**Part 1**

FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA
MINISTRY OF AGRICULTURE

# Community-based Participatory Watershed and Rangeland Development: A Guideline

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I am confident that our Country, as a result of these investments in the Guidelines, will reap an enormous reward: to see watershed and rangeland development in Ethiopia act as a central forerunner to eradicating poverty from Ethiopia, and transform the country towards its vision.

----------, State Minister of NR&FS Sector, Ministry of Agriculture (MoA)

# FORWARD

The previous guideline has been a comprehensive technical manual in its content and form, even though it was used for longer periods without any update and was developed in the context of mixed-farming areas, and misses newly introduced technologies, particularly in the planning steps, and some newly introduced technologies, approaches and important emerging issues related to NRM and Livelihood interventions such as, climate smart planning, environmental management framework, gender and social development, codification of watersheds, livelihood technologies, policy and legal issues etc., were the missing or gaps that were identified during gap assessment and during consultation workshops.

Cognizant of these and other prevailed gaps, the MoA decided to update and develop one national Watershed/Rangeland development guideline. The update work has gone through gap assessment by NRMD of the MoA; and a series of technical meetings, consultation workshops and writeshops with the participation of a number of stakeholders, until reaching the final form and content. The planning steps of this newly developed Watershed/Rangeland development guideline was tested last year in 2019, in 14 kebeles in seven woredas selected from both mixed-farming and pastoral regions.

The Guideline consists of three parts. The first part describes the background on watersheds/rangelands and the planning steps with annexes. The planning steps classified into three sections; (i) planning steps for Mixed Farming Areas, (ii) planning steps for pure pastoral areas and (iii) common planning steps for Mixed Farming and Pure Pastoral Areas. The second part deals with interventions and the technologies suitable for mixed farming areas, and the third part discusses technologies applicable for pastoral areas. Both, the second and third part, are presented with supporting annexes related to technologies. The draft guideline was discussed and enriched at various professional forums, during training sessions organized for federal sector experts (NRM, Livelihood, CRGE, Water Resource, Livestock and Extension); mixed-farming regions regional and zonal level experts of NRM and Livelihood; Pastoral regions and their respective woredas of RLM, and edited and fine-tuned by a week-long workshop of key experts and coordinators.

Moreover, there is a plan to translate this Guideline into local and working languages with the active involvement of the respective regions that would further facilitate the implementation of watershed and rangeland development by the rural community. As this national guideline is the outcome of a joint effort made by all major stakeholders, federal and regional governments and the development partners, we hope such joint efforts to come up with similar important guidelines in the near future.

This Guideline addresses important developmental activity and the contents give information on how to plan, design and implement community watershed development/Range land development activities. The Guideline provides consolidated and normative information for field workers and Wereda experts. The Guideline has been designed in such a way that important steps are followed by implementers and the community members are involved right from the inception of the idea up to its implementation and result based performance assessment.

----------State minister, Ministry of Agriculture

## ACRONYMES

| | |
|---|---|
| ATVET | Agricultural Vocational Education Training |
| AMAREW | Amhara Micro-enterprise Development, Agricultural |
| CBPWD | Community Based Participatory Watershed Development |
| CCA | Climate Change Adaptation |
| CRGE | Ethiopian Climate Resilience Green Economy |
| CRT | Community Rangeland Team |
| CSA | Central Statistical Authority |
| CWM | Community Watershed Management |
| CWT | Community Watershed Team |
| DA | Development Agent |
| DRM | Disaster Risk Management |
| DRR | Disaster Risk Reduction |
| EIA | Environmental Impact Assessment |
| ESIA | Environmental & Social Impact Assessment |
| ESIF | Ethiopian Strategic Investment Framework |
| ESMF | Environmental & Social Management Framework |
| EU | European Union |
| FAO | Food And Agriculture Organization |
| FSD | Farming System Development |
| FTC | Farmer Training Centers |
| GERD | Grand Ethiopian Renaissance Dam |
| GIS | Geographical Information System |
| GIZ | Germen Cooperation for Development |
| GPS | Geographical Positioning System |
| GSD | Gender & Social Development |
| GTP | Growth And Transformation Plan |
| HH | House Holds |
| HUC | Hydrologic Unit Code |
| HUD | Hydrologic Unit Database |
| HUs | Hydrologic Units |
| IGA | Income Generation Activities |
| ILRI | International Livestock Research Institute |

| | |
|---|---|
| IPM | Integrated Pest Management |
| IRM | Integrated Risk Management |
| KRT | Kebele Rangeland Team |
| KWT | Kebele Watershed Team |
| LLPPA | Local Level Participatory Planning Approach |
| MERET | Managing Environment Resources to Enable Transition to more Sustainable Livelihoods |
| MoA | Ministry of Agriculture |
| NGO | Non-Governmental Organization |
| NRM | Natural Resource Management |
| NWDPRA | National Watershed Development Project For Rain Fed Areas |
| P&RBM | Participatory & Result Based Management |
| PA | Pastoral Area |
| PI | Problem Identification |
| PLUP | Participatory Land Use Planning |
| PMF | Performance Monitoring Framework |
| PRA | Participatory Rural Appraisal |
| PRM | Pastoral Rangeland Management |
| PTC | Pastoral Training Centers |
| RBoEF | Regional Bureau of Environment and Forests |
| RUSLE | Revised Universal Soil Loss Equation |
| SLMP | Sustainable Land Management Program |
| SNNPR | Southern Nation and Nationalities People Region |
| SSI | Small Scale Irrigation |
| SWC | Soil & Water Conservation |
| USAID | United States Agency for Aid and Development |
| WB | The World Bank |
| WFP | World Food Program |
| WPDO | Woreda Pastoral Development Office |
| WRT | Woreda Rangeland Team |
| WUsA | Watershed User's Association |
| WWT | Woreda Watershed Team |

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# PART 1: SECTION A (1)
# SCOPE AND MAIN ELEMENTS

# 1. INTRODUCTION

## 1.1 Historical background

Watershed management is not a new concept in Ethiopia as it had been intensively practiced by indigenous people since ancient times. Examples include: bench terraces of Konso, agroforestry practices in Gedeo, contour planting and in-situ moisture harvesting techniques in Hararghe, and stone terraces in Ankober and Nadier Adet. Formal government supported watershed management came to prominence after the recurrent and catastrophic malnutrition and famine problems subsequent to the drought phenomena of the 1970's and 1980's. Land degradation resulting from soil erosion has usually been considered as the main driving cause of the problem. The formal planning process for watershed development in Ethiopia began in the 1980's and involved planning units for large watershed development covering 30-40 thousand hectares. The purpose was mostly to implement natural resources conservation and development programs. But such large-scale efforts remained mostly unsatisfactory due to lack of effective community participation and limited sense of ownership. The planning units also proved generally unmanageable.

The lessons learned from this experience encouraged the MoA and support agencies like FAO to initiate pilot watershed planning approaches on a bottom-up basis, using smaller units and following community-based approaches. As a result, minimum planning and sub-watershed approaches were introduced. Minimum planning at the initial stage involved shifting from larger watersheds to smaller sub-watersheds. These were tested on a pilot basis by MoA with FAO technical assistance in the period 1988 - 91.

Later, in 2005, MoA and its supporting partners (i.e. AMAREW Project, GIZ, ILRI, USAID, and WFP) created /issued the Community-based Participatory Watershed Development Planning (CBPWD) Guidelines, incorporated into the LLPPA (Local Level Participatory Planning Approach). LLPPA was designed for Development Agents, as a practical approach to be used for integrated NRM interventions. It included productivity intensification measures, and small-scale community infrastructure such as water ponds and feeder roads. LLPPA was at the core of the MoA-WFP assisted MERET project to combat land degradation and food insecurity in many Woredas of the country. The watershed management efforts started initially in the highlands on highly dissected and steeply sloping terrain and were gradually moved to the lowlands.

Consequently, several NGOs, bilateral organizations and donors adopted and supported the participatory community watershed management approach in the last three to four decades within their respective areas of intervention and in close collaboration with government partners.

The collective experience involved different approaches, combined with the need to have a common and standardized more effective approach to the country as a whole. It gave birth to the First Edition of community-based participatory watershed development guidelines in 2005. This was first prepared in English and translated into three national languages (e.g. Afan Oromoo, Amharic, Tigrigna, etc.) and was printed, and distributed throughout the country. PSNP's Pastoral guidelines were also issued in 2012. Since the issuance of these guidelines, there has been positive achievement in the rehabilitation of severely degraded land which is once again becoming a source of income and livelihood support for communities. The guidelines have been used to support the on-going project and program level implementation of the watershed management initiatives. Without these it would have been very difficult to mainstream and expand improvements in watershed management throughout the country. Accordingly, large tracts of

degraded hillsides, farmlands, grazing lands, and gully affected lands have been reclaimed through application of the community watershed approach. Furthermore, the application of the guidelines for cascaded trainings from Federal level to Regions, has resulted in grass-root awareness and the development of community and frontline staff capacities. There is now a more consolidated foundation of experience and lessons learned in comparison to what existed before the guidelines were issued.

