all of his/her parcels, bringing stones to be erected at each delineated corner to demonstrate its legitimacy. Witnessed by the land administration committee, all information about the parcel and the possessor are registered by the surveyor on the field form.

XII. Conducting Public Hearings on Individual and Group Holdings

Once the registration of all the parcels in the kebele has been finalised the surveyor and the land administration committee call a public meeting. In the presence of as many community members as possible, registered parcels, against their supposed rightful possessors, are presented for comment and discussion. Those possessors that receive no complaint are given holding rights and a parcel identification number. The parcels and possessors which have triggered disagreement or unresolved discussion are retained, for further scrutiny is carried out. Even for parcels which have passed public hearing without complaint are given a 30-day waiting period before final registration of the parcel identification number is signed – just in case of any delayed complaints. Parcel identification numbers are then permanently registered after 30 days. Thereafter the possessor is legalised and issued with a green Book of Holding; all information hereafter is recorded into the kebele land-administration registry book.

XIII. Data Entry into the Registry Book

The land data which has received approval by kebele members is copied into the registry book from the field sheet. Careful and thorough proofreading must be done to avoid any erroneous information. The registry book also has to be duplicated and kept at the kebele and woreda offices.

XIV. Submission of Photographs

Landholders are to bring a portrait photograph of themselves, to be attached to their green Book of Holding. Those with no access to personal photographs

should be assisted in trying to be photographed nearby. The landholders submit their photos and the LAUC collect and label at the back of the photo by writing full name of a landholder.

XV. Copying Holding Information into the Book of Holding

The Registry Book has now become the only source of accurately logged holding information. This information is then copied into each green Book of Holding from the Registry Book. Photos are attached and stamped. Finally, the green book is signed and stamped by the chairman of the LAUC.

XVI. Issuance of First-Level Certification

Figure 56. First-level certification - for men and women

Upon collecting their Book of Holding the land holders must sign it inside, as well as filling out and signing a delivery form. The kebele LAUC then archives all documents in a systematic way.

XVII. Copying the Registry Book for the Woreda Office

The kebele office then sends a copy of the Registry Book, and any other necessary documents, to the woreda office for safe, systematised and accessible storage.

9.1.5. Procedures for Second-Level Certification

I. Data Entry into Land Administration Information System

Data entry into a computer is the linking of holding information from first-level certification with that of second-level certification. Printouts of all parcel-identification numbers should accompany cadastral surveying, in order to ensure

that parcel-identification numbers (the same for both first- and second-level certification) are accurately recorded and entered as computer data.

Data entry can be carried out by woreda staff or task forces of contracted workers, hired and trained to do this activity. The following procedure has to be followed:

- Procurement of office equipment for data entry into the computer-assisted Information System for Land Administration;
- The woreda staff are to receive relevant computer training;
- Data from the Registry Book should be entered into the computer;
- Data to be printed out and proofread / double-checked for accuracy.

II. Print All Holding Information

Computer print-outs of holding information, as well as accurate lists of holdings, are taken to the field to accompany cadastral surveying.

III. Training on Cadastral Surveying and Mapping

Woreda surveyors shall receive training on cadastral surveying, based around the survey methods and equipment to be used. Cadastral Index Maps (CIMs) can be generated by undertaking ground surveys or by using remote-sensing materials and techniques such as Ortho-Photo or satellite imagery.

The training will cover use of surveying equipment, spatial data capturing and analysis, map making and spatial-data management. Training lasts about one month or less, and most importantly, more than 80% of this time should be allocated to practical exercises and 'learning by doing'.

IV. Preliminary Study

Figure 57. A parcile survey instrument - Precision GPS-RTK

The woreda surveyor will undertake a preliminary study of each kebele which has been approved for second-level certification. Identification of ground locations for the establishment of geodetic control points will be carried out as part of a reconnaissance survey, during which information for preparation of an action plan will be gathered based upon 1:50,000-scale topographic maps.

V. Establishment of Control Points

Cadastral surveying is to be linked to the national geodetic network, providing fixed coordinates of parcel boundaries which can be recorded by the landholder. Establishing control points across the kebele is thus the first step of cadastral surveying. The number of points established depends upon obstructions met, as well as the maximum reading length of the surveying equipment: if satellite imagery is used for Cadastral Index Mapping (CIM), the more control points the better.

VI. Surveying Kebele Boundaries

Having established as many control points as is feasible, the kebele boundary is surveyed and finalised. Neighbouring kebele administrations should be present

during this process. The surveyor will then download the captured data into the computer, process it and make a map of the exact kebele boundary.

VII. Surveying Communal and State-Owned Land

During cadastral surveying of these lands, the parcel identification number (ID) for both communal and state-owned lands will be identified from the Information System for Land Administration (ISLA), printed out (if necessary), and entered into the surveying equipment in order to link first- and second-level certifications. Following surveying, the captured data is downloaded, edited and converted to parcel maps by the surveyor. The LAUC and the kebele administration should be involved during the actual field survey.

VIII. Surveys of Private Holdings

Figure 58. An example of land-parcel boundaries, drawn onto an aerial image

The holdings possessed by individuals, organisations and local institutions will be surveyed, parcel to parcel, by the Woreda surveyor. The kebele expert checks in the holding printouts, which parcel is being surveyed, and provides the parcel ID of the subject parcel for the surveyor. The surveyor enters the parcel ID into the surveying equipment in order to link first and second level

certification. The landholder should be shown up in his/her holding when cadastral surveying is taking place and LAUC will be involved. After the field work, the Woreda surveyor downloads and edits the captured data daily.

IX. Producing Cadastral Index Maps (CIM)

All cadastral survey data is collated and processed into a CIM. It is then sent to the kebele office for display – and for amendment in the case of any erroneous data..

X. Displaying the CIM

The Kebele Land Administration office will post the prepared CIM on display for some days, at least 30 days, gathering comments from the landholders and sending them to the woreda office, which makes necessary amendments and produces a final CIM.

XI. Exchanging Data with Computer Systems

The woreda surveyor provides all of the finalised data to the land registrar of the woreda office. The registrar has to check that all information is correct. If there is a need to make some correction then the surveyour has to make the correction and the data at the surveyor and the registrar must be the same.

Figure 59. Laptop computers with ISLA software are used to register land parcels

XII. *Producing the parcel map and holding printout*

The woreda office sends all print-outs of holding information and land-parcel maps back to the kebele office for accessible archiving.

XIII. *Issuance of Second-Level Certification*

The kebele office collects back from landholders the Books of Holding issued for first-level certification, attaching parcel maps to the book, signing and stamping it with the seal of the Kebele Land Administration Office. A second-level holding certificate is now also given to the landholder.

10. Cross-cutting Issues

10.1. Networking

Cooperation with actors working in similar sectors saves resources and enhances the planning and implementation of project activities. The lack of cooperation in this country is a widely acknowledged fact despite the numerous attempts to establish cooperation. The establishment of national, regional and woreda SLMP platforms was conceived with the objective of bringing together stakeholders for exchanges of experience and coordination of support. Although the cooperation changes that were hoped for have not been fully achieved, success stories of established platforms being strengthened do exist.

In addition to exploiting the existing forums of cooperation, the GIZ-SLM advisors are encouraged to establish cooperation with other institutions in areas such as:

- Experience-sharing visits;
- Collaborative training;
- Exchanges of planting material;
- Consultancy services;
- Joint evaluations of interventions and projects;
- Participatory workshops;
- Sharing manuals and publications;
- On-farm research;
- Developing modules of training and manuals.

A good example of such cooperation is that made between the Ethiopian Animal Management Association and the United States Agency for International Development (USAID). The Association was given the responsibility to develop modules and training manuals in different languages for a project supported by USAID. They implemented the assignment by soliciting support from its members, at little cost. The members were happy to assist with honorarium and were willing to share their knowledge with others. Indeed, there are 15 such professional associations in the agricultural sector who can easily be mobilised!

Numerous workshops take place at federal and regional levels in which GIZ-SLM is invited to participate or which are indeed organised by GIZ-SLM. These

workshops are excellent forums for exchange of experience and establishing links with others. GIZ-SLM advisors should use this opportunity to establish contacts. The advisors are also expected to report on their participation of the workshops with the form attached in Annex 4.

Every GIZ-SLM advisor should develop an inventory of potential partners for cooperation in his or her respective field. Advisors should establish links in their region, and even at federal level – with assistance from the GIZ Coordination Office. Whilst cooperation with other organisations should be well established and based upon strong mutual understanding of cooperation parameters, the signing of a memorandum of understanding (MoU) is one way of strengthening and institutionalising cooperation agreements.

10.2. Gender, HIV/AIDs and Population/ Family Planning

Gender, family planning (in relation to population) and HIV/AIDS are treated as cross-cutting issues on many development agendas. Whilst everyone agrees upon the importance of incorporating them into the daily business of projects, it is unfortunately all too common that they get marginalised in practice, if not by intention.

SLMP comprises four components, described as follows:

Component 1: Investment in Integrated Watershed and Landscape Management for Promoting and Scaling Up SLM;

Component 2: Capacity Development of Public and Private SLM Service Providers, Knoweldge Generation and Management;

Component 3: Rural Land Adminstration, Certification and Use;

Component 4: Programme Management.

The German-Ethiopian Development Cooperation's priority-area strategy paper (2008) on SLM indicates that HIV/AIDS activities are to be carried out under Components 1 and 3 of SLMP. During government negotiation between Germany and Ethiopia in June 2008, it was agreed that the issues of Women's Rights and HIV/AIDS were to addressed as cross-cutting issues under Components 1 and 2.

GIZ-SLM's support of cross-cutting issues is contained in the areas of capacity building and technical-advisory services. There exist policy frameworks and institutional arrangements worked out by federal and regional government

bureaux. Of course, working through these existing government structures comprises GIZ's method of work. In other words, there already exists an enabling environment to work on cross-cutting issues down to community level. GIZ-SLM's performance record, however, does not live up to the expected levels of support. The following operational strategies are therefore proposed.

10.2. 1. Internal Measures

GIZ's support of the three cross-cutting issues of gender, family planning and HIV/AIDS should focus on capacity development and technical advisory service in the areas of advocacy, information dissemination, and awareness creation (demand creation). Cross-cutting issues should be explicitly included in the project log-frame with verifiable indicators, as well as being explicitly incorporated into job descriptions of directors, managers, technical advisors and administrative and financial staff of GIZ.

Project monitoring and evaluation systems should take into account cross-cutting issues very seriously. (Monitoring and evaluation advisors should play significant role in evaluating performance, meanwhile). Within the GIZ-SLM support system, discussions on cross-cutting issues should always be first on the agenda of monthly and quarterly meetings, in order that the subject is addressed with the full energy of participants.

The planning, implementation and evaluation of projects requires that consideration of SLM is given to activities addressing the problems of women and HIV/AIDS-affected groups. The monitoring and evaluation system of the organisation should also consider these aspects during the planning, reporting and evaluation of performance.

10.2. 2. External Measures (Advisory Service to Partners)

Although regional and zonal level structures of partner institutions are important to work with, the main institutional entry points to delivering advisory and technical support are at the woreda and kebele levels of government. Activities to be supported have to be planned by the sector offices and communities that are responsible for the implementation of SLMP, especially at the levels of participatory engagement and micro-watersheds. Training manuals and information materials prepared, technical training, as well as discussion forums organised, should incorporate cross-cutting issues as an obligatory task.

10.2. 3. HIV/AIDS PREVENTION AND MAINSTREAMING CONTROL

Linkages have to be created with the woreda offices of HIV/AIDS prevention and control coordination. The woreda office is mandated with capacity development, resource mobilisation, monitoring and evaluation. Using experts from the coordination office, the capacity of the experts of the Woreda Office of Agriculture and Rural Development (OoA), and the Office of Environmental Protection, Land Administration and Use (OoEPLAU) should be enhanced with regard to mainstreaming HIV/AIDS prevention and control. To be specific, the capacity of focal persons, development agents and supervisors should be enhanced.

Using capacity created in front-line woreda offices of SLMP, the capacity of the kebele HIV/AIDS Prevention and Control Coordination Committees has to reach out to the larger community. In order to properly include the HIV/AIDS activities in watershed development plans, it is imperative to put the kebele HIV/AIDS Prevention and Control Coordination Committee Chair Person as a member of the community into the watershed planning team.

Informal meetings and discussions are every bit as useful as formal structures for disseminating information on HIV/AIDS prevention and control. In order to reduce the risk of infection, community compensations such as payment for watershed-management activities and training should be undertaken at kebele or community levels.

10.2. 4. GENDER MAINSTREAMING

Assessments of gender mainstreaming in SLMP woredas must try to address the socio-economic situation, access and control over resources, land registration and certification, women's involvement in SLMP, gender roles and relations in communities, networking, integration of diverse stakeholders, and women's income-generating activities.