This doesn't mean that the current watershed management practices are fully sustainable. Attention must still be paid to: work quality, spatial coverage, strengthening awareness and capacity building, ensuring real community participation, and ensuring the equitable and the fair share of benefits between and among upstream-downstream communities. However, it has been tested and served for many years and is providing lessons from past mistakes. From a practical point of view, it requires updating to reflect the latest development dynamics. These include guidelines on; climate smart thinking; updated planning steps; and the inclusion of additional watershed development technologies and related working annexes. Above all, watershed management must be evaluated in terms of environmental soundness, economic viability and social acceptability.

## 1.2 Experience of PWDP in Other Countries - Successful Watershed Initiatives

The first generation of watershed management projects in developing countries in the 1970s and 1980s applied a soil and water conservation approach, which emphasized engineering works aimed at specific on-site and downstream physical outcomes. Less attention was paid to the role and needs of upstream populations or to their involvement in and ownership of program activities. As a result, investment costs were high and not always well justified, and the assets and benefits created often had a limited life. By the end of the 1980s, the comparative failure of this "engineering" approach was clear, and a major rethinking of watershed management approaches was undertaken.

Many countries, particularly those having significant areas with complex, mountainous, and fragile ecosystems have developed national watershed programs or projects. The Indian National Watershed Development Project for Rain fed Areas (NWDPRA) is a major initiative operating in conformity with the Common Approach for Watershed Development. It was jointly formulated and adopted by the Ministry of Agriculture and Rural Development incorporating lessons learnt from successful projects, especially in community participation.

China also successfully practices the concept of small watershed-based development and the case of the Yellow River (Loess Plateau) is a unique one. The plan for the management of a small watershed emphasizes comprehensive erosion control measures including measures for hill-slope and gully stabilization, regulating river systems and rearranging farmlands. The principles of soil erosion control have been further developed by combining physical soil erosion control measures with the optimum utilization of biological measures. Appropriate management and use of degraded watersheds have obviously resulted in largescale ecological, economic and social benefits to farmers. Various Asian countries such as Nepal, The Philippines and Indonesia also have remarkable and often large-scale watershed development programs.

Participatory conservation and watershed-based approaches have been successfully introduced and expanded in various countries in Africa, particularly in Kenya, Niger, Burkina Faso and Mali, to name a

few. Such programs have been realized within the context of combating desertification and poverty reduction efforts.

Success in testing community-based approaches in several countries, including Brazil, China, India, Turkey, Yemen, Kenya, and Nepal has led to adoption of broader policies for community-based watershed management. In other countries, including Morocco and Indonesia, doubts about program performance and cost have delayed the adoption of national policies. In general, national policies on watershed management have tended to develop in a pragmatic and iterative fashion, with early setbacks over engineering-dominated approaches. This being succeeded by tests of community-based approaches and by technology packages, targeting sustainable changes in land and water use practices that brought benefit and better livelihoods to communities and other stakeholders.

Since the 1990s, watershed management programs in developing countries supported by the international community typically targeted livelihood improvements and poverty reduction objectives in addition to resource conservation. Operations aimed at these twin targets typically adopted integrated farming systems and participatory, demand-driven approaches implemented in decentralized jurisdictions. The move away from planned investments toward farming systems and participatory approaches was designed to seek "win-win" solutions, but posed two substantial questions: Could the new approach achieve both conservation objectives and increase incomes? Could a demand-driven program upstream have a positive effect on downstream conditions?

## 2. RATIONALE

Watershed development has been problematic when applied in a rigid and conventional manner, particularly when applied without community participation, using only hydrological planning units, with a limited range of interventions and neglect of post-rehabilitation management aspects. Such interventions have frequently resulted in failures or had serious shortcomings which were difficult to correct; examples are to be found in Ethiopia and elsewhere. The case of Borkena earthen dam in South Wello and siltation of natural as well as artificial waterbodies in different parts of the country are good examples to show failures of previous efforts. Other examples in Ethiopia of the unsatisfactory performance of conservation efforts include the failures of various large size watershed planning initiatives during the 1980s. These top-down approaches and rigid technical packages clearly demonstrated that poorly planned watershed approaches can result in complete failure. However, the previous efforts have laid a foundation and served as evidence-based learning processes for the current integrated approaches.

Hence, watershed degradation has environmental and socioeconomic effects far beyond the more obvious on-site and downstream impacts. For the same reasons, watershed management interventions may bring local, regional, and global environmental benefits. However, watershed management programs have tended to neglect environmental impacts beyond immediate land and water impacts. The quality of implementation of watershed management practices, particularly those dealing with physical and engineering measures, are still to some extent nascent but pose a challenge in many places. It may, for instance, be worse to have improperly planned, designed and constructed /implemented watershed management measures than none.

A degraded watershed often results in a substantial increase in vulnerability to disaster risk and climate change. This is the case when ecosystem services are lost because of environmental degradation. Deforestation and conversion of wetlands, for example, may cause massive erosion and increased exposure

to drought, storms and floods. Sometimes well-intended measures result in unintended adverse consequences and a net increase in vulnerability. This is the case, for instance, when water is diverted upstream to support agriculture or hydropower installations, leading to less water downstream, which in turn can lead to the loss of wetlands and their valuable services to downstream communities.

Acknowledging and understanding the deep interdependency between the use of land and ecosystems, human well-being, risk patterns, increased variability and unpredictability of weather is at the core of better watershed management, disaster risk reduction and climate change adaptation. Watershed management may also play a key role in hazard mitigation and prevention.

## 2.1 Objectives of CBPWD in Ethiopia

The overall objective of Participatory Watershed Development approach is to improve the livelihood of community/households in rural Ethiopia through comprehensive, participatory and integrated natural resources management. It aims at productivity enhancement measures for improved income generation opportunities, enhanced livelihood support systems, adaptation to the vagaries of climate changes, and high resilience to shocks. It helps to optimize the use of existing natural resources and untapped potentials in both already degraded areas and in the remaining potential areas in the country.

**More specific objectives include**:

1. Conserving soil, rainwater and vegetation effectively for productive uses;
2. Harvesting surplus water to create water sources in addition to ground water recharge;
3. Promoting sustainable farming and stabilize crop yields by adopting suitable soil, water, nutrient and crop management practices;
4. Rehabilitating and reclaiming marginal lands through appropriate conservation measures and the mix of trees, shrubs and grasses, based on land potential;
5. Enhancing the income of individuals by the diversified agriculture production, increased employment opportunities and cottage enterprises, particularly for the most vulnerable, linked to the sustained use of natural resources;
6. Building resilient landscape and communities by integrating disaster risk and climate change adaption measures within a broader watershed management practice.

## 2.2 Objective of the Guideline

The Guidelines aims to build upon existing community-based participatory watershed efforts to harmonize and consolidate planning procedures at the grass-roots level. The intent is to provide DAs, rural communities, and development practitioners with workable and adaptable planning tools, that may be applied in a variety of circumstances. This would include: low or high rainfall areas, severely degraded and food-insecure areas; areas that may be a food secure and not yet seriously affected by land degradation; or areas dominated by cereal-plough farming or enset-hoe use. They should be capable of being applied by men, women or youth.

In this regard, another main objective is also to provide practical guidance on the correct selection of appropriate technologies under different conditions and their sequentially correct implementation. Different interventions are summarized in planning procedures and included in some detail as packages in the

Annexes and in other support documents. Finally, the Guidelines would be used as a reference for Agricultural Vocational Education Training (ATVET) and Farmer /Pastoral Training Centers (FTCs /PTCs) theoretical and practical trainings.

## 2.3 Scope of the Community Watershed Development Approach

Community-based watershed development is seen as the most effective adaptation strategy and mitigation option, to counter the rapid pace of land degradation, water resources depletion and climate related issues facing the country. It ensures that watershed development planning efforts remain focused, effective, and efficient and that there is clear definition of the scope of the effort required for implementation. This is essential because of the wide variation in the distribution of resources and the diversity of issues likely to be encountered, and the fact that watershed development planning is always broad in scope. It also ensures that land and water management and livelihood improvement are central to the watershed development planning process.