The assessments have unfortunately underlined that gender relations in the surveyed watersheds reflect men's domination and women's subordination. Inequality is similarly reflected in divisions of labour, access to and control over resources, and household- and community decision-making processes. Gender divisions of labour overburden women, reducing their opportunity to engage in project activities. Women generally control and administer consumed items at household level, and farm products of lower economic value such as poultry, eggs,

dairy products, some crops and firewood stocks. Although women can discuss with their husbands amounts of food stocked for consumption, or sale of farmed yields, the ultimate power of decision making remains in the hands of men.

Women's representation in steering committees and technical committees is overlooked by SLMP. Committees established at national, regional and woreda levels have no women members. Indeed, women are only represented by chance, if they happen to be present, say, when steering committee members are being selected; neither are SLMP plans and accomplishment reports disaggregated by gender.

Gender-sensitive project design, implementation and P, M&E, gender analysis, disaggregating data by sex, gender-responsive project budgeting, shared responsibility for gender equality, leadership commitments, institutionalised gender acceptance and the placement of a gender specialist in the SLMP Coordination Office are the strategic pillars towards mainstreaming gender within the programme.

Recommendations drawn from findings of the assessment note that mainstreaming of gender in SLMP from policy to project levels, as well as disaggregating data by sex to generate information on women's participation contribute to the project's objectives. Similarly, capacity building and awareness creation programmes on gender issues among all stakeholders are also recommended. Lastly, the enhancement of off-farm activities to fill food gaps during shortages, as well as environment-, gender friendly and market-oriented income-generating activities designed specifically for women are also highly recommended.

In order to really push these constructive notions forward, working relations and linkages have to be established with the woreda Offices of Women's Affairs (OoWA). OoWA is mandated with capacity building, resource mobilisation and P, M&E of gender mainstreaming. Using experts from OoWA, the capacity of the experts of the woreda OoA and OoEPLAU has to be enhanced regarding the mainstreaming of gender in their day-to-day activities. To be specific, the capacity of focal persons assigned to follow-up gender mainstreaming, development agents and supervisors has to be enriched.

Using the capacity created in the front-line woreda offices who achieve the core elements of SLMP implementation, the capacity of kebele-level gender activists and women's associations must be improved in order to reach the larger community. In order to be able to genuinely include gender-related activities

into watershed development plans it is imperative to add in gender activists and chairwomen of the associations as members of every community watershed-planning team. Gender-related objectives should be explicitly included into the project log frame, and the achievement bar set by verifiable indicators.

10.2. 5. Family Planning

The Woreda offices of health (OoH) are mandated with implementing health policy, including both family planning and HIV/AIDS prevention and control. The capacity of these woreda OoA and OoEPLAU staff has to be enhanced with regard to addressing family-planning issues. In other words, the capacity of the focal people assigned to follow-up on advocacy activities on the importance of family planning, development agents and supervisors has to be enhanced.

As with gender mainstreaming described above, capacity of kebele-level health extension workers and Kebele Administrations in implementing family-planning measures has to be enhanced. Similarly, health extension workers must be included as members of every community watershed-planning team.

10.2. 6. Coordination and Management

In order to coordinate advocacy and capacity-building processes for all the cross-cutting issues discussed in this Implementation Strategy Document, and to provide proper advisory services, regional GIZ-SLM offices need to have a full-time advisor for cross-cutting issues. This is preferred to the assignment of focal persons since the responsibility of facilitating, supporting and mainstreaming cross-cutting issues cannot simply be handled as an add-on.

10.3. Policies, Strategies and Procedures

Whilst GIZ is not short of policies or strategies, there is always rooms for improvement in any organisation's methods of implementation. Are GIZ-SLM advisors and others sufficiently knowledgeable about the policies to properly see through their implementation?

Advisors should first compile all policies, strategies, proclamations, guidelines and procedures relevant to their fields of engagement. This documentation may exist in either hard copy or electronically. The advisors are also expected to analyse the documents for to identify new-development requirements, gaps

in content, or even just for general familiarisation in light of the up-scaling objectives of SLMP.

If needs be, a consultant can be tasked with identification of gaps in policies, strategies and procedures, as well as whether implementers at different levels are familiar with them and their implementation status. The outcome of the consultant's work will of course complement the efforts of the advisors.

10.4. Climate Change

Changes in rainfall patterns and climatic increases in temperature during the past few decades suggest that Ethiopia is no escapee of climate change. Rainfall changes include late onset, longer dry spells, heavy rains, late succession, short rainy seasons, rains into October and hailstorms. GIZ projects consistently try to address the consequences of these phenomena without necessarily referring to climate-change adaptation or mitigation.

Biophysical soil and water conservation, small-scale irrigation, improved agriculture, fuel-saving stoves and PFM activities supported by GDC are seen as the most appropriate and thus effective measures for climate-change adaptation and mitigation. This does not mean that efforts have not been made to promote all the possible interventions relevant to climate change – with the goals of land rehabilitation and increase in agricultural productivity being related. The major areas not given sufficient emphasis are conservation agriculture and improved varieties for climate change adaptation.

Climate change is now a global issue and there is call for support from the developed world to affected countries. More resources are expected to flow from climate change initiatives in the coming years. There already exist a few examples of communities obtaining monetary benefits from SLM activities in addition to the benefits from rehabilitation of the land. For instance, communities in Humbo, SNNP Region are getting money from the World Bank (under REDD+, Reducing Emissions from Deforestation and Forest Degradation) for enclosure and natural regeneration activities. There are also efforts for similar gains in the Bale Mountains where GIZ has been supporting the promotion of participatory forest management (PFM).

More positively, at the international-policy level Ethiopia has ratified the

conventions of the United Nations Framework Convention on Climate Change (UNFCCC) and the United Nations Convention to Combat Desertification (UNCCD). It has also adopted other policies on various aspects of the environment. The National Adaptation Plan of Action (NAPA) of 2007 seeks to prioritise climate-change projects and create a plan of action for enhancing human capacities to cope.

Ethiopia has the ambition to develop along a green economic trajectory. It has consequently outlined a strategy to build this green economy. So far it has identified and prioritised more than 60 initiatives which can help the country to achieve its economic development goals, while at the same time limiting net greenhouse gas emissions in 2030 to below today's 150 Mt CO_2 equivalent - which is less than the current development path or 'business as usual' estimate of 250 Mt CO_2 equivalent. Building a green economy will lead to further socio-economic benefits and allow Ethiopia to tap climate finance.

The Climate-Resilient Green Economy (CRGE) initiative was started in 2011. It comprises three complementary objectives:

- Fostering economic development and growth;
- Transition to a green economy in order to abate future emissions;
- Improving resilience to climate change.

Ethiopia has also categorised green-economy initiatives as funded and planned fully by the government versus supported initiatives which are planned by the government but require contracted support for their implementation. Ethiopia also prioritises market-based initiatives for which it might be able to monetise carbon credits in exchange for greenhouse-gas abatement.

Based upon these strategies, a Global Climate Change Alliance (GCCA) piloting project is being implemented by GIZ, financed by the European Union. Its objective is to test, analyse and document so-called 'climate smart' SLM interventions. In accordance with this, GIZ advisors need to support partners in seizing opportunities for carbon-financing mechanisms. SLMP interventions can of course qualify for carbon financing if it is written in from the outset. Acquisition of a carbon-financing project requires sound baseline information and proof of the additional carbon gained, according to the criteria set. The first line of preparedness is to develop a good understanding of the different mechanisms available.

10.5. Financial Management

Physical performance alone cannot facilitate proper implementation of planned project objectives. The SUN programme saw its project implementation extended by two years due mainly to poor financial management – complicated procurement procedures, poor procurement planning, delayed reporting and settlement of accounts, and numerous requirements for fund disbursements. The experience dictates that the GDC should give equal emphasis to financial management as to physical activities. Financial management training, provision of necessary materials, assigning financial advisors and creating common understanding about the project's financial procedures and overall project objectives are key for SLMP's regional and woreda finance staff.

One of the best lessons from SUN has been the assignment of mobile accountants. Normally, government finances are managed by a pool system whereby all the finances for the woreda are managed by a centralised system that provides services to all the government offices in a given woreda. According to this procedure only one accountant is assigned to deal with requests and financial settlements for all of the projects in the woreda. This procedure has inevitably created long backlogs for numerous issues. In order to address the problem, SUN assigned mobile accountants to assist the woredas with efficiency of processing. They move from woreda to woreda supporting the district accountants to settle finances on time and providing general guidance and advice.

11. Up-Scaling Best Practices

SLMP was originally designed with the notion that scaling up best practices had sustainable land management built into it. Regional governments are undertaking scaling-up exercises in various areas too. Scaling up comprises the geographic and institutional expansion of technologies and techniques whose wider positive impact can be proven. The main issue related to scaling up is how to go about it including selection of best practices, institutionalisation, determination of requirements, selection of watersheds and financial resources. The most important aspects for successful implementation of up-scaling are identification and documentation of best practices, as well as capacity development for better implementation.

Scaling up can be successful if best practices are institutionalised through the policies and strategies of the government. The knowledge management system supported by SLMP can contribute towards this institutionalisation, selecting best practices from programme experience versus clearly defined criteria and recommendations on where and how scaling-up can be implemented. The identification of technologies and approaches for SLMP during the process will adhere to the recommendations made.

Of course, the lessons learned from the experiences of governmental and non-governmental institutions in past years contributes hugely to the knowledge compiled in any knowledge management system. GIZ-SLM advisors are strongly encouraged to start working on the identification of the best practices from their experience, since the knowledge management system will demand it soon. The knowledge management system will use a standardised method (possibly based on computer software) to assess technologies and approaches based upon clear criteria, for their inclusion as best practices. Required criteria for scaling up may include the following:

- A large proportion of practising farmers are convinced about the merits of the intervention;
- The approach or technology is well understood by woreda experts and development workers for guiding farmers;
- The approach or technology supports the directions of the government;
- The approach or technology has been proven to be the most cost-effective solution to the constraint;
- Farmers can easily take up the approach or technology and continue it themselves;

- The material requirements of the approach or technology are easily accessible to the farmer.

One method which must be looked at in greater depth in order to facilitate the scaling up of best practices, is the use of geographic information systems (GIS) to match the areas where a best practice has been implemented. The method tries to match the soil and climatological data of the site in which a best practice is applied, with the data of the new sites. The agro-ecological and livelihood zone maps developed could also be a useful tool if soil and climatological data are not available. In this way GIS supports the characterisation of geographical areas. Its use facilitates the identification of appropriate geographic areas which fit best to the requirements of the technologies. Whilst GIS facilitates identification of areas for technology dissemination, it should not be applied blindly in every woreda. Rather its application should be handled in a centralised manner at the regional level.

Table 6: Classification of technologies and practices

Type of practice	Level of evidence	General applicability
Policy and principles	Proven in multiple settings, replication studies are available, quantitative evidences are abundant, scientifically proveds	Consistently replicable
Best practices	Evidence of impacts from multiple settings are available, meta-analysis and expert review are apparent	Demonstrated replicability with limited risk
Good practice, better practice	Clear evidence from some settings, several evaluations done	Promise of replicability with medium risk
Model practices	Positive evidence in a few cases such as programme evaluation, conferences and workshops	Limited number of settings and experience
Promising practices	Unproven in multiple settings, anecdotal evidence, testimonials articles, reports	High risk
Innovations	Minimal objective evidence, inferences from parallel experiences and context	No or little previous experiences, thushigh risk

The status of technologies and approaches applied during the implementation of previous projects are classified based upon the criteria shown in Table 6 above. The status of these different technologies and approaches is presented in Table 7 below, while the plant species that have been tested are presented in Tables 8 and 9.