The term scope is also used to describe the boundaries or extent of a program or project, which can be defined in terms of space (the area included in the watershed plan) or other parameters. Hence the title of this guideline is "Community Based Participatory Watershed Development Guidelines" which differentiates it from large-scale hydrological watershed development planning. The community watershed is used as the reference area and the planning process is based on the integrated management of the existing natural resources - soil, water, and plants. Under normal circumstance, the optimum size of a community watershed is 500ha. Nevertheless, in special situations there will be watersheds which will have 250 ha as a lower limit in highland areas (rugged topographies). Likewise, the upper limit can go up to 1000 ha in flat and gentle landscapes. The process applied ensures that there is coincidence between the area in which the community and interactions occur and the scope of decision-making: i.e. that problems are resolved where they are happening and with the involvement of the affected population.

These guidelines define the scope of community watershed planning efforts not only in terms of the geographic area to be addressed but also in relation to the issues of concern, the goals that should be attained and the extent of these. If the scope is too broad, it becomes difficult to coordinate the various initiatives and make the best use of the available financial and human resources as the watershed plan is developed and implemented. If the scope is not defined; the possibility of undertaking detailed analyses is hampered, there is less likelihood of adequate involvement of key stakeholders and, ultimately, less chance of successful plan implementation. Too narrow a scope might, however, preclude the opportunity to address watershed problems and stressors in a rational, efficient, and economical manner. It is advisable to define the scope and set preliminary goals early in the planning process, which makes it is easier to work through the later steps in the process. Key stakeholders must provide the critical input into the watershed planning process which is needed to identify issues of concern, develop goals, and propose management strategies for implementation. Without careful attention to the participatory process, underlying local social or political dynamics may well derail the intent of this guideline. The implications of existing policies on the scope and performance of various local institutions must also be analyzed to assess their effectiveness in managing the land and water resources separately as well as for their integrated management. In summary therefore, Information from the stakeholders shapes the scope of watershed planning efforts.

The geographic scope of the community watershed also affects the temporal scope of watershed plan implementation. Although there are no hard and fast rules, watershed plans are typically written for a time

span of 3 to 5 years. If the watershed goals are not attained within 5-year timeframe, much of the information might become out-of-date, and it may well be necessary to update the watershed plan.

## 2.4 Scope of the Guidelines

These guidelines have been produced primarily to guide community watershed planning at the Woreda and Kebele levels. They may also be referred to and applied by national and regional government workers and by development partners supporting the implementation of national watershed development planning initiatives. They may also be of use to NGOs involved in watershed development projects, who are likely to have effective communications with the local community. They may also be of use to universities and scientific institutions.

These guidelines provide advice as to how community watershed planning can be carried out in both highland and pastoral areas. Generally, the Guidelines have four distinctive parts i.e. i) The Background; ii) The Planning Steps; iii) The Technologies or so called Info-techs; and iv) The Annexes. The latter one consists detailed working annexes for the planning steps and for the technologies. The background part includes Introduction; Rationale; Policies and Strategies; and Guiding Principles of CBPWDP. The planning step part has 8 clearly articulated, detailed steps and monitoring and evaluation. The technological part includes info-tech packs contained in 14 folders and reaching more than 110 in number. Each technology is prepared in two or three pages, using standard technology presentation format, to optimize the size of the guidelines. Readers who would like to deepen should refer other manuals listed in the reference, available hard copies, and from web search. The planning steps and the working annexes combined, provide a handy checklist of recommended actions for carrying out effective community watershed planning. The various technologies are each summarized in two to three pages "info-techs" which provide overview information. For more in-depth understanding of the individual technologies, readers are advised to refer to specific manuals as these guidelines are not intended to substitute for the manuals. The list of manuals, some are given in the reference list, and others could be searched in hard copies or web search. The guidelines have been prepared for the "Mixed farming areas and "Pure-Pastoral" areas of the country. These current guidelines are for the first two whilst the later one has also been issued in separate volumes /parts following similar arrangement.

## 2.5 PWD as a Foundation for Sustainable Agricultural Development in Rural Ethiopia - PWD to Combat the Land Degradation-Food Insecurity-Poverty Nexus

Ethiopia has mostly complex and fragile landscapes. Land degradation seriously affects livelihoods and food security of millions in Ethiopia and threatens the livelihood of many more. The main land degradation arises from (1) high soil erosion rates as a result of steep slopes, continuous encroachment and cultivation of marginal lands; (2) long history of deforestation, overgrazing, negative coping strategies such as the burning of animal dung, extensive use of charcoal, reduced rotation periods, and others. The points stated above are more elaborated using Figure 1.

Recurrent cycles of drought and inadequate infrastructure have further aggravated the problem. Consequently, the farming systems that exist in the country are progressively impoverished and more vulnerable to shocks. These are serious constraints to sustainable development and a main cause of unstable, over-simplified and drought prone production systems.

Therefore, participatory watershed planning and development is a vital necessity in complex landscapes. In this context interactions, between and within, communities are highly dependent on what happens at different levels of the watershed. Watershed planning has moved away from conventional land use-planning exercise to a logical interpretation of the potentials of the land as a function of the needs, demands and aspirations of the people living in the watersheds, including the interactions between people's activities and the land resources. Participatory watershed planning is thus the key to understanding what needs to be done at various levels to sustain, improve and diversify production while developing and managing the natural resource base to promote income generation opportunities, increase access to basic services (roads, markets, schools, water, and the like) and make livelihood systems resilient to shocks.

**Relationship between livelihoods and watersheds in rural Ethiopia**: All over Ethiopia, watershed logic governs water flow regimes, erosion levels, biomass availability, productivity levels, the quality of infrastructure and countless other activities. In degraded watersheds, opportunities for water harvesting and management are few and of limited use, access to clean water for domestic use is often very difficult and incidence of water-borne diseases is very high. Expansion of road networks without the proper catchment protection works can have as great an impact on watersheds as farming or herding and access roads may be continuously damaged where they have been inappropriately located and/or constructed. Road construction removes vegetation, and may leave the area susceptible to surface erosion. Unstable watersheds induce unstable production systems marked by inefficiency of input utilization as a result of erosion and the removal of topsoil, fertilizer, sown seed, compost, and lime by surface flows. This also limits opportunities to enhance productivity. Moreover, income generation opportunities linked to introduction of cash crops, bee-keeping, livestock fattening or dairy, and others, largely depend on the conditions or "health" of the watersheds. They depend as well on the interactions between communities and the different levels of the watershed units. Increased vulnerability to drought and food insecurity is directly linked to the conditions of the watershed and the limitations of its capacity to support local livelihoods. The opposite occurs with protected and developed watershed systems, which generate multiple positive effects on people's livelihoods, the environment and the overall economy of the area.

**Potentials and opportunities linked to PWD**: The potential for community-based watershed development in Ethiopia is huge. This applies both for already severely degraded and food insecure areas as well as for those areas classified as food-secure and surplus-producing. One should not be misled by these latter areas as they are also subject to high erosion and deforestation rates, and mostly in the process of gradually losing their potential. Even in these areas corrective actions should be promptly taken to reverse degradation trends and retain and improve their productive potential. The level and types of activities, including technological interventions, may differ but the same principles and recommendations apply.

In other words, participatory watershed planning should be considered as an instrument - to "bring rural households back to business" in food-insecure and degraded contexts and to "keep rural households in business" in other areas. Besides, watershed development also enables new opportunities to emerge, linked to water development such as: diversification of crops, improvement of livestock management, improved market access opportunities, land reclamation, fertility improvement, and new off-farm activities etc. Thus, the watershed, or catchment area, forms a natural framework for resource development in relation to agricultural production systems as well as for resource conservation and utilization.

Equally important, PWD is a practical and effective tool for best utilization of the different disciplines related to agriculture and food security, in a way that they mutually reinforce each other. Natural resources, inputs and extension, livestock, water and marketing are all connected and can benefit greatly from the application of a participatory watershed planning framework. Watershed development benefits local households and farmers, the local community, and the society at large.

**Benefits to households**:

- Improved surface water retention and moisture availability for crops;
- Improved water availability and quality in streams and storage sites;
- Improved soil quality and fertility retention levels for crop production and diversification;
- better soil structure and drainage;
- Increased access to biomass for multipurpose use (fodder, firewood, fruits, construction, and others) and higher profits;
- Increased resilience to climate change shocks and improved livelihoods;
- Increased opportunities for participation in income generation activities.

**Benefits to local community**:

- Reduced erosion, deforestation, flooding and waterlogging;
- Lower land development costs;
- Enhanced aquifer recharge - more dependable, clean (healthy) water supply for domestic and industrial use;
- Increased overall agricultural productivity and access to markets and basic services;
- Improved livelihood options, including for the poorest households.