Table 7. The status of technologies and approaches applied to past projects and programmes

Homesteads		
Technology/ Approach	**Status and Justification**	**Prerequisites or conditions necessary for implementation**
Ponds	**Model Practice** Guarantees production in areas with erratic and unpredictable rainfall. Allows additional production during the dry season. Hence, rainwater harvesting using ponds is one of the technologies that have to be promoted to optimise the available water resource in drier areas. Designs appropriate for different soil types, rainfall patterns, topography etc. have to be tested for up scaling. For example, the design in black cotton soils (vertisols) is different from other soil types.	Viable areas where it is the only option for availing water in the dry season for irrigation and/ or any other purposes. It requires farmers' experience and commitment for sustainably managing it. Concrete ponds should be constructed under close follow-up of the construction supervisor to reduce risk of cracking and leakage. As the cost of cement is continuously increasing, concrete ponds are best recommended in areas where there are small springs to refill the ponds.
Apples	**Best Practice** The crop has been tested widely in 42 woredas of Oromia and grows very well in the highlands. The demand for the crop has increased dramatically as farmers are getting considerable income. Private nurseries are booming because of the increased demand. Scaling up is also being carried out by many regions. It has also provided cover to the soil and increased soil organic matter content efficiently.	The agro climatic condition needs to be highland (above 2000m). Apple trees prefer red soil for optimum growth. Proper training must be provided to farmers on site preparations, tending, pruning, etc. The orchard needs to have access to water for irrigation and manure. Preferencesisgiven to women-headed households. Improvement in seedling production systems is vital to address growing demand.
Vegetable production	**Best practice** The farmers themselves are scaling up the production of vegetables and has contributed much in improving farmers' income. Evidences on its positive impact in livelihood improvement are available at various agro climatic condition of the country. It also provides composting materials. Farmers are ready to pay for good quality seed. It is an important package which should be promoted to homesteads, even the rain-fed areas. Vegetables always have a better market than cereals and can easily be managed by women, who spend a majority of their time at or close to home.	The selection of vegetable species should be based upon farmers' experience and preference, research findings, agro climatic condition and soil type. Priority should be given to women-headed households, with HIV/AIDS affected members, and active participants in SLM interventions. Irrigation is recommended during the dry season. The scaling up of the practices will be easier and sustainable when sustainable input delivery mechanisms are ensured at local level.
Composting	**Good practice** There is evidence that composting increases the productivity of land. So far it has mainly been practised at homestead level. The demand for it is considerably increasing and its contribution in improving production and productivity is widely recognized by farmers. Composting is also an important element of homestead packages, be it for vegetable or cereal production, as it replenishes soil nutrients.	Appropriate training on preparation and utilization of compost is required. Since it needs biomass and water it is important to do it during/immediately after the rainy season in drier areas, and compost pits have to be as close as possible to water points. In most Ethiopian highlands, heap methods work well in terms of compost quality and decomposition rate.
Enset	**Good practice** Has a positive impact in improving the food security level of households. Replicability is promising but evidence of positive impact is limited. It is liked and being used in the areas where it was not known before. Scaling up is also being carried out by the farmers themselves.	The agro-climatic condition needs to be highland (over 2000m altitude). Farmer-to-farmer experience exchange visits and proper training on growing, processing and food preparation is a prerequisite for promotion of production in new areas.

Fish ponds	**Innovation stage** Evidence of impact is minimal at farmers' level. Nevertheless, according to the parallel experience in other countries the technology is providing additional income source and improves food-security levels. There is one prototype of fish production system at household level which allows the utilization of the same water through purification using technology which comprises Vetiver plant as one component.	Proper design and application by learning from areas where it is practised is need. The Kenyan experience could be tried here as it is working very well in conditions similar to Ethiopia.
Multi-story agro-forestry	**Good practice** Has a positive impact in improving income of beneficiaries and protects the land from erosion. Has been applied in limited settings. Farmers have developed interest from the impression they have from experience-exchange visits. The demand for it is also growing. It encourages zero/controlled grazing practice, and its steady generation of income is significant, without compromising resources.	Experience-exchange visits for farmers to areas like Gedeo Zone, SNNPR, are essential. The multi-story needs to be designed in consideration of the farming system, agro-climatic conditions and objectives of farmers. Farmers need to effectively participate during the design of the system. Crop selection requires the proper consideration of compatibility.
Apiculture	**Best practice** There is much practical evidence at various agro climatic conditions that apiculture has a positive impact on income. Apiculture is a homestead activity; its demand for initial support is growing and farmers are paying back the credit. Scaling up by farmers themselves is practised in considerable numbers.	Farmers need experience in traditional beekeeping and training in bee management. Bee-forage planting and water supply are also necessary. Priorities are given for women-headed households and HIV/AIDS-affected individuals. The homestead area needs to be conducive for this activity. Revolving-fund management system establishment is essential for addressing more farmers, with limited funds.
Rearing small ruminants	**Model practice** Practised in a limited number of settings, but with ample evidences about contribution to the livelihoods of the landless. Intervention was started belatedly in Amhara as the financial cooperation didn't previously allow such interventions. As part of watershed-development interventionsrearing small ruminants can incorporate controlled grazing practices.	Farmers need to be trained in livestock management and have enough feed reserved for the whole year. Farmers need to get access for credit for large-scale interventions. There is a need to associate it with proper revolving-fund management systems to address more people with funds.
Spices production	**Model practice** Very little experience, but there are a number of evidences from research reports that it is a good source of income and that practices are simple. Spices are high-value crops, maturing early even with little rain. Farmers are familiar with it, and it can be managed by women.	Farmers need to be trained on spice management and receive some initial resource input.
Cactus	**Best practice** There is a lot of practical evidence of its impact in improving income level, forage availability and food security, plus natural-resource conservation. It is an important cash crop, livestock feed and bee forage. Grows under harsh conditions with little soil or moisture.	Although drought tolerant, it gives higher yield when supported with water-harvesting structures. Exclusion from livestock grazing also enhances vegetative growth at early stage.

Sweet Potato	**Good practice** Clear evidence of benefits to water harvesting, improving food security situation and generating income. High yielding, drought tolerant and nutritious. It is propagated by vegetative means which makes it easy for scaling up.	Loose and sandy soil favours enlargement of the tuber and hence better yields. Farmers need to be trained in processing, preservation and food preparation.
FARMLAND		
Technology/ Approach	**Status and Justification**	**Prerequisites or conditions necessary for implementation**
Soil bunds	**Best practice** Much evidence of its contribution to minimizing erosion and harvesting water in the field. Acceptability by farmers is still limited since benefits do not offset the land taken by the structure. Effective in conserving soil and moisture but some farmers are skeptical about it since it requires continuous maintenance and consumes considerable amounts of land. It is appreciated much more when combined with biological measures, which reduce maintenance costs and render immediate benefits.	Successful on farmlandwithgentle slopes and stable soils. Less successful in areas with sandy and clay soils as it is difficult to have a stable and compacted bund in sandy soils. It is possible to make an embankment in clay soils, but it will dissolve during rainy season and it also creates temporary water logging. Stabilize the structure with the planting of grasses and legumes.
Stone bunds	**Good practice** Lots of evidence of its contribution to minimizing erosion and harvesting water in the field. Not much liked by farmers since it requires continuous maintenance, harbors rodentsand consumesland. Much liked when combined with biological measures which reduce maintenance costs and render immediate benefits.	Needs proper layout combined with biological measures. It is recommended in areas with ample stones and where trenching is difficult or not recommended. For instance, in areas where there are big water-harvesting reservoirs downstream, stone bunds are recommended.
Relay cropping	**Good practice** Several evaluations indicate that it increases in productivity and fertility. However, its replicability is not effectively demonstrated as it was tested in limited settings. The risk of getting the second crop to fell is medium. Haricot beans were introduced to the farmers, to plant after harvest of maize crops. It happened to be productive and effective using residual moisture. The intervention provided them with additional harvest and contributed toimprovement of the succeeding crop. It is liked by farmers.	Land clearance of maize crop before harvest is required. Maize harvesting needs to be undertaken with care.
Green manure	**Good practice** Forage crops such as common vetch andCloroteria, which have soft leaves and stems, are grown and incorporated into the soil before seeding. It was tried in few places. The technology improves soil organic matter.	Awareness creation for farmers to plant leguminous plants on their field and to wait for at least one season, is required.

Alley cropping	Best practice This practice has been widely applied successfully. Multipurpose species (mainly Sesbania sesban, tree Lucerne, pigeon pea, telineand fish bean (Typhorsia vigoli)), planted in rows, have been scaled up in many woredas. Farmers are happy about the fodder produced from the legume.	Controlled animal grazing is a prerequisite. The selection of the right species for the purpose is important.
Intercropping	**Best practice** Tried at multiple settings and the outcome was excellent, and much liked by the farmers. Intercropping of sun and safflower with teff is widely applied. There are also attempts to intercrop pigeon pea, haricot bean, lablab and cow pea with sorghum and maize. Intercropping with cow pea and lablab was also applied successfully in Tigray.	The crops need to be symbiotic and with different rooting zones. For example, teff is shallow rooted and sunflower is deep rooted, hence they do not compete with each other. Pigeon pea is a legume which fixes nitrogen and can be used with sorghum or maize.
Multiple cropping	**Best practice** Several evaluations have shown increased productivity and land fertility. Its replicability has also been effectively demonstrated in multiple settings. Multiple cropping is very common in south-western Oromia where farmers are benefiting from a harvest of multiple crops such as cereals, coffee, root crop, vegetable and fruits. Furthermore, farmland is covered almost throughout the year, thus well conserved. One crop failure is compensated by the another-crop's harvest, thus risk to livelihood is reduced.	The combination of crops should be well designed to ensure the husbandry requirements of the crops.
Triticale	**Best practice** Implemented in almost all agro-climatic situations of the country, the feedback on its positive impacts are encouraging. It has been disseminated through farmers and seed companies effectively in many regions. Triticale provides a range of benefits as feed for human beings, thatching, forage and compost making. It also increases the soil organic matter content as an effect of the huge root biomass. Triticale (Senna) grows well in moisture-deficient areas.	It is not a replacement for wheat and barley, but grows better than both crops under harsh climatic conditions. Grows in all agro-ecological zones. Proper threshing methods need to be demonstrated.
Improved varieties	**Innovative stage** Not much effort has been made here. Improved varieties are the only solution for improved yield and have to be introduced systematically.	The list of improved varieties for all crops has to be collected from research institutions in order to raise awareness about its potential in Ethiopia.
Termite protection	**Innovative stage** Involves a combination of mechanical and chemical methods. Structures such as terraces and trenches are constructed to increase water holding capacity. Pesticides are applied during the dry season. The method is liked by farmers as it increases crop yield.	Experience-sharing visits for farmers and experts are a prerequisite for testing in multiple settings.

Soil acidity rehabilitation	**Good practice** This is the application of lime in soils in which soil acidity is high. Has been tried in few places, but very effective. It improves soil conditions and crop yields.	
Vetiver hedge	**Best practice** Tried in multiple settings and the outcome with regard to soil and water conservation, road embankment stabilisation, maintenance of the natural drainage system and use as forage was convincing. Vetiver hedge performs very well in low to mid altitudes. Its use as forage, bio-insecticide, thatching, and handicraft making is growing. Farmers generate income from its sale. Scaling up is done by farmers themselves.	Identification of appropriate propagation techniques for the watershed area is essential prior to large-scale plantation. Production of vetiver grass at nursery level is also very important. Farmers' experience-exchange visitsare essential for effective dissemination of the technology.
Phalaris hedge	**Good practice** Lots of evidence with regard to its impact in production of good quality forage and stabilisation of conservation structures. Nevertheless it has been tried only in limited settings, and so replicability has not been effectively demonstrated. Phalaris is accepted by farmers in the highlands. Its effect in conservation of soil and water without the support of physical structures is low. Farmers are using it for forage and its scaling up by them is higher.	The production of planting materials at required amount is essential before dissemination. There are also medium risks like hedge die-off if livestock or human interferences are high.
Tenkara Kind-Plough	**Model practice** This plough is designed for deep plowing to break soil hard-pans to increase water percolation. It has been tried in a few settings. Improves water holding capacity of the soils, land productivity and tolerance to dry spells.	Oxen must be well fed for effective plowing.
Hand-dug wells	**Good practice** Successful in limited settings but non-functional in most places due to lack of proper maintenance. In areas with shallow water table it is a successful intervention for small-scale irrigation, as well as water supply for drinking. In sandstone areas the water table can be raised after investments of trenching and hillside terracing.	The well should be dug until it gives optimum water yield. Minimum acceptable discharge for a shallow well to irrigate 0.25 ha land is 5 litres per second. Group-owned shallow hand-dug wells (eg. 4-5 owners), with regulated water use and water abstraction is advisable, as compared to individually owned wells in which competition for water and excessive use is a prevailing problem.

Stream diversion	**Model practice** Positive evidence exists from a few cases. Not implemented in multiple settings and the experiences in this regard are not really rich. This intervention could be critically important for full and spate irrigation purposes,to be implemented at large scale.	Regulation of water use and establishment of water user groups is necessary. User fees should be well established to fund the maintenance of structures.
Spring development	**Best practice** Effectively demonstrated in multiple settings, and replicable. Farmers like the technology and contribute labour without payment. Springs are sustainable sources of fresh drinking water for humans and livestock in most rural areas. Depending on the discharge, could also be used for irrigation.	Ensure optimum discharge and organise users for proper maintenance and use. Water supply is only sustainable if constructed in a standard manner and maintained properly.
Diversion ditches	**Model practice** There is positive evidence with regard to its acceptability and impacts, improving productivity in a few cases. This intervention is successful in lowland areas in which floods come from the highlands and also in diverting springs and small streams into farmland.	Streams need to have sufficient base flow and must be perennial. Users should get training in water management and irrigation agronomy.
Trenches	**Best practice** Has been practised in multiple settings and proven successful. Continuous trenches in sandy soil are particularly successful. Increase soil moisture, recharge the groundwater table, reduce run-off and create conducive conditions for surrounding plant growth.	Proper layout and sufficient soil depth is required. Not recommended in soils with tunneling problems. Should be done in combination with a structure which safely disposes of surplus water.
Waterways	**Good practice** Risks here are that waterways develop into gullies if not constructed properly. Tried in very limited settings, with some positive results. Invaluable in water-logged areas to drain excess water.	Proper grading is needed and depends on soil type and grassing to protect erosion of the bed.

PASTURELAND / GRAZING AREAS

Technology/ Approach	Status and Justification	Prerequisites or conditions necessary for implementation
Trenches	**Best practice** (as above)	(as above)
Over-sowing of grasses	**Best practice** Adequate evidence exists about its positive impact in improving forage quantity and quality. Its positive contribution is verified in multiple settings. A common and successful practice in very degraded and bare lands. Such areas are over-sown with improved exotic grass seeds or sometimes with local grasses.	Seed purchase before sowing time, and making the grazing area free of grazing in the first two months, is necessary. Farmers must use cut-and-carry systems. Proper selection of the combination of species determines success.

PASTURELAND / GRAZING AREAS		
Technology/ Approach	**Status and Justification**	**Prerequisites or conditions necessary for implementation**
Enrichment planting	**Best practice** There are a number of evidences describing its positive impact in forage quantity and quality improvement. Its positive contribution is verified in multiple settings.	Selection of plant species suitable for agro-ecology, with minimum shade effect. Works only when zero/controlled grazing is practised.
Partitioning/ Paddock	**Promising stage** Not proven in multiple settings ofEthiopia. The evidence available is subjective, and the availability of testimonial articles with references to the Ethiopian context are limited. This is traditionally practised in some areas in Eastern Tigray and it is a wise management of pastureland.	Could create conflict among users if there isnot strong leadership or community by-laws.
Rotational grazing	**Good practice** There much information on its benefits in the Ethiopian context. Practised in some of the south west of the country. Creates time for regeneration of pastureland.	Grass should not be grazed until the land is exposed. Grazing should stop one month before the onset of the rainy season to get enough cover before the rain, and hence be protected from rain splash erosion.

UNCULTIVATED LAND		
Technology/ Approach	**Status and Justification**	**Prerequisites or conditions necessary for implementation**
Trenches supported with biological measures	**Best practice** Practised in multiple settings: there is ample evidence describing its positive impacts. It retains a lot of water in place, reduces run off to downstream areas and creates conducive conditions for plant growth. Plants in and around the structure perform very well. Farmers like it very much and replicate around the site. A successful intervention for groundwater recharging in deep-profile soils.	Communal land needs to be distributed to individuals and certified. Proper layout and commitment from farmers to use cut-and-carry systems andre-fraining from free grazing is necessary.
Bunds supported with biological measures	**Best practice** Has been practised in multiple settings with ample evidence of positive impacts. Farmers like it as the area taken up by the structures is minimum and an immediate benefit can be drawn. Retains water and safely disposes of surplus water, reducing run-off to downstream areas. Plants in and around the structure perform very well. Farmers like it very much and replicate around the site.	Communal land needs to be distributed to individuals and certified. Proper layout and commitment from farmers to use cut-and-carry systems andre-fraining from free grazing is necessary. Bunds are not recommended on steep slopes: terraces are better.

UNCULTIVATED LAND		
Technology/ Approach	Status and Justification	Prerequisites or conditions necessary for implementation
Enrichment planting supported with physical measures	**Best practice** Practised in multiple settings, with evidences of positive impacts in improving forage production as a result of moisture retained in the area. Plants perform well with the combination, and the quality and quantity of vegetation growth is high. Depending on the soil type and agro-ecology of the area, some areas could be enriched by different forage plants.	Communal land needs to be distributed to individuals and certified. A physical structure needs to be established before plantation.Proper layout and commitment from farmers to use cut-and-carry systems andrefraining from free grazing is necessary. A management plan needs to be established, and training organised on implementation.
Bee keeping	**Best practice** There is practical evidence at various agro-climatic conditions that it has a positive impact on income. The practice has been tried in multiple settings and analysis shows that it is successful. Treated and well-kept uncultivated lands are ideal for beekeeping as bee forage is abundant.	Beekeeping needs enrichment planting of the uncultivated lands with different plants and nearby water sources. Proper training on bee and forage management as well as harvesting is a prerequisite.
Fruits	**Model practice** Have proven effective in areas where they were tested. Practised in a very limited number of setting, and risks involved are medium. Uncultivated areas with supplementary water sources can be used for fruit production. Cancontribute to income generation, soil and moisture conservation, and sustainable management of degraded lands.	Selection of appropriate fruit species suitable to the agro-ecological context is essential. Sufficient surface/groundwater supplies and proper training on the tending of orchards are prerequisites.
Semi-circle terraces	**Good practice** Evidence of its contribution to minimizing erosion and harvesting water in the field. However, not practised in many settings. An ideal technology for in-situ water harvesting in areas with < 45% slopes. Terraced areas can be used for intensive forage production or orchard establishment, depending on water availability.	Enough run-off area optimum layout of terraces is necessary. Selection of good plant mixtures are necessary in orderto optimise the area of cultivation and the harvested water.
Spate irrigation	**Model practice** Positive evidence from few cases, but not implemented widely. May need supplementary irrigation where areas do not receive adequate rainfall.	Proper location of a diversion weir is necessary. Irrigation fields need to be leveled (plain land). Run-off and run-on areas need varying agro-ecologies.
Percolation ponds	**Promising stage** Not proven in multiple settings matching Ethiopian farming conditions. The technology has been effective in Tigray for recharging downstream areas, for re-use in shallow irrigation wells.	Requires sufficient soil depth, infiltration rate, run-off area and optimum location and layout in order to work.

UNCULTIVATED LAND		
Technology/ Approach	**Status and Justification**	**Prerequisites or conditions necessary for implementation**
Gabion check dams	**Best practice** There is practical evidence from various agro-climatic conditions that it has a positive impact on conserving soil, reducing the expansion of gullies, and converting degraded areas into productive land. The practice has been tried in multiple settings and analysis shows that it is an effective structure for controlling concentrated flows. It is cost effective if used at selected sites such as junctions and rocky gully beds, where loose-stone check dams cannot tolerate flooding. It avoids bed scouring. It creates conducive condition for plant growth. It is not replicated by farmers themselves as the cost is beyond the reach of farmers.	Proper layout is a prerequisite:must be built in a deep soil foundation to make it cost effective. Must be erected in the narrower area of the gully, where there is higher inundation. Height and width ratios need to be maintained. Training of experts, development agents and farmers on planning, building and maintenance of the damsis necessary.
Brushwood check dams	**Model practice** Applied for gullies very small in size and with little run off. There are positive evidences in a few cases. It is not implemented in multiple settings. It is effective in reducing erosion.	Optimum layout and a sufficient wood source are prerequisites.
Arc weirs	**Good practice** Reduces the height of gullies, conserves moister and soil efficiently, and holds more water for use by the plant during dry spells. Not widely practised nor replicated by farmers themselves, as the cost is beyond the reach of farmers. Rarely used due to high cement prices.	Optimum layout is a prerequisite: must be constructed at a site with impervious foundations and narrow places with big inundation areas. Height and width ratio needs to be maintained across the weir.
Loose-stone check dams matted with reed and bamboo mats	**Good practice** Positive impact on conserving soil, reducing the expansion of gullies, and converting degraded areas into productive land in limited settings. Reduces gully height and conserves soil efficiently. Creates conducive conditions for plant growth. Replicated by the farmers themselves. Commonly used for gully rehabilitation and is cost effective.	Proper layout is a prerequisite: must be constructed in a wide area where one can be sure that the energy of the runoff is effectively distributed so as not to detach stones from the structure. Reservoir height shouldn't be more than one meter. Needs good quality stones and special care in construction (keying, proper foundations and aprons).
Live check dams	**Model practice** Applied to small gullies with little runoff and small gully width. There is positive evidence in a few cases. It is effective in conserving soil and moisture if well placed. Provides additional forage and is easily replicated by farmers. Difficult to undertake alone as heavy flooding can destroy it at seedling stage. However, it does work once gullies have already been stabilised loose-stone or gabion check dams.	Selection of the appropriate planting material is very important. Site selection for must also be thoroughly scrutinized.

UNCULTIVATED LAND		
Technology/ Approach	**Status and Justification**	**Prerequisites or conditions necessary for implementation**
Tree, grass and fruit planting in gullies	**Best practice** There is practical evidence from various agro-climatic conditions that it has a positive impact in reducing erosion, stabilising gullies and increasing forage biomass. It provides forage, fuel wood, construction materials and fruits (in a few cases). Keeps gullies intact and checks their development. Replicated by the farmers. Planting of grass cuttings and shrubs is commonly used to stabilise gully walls and beds. Fruit and tree plantations have to be considered in well-stabilised gully beds, as they are often moist.	Appropriate species identification and production at required amount and site layout based on local characteristics, are required.
Reshaping	**Best practice** Gully reshaping's positive effect in reducing collapse rate of gully side wall is demonstrated,and practised in multiple settings. Reshaping gully walls after check-dam construction is important in order to stabilise gully flanks. Provides optimum conditions for plan growth including fruits.	Slope reshaping should be done at least 3 months before the onset of the rainy season so that the planted grasses and shrubs give enough cover for the exposed soil. Water sources needed for planting during the dry season.
Trenches reinforced with biological material (gullies)	**Best practice** Practised in multiple settings with ample evidence of positive impacts, increasing soil moisture, recharging of the groundwater, reducing lateral runoff into gully side wall and creating conducive conditions for plants growth around it. Easily replicated by farmers. Trenching in the reshaped gully wall is an appropriate technology for retaining moisture for planted cuttings in the gully wall.	Proper layout, identification and production of planting material are required. Highly effective if done in combination with a structure to safely dispose of surplus water.
Furrows	**Best practice** Practised in multiple settingswith ample evidence of positive impacts. Effective in increasing soil moisture, recharging groundwater and reducing lateral runoff into gullies.	Proper layout and soil clearing are necessary.
Sand-filled sack check dams	**Good practice** Applied in gullies where runoff is not high. There exists much evidence of its impact on soil and water conservation. Effective in reducing the development of gullies and in changing the gully into productive land. It uses locally available material (mainly sand) and hence it is cost efficient.	Proper layout and design needed. Also, must be reinforced with stone riprap.

Uncultivated land		
Technology/ Approach	**Status and Justification**	**Prerequisites or conditions necessary for implementation**
Soil-filled sack check dam	**Model practice** Applied in gullies where the availability of stones is limited. There is positive evidence from very few cases. Uses locally available materials (mainly soil) and is thus cost effective.	Proper layout and design needed. Also, must be reinforced with stone riprap.

Approaches relevant to watersheds as a whole		
Technology/ Approach	**Status and Justification**	**Prerequisites or conditions necessary for implementation**
Cut-off drains	**Best practice** There is considerable practical evidence from multiple settings of various agro-climatic conditions that it safely disposes of runoff. Effective in reducing runoff from untreated areas, protecting downstream areas from runoff damage and allowing water to percolate slowly.	Proper layout is key in order to avoid negative effects.
Waterways	**Promising stage** There is some evidence describing their impact on the safe disposal of surplus runoff from the field. In most of the cases, however, they develop into gullies and are therefore not liked by farmers.	Proper layout, with appropriate gradient, depending on soil type and the need for planting grasses, must be scrutinised.
Community contracting	**Best practice** Proven in multiple settings with regard to its impact in improving the quantity and quality of work done through cash for work (CFW). Allows farmers to properly manage their time and increase their work efficiency. Problems with some finance offices in adopting the system were observed.	Farmers should have a full understanding of the conditions to be fulfilled under the contract. Training in how to handle the organisation of the work, recording, measurement and payment modalities is necessary.
Planning	**Best practice** Proper planning tools have improved the planning of watershed activities. Applied in 95 watersheds under SUN. Widely adopted by partners and communities.	Proper capacity building and application follow up are necessary.
Hive for work	**Promising stage** The concept is well developed but not practised yet. A promising activity which should be applied wherever applicable. Provides access to landless youth and poor farmers who cannot afford to buy hives. They contribute labour for other activities equivalent to the cost of the hives.	Proper capacity building and implementation follow up are necessary.