**Benefits to the society at large**:

- Better conservation of natural resources and biodiversity;
- Less danger from floods to downstream farmlands;
- Reduced sedimentation of costly irrigation projects and protection of major infrastructure (e.g. roads, dams, natural lakes);
- Increased water supply and improved health;
- Reduced occurrence of drought, flood and increased stability of production systems;
- Increase to resilience to climate change factors – drought, intense rainfall, floods etc.

## 2.6 Adaptability of PWD

Participatory Watershed development (PWD) can be adopted to diverse ecosystems to overcome the challenges posed by land degradation as a result of soil erosion, deforestation, overgrazing, and inappropriate land use system in general. It should be adapted based on local conditions to increase resilience and adaptive capacity of communities in the face of gradual shrinking of the ecosystem and agricultural production capacity due to climate change induced factors such as drought, flooding, uneven rain condition, untimely rain, crop & livestock disease, etc.

### 2.6.1 PWD in diverse ecosystems

The Ethiopian landscape is mostly rugged and thus also mostly prone to land degradation. Water erosion in the rainy season and wind erosion in the dry season are obvious threats to agriculture and to ecosystem services in general. Extremes of both drought and flooding will increase with climate change, making land degradation an even greater threat to food production and to all ecosystem services.

The 1990s represented a new departure for watershed management programs, which in the developing countries, were supported by the international community. Although engineering solutions were not excluded where appropriate, the emphasis was placed more on farming/pastoral systems and on participatory and demand-driven approaches implemented at the decentralized local level. Stimulus was given to this new departure by the renewed emphasis on rural poverty reduction in development programs. The move away from planned investments towards farming/pastoral systems and participatory approaches was designed to seek synergies and to limit the need for tradeoffs.

PWD can be applied in almost all contexts but needs to be tailored to local conditions. The approach can be adapted to suit different sizes of watersheds and accommodate community and Kebele administrative boundaries. It can also be adapted to accommodate relationships between communities and watersheds as well as to the application of the various technologies under different conditions. The same measure; for instance a soil bund, requires different design and vegetative stabilization considerations if constructed in dry *weyna dega* or in moist *weyna dega* conditions. Watershed planning for a community located at the foot of a single hillside or few hills will be largely different from watershed planning for communities located under broad mountainous ranges and where the watershed includes complex vertical and horizontal relationships. The second scenario will need various community-based sub-watershed plans to be prepared and linked to one another to achieve the intended results.

Adaptability is also required in treating watersheds with the various measures that might be available. Within a single watershed consisting of many sub watersheds there are an almost infinite number of sub-divisions that may be necessary to identify or manage. There may also be large interactions between large watersheds that influence major hydrology and local economies of an area. An example is recharging of water-tables and protection of feeder roads.

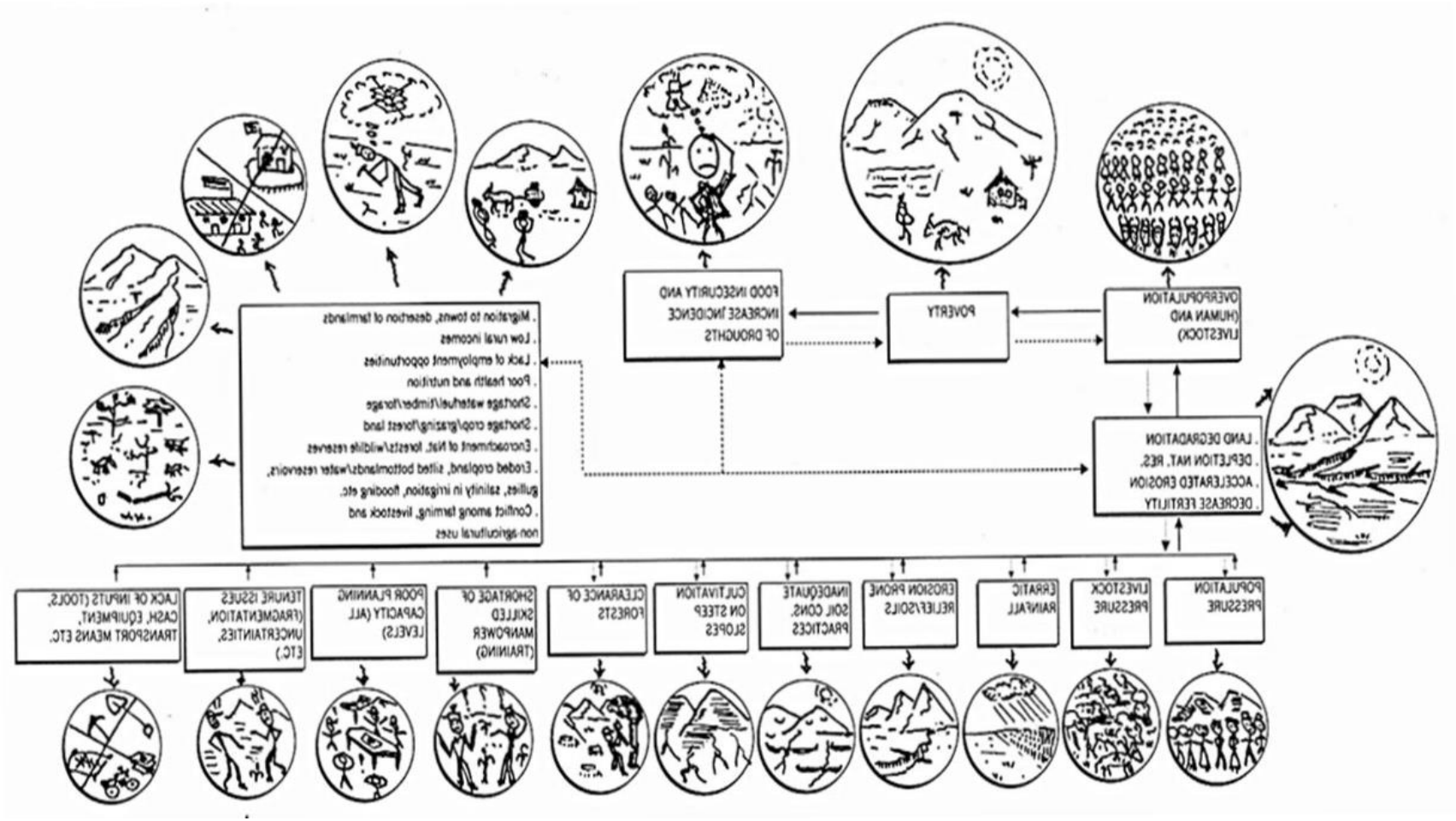
Very small interactions at the micro-watershed level are also important; at the level of a farmer's homestead or even between sections of the homestead for example. What can be developed or improved at the homestead level is often closely linked to what is done on a surrounding larger watershed. Examples of this include situations where development of hand-dug wells and small-scale irrigation is now possible at an individual household level in several Woredas following systematic implementation of moisture conservation measures in large watersheds. Small initiatives limited to a few hectares cannot generate such results. On the other hand, watershed principles must still be applied to the smallest unit of interventions, including in a single plot of land.

Finally, flexibility is needed in the way watershed-planning units themselves are delineated. Planning units should be community-based (*gott, genda, kushet*, and others) but specific watershed units are identified both within and outside the community boundaries based upon hydrology and land-use interactions. Quite often, interventions will need to include more than a single community or kebele. In this case, each community-based watershed plan will contribute to larger plans and share major interactions and activities with other(s).

### 2.6.2 Application and Relevance of PWD in Pastoralist Systems

Watershed management approaches are likely to be most effective on steeper terrain, particularly where there are problems with both upstream land and water management and with downstream impacts. In such situations there are more likely to be demonstrable linkages between upland activities and basin-level environmental conditions, and upstream conservation measures are likely to have significant downstream impacts. On the other hand, alternative rural development approaches may be more cost effective where these upstream-downstream impacts and interactions are not key issues from an investment point of view and a broader rural development approaches may be a more cost-effective way to tackle upland problems.

PWD as explained in this Guideline is more suited for settled agriculture but can be adapted to suit the needs of agro-pastoralists and pastoralists. The latter are traditionally rather mobile along transhumance (grazing) routes, which are the result of decades of experience and adaptation to climatic and environmental conditions. Instead of defined watershed units, an "area-based" watershed approach is more appropriate, where specific areas along rangelands and transhumance routes, will be developed following watershed principles and /or settlement patterns. However, at regional, zonal and woreda levels, broad watershed units should be delineated within which specific areas are identified for interventions. The interventions will be executed following specific sub-watershed interactions. The most critical needs are always water and animal feed. Water development for pastoral areas is commonly seen as a failure because the concentration of animals results in the rapid degradation of land around the few water points. The strategy should be directed to create sufficient grazing reserves for pastoralists to use at times of drought and along transhumance routes. For agro-pastoralists, an entire set of conservation and water harvesting measures can be implemented to enable them to stay longer in a given location (increased crop and fodder production as well as access to water supply). Specific recommendations are provided for pastoralist systems in several sections of the planning steps, technological packs and in the Annexes.




[1]

**FIGURE 1 : THE LAND DEGRADATION-FOOD INSECURITY VICIOUS CYCLE**

# 3. POLICIES AND STRATEGIES RELATED TO WATERSHED DEVELOPMENT

## 3.1 Food Security Strategy (2002)

This is targeted mainly at chronically food-insecure, moisture-deficit and pastoral areas. The focus is on environmental rehabilitation to reverse the current trend in land degradation, and to provide a source of income generation for food insecure households. Watershed based water harvesting and introduction of high value crops, livestock, and agro-forestry development are new elements in the revised strategy. Since the New Coalition for Food Security Program was issued, which had the principal objective of promoting Integrated Participatory Watershed Management Planning and implementation of food-security interventions, several community watersheds have become operational in foods insecure Woredas of the country.

## 3.2 The Ethiopian Strategic Investment Framework (ESIF) and the Sustainable Land Management Program (SLMP)

The ESIF were initiated in 2008 to address two of Ethiopia's most significant developmental and environmental problems: low agricultural productivity and land degradation. The SLM is an umbrella framework for all land management interventions. It was developed on the basis of Paris declaration of aid effectiveness and through collaboration between international and national stakeholders (Terrafrica, FAO, GM, WB, GIZ and government ministries). It provides a holistic and integrated strategic planning framework under which government and civil society stakeholders can work together to remove barriers, overcome the bottle-necks, and promote scaling up of sustainable land management (SLM) within Ethiopia. The plan was to implement ESIF in three phases (of 5 years each) over a fifteen-year period starting in 2009 and is continuing until 2023. This framework promotes multi-sectoral partnerships to combat the country's prevailing land degradation challenges. It focuses on the outcomes of:

- Reducing the area of land adversely affected by land degradation;
- Reducing rural poverty and vulnerability;
- Removing the key barriers to secure land tenure/user rights issues;
- Improving knowledge and capacity to use land according to its suitability and capability;
- Enhancing the enabling policy environment for the promotion of SLM at all levels; and
- Ensuring the existence of an effective institutional capacity and operational structure to support the implementation of the framework.

## 3.3 Ethiopia's Natural Resources Policy

Natural Resources provide the basis for the rural and urban environment and are the foundation of the economy. The objectives of the Natural Resources Policy are to ensure that the ecological processes and life support systems are sustained, and biodiversity preserved. It is also intended to ensure that renewable natural resources are used in such a way that their regenerative and productive capabilities are maintained and where possible enhanced so that the needs of future generations are satisfied and not compromised.

The policy focuses among other things on: soil husbandry and sustainable agriculture; forest and woodland management and protection, and on genetic diversity of species and ecosystem biodiversity.

### 3.4 The Ethiopian National Conservation Strategy

The national conservation strategy was issued in 1994 and takes a holistic view of natural, human-made and cultural resources and their use and abuse. It seeks to integrate into a coherent whole existing and future Central and Regional Government planning in all sectors that impinge on the environment. These include: agriculture, forestry, wildlife, fisheries, soils, water, minerals, energy, urban planning and cultural heritage. It consists of five volumes, i.e. the country background, policy environment, institutional set ups, action plan and investment. Following this example, the regions have also issued their respective policies.

### 3.5 The Ethiopian Climate Resilience Green Economy (CRGE)

The CRGE was issued in 2011, plans to achieve climate resilient and green middle-income economy status by 2025 with zero net emissions. It has three complementary objectives: fostering economic development and growth, ensuring abatement and avoidance of future emissions for transition to a green economy, and improving resilience to climate change. The strategy is based on four pillars: 1. Adoption of agriculture and land use efficiency measures; 2. Protection and rehabilitation of forests for their economic and ecosystem services including as carbon stocks; 3. Deployment of renewable and clean power generation; and 4. Use of appropriate advanced technologies in industry, transport, and buildings.

### 3.6 Engagement in the Construction of Hydro-dams

The Government of Ethiopia is engaged in constructing hydro-dams for power generation and irrigation development. The **Grand Ethiopian Renaissance Dam** (GERD), for which the foundation stone was laid on April 2, 2011, is the major element of this, and when completed will generate more than 6,000 MW of power. In total Ethiopia has an estimated potential of 45 GW (45,000 MW) of hydropower. According to the information widely available on GERD, of the total of 145 meters effective height (the river bed to the crest of the auxiliary spillway), 90 meters is set aside for dead storage to accommodate the likely silt load. With this in mind, it is clearly essential to manage the upper catchments of this and other dams in such a manner as to reduce silt loads and ensure the sustainability of the investments made in them. Appropriate erosion control measures must therefore be undertaken in all upstream areas of these hydropower dams (GERD, Gilgel Gibe I, II, III, etc.). Apart from the negative on-site effects in untreated watersheds (Loss of fertile soil, moisture depletion, seed and nutrient wash), they pose negative off-site threats: burying fertile agricultural lands downstream, burying infrastructural facilities, accelerating wear and tear of power generating turbine blades, suffocating wetlands and contributing to the loss of natural and artificial water bodies by enhancing the development of water hyacinth (e.g. As is happening in Lake Tana and Koka Dam).

## 3.7 Watershed and Agroforestry Strategies

The Ministry of Agriculture actively engaged in the process of developing strategies which will complement the updated CBPWD Guidelines for the mixed farming areas and pure-Pastoral areas of the country. These strategies will play paramount role in setting strategic directions for addressing some critical capacity and systematic challenges observed in natural resources management in the country.

## 3.8 The Ethiopian Growth and Transformation Plan (GTP II - 2015/16-2019/20)

The GTP II issued in 2015, highlights the major achievements, in watershed management, soil and water conservation works and forestry development under the GTP I (2011 -2015). It also recognizes the role played by productive and organized social mobilization and the increased effectiveness of initiatives resulting from the active engagement of communities across the county. It should be noted that this also inspired and mobilized the nation for Ethiopia's Green Economy. The priority focus of the GTP II strategy is on scaling-up and maintaining the momentum of GTP I in all parts of the country. In this regard, the expansion of small-scale irrigation in tandem with natural resource conservation to increase agricultural productivity and production has been clearly identified as a means to enhance the economic contribution of natural resources.

# 4. CONCEPTS AND PRINCIPLES OF PWD

## 4.1 Definitions

### 4.1.1 A Watershed

A watershed is defined as any surface area from which runoff resulting from rainfall is collected and drained through a common confluence point. The term is synonymous with a drainage basin or catchment area. Hydrologically, a watershed could be defined as an area from which the runoff drains through a particular point in the drainage system (Figure 2). It includes all the natural resources in a basin, especially water, soil, and vegetative factors. At the socioeconomic level a watershed includes people, the farming system (including livestock) and interactions with land resources, coping strategies, social and economic activities and cultural aspects.