APPROACHES RELEVANT TO WATERSHEDS AS A WHOLE		
Technology/ Approach	**Status and Justification**	**Prerequisites or conditions necessary for implementation**
Participatory Forest Management (PFM)	**Best practice** A proven approach for minimizing forest destruction. Currently being scaled up with the support of GIZ and other organisations. Provides a sense of ownership and income to the community members living in and around big forest areas.	Close consultation with, and involvement of, local government and communities in and around the forest necessary.
Private nurseries	**Best practice** Proven in multiple settings in facilitating planting-material production and capacity building at community level. Reduces the burden of planting material production from the government representatives. Farmers also generate income and the capacity created allows the creation of local markets for planting materials.	Producers must be trained in nursery management and seedling production. Permanent water sources are a prerequisite. Continuous follow up and support with initial inputs is required.
Establishment of legal associations	**Best practice** Applied in many SUN watersheds of Amhara Region. Community members are empowered to take development into their hands. The deterioration of investments made in watersheds is reduced. Enhances local leadership and empowerment, particularly women. A great opportunity in which watershed users analyse their own situation, plan against their options, and implement together as a team, contributing to sustainable management and development of their local resources.	Close consultation with, and involvement of, woreda and kebele authorities as well as communities. Adequate training needed for leaders of associations.

Table 8. Species tested by the German Development Corporation (GDC) and recommended for planting in watersheds

	Common Name	Scientific Name	Use	Propagation and seed treatment
1	Red cedar	Acrocarpus fraxinifolius	Soil conservation, Timber, Fast growing, Forage	Seed, soaked in boiled water for two minutes
2	Alfalfa (Lucerne)	Medicago sativa	Forage, Soil fertility improvement, Soil conservation	Seed, no treatment
3	Avocado	Persea Americana	Fruit, Soil conservation	Seed, no treatment
4	Banana passion fruit	Passiflora molissima	Fruit, Ornamental	Seed, no treatment
5	Bana grass	Pennisetum purpureum x P. typhoides	Forage, Soil and water conservation, Slope stabilisation	Cuttings from matured cane, Splitting, Mature cane layering
6	Basket willow	Salix viminalis	Soil conservation, Medicinal, Soil stabilisation and conservation, Forage	Cuttings or truncheons, Stem layering
7	Big trefoil	Lotus uliginosus (schkur)	Forage, Soil fertility improvement, Soil conservation	Seed, no treatment
8	Birbira	Millettia ferruginea	Soil conservation, Timber, Fish poison	Seed, soak in 70°C water for three minutes
9	Birds foot trefoil	Lotus corniculatus	Forage, Soil fertility improvement, Soil conservation	Seed, no treatment
10	Bisana	Croton macrostachyus	Medicinal, Soil fertility improvement, Farm implements, Soil conservation	Seed, no treatment, Seed fertility deteriorates with storage
11	Black locust	Robinia pseudoacacia	Forage, Timber, Firewood, Construction, Soil conservation	Seed, place in boiled water for 3 minutes and allow to cool for 24 hr
12	Black mulberry	Morus nigra	Fruit, Forage, Silk worm feed, Soil conservation	Cuttings
13	Blackwood	Acacia melanoxylon	Construction, Soil conservation, Soil stabilisation, Timber	Seed, place in boiled water for 3 minutes, and allow to cool for 24 hr, Root cutting
14	Calliandra	Calliandra calothyrsus	Forage, Firewood, Soil conservation, Soil fertility improvement	Seed, place in boiled water for 3 minutes, and allow to cool for 24 hr

	Common Name	Scientific Name	Use	Propagation and seed treatment
15	Canna	Canna indica	Ornamental, Slope stabilisation, Soil conservation	Splitting
16	Casmir	Casmiroa edulis	Fruit	Seed
17	Cassia	Cassia sturtii	Forage, Soil fertility improvement, Soil conservation, Range land enrichment	Seed, place in boiled water for 3 minutes, and allow to cool for 24 hr
18	Chestnut	Castanea sativa	Animal fodder, litter, timber, fuel, tannin for leather industry, wildlife habitat	--
19	Crown vetch	Coronilla varia	Slope stabilisation, Fix nitrogen, Forage, Soil conservation	Seed, soak in 70°C water for three minutes
20	Elderberry	Sambucus nigra	Slope stabilisation, Medicinal purpose, Soil conservation	Cuttings, Stem layering
21	Elephant grass	Pennisetum purpureum	Forage, Slope stabilisation, Soil conservation	Cuttings of mature canes, Splitting, Mature cane layering
22	Erect weeping willow	Salix babylonica	Forage, Soil stabilisation, Soil conservation, Medicinal	Cuttings or truncheons, Stem layering
23	False banana	Enset ventricosum	Local bread making material, Human food, Slope stabilisation	Splitting from corm
24	Firethorn	Pyracantha spp.	Life fence, Fruit, Soil conservation, Slope stabilisation	Seed, soak in 70°C water for three minutes
25	Fish bean	Tephrosia vogelii	Bio insecticide, Soil fertility improvement, Fish poison, Soil conservation	Seed, place in boiled water for 3 minutes and allow to cool for 24 hr
26	Gesho	Rhamnus prinoides	Local beer making, Soil conservation	Fresh seed, treated with ash
27	Grey poplar	Populus canescens	Timber, Construction, Slope stabilisation	Root cuttings

	Common Name	Scientific Name	Use	Propagation and seed treatment
28	Green gold	Pennisetum sp	Fodder, Soil conservation, Slope stabilisation	Cuttings from matured cane, Splitting
29	Green wattle	Acacia decurrens	Construction, Fire wood, Soil conservation, Timber	Seed, place in boiled water and allow to cool for 24 hr
30	Honey locust	Gleditsia triacanthos	Forage, Soil conservation, Soil fertility improvement	Seed, boil in water for three minutes and allow to cool for 24 hr
31	Horsetail tree (beef wood)	Casuarina equisitifolia	Soil fertility improvement, Fire wood and charcoal, Soil conservation, Ornamental, Wind brake	Seed, no treatment
32	Hybrid poplar tree	Populus euramericana x P. deltoides	Soil conservation, Forage, Timber, Construction	Cutting or truncheons, Stem layering
33	Italian melon (pepino)	Solanum muricatum	Fruit, Soil conservation, Forage	Seed, Cuttings
34	Jacaranda	Jacaranda mimosifolia	Firewood, Construction, Timber, Ornamental, Soil conservation	Seed
35	Kerkeha	Arundinaria alpine	Construction, Soil conservation, Slope stabilisation	Splitting
36	Kikuyu grass	Pennisetum clandestinum	Soil Conservation, Forage, Slope stabilisation,	Cuttings of rhizomes
37	Kitkita	Dodonaea angustifolia	Soil conservation, Slope stabilisation, Firewood	Seed, no treatment
38	Kontir	Entada abyssinica	Live fence, Soil conservation	Seed, place in boiled water for 3 minutes and allow to cool for 24 hr
39	Kudzu	Pueraria thunbergiana	Fodder, Soil Conservation, Soil fertility Improvement, Roots Edible	Seed, place in boiled water for 3 minutes and allow to cool for 24 hr
40	Kulkual	Opuntia ficus indica	Fruit, Soil conservation, Slope stabilisation	Leaf cuttings
41	Leucaena	Leucaena leucocephala	Soil fertility improvement, Soil conservation, Firewood, Forage	Seed, place in boiled water for 3 minutes and allow to cool for 24 hr

	Common Name	Scientific Name	Use	Propagation and seed treatment
42	Leucaena	Leucaena leucocephala, Leucaena pallida	Soil fertility improvement, Soil conservation, Firewood, Forage	Seed, place in boiled water for 3 minutes and allow to cool for 24 hr
43	Lespedesa	Lespedeza sericea	Forage, Soil conservation, Soil fertility improvement, Slope stabilisation	Seed, water, 70°C for three minutes
44	Olive	Olea europaea	Fruit, Soil conservation	Cuttings
45	Phalaris	Phalaris aquatic	Forage, Soil stabilisation in water logged area, Soil conservation	Seed, splitting
46	Phragmites	Phragmites communis	Forage, Soil stabilisation	Cuttings, Splitting, Mature cane layering
47	Pink serradella	Ornithopus sativus (Brot)	Forage, Soil conservation, Soil fertility improvement	Seed, no treatment
48	Pomegranate	Punica granatum	Fruit, Soil conservation	Seed, no treatment
49	Prairie wattle	Acacia angustissima	Soil conservation, Soil fertility improvement, Forage	Seed, place in boiled water for 3 minutes and allow to cool for 24 hr
50	Purple granadilla	Passiflora edulis	Fruit, Ornamental	Seed, no treatment
51	Raspberry	Rubus idaeus	Fruit, Slope stabilisation, Forage, Soil conservation	Seedlings, growing from rhizomes
52	River kikuyu	Pennisetum riparium	Soil conservation, Soil stabilisation in water logged area, Forage	Cuttings of rhizomes
53	Saltbush	Atriplex nummularia	Forage, Saline area rehabilitation, Soil conservation	Seed, soaked in running water for 48 hr
54	Simbelet	Hyparrhenia spp	Soil conservation, Thatching, Slope stabilisation, Forage	Seed, no treatment
55	Sesa	Albizia schimperiana	Soil fertility improvement, Coffee shade, Bee hive tree, Soil conservation	Seed, place in boiled water for 3 minutes and allow to cool for 24 hr

	Common Name	Scientific Name	Use	Propagation and seed treatment
56	Sesbania	Sesbania sesban	Forage, Coffee shade tree, Soil fertility improvement, Soil conservation	Seed, water, 70°C for three minutes
57	Shambokko	Arundo donax	Soil conservation, Construction, Slope stabilisation	Splitting, Mature cane layering
58	Shiferaw	Moringa oleifera	Spinach, Soil conservation, Medicinal, Water purification	Seed, no treatment
59	Shiferaw	Moringa stenopetala	Spinach, Soil conservation, Medicinal, Water purification	Seed, no treatment
60	Shola	Ficus carica	Soil conservation, Gully bed stabilisation	Seed, cuttings or truncheons
61	Silky oak	Grevillea robusta	Construction, Fire wood and charcoal, Soil conservation	Seed, no treatment
62	Siris tree	Albizia lebbeck	Soil fertility improvement, Coffee shade, Soil conservation	Seed, place in boiled water for 3 minutes and allow to cool for 24 hr
63	Stink bean	Paraserianthes lophantha	Forage, Soil fertility improvement, Soil conservation	Seed, place in boiled water for 3 minutes and allow to cool for 24 hr
64	Tagasaste (tree lucerne)	Chamaecytisus palmensis	Soil conservation, Soil fertility improvement, Forage	Seed, place in boiled water for 3 minutes, and then transfer to cold water
65	Tall fescue	Festuca arundinaceae	Forage, Soil conservation, Soil stabilisation in water logged area	Seed, Splitting
66	Tamarix	Tamarix nilotica, T. aphylla	Forage, Soil conservation, Saline area rehabilitation, Slope stabilisation	Cuttings
67	Teline	Teline canariensis	Soil fertility improvement, Soil conservation, Forage	Seed, water, 70°C for three minutes
68	Teline	Teline madeirensis	Soil fertility improvement, Soil conservation, Forage	Seed, water, 70°C for three minutes
69	Teline	Teline monspessulanus	Soil fertility improvement, Soil conservation, Forage	Seed, water, 70°C for three minutes

	Common Name	Scientific Name	Use	Propagation and seed treatment
70	Tree lupin	Lupinus arboreus	Soil fertility improvement, Soil conservation, Forage	Seed, soaked in boiled water for 3 minutes and allow to cool for 24 hr
71	Vetiver grass	Vetiveria zinzanioides	Soil and water conservation, Bio insecticide, Ornamental, Forage	Splitting
72	Virgilia	Virgilia divaricata	Soil fertility improvement, Soil conservation, Forage	Seed, soaked in boiled water for 3 minutes and allow to cool for 24 hr
73	Virgilia	Virgilia oroboides	Soil fertility improvement, Soil conservation, Forage	Seed, soaked in boiled water for 3 minutes and allow to cool for 24 hr
74	Wanza	Cordia africana	Timber, Coffee shade, Forage, Soil conservation	Seed no treatment
75	Weeping love grass	Eragrostis curvula	Forage, soil conservation, Ornamental	Seed, splits
76	Weeping willow	Salix babylonica	Forage, Soil stabilisation, Soil conservation, Medicinal	Cuttings or truncheons
77	Weeping wattle (Port Jackson willow)	Acacia saligna	Soil fertility improvement, Firewood, Soil conservation, Forage	Seed, boil for 5 minutes, put in cold water
78	White mulberry	Morus alba	Fruit, Forage, silk worm feed, Soil conservation	Cuttings
79	White-tip clover	Trifolium variegatum	Forage, Soil fertility improvement, Soil conservation	Seed, no treatment
80	Yellow lupin	Lupinus luteus	Human feed, Soil fertility improvement, Soil conservation	Seed, no treatment
81	Yellow serradella	Ornithopus compressus	Forage, Soil conservation, Soil fertility improvement	Seed, water, 70°C for three minutes