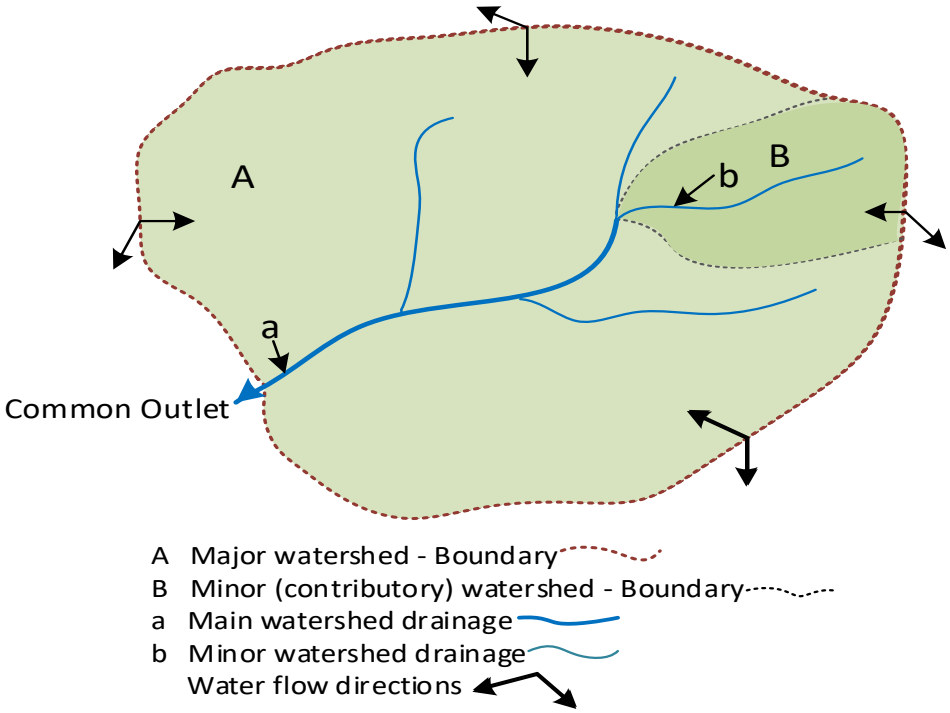



FIGURE 2: A WATERSHED UNIT

### 4.1.2 Participatory Watershed Development

Participatory watershed development (PWD) can be defined as "the rational and socially acceptable utilization of all the natural resources in a manner that achieves the optimum production required to fulfill the present needs with minimal degradation of natural resources, including land, water, and all other elements of the environment." It clearly recognizes the people's needs and aspirations drive the planning process and must therefore be emphasized, and the water supply and management initiatives must consider the whole watershed as well as the people living within it as a planning unit. Local farmers, other land users

and the wider community who depend on the land must be involved from the very beginning of the planning process since they must live with the end results. It is essential therefore to emphasize that the adequacy of planning depends on the human element and not only on the physical or technical aspects. Planning must start, therefore, with the people living on and depending on the land.

The PWD process therefore recognizes: (a) that as the inhabitants of a watershed depend on it for their livelihoods and survival, they in turn should be responsible for the proper or improper use of the resource; and (b) that the key to success in achieving sustainable use of land and water resources is the full engagement and participation of the men and women in the proposed project area in the selection of the various technologies to be applied within the watershed area. This latter includes land improvements, rehabilitation, and other technical works as well as measures intended to improve incomes and welfare of the people. The PWD process must include substantial consultations with the "target population" before the preparation of detailed project proposals in the office. To be effective this requires a mechanism for establishing priorities and making decisions at the local level. People also need to be informed about available alternatives and to feel that their concerns are being addressed. To ensure satisfactory results this initial consultation and planning process must also incorporate agreement on a system of monitoring and evaluation to enable the rural people to follow and measure progress made on joint decisions, and to make changes if necessary. Without the effective establishment of this PWD process it is impossible to create the self-supporting systems so essential for sustainability.

The concept of PWD and management emphasizes a multidisciplinary and multi-institutional approach for multiple interventions. This includes effective use of any form of assistance and community contribution, as well as the sound management of the assets created. To affect this, Watershed Management Plans (WMPs) must be prepared in accordance with this Guideline and other relevant and approved documents such as the Climate Smart Agriculture Manual (and periodic updates). This specifies that WMPs should (i) cover a five-year period, (ii) indicate SLM practices that will be developed and/or maintained, and (iii) provide a timeline, budget, and estimated labor and other input requirements.

Participatory watershed development is also intended to generate greater cohesion within the society and enable its poorest members to benefit from the various assets created and eventually to overcome their food insecurity.

#### 4.1.3 Integrated Risk Management

Integrated Risk Management (IRM) is as an enhanced, holistic approach to increase community resilience by integrating disaster risk reduction, climate change adaptation and ecosystem management and restoration within a broad watershed management practice.

## 4.2 Principles of Watershed Development

#### 4.2.1 Main Principles

**Participatory**: Watershed communities need to be involved in all stages of planning, implementation and management of watershed development activities. It is a continuous process and not a onetime exercise. Different participatory techniques will be used based upon existing and innovative experience.

**Gender sensitive**: Women are the most affected by environmental challenges; for example, they need to walk long hours to fetch increasingly scarce water, firewood and animal dung in addition to attending

livestock, to name a few. Their involvement in watershed development planning, implementation and management is the key to ensuring that they benefit equally from the various measures.

**Building upon local experience, strength and what works**: Local knowledge is essential to improve existing technologies, to adapt new ones and to manage natural resources and other measures once they are introduced and established. Best practices should be identified and disseminated.

**Realistic, integrated, productive and manageable**: Watershed development planning 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 resources base is the guiding principle for watershed development together with the optimum use of social resources. To the extent possible watershed development activities should provide tangible and quick benefits to households. This is possible to achieve 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, the 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.

**Watershed logic and potential respected**: Adoption of ridge to valley approach, of manageable size, and focused on interactions between land uses and their capability. Simple descriptions of land use and features helps to identify suitable ranges of technical options to optimize existing land use or improvements responding to both biophysical and social requirements. Due emphasis should be placed on activities that enhance production by optimizing productivity per unit area, per unit time, or per unit of water for both land owners and landless families. Emphasis should be given to the role that the quality of physical structures, vegetative cover and biological measures plays in achieving this.

The reclamation and rehabilitation of degraded and marginal lands, including gullies, will be promoted as a major activity in most of these areas through application of alternative and productive land-use systems. In semi-arid and arid areas, specific attention will be given to in situ and off-site water harvesting. For purely pastoral areas broad watershed units should be delineated within which specific and appropriate interventions might be applied.

**Environmental and Social Sustainability**: Watershed management activities should be designed according to the required environmental and social sustainability standards and should incorporate mitigation measures and a designated budget to offset any potential negative impacts to meet the required standards.

**Climate Smart**: The approaches and technologies to be pursued should be environmentally friendly and be able to sequester carbon (reduce greenhouse gas emission) at the same time as increasing the resilience of communities to weather extremes associated with climate change.

**The need for flexibility at different levels**: Flexibility and the ability to adjust to prevailing local conditions (topography, climate, vegetation biomass and social situations) are key criteria for project design and management under PWD. Flexibility is needed during the selection of community watersheds, their size (whether they are slightly smaller or larger than the ranges indicated) and clustering and during the steps of the procedures. Similarly, flexibility is essential when considering the choice and design of measures within the agreed criteria of quality and integration. In pastoral areas, flexibility in applying the planning unit consists mainly in adjusting to settlement patterns, grazing routs, water resources, etc. There

is no an exact definition of a "watershed approach" to planning, rather it is a social construct agreed to by the people living in that watershed. *The process is not rigid or cast in stone.*

**Cost-sharing and empowerment/ownership building**: Cost-sharing by stakeholders contributes to the sustainability of a project and plays an important role in establishing the responsibility of various stakeholders in the management of the resources. Various forms of local contributions are possible based upon social networks and group formation mechanisms.

**Complementary to food security and rural development mainstreaming (including HIV/ AIDs, health and education, and others)**: To the extent possible, watershed development planning incorporates additional elements related to basic services and social infrastructure. These activities will all benefit from their inclusion in the participatory watershed development framework.

**Integration of DRR and CCA within Watershed Management:** in areas where the watershed is completely degraded and the ecosystem services are lost, neither reducing disaster risks nor adaptation to climate change is possible. Given the fact that an enhanced watershed practices would create a strong foundation for sustainable risk reduction and improved climate change adaptation capacities, integrating DRR and CCA aspects from the assessment to planning, to implementation and evaluation of watershed management interventions could even results in better synergy and multiple benefits to the community.

**Working across different time scale**: willingness to work across time scales enables adaptive planning of watershed management. For many climate related hazards, especially at the most local levels, we do not know precisely how their frequency, intensity and predictability will change over time. However, we can design measures robust enough for the change we can anticipate in the watershed and that can be adjusted over time.

**Integrate disciples and approaches within the watershed:** local communities living in a specific watershed could face manifold vulnerabilities that have various underlying causes. Addressing these effectively requires a combination of disciples to analyze risks at all levels and draw up plans and implement them. These disciples could cover different sectors such as natural resource management, health, agriculture, water, education, infrastructure, disaster risk reduction, climate change adaptation, and even disaster response. Efforts should be made at the watershed level to bring these sectors (different stakeholders) together and ensure their complementarity for better results.

**Community self-management**: The betterment of the community is determined by its resources and its knowledge, and whether it can organize itself to mobilize local resources equitably. Empowerment and the creation of local ownership are essential for communities to be in the driving seat of their watershed development.

**Livelihood focused**: when a watershed is affected, it has a direct impact on the livelihoods of significant number of communities. Effective watershed management practice is the one which puts communities' livelihood at the center of tis focus and shows a clear links between the watershed interventions with the livelihood benefits it would generate to the community. This could also use to mobilize the community better.

### 4.2.2 **Size of the Watershed**

A watershed may be only a few hectares constituting the drainage area needed for filling small ponds or, in the case of rivers; it may cover hundreds of square kilometers. The size of the watershed should be based on the land-based needs of the community or communities depending on it (i.e. for intensive or extensive crop production or grazing). This enables of the definition of a suitable watershed size for effective planning for conservation and maximum production. It also provides the basis for efficient management of watershed resources by defining an appropriate unit size that ensures the resources are managed and handled effectively, collectively and simultaneously. The average size of the community /micro watershed for the mixed farming communities should be assumed to be about 500ha with some variations depending on practical considerations. Some exceptions are to be anticipated above this, particularly in drier areas where villages are scattered within larger watershed units and where natural resource development is possible only if larger units are considered. In this case, however, sub-watershed units should be identified and prioritized for orderly implementation of interventions. For pastoral areas, however, the size can be adjusted according to community needs within the Kebele.

As the community and its surroundings is the decision-making unit for any watershed, this is of necessity as a starting point for planning. Within the size range suggested above, a watershed will be then selected as much as possible to:

- Include the community or most parts of a community comprising the smallest unit available (gott, genda, kushet, and others). One kebele may thus have several watershed plans.
- Include more than one community where the interactions between two or more communities are closely linked to the watershed they share.
- Include only a portion of a community where it is widely scattered and where there are two or more community watersheds being occupied by the community. In this case, several community watershed plans can be developed and linked one to the other (see section 5.8.3 of the planning steps).
- In cases where a community watershed falls within two or more kebeles, the planning and implementation shall be executed with a collaborative effort of the concerned bodies of the respective Kebeles. This also applies for watersheds which crosses woredas boundaries.

In **pure pastoral** areas the density of settlement is generally lower than in the highlands. The spatial coverage of any given Kebele is also and generally larger than in the highlands. Interventions for management of rangelands /pasture lands are most likely to include: forage development /improvement, control of invasive species, water harvesting, and the opening/demarcating and mapping of livestock trekking routs. Pastoralists already have common resource management terminology such as “Madda” meaning water point and “Dheda” meaning grazing /rangelands. In (Borana) areas, a group of people living within a village is known as “Rera” and “Ollaa” is a neighborhood. The water points can be permanent or seasonal. There are also wet season and dry season grazing areas where livestock are trekked from place to place depending on seasons. These resource centers may range from a few hectares to very large areas covering clusters of villages, Kebeles, and Woredas. So, boundaries of these resource centers should not be taken as the lowest planning unit in the watershed logic. In the pastoral areas, the lowest planning unit may be the boundary of the **community** or **villages** within the **Kebele**. One Kebele may have two or more communities where such land and water resources planning can be carried out. The boundary of these communities may not necessarily fit within a logical and watershed but may encompass all the land under

the community's jurisdiction within the Kebele structure. Community level planning can thus be aggregated at Kebele level. It is evident from this that for doing watershed-based planning the watershed logic may not be as easily recognized and applied in the pastoral areas as in the highland landscape. However, as connection, aggregation and continuum of communities grows between one or more Kebeles the watershed boundaries appear to be more clearly defined, with identifiable dividing lines between catchments, and recognizable water courses and common outlets or water flow confluence points. It is also to be noted that, due to pastoralists' highly mobile behavior, it would be difficult to constrain pastoral communities to smaller size community watersheds for land and water resources planning and management. Community or Kebele level planning is recommended instead[1].

### 4.2.3 Watershed and community /micro-watersheds: Linkages and Intervention Logic

All watersheds can be divided into smaller community/micro-watersheds. Each watershed or community /micro-watershed hydrological unit is connected, and any modification of the land use in a watershed or micro-watershed will reflect on the water as well as sediment yield of the overall watershed. Watersheds can be classified as micro-watersheds, major watersheds, sub-basins and basins.

There is quite interesting resemblance between a tree and a watershed (see Figure 3). A tree can be explained as leaves leading to small branches and these small branches leading to larger branches and the larger branches lead to the trunk of the tree. Also, there is similarity between administrative ladder and watershed as village (e.g. Gott/Kushet), Kebele, Woreda, Zone, Region, and National. So, there is always intervention logic between the small and larger watersheds and continuum exists. Finally, a whole watershed treatment means generation of abundance of resources and wealth.

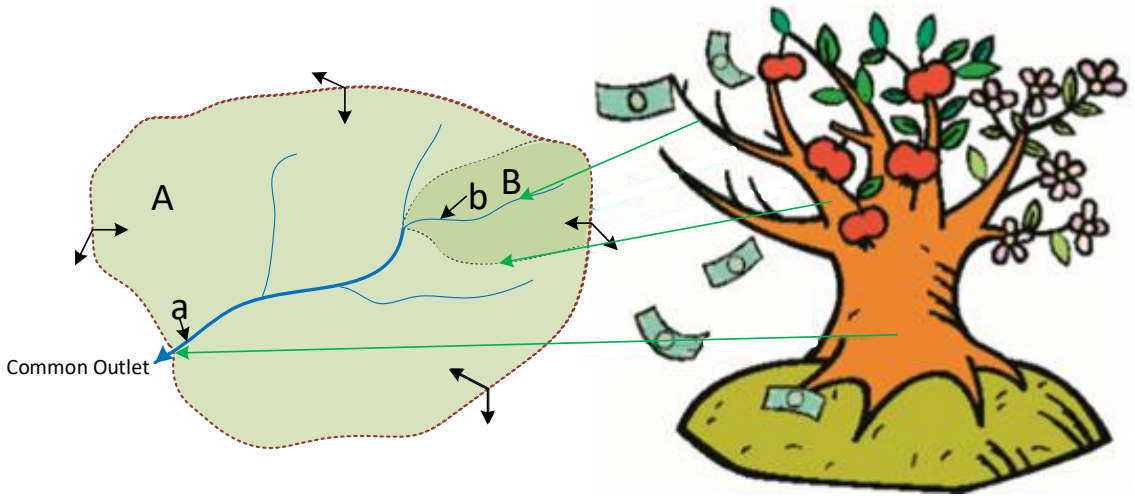



FIGURE 3:THE RESEMBLANCE BETWEEN WATERSHED AND A TREE

**Linkages**: Once the major watershed unit has been chosen, community watershed units can be identified within this unit to prioritize activities and their sequences. There are interactions between the major watershed and community/micro-watersheds that may be extremely important to remember and to consider. Some are simple and obvious; others are less evident and need to be looked at more carefully. These

[1] Refer to pure pastoral planning steps 1 and 2 for details on this

interactions are based not only on how drainage and surface runoff interact but also on land use and socio-economic factors. Planning Step 5 section 5.8.3 illustrates common situations in the field and problems that may occur when such factors related to watershed management are neglected.

In general terms, a holistic approach to watershed treatment is required. Although such integrated and comprehensive treatments are ideal, these may not be possible because of resources or cost-benefit considerations or because of conflicting local priorities and other factors. By using a flexible planning approach treatments can still be planned to take place sequentially over time. Sometimes it is only necessary to apply partial treatment to watersheds.

**Intervention logic**: The selection and logical sequencing of the different interventions should be geared to farmers' interests and by how these can be addressed based upon the biophysical characteristics of the landscape. Technical support is also needed to help community members visualize watershed potentials and logic. Intervention logic is not only related to the type of activities that should be undertaken sequentially or simultaneously but also to a number of agreements and arrangements required to accommodate the interests of different land users: what will be done, where, by whom and how. For instance, a feeder road or a water pond may be a priority for the community. However, without treatment of upper watershed areas, these two assets may not be sustainable and may even be severely damaged. Those upper sections may need to be closed and planted, which in turn implies sharing arrangements, control grazing agreements, choice of type of conservation measures to support plantation and control runoff, choice of species, and the like. During the selection of measures such interactions will determine the best sequence to follow and the risks to avoid. This Guidelines and support documents will provide information on main interactions and integration requirements for various technologies and interventions. The two examples below further clarify intervention logic.

**Example 1**: Soil bunds may be requested by a group of farmers from a given area, but it may easily happen that implementation cannot take place because their land is located below a hillside and could thus be damaged by runoff from the hillside after intense rains. It would then be necessary to involve another group of land users who have rights over those hills, or to consult the community (ies) if the area is under communal use rights (such as grazing). In this case, the problems which may be encountered might include: lack of interest in treating the hillsides, disputes over use rights, different opinions on what measures to apply on the hillsides, disputes over access to labor opportunities, and other issues. It is only after clear agreements are reached on what, where, how, by whom and when the treatment of the hillside will be undertaken that soil bunds become a viable option for that area.