Table 9. Recommended plant species for biological gully rehabilitation and rangeland improvement

Planting Location	Category	Species	Main Uses (other than soil conservation)	Remarks
Gully floor or bed	Covering grasses	Kikuyu grass (Pennisetum clandestinum)	Soil cover, fodder, invasive character	Highlands (HL), lowlands (LL)
		Riverine Kikuyu (Pennisetum riparium)	Soil cover, fodder	Needs high moisture, HL,LL
		New grass from Fogera	Soil cover, fodder	Needs high moisture, LL
		Bermuda grass (Cynodon dactylon)	Soil cover, fodder	Especially in sandy soils, HL,LL
	Covering legume	Birds foot trefoil (Lotus corniculatus)	Soil cover, fodder	Propagation: stem layering, splitting, HL,LL
	Other legumes	Sunhemp (Crotalaria juncea)	Fodder, fibre	
		Fish bean (Tephrosia vogelii)	Insecticide, soil improvement	Drought hardy, HL, LL
	Tall grasses	Shambokko or Spanish reed (Arundo donax)	Building material, fencing, fodder	HL, LL
		Kerkeha or Mountain bamboo (Arundinaria alpina)	Building material, fencing	HL
		Common reed (Phragmites communis)	Building material, fodder	HL, LL
		Phalaris (Phalaris aquatica, P. arundinacea)	Fodder, cultural use (coffee ceremony)	HL, LL
		Tall fescue (Festuca arundinacea)	Fodder, cultural use (coffee ceremony)	Drought hardy, HL, LL
		Vetiver (Vetiveria zizanioides)	Grain storage, rodent repellent	For hedgerows across the gully bed, HL, LL
		Green gold (Pennisetum spp.)	Fodder, highly productive	Can stand water-logging, HL, LL

Planting Location	Category	Species	Main Uses (other than soil conservation)	Remarks
Gully floor or bed (continued)	Trees	Hybrid poplars	Poles, building material, plough, furniture	HL, LL
		Grey poplar (Populus canescens)	Poles, building material, furniture	Can have colonizing effect in gully beds, HL, LL
		Ahaya or Wild willow (Salix subserrata)	Fodder	Moist conditions, HL, LL
		Basket willow (Salix viminalis)	Fodder, basket making	Needs moist conditions, HL, LL

Planting Location	Category	Species	Main Uses (other than soil conservation)	Remarks
GULLY FLOOR OR BED (CONTINUED)	Trees	Erect weeping willow (Salix babylonica)	Poles, building material, fodder	Needs moist conditions, HL, LL
		Stink bean (Paraserianthes lophantha)	Fodder, firewood	Drought hardy, HL, LL, fast growing
		Sesbania (Sesbania sesban)	Fodder, firewood	HL, LL
		Tamarisk (Tamarix aphylla, T. nilotica)	Firewood, fodder	In dry or waterlogged areas, tolerates salt, better in LL
		Dokma or Waterberry (Syzygium guineense)	Firewood, poles, timber, fruit	In dry, lower altitudes
GULLY SIDEWALLS	Tall grasses	*Shambokko* or Spanish reed (Arundo donax)	Building material, fencing, fodder	HL, LL
		Kerkeha or Mountain bamboo (Arundinaria alpina)	Building material, fencing	HL
		Vetiver (Vetiveria zizanioides)	Grain storage, rodent repellent	For hedgerows along sidewalls, HL, LL
		Shenkora Ageda or Sugar cane (Saccharum sp.)	Food	Lower parts of sidewalls, LL
GULLY SIDEWALLS (CONTINUED)	Fodder grasses	Green gold (Pennisetum spp)	Fodder	Lower parts of sidewalls and gully bed, needs moist conditions for best performance but will also do under somewhat drier conditions, HL, LL
		Bana grass (Pennisetum purpureum or Pennisetum typhoides)	Fodder	Lower parts of sidewalls, rangeland, drought hardy, needs feeding (manure, fertilizer) HL, LL
		Elephant grass (Pennisetum purpureum)	Fodder	Lower parts of sidewalls, in rangeland, needs feeding (manure, fertilizer), HL, LL
	Fodder grasses (continued)	*Senbelet* (Hyparrhenia nyassae)	Fodder, thatching	Lower and upper parts of sidewalls, HL,LL
		Weeping love grass (Eragrostis curvula)	Fodder	Upper parts of sidewalls, on sandy soils, very drought resistant, HL, LL

Planting Location	Category	Species	Main Uses (other than soil conservation)	Remarks
Gully sidewalls (continued)	Annual grasses	*Teff* (Eragrostis teff)	Fodder	HL, LL
		Dagusa (Eleusine corolana)	Fodder	
	Covering legumes	Kudzu (Pueraria thunbergiana)	Fodder	Lower parts of sidewalls
		Crown vetch (Coronilla varia)	Excellent soil cover, fodder, non-bloating	Lower and upper parts of sidewalls, very drought resistant, no waterlogging, HL, LL
	Other legumes	Pink and Yellow serradella (Ornithopus sp.)	Soil cover, fodder	Lower parts of sidewalls, HL, LL
		Lespedeza (Lespedeza sericea)	Fodder	Dry conditions only, LL
	Trees/ Shrubs	Green wattle (Acacia decurrens)	Firewood, timber, bee fodder	HL, LL
		Silver wattle (A. dealbata)	Firewood, timber, bee fodder	HL, LL
		Blackwood (Acacia melanoxylon)	Firewood, timber	Especially lower parts of sidewalls, HL, LL
		Saligna or Port Jackson willow (Acacia saligna)	Fodder, firewood	HL, LL
		Prairie wattle (Acacia angustissima)	Fodder, firewood	Lower parts of sidewalls, drought hardy, HL, LL
		Kitkita or Hop bush (Dodonaea angustifolia	Firewood, tools, handles	HL, LL
		Enset or False banana (Enset ventricosum)	Wrapping material	Lower parts of sidewalls, HL, LL
		Shola or Fig tree (Ficus carica)	Fruit, medicinal	Lower parts of sidewalls HL, LL
	Trees/ shrubs	Elderberry (Sambucus nigra)	Medicinal	HL
		Leucaena (Leucaena leucocephala, L. pallida)	Fodder, firewood	LL
Gully sidewalls (continued)	Trees/ shrubs (continued)	Sturt's pea (Cassia sturtii)	Fodder, firewood	Very drought hardy, LL
		Calliandra (Calliandra calothyrsus)	Fodder, firewood	Not doing well in HL
		Sesbania (Sesbania sesban)	Fodder, firewood	HL, LL
		Mulberry (Morus nigra, M. alba)	Fodder, firewood	Lower part of sidewalls, HL, LL
		Shiferaw (Moringa oleifera, M. stenopetala)	Food, firewood, water purification	Lower part of sidewalls, at low altitudes, LL

Planting Location	Category	Species	Main Uses (other than soil conservation)	Remarks
Trees/ shrubs (continued)		Pigeon pea (Cajanus cajan)	Fodder, food	Lower part of sidewalls, at lower altitudes, not for HL
		Teline (Teline canariensis, T. monspessulanus, T. maderensis)	Fodder	Drought hardy, no waterlogging, HL, LL
	Live fences, along sidewalls	Sisal (Agave sisalana, A. americana)	Emergency fodder, fibre	Mainly upper parts of sidewalls, Live Fence, HL, LL
		Aloe (Aloe africana, A. vera)		Dry areas, HL, LL
Gully offsets or rangeland	Grasses	*Senbelet* (Hyparrhenia nyassae)	Fodder, thatching	Very drought resistant, grows also on very poor soils, HL, LL
	Trees/ shrubs	Saligna or Port Jackson willow (Acacia saligna)	Fodder, firewood	HL, LL
		Silky oak (Grevillea robusta)	Firewood, timber	HL, LL
		Sesbania (Sesbania sesban)	Fodder, firewood	Drought hardy and can stand wet conditions, HL, LL
		Casuarina (Casuarina equisetifolia)	Firewood, timber, charcoal, fodder	Drought hardy, HL, LL
		Blackwood (Acacia melanoxylon)	Firewood, timber	HL, LL
		Prairie wattle (Acacia angustissima)	Fodder, firewood	Lower parts of sidewalls, drought hardy, HL, LL
		Bisana (Croton macrostachyus)	Firewood, timber	
Gully offsets or rangeland (continued)	Trees/ shrubs (continued)	*Sesa* (Albizia schimperiana)	Fodder, firewood, timber	
		Wanza (Cordia africana)	Fodder, firewood, timber	HL,LL
		Serk Ababa (Cassia siamea)	Firewood, medicinal	Invading species, HL,LL
		Saltbush (Atriplex nummularia)	Fodder	Very drought resistant, no waterlogging, HL, LL
		Teline (Teline canariensis, T. monspessulanus, T. maderensis)	Fodder	Very drought resistant, no waterlogging, HL, LL

Planting Location	Category	Species	Main Uses (other than soil conservation)	Remarks
Gully offsets or rangeland (continued)	Live fences along outer edge of 00offsets	Tree lupin (Lupinus arboreus)	Fodder	Drought hardy, HL, LL
		Bazra girar (Acacia abyssinica)	Firewood, timber, charcoal	HL,LL
		Kontir (Acacia mellifera)	Firewood	HL,LL
		Grar (Acacia albida)	Fodder, firewood, timber	LL
		Cheba (Acacia nilotica)	Firewood, timber	Very drought resistant, HL, LL
		Agave (Agave sisalana)	Fibre, emergency fodder	Very drought resistant, HL, LL
		Aloe (Aloe africana)	Medicinal	Dry areas only, HL, LL
		Kulkual (Opuntia ficus-indica)	Fruit, emergency fodder	Dry areas only, HL, LL
Field bunds	Grasses	Vetiver (Vetiveria zizanioides)	Fodder, grain storage, rodent repellent	Very drought resistant, HL, LL
		Phalaris (Phalaris aquatica)	Fodder, coffee ceremony	Needs moist conditions, HL, LL
	Fodder strips	Bana grass (Pennisetum purpureum or Pennisetum typhoides)	Fodder	Drought hardy, HL, LL
		Alfalfa (Medicago sativa)	Fodder	Drought hardy, HL, LL

Planting Location	Category	Species	Main Uses (other than soil conservation)	Remarks
Field bunds (continued)	Trees/ shrubs	Sesbania (Sesbania sesban)	Fodder, firewood	Drought hardy, can also stand waterlogging, HL, LL
		Teline (Teline canariensis, T. monspessulanus, T. maderensis)	Fodder	Very drought resistant, no waterlogging, HL, LL
		Tagasaste, Tree lucerne (Chamaecytisus palmensis)	Fodder, firewood	Very drought resistant, no waterlogging, HL, LL
		Saligna or Port Jackson willow (Acacia saligna)	Fodder, firewood	Very drought resistant, can also stand waterlogging, HL, LL
		Pigeon pea (Cajanus cajan)	Food, fodder, firewood	At lower altitudes, attacked by insects, drought hardy, not for HL

Annex 1: SLM-focused GIZ projects in Ethiopia

Project / programme title	Years of operation	Working areas / regions of Ethiopia
Integrated Food Security Project (IFSP) – Shire	1993 – 2000	Shire Zone, Tigray Region
Tigray Tree Nursery Rehabilitation Project (TTNRP)	1994 – 2000	Tigray Region
Adaba-Dodola Integrated Forest Management Project (IFMP)	1995 – 2006	Adaba-Dodola Forest, Oromia Region
Integrated Food Security Project (IFSP) – South Gonder	1996 – 2004	South Gonder Zone, Amhara Region
Land Use Planning and Natural Resource Management Project in Oromia Region (LUPO)	1997 – 2004	Oromia Region
Forest Genetic Resources Development Project (FGRDP)	1998 – 2005	National coverage
Social Forestry Project Tigray (SFPT)	2001 – 2005	Tigray Region
Sustainable Utilization of Natural Resources for Food Security (SUN)	2005 – 2008	Amhara, Tigray and Oromia Regions
Sustainable Land Management Programme (GIZ-SLM)	2009 – present (2015)	Amhara, Tigray, Oromia, SNNPR, Benishangul-Gumuz and Gambella Regions

Annex 2: Roles and responsibilities of stakeholders involved in the SLMP

Financial Cooperation (WB and GDC through KFW)

- ✓ Provide the funds for implementation of watershed activities;
- ✓ Timely release of funds;
- ✓ Involved in annual planning;
- ✓ Participate in the joint implementation supervision missions;
- ✓ Ensure the development of a well-functioning P, M&E system;
- ✓ Receive periodic reports on project achievements;
- ✓ Control the utilisation of funds;
- ✓ Organise audits of project accounting.

Technical Cooperation (GDC through GIZ)

- ✓ Provides technical support to the partner system;
- ✓ Develops and implements capacity-development strategy;
- ✓ Prepares technical manuals;
- ✓ Supports the development of strategies, legal frameworks and procedures relevant for watershed scale-up;
- ✓ Supports the development of a functional P, M&E system.

SLMP Coordinator

- ✓ Overall coordination of project;
- ✓ Provides guidelines to regional and woreda offices in planning, monitoring and reporting;
- ✓ Prepares periodic financial and written reports;
- ✓ Organises training programmes for regional and woreda implementers;
- ✓ Transfers funds to regional focal persons;
- ✓ Organises inter-regional and overseas experience exchanges;
- ✓ Organises joint implementation-support missions;
- ✓ Ensures that relevant government and World Bank policies, manuals and

guidelines are properly adhered to in the process of project implementation;

- ✓ Ensures and assists the preparation of Annual Work Plans (AWP) by different stakeholders of SLMP, and coordinates follow-up of implementation thereof;
- ✓ Follows up on progress achieved in the implementation of the project, with special reference to monitoring indicators;
- ✓ Prepares and submits to the NSLMSC quarterly Programme Implementation Progress Reports which summarise activities undertaken (as per the AWP).

National SLM Platform

- ✓ Guides the planning, implementation and P, M&E of the project;
- ✓ Reviews the project's annual work plans against budget allocations, and gives approval as appropriate;
- ✓ Reviews the regional project implementation process;
- ✓ Reviews and monitors whether results are reaching the intended beneficiaries (and targets);
- ✓ Assesses and evaluates the risks of failure and plans mitigating or remedial action;
- ✓ Identifies and assigns taskforces to work on a specific set of required activities, and assesses their progress.
- ✓ Ensures that there is no unnecessary overlap of activities within the different programmes or between different organisations.
- ✓ Ensures that any potential conflicts between stakeholders at different levels will not arise, and if they do, tries to help resolve them.
- ✓ Oversees dissemination of project results and monitors progress.

EPLAUAs

- ✓ Responsible for implementation of the land administration component of the project, guiding its implementers;
- ✓ Supports the preparation of annual land administration plans;
- ✓ Identifies gaps in current land law that need to be addressed to fulfill the interests of all stakeholders;
- ✓ Drafts new laws and regulations, for enactment by the regional council;
- ✓ Writes detailed directives for smooth implementation of the laws and regulations;

- ✓ Devises working procedures and not Compils guidelines;
- ✓ Pilots new technology and ways of working;
- ✓ Gives technical support to zonal and woreda staff;
- ✓ Organises and gives training and awareness-creation workshops;
- ✓ Prepares forms for land administration activities.

BoAs

- ✓ Assigns a focal person for the SLMP;
- ✓ Oversees the implementation of the project.

Regional Focal Person (extracted from the Project Implementation Manual)

- ✓ Ensures that relevant government and funding-organisation policies, manuals and guidelines are properly adhered during project implementation;
- ✓ Assists in the preparation of Annual Work Plans (AWP);
- ✓ Ensures procurement of goods and services in accordance with agreed procedures;
- ✓ Prepares and submits to the SLMP Country Office and to the MoA lists of goods and services to be procured at federal level;
- ✓ Works closely with the regional Bureau of Finance and Economic Development (BoFED), the Bureau of Water Resources (BoWR), BoA, EPLAUA, the Central Personnel Agency (CPA) and OoAs to ensure the proper implementation of the project and the timely financial, physical and impact reporting of the implementation of the project to the SLMP Country Office;
- ✓ Facilitates annual audits of project accounts by external auditors;
- ✓ Closely monitors and follows up on all short- and long-term training courses undertaken in the region, and provides any assistance required to the woreda offices;
- ✓ Follows up on progress achieved in project implementation across the region, with special reference to monitoring indicators;
- ✓ Prepares and submits to the SLMP Country Office financial and physical progress reports from across the region;

- ✓ Coordinates and facilitates regional project annual reviews and sends a detailed report to the Regional Steering Committee and the SLMP Country Office at the MoA for their review and comment on the progress of the project at regional level;
- ✓ Prepares and submits to the Regional Project Steering Committee quarterly Programme Implementation Progress Reports which include summaries of activities undertaken as per the annual work plan.
- ✓ Facilitates mid-term reviews (MTRs) and passes them to the project coordination office, with information describing the implementation status of each component of the project at regional level.

Regional SLM Platform

- ✓ Reviews and approves the roles and responsibilities of the participating organisations in the region;
- ✓ Assesses and directs the project in accordance with the regional government's policy and agricultural and water development policies and strategies;
- ✓ Oversees the adherence of the project to the established policy frameworks;
- ✓ Reviews the project's regional annual work plans against budget allocations, and gives approval;
- ✓ Review all regional project implementation;
- ✓ Monitors and reviews stakeholders' performance in relation to fulfilling their mandates as defined in the Innovation and Development (I&D) project;
- ✓ Monitors whether results are reaching their intended targets;
- ✓ Assesses and evaluates risks of failure, and plans mitigating and remedial actions;
- ✓ Identifies and assigns taskforces to work on sets of specific required activities, and assesses their progress;
- ✓ Ensures that there is no unnecessary overlap of activities between different programmes or organisations;
- ✓ Ensures that any potential conflicts between stakeholders do not arise or try to resolve them when they do.

OoAs

- ✓ Assigns staff and coordinates SLMP management at woreda level;
- ✓ Organises and facilitates the establishment of Woreda Watershed Teams (WWTs) and Kebele Watershed Teams (KWTs);
- ✓ Develops annual work plan and submits them to the BoA for approval;
- ✓ Identifies capacity-building and enhancement needs for SLM activities;
- ✓ Facilitates community participation in all watershed-development planning and implementation;
- ✓ Organises and coordinates SLM-specific training workshops and field demonstrations for woreda extension staff, development agents and watershed groups;
- ✓ Disseminates innovations in SLM;
- ✓ Monitors and evaluates the planning and implementation of all SLM activities;
- ✓ Fosters and maintains healthy stakeholder partnerships and participation in the SLM agenda.

Woreda Land Administration Offices

- ✓ Oversees implementation of all planned land-administration activities;
- ✓ Assigns a focal person for the SLMP;
- ✓ Establishes Land Administration and Use Committees (LAUC) through public, gender-balanced elections at kebele and sub-kebele levels;
- ✓ Follows up with LAUCs to ensure that land administration is implemented as per the Proclamation;
- ✓ Trains elected committee members as necessary;
- ✓ Handles all data concerning land administration and use;
- ✓ Educates the community on the essence of land-administration and use proclamations, regulation, directives and working procedures;
- ✓ Coordinates and facilitates demarcation of kebeles, sub-kebeles, communal areas and private holdings;
- ✓ Backstops land adjudication and registration made by LAUCs, entering the acquired data into the registry system;
- ✓ Conducts cadastral surveys and prepares final land-parcel maps;

- ✓ Issues first- and second-level Books of Holding, together with the chairperson of each LAUC.

Woreda Administration

- ✓ Facilitates the correct mechanisms for all integrated development planning;
- ✓ Coordinates cross-sectoral networks and collaborates in woreda- and kebele-level institutional and programme management;
- ✓ Facilitates the implementation of land-administration interventions;
- ✓ Creates platforms for partnership between farmers and service providers;
- ✓ Fosters and maintains government and non-government agency partnerships for capacity building and development;
- ✓ Generally promotes an enabling environment for SLM activities.

Woreda Watershed Team (WWT)

- ✓ Participates in the selection and prioritisation of community watersheds across the woreda;
- ✓ Identifies major interactions between community watersheds;
- ✓ Ensures that coordination takes place between community watersheds, planning teams and development agents during planning, implementation and P, M&E for those areas that need to form logical continuums or watershed clusters - critical watersheds, broader territorial units, and others;
- ✓ Organises orientation and training of development agents in watershed planning and implementation, including follow-up, on-the-job training, preparation of information kits and teaching aids;
- ✓ Assists development agents during watershed plans preparation;
- ✓ Collects and reviews watershed plans, prepares woreda-level aggregated watershed plans, and uses them to upgrade overall strategic woreda plans;
- ✓ Coordinates different community watershed plans, particularly for specific interactions that need to be carried out jointly between communities;
- ✓ Provides technical support and training to development agents and farmers, including promotion of field days and experience sharing;
- ✓ Coordinates the mobilisation of resources for the community, government and external supporters in their implementation of watershed plans;

- ✓ Coordinates supplementary technical support from woreda, zone or region as required;
- ✓ Prepares proposals for synergy with other institutions, such as health and education;
- ✓ Ensures timely results-based monitoring using participatory approaches and annual review of watershed plans by development agents and communities;
- ✓ Assists in the thorough documentation, dissemination and networking of watershed-development activities across the woreda;
- ✓ Integrates family planning with watershed development;
- ✓ Holds regular meetings every two weeks to review progress.

Woreda Focal Person

- ✓ Ensures that relevant government and funding-organisation policies, manuals and guidelines are properly adhered to during project implementation;
- ✓ Ensures and assists in the preparation of Annual Work Plans (AWPs);
- ✓ Ensures the procurement of goods and services in accordance with agreed procedures;
- ✓ Prepares and submits to the regional focal person lists of goods and services to be procured at central level;
- ✓ Works closely with woreda partner offices to ensure the proper implementation of the project and timely financial and impact reporting on project implementation, submitted to the regional focal person;
- ✓ Closely monitors and follows up all short- and long-term training courses undertaken in the woreda and provides any assistance required to the kebele offices;
- ✓ Follows up on project progress achieved in the woreda, with specific reference to monitoring indicators;
- ✓ Prepares and submits to the regional focal person financial and written progress reports of project progress in the woreda;
- ✓ Compiles a woreda project annual review, sending a detailed report to the woreda Steering Committee and the regional focal person for their review

and comment on project progress at regional level;

- ✓ Prepares and submits to the Woreda Project Steering Committee quarterly Programme Implementation Progress Reports which summarise all activities undertaken as per the AWP.

Development Agents

- ✓ Liaises and communicates between woreda and communities;
- ✓ Guide communities in activity planning;
- ✓ Provides technical support during implementation of project activities;
- ✓ Prepares periodic reports on project progress;
- ✓ Actively participates in the introduction and testing of new methods or technologies;
- ✓ Participates in and supports all planning, monitoring and evaluation (P, M&E) activity.

Kebele Watershed Teams (KWTs) – as listed in the CBPWDG

- ✓ Ensures that watershed planning is undertaken in every participating community;
- ✓ Sets realistic priorities based upon community needs and upon watershed logic;
- ✓ Coordinates interventions involving more than one community;
- ✓ Allocates key resources;
- ✓ Assists in targeting and quality control;
- ✓ Settles disputes and provides support on specific issues such land certification;
- ✓ Assists communities in P, M&E, compilation reports, training and organisation of exposure visits.

Community Watershed Teams (KWTs) – as listed in the CBPWDG

- ✓ Serves as a permanent contact between development agents and communities;
- ✓ Liaises with the other communities in the same watershed;
- ✓ Participates in baseline data collection;
- ✓ Plans all sub-watershed interventions;
- ✓ Coordinates the selection of beneficiaries.

Land Administration and Use Committees (LAUCs)

- ✓ Manages kebele land, holds unoccupied extra land found therein, and determines its utilisation in collaboration with the authority's woreda representative office;
- ✓ Replies to land-related requests submitted by kebele residents, organisations and or other persons legally permitted to acquire rural land;
- ✓ Records landholders available in the kebele, carefully archiving and storing all documents;
- ✓ Systematically records all land-holding details, rent mortgages, donations, and copies of agreements registered through the Authority's woreda representative office;
- ✓ Gives oral and written warnings to users who do not properly handle their land. Unless they correct themselves following the warning, the LAUC reports it to the concerned authority's woreda representative office with a view to exercising stricter measures upon the individual or group;
- ✓ Administrates and develops communal holding lands found in the kebele, in consultation with the kebele administration and the authorities of the woreda-representative office.

Sub-Kebele Land Administration and Use Committees (SK-LAUCs)

- ✓ Represents residents' affairs of rural land administration and usage at sub-kebele level;
- ✓ Raises awareness and informs residents on land administration and usage rules and practices;
- ✓ Records and stores lists of all land users found in the sub-kebele and transfers them to the Kebele Land Administration and Use Committee (LAUC);
- ✓ Collects new land-holding requests, arranges them chronologically, and submits them to the LAUC.

Farmers

- ✓ Participates in the implementation of project activities;
- ✓ Contributes labour for communal activities (as agreed in the project concept);
- ✓ Actively participates in the planning of watershed-development interventions;
- ✓ Participates in the testing of innovative practices or technology;
- ✓ Participates in voting for watershed-committee members.

Annex 3: Back-to-office reporting form from field trips

DESTINATION	DEPARTURE DATE (EUROPEAN CALENDAR'.): RETURN DATE (EUR. CAL.):	VEHICLE: Driver:
SUN staff members		
Others:		

Fill the remaining parts on a separate page for each subject per location		
Subject	Location	Contacted entity
Start of consultation (European date & time):	End of consultation (European date & time):	Duration of consultation (working hours):
Persons met (name & position):		
Findings:		
Conclusion: Measures Agreed upon		

No.	General description	Objectively verifiable indicator	Deadline	Resp. pers.	
1					
2					
3					
4					

	SLMP mission leader	Contacted entities' representative	Authorising SLMPstaff member
Name			
Position			
Signature			

Annex 4: Back-to-office reporting form from workshops and experience-sharing visits

I. General Information	
1.1 Organised by	
1.2 Title / theme	
1.3 Date of workshop	
1.4 Venue	
1.5 Key institutions present	
II. Topics presented	
III. Major points raised	
IV. Lessons learned	
V. List of reference materials issued	
V. Reported by / date	

Annex 5: GIZ-SLM annual technical advisory-service

delivery-planning template

Region : _____

Fiscal Year : _____

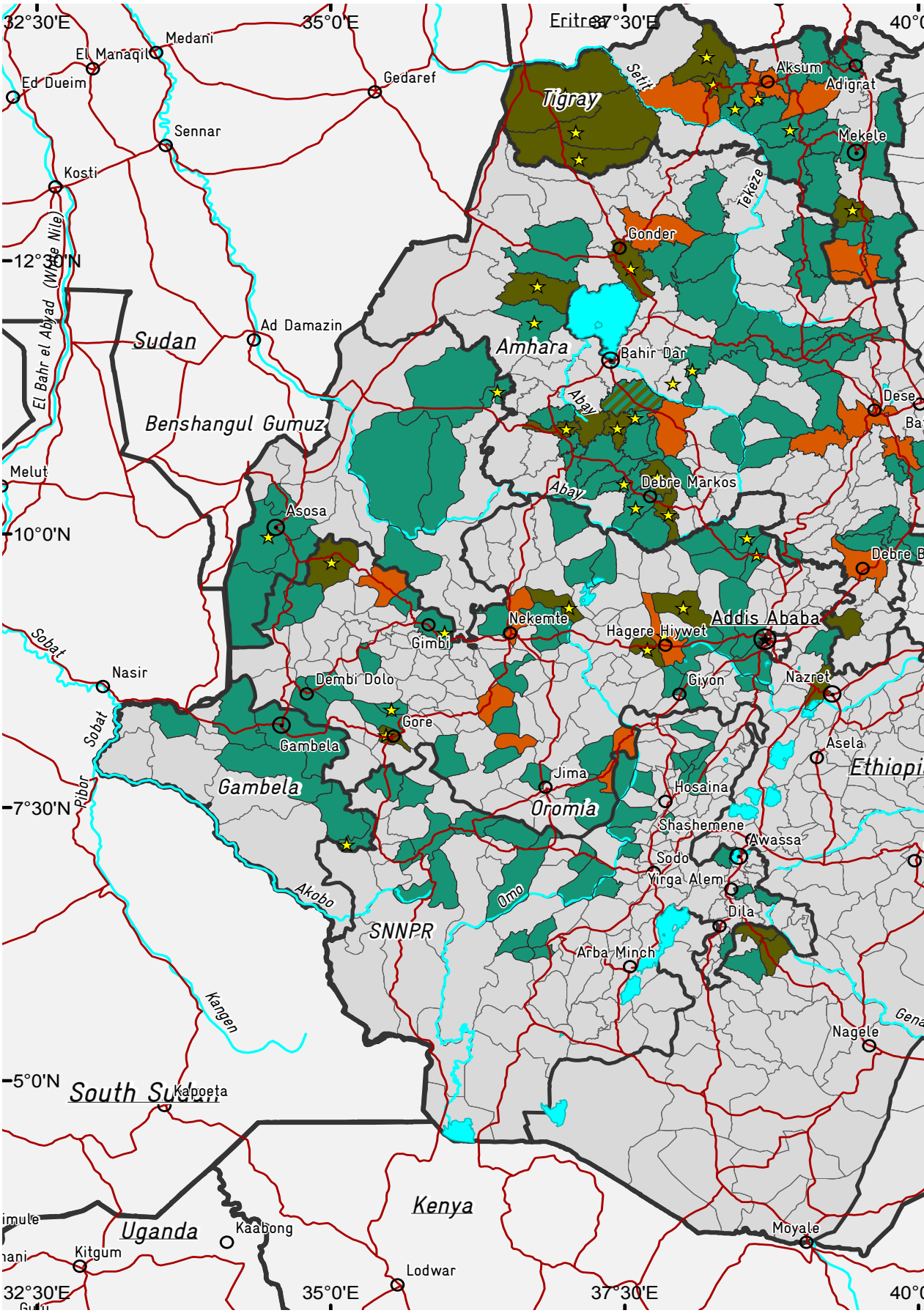
Activity description by output	Unit	Target	Activity Distribution by month												Responsible
			J	A	S	O	N	D	J	F	M	A	M	J	
Component I: Conditions improved at federal, regional and woreda levels, to scale up and effectively implement successful innovative approaches / methods for SLM															
Output 1.1 Proposal for policies / strategies / procedures are developed, according to requests from MoA and SLM Platform. Indicators:															
Output 1.2 Staff trained / familiarised in newly institutionalised policies, strategies, procedures at federal and regional levels, based on identified needs. Indicators:															
Component II: Agricultural productivity / production and income are increased in targeted areas (including the support of HIV/AIDS prevention and gender equality)															
Output 2.1 Promising economic opportunities for the development of watersheds are upscaled. Indicators:															
Output 2.2 Watershed areas are rehabilitated and used sustainably, with high participation of target groups. Indicators:															

Output 2.3 Agricultural and rural services are improved. Indicators:															
Output 2.4 PFM approaches are harmonised and up-scaled. Indicators:															
Output 2.5 Income generating possibilities from forest products and non-forest products are promoted. Indicators:															
Component III: Approaches and methods for SLM, PFM and energy utilisation are developed, improved, scaled up and disseminated with the participation of people at community level.															
Output 3.1 Relevant technologies / approaches for community based participatory watershed development are tested, developed and documented for scaling-up. Indicators:															
Output 3.2 Partner systems are successfully capacitated in management, approach development and up-scaling at local level. Indicators:															
Output 3.3 IT network and database systems are fully functional. Indicators:															

Annex 6: Indexes of Figures and Tables

Index of Figures

Index of Tables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7°30'N
5°0'N
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Medani
El Manaqil
Ed Dueim
Gedaref
Sennar
Kosti
Tigray
Aksum
Adigrat
Mekele
Setit
Tekeze
Gonder
Sudan
Ad Damazin
El Bahr el Abyad (White Nile)
Amhara
Bahir Dar
Abay
Dese
Benshangul Gumuz
Melut
Debre Markos
Asosa
Addis Ababa
Nekemte
Hagere Hiywet
Gimbi
Debre B
Sobat
Nasir
Dembi Dolo
Giyon
Nazret
Gore
Gambela
Asela
Ethiopi
Jima
Hosaina
Gambela
Oromia
Pibor
Shashemene
Awassa
Sodo
Yirga Alem
Akobo
Omo
Dila
SNNPR
Arba Minch
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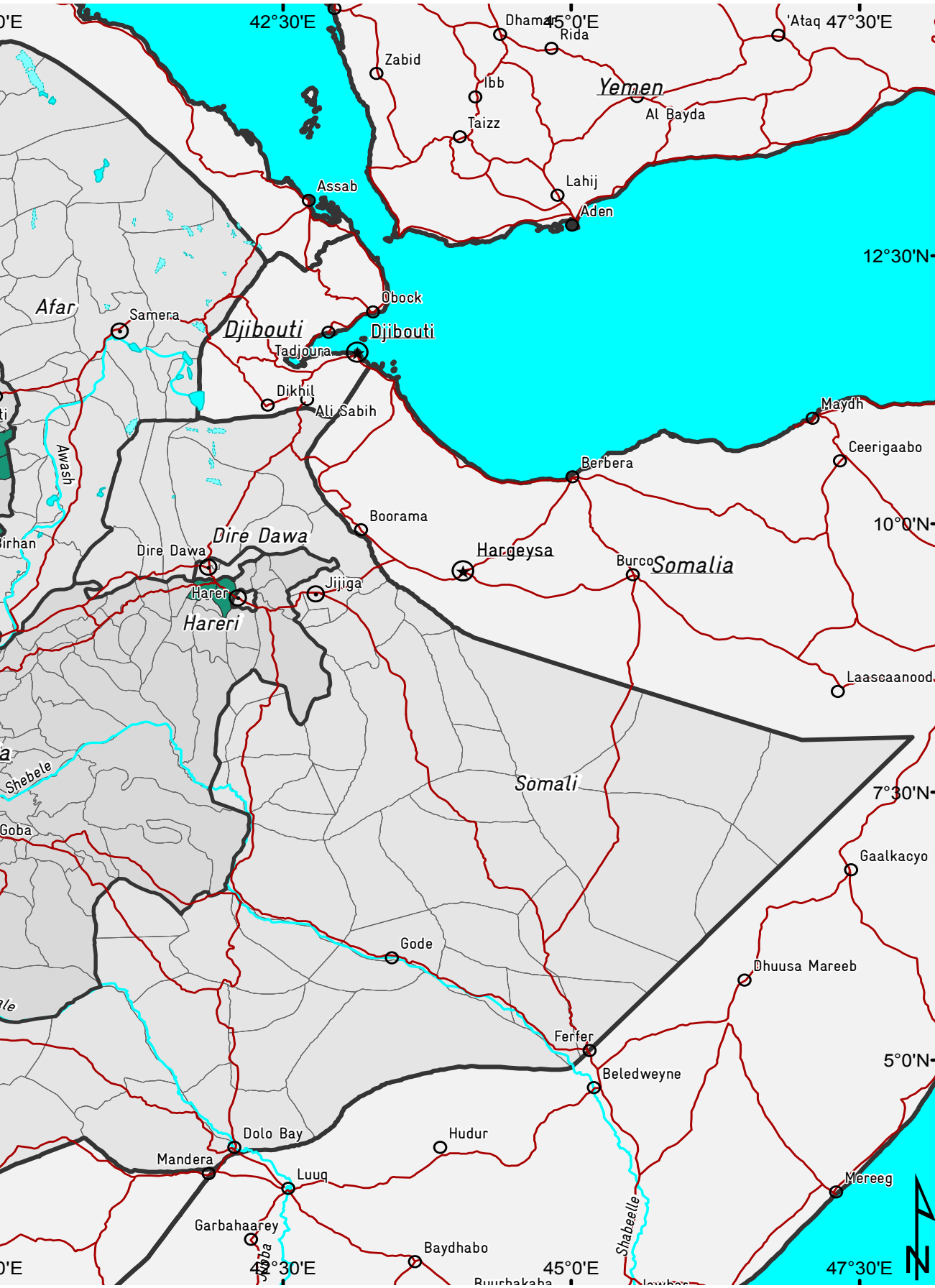
Nagele
Gena
South Sudan
Kapoeta
Kenya
Uganda
Kaabong
Moyale
Kitgum
Lodwar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Ibb
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Taizz
Al Bayda
Lahij
Assab
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Afar
Samera
Djibouti
Djibouti
Tadjoura
Dikhil
Ali Sabih
Maydh
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Awash
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Dire Dawa
Dire Dawa
Hargeysa
Burco
Somalia
Jijiga
Harer
Hareri
Laascaanood
Shebele
Somali
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Goba
Gaalkacyo
Gode
Dhuusa Mareeb
Ferfer
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Beledweyne
Dolo Bay
Hudur
Mandera
Luuq
Mereeg
Garbahaarey
Shabeelle
Baydhabo
Juba
42°30'E
45°0'E
47°30'E

ETHIOPIA

Sustainable Land Management Programme

Legend

Administrative

- International boundary
- Regional boundary
- District boundary

Hydrology

- Lake
- Seasonally flooded
- Major river

SLMP

- Programme region
- Non-programme region

Funding Source

- World Bank
- BMZ (KfW)
- Canada (DFATD)
- EU (GCCA-E)

Infrastructure

- International capital
- Regional capital
- Major city
- Major road

MoA SLM ETHIOPIA

0 200 400 800

Kilometers

Created by: Ulrich Bormann, GIZ
Map not representative.

Sustainable Land Management Woredas by funding source

Boundaries on this map must not be considered authorative

Projection: WGS84
1 : 5.850.000

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