**Example 2:** In many areas, there is considerable untapped potential for water harvesting. Understanding the potential of a watershed provides the best indication as to what type of measure to select, for example; micro-ponds and/or hand-dug wells. Hand-dug wells are more advantageous for small-scale irrigation, but water-tables may be too deep and have limited flow. In many parts of the country there are frequent superficial geological fractures, as a result of which shallow aquifers can be recharged and water is available at depths of 5 to 10 m. Water-tables may, however, be raised if adequate and significant hillside treatments are undertaken. Trenches combined with other measures such as infiltration pits and related measures can be very effective in this regard. Once such treatments are completed, hand-dug wells become feasible. In other circumstances micro-ponds will be the best choice provided they are also integrated with upper micro watershed rehabilitation – a combination of the two is often possible depending on the topography of the area.

## 4.3 Watershed Coding

The concept of the tree introduced above (i.e. trunk, large /medium /small branches, and its leaves) provides a model around which one might approach the disaggregation of a watershed into Basin, Sub-Basin, Major Watershed, Community /Micro-watershed hierarchies - based on the topology of a stream network. Hierarchical watershed coding systems have been broadly applied worldwide and various methods for watershed and stream network numbering developed (for example the Strahler stream coding order2). These systems were all developed for purposes of water and land resources management. A number of developed countries have coded and documented their land resources locations, potentials, limitations, and development planning needs on a metric grid, and it would perhaps be timely for Ethiopia to start doing the same. Using GIS systems, watersheds can be coded providing information on their locations/positions and their sizes. Such coding systems can also be developed for water and land resources management purposes at the national, regional, Woreda, and local levels. Standardized coding systems are needed which are informative, simple to use at the different administrative levels, open, and user-friendly with a clear relationship between watersheds of different sizes, the main river basins and their tributaries. The Ministry of Agriculture has recognized the need to pursue the task of **coding watersheds** in order to achieve effective watershed management, planning, implementation, progress monitoring, change tracking, and impact studies. Some regions (e.g. Tigray) have already started this by coding close to 7,359 community/micro-watersheds within the region's 3 major basins, 23 sub-basins, and 488 major watersheds.

### 4.3.1 Watershed Codification System

In this system the national territory is divided into major regions composed of sub-regions, which are again broken into successively smaller accounting units and cataloging units (major and smaller watersheds). The boundaries of these units are defined in terms of the topographic divides between river basins, and their sub-basins and watersheds. In applying this to Ethiopia we find a watershed hierarchy composed of multiple levels of watershed hydrologic units. These consist of: basins, sub-basins, and major watersheds (covering 6,000-20,000 ha) at *Woreda* level; and micro/community watersheds with average of 500Ha at community level in most cases. However, were local conditions compel to have smaller or larger sizes the lower and upper limit should be 250Ha and 1000Ha respectively. Often there are smaller watershed units nested in the larger watershed hydrologic unit for which a hierarchical order can be established. A hydrologic unit code (HUC) is assigned to indicate region, sub-region, accounting unit, and cataloging unit. The hydrologic units delineate a nationally predefined boundary, basin and watershed area.

**Example**: The Ethiopian administrative hierarchy consists of regional, zonal, *Woreda* and *Kebele* administrative units, in which the Region and *Kebele* represent the highest and the lowest units. Based on this, the proposed classification and coding system is as illustrated in the three tables below. The following logic is applied: A watershed code, will include codes for the region, the basin, sub-basin, zone, *Woreda*, major watershed, and the community/micro-watershed. The planning steps contained in this guideline was tested in sample Woredas of the country. One of the micro-watersheds in Amhara Region, Tach Gaint woreda codified as 03Ab06a06A06a. The interpretation was provided as follows:

[2] https://en.wikipedia.org/wiki/Strahler_number

**TABLE 1: EXAMPLE OF MICRO-WATERSHED CODING**

| | |
|---|---|
| 03 | Amhara Region |
| Ab | The Abay basin |
| 06 | A sub-basin (Beshlo) in Abay basin |
| a | The South Gondar Zone |
| 06 | Tach Gaint Woreda |
| A | Zita-a major watershed in the Woreda |
| 06 | Antseta Kebele in the Woreda |
| a | Meshant community/ micro-watershed in the Kebele |

**TABLE 2: WATERSHED HIERARCHY AND CODING**

| ***No*** | ***Category of hydrologic unit*** | ***Size range*** | ***Delineation and coding*** |
|---|---|---|---|
| 1 | Basin | 2,223-202,220 $km^2$ (See Table 5.6) | Basins are assigned with first two letters e.g: Me (Mereb), Da (Danakil), Aw (Awash), Wa (Wabi Shebelle), Ge (Genale-Dawa), Ri (Rift Valley), Om (Omo-Gibe), Ba (Baro-Akobo), Ab (Abay) and Te (Tekezie) |
| 2 | Sub-basins | Intermediate to basins | Each basin is divided into a number of sub-basins, which pertain to main tributaries or a group of contiguous tributaries or individual streams. Sub-basins are represented by numbers suffixed to basin code as 1, 2, 3.....9. |
| 3 | Major Watersheds | 6,000-20,000 ha | The sub-basins are further divided into a number of major watersheds (of 6,000-20,000ha), which are mainly smaller tributaries and streams. Major watersheds are indicated by suffixing alphabets (capital letters) to the sub-basin code as A, B, C.....Z. |
| 5 | Community/micro-watersheds in the *Kebele* | +/- 500 ha[3] | Community/micro-watersheds are represented with lower case letters a, b, c, etc. |

**TABLE 3: ADMINISTRATIVE HIERARCHY AND CODING**

| **No** | **Administrative Hierarchy** | **Codification pattern** |
|---|---|---|
| 1 | Region | Regions are codified by numbers e.g. 01 (Tigray), 02 (Afar), 03 (Amhara), 04 (Oromia), 05 (Somali), 06 (Begu), 07 (SNNPR), 12 (Gambela), 13 (Harari), 14 (Addis Ababa) and 15 (Dire Dawa). |
| 2 | Zone | Zones are represented by lower case a, b, c etc. |
| 3 | *Woreda* | *Woredas* are represented by numbers 1, 2, 3 etc. |
| 4 | *Kebele* | *Kebeles* are represented by numbers 1, 2, 3, etc. |

2. The +/- 500 ha refers to local conditions compelling to have smaller or larger sizes the lower and upper limit should be 250Ha and 1000Ha respectively

TABLE 4: INTEGRATION OF ADMINISTRATIVE UNITS WITH WATERSHED HIERARCHAL UNITS

| No | Hydrologic Unit / Administrative Boundary | Codification Pattern |
|---|---|---|
| 1 | Region | As in Table 3 above |
| 2 | Basin | Basins are assigned with first two letters e.g: Me (Mereb), Da (Danakil), Aw (Awash), Wa (Wabi Shebelle), Ge (Genale-Dawa), Ri (Rift Valley), Om (Omo-Gibe), Ba (Baro-Akobo), Ab (Abay) and Te (Tekezie) |
| 3 | Sub-basin | Sub-Basins are represented by numbers 1, 2, 3…etc suffix to basin. |
| 4 | Zone | Zones are represented by lower case letters a, b, c… |
| 5 | *Woreda* | *Woredas* are represented by numbers 1, 2, 3, ... etc. |
| 6 | Major watersheds in the *Woreda* | Major watersheds will be represented by capital letters A, B, C, … etc. |
| 7 | *Kebele* | *Kebeles* are represented by numbers 1, 2, 3, … etc. |
| 8 | Community/ micro-watersheds in the *Kebele* | Community/micro-watersheds are represented with lower case letters a, b, c…etc. |

TABLE 5: IMPORTANT PHYSICAL CHARACTERISTICS OF THE ETHIOPIAN BASINS

| No. | Basin Name | Type | Source | Area (Km2) | Direction of Flow | Terminal |
|---|---|---|---|---|---|---|
| 1 | Wabi Shebelle | R | Bale Highland | 202,220 | East | Indian Ocean |
| 2 | Abbay | R | West, Southwest HL | 199,912 | West (Nile) | Mediterranean Sea |
| 3 | GenaleDawa | R | Bale Highland | 172,259 | East | Indian Ocean |
| 4 | Awash | R | Central Highland | 110,000 | North East | Terminal Lakes (Internal) |
| 5 | Tekeze | R | North Wollo Highland | 82,350 | West (Nile) | Mediterranean Sea |
| 6 | Denakil | D | North Wollo Highland | 64,380 | NF | Internal |
| 7 | Ogaden | D | No Flow | 77,120 | NF | Internal |
| 8 | Omo-Ghibe | R | Central, western HL | 79,000 | South | Rudolph Lake (Internal) |
| 9 | Baro-Akobo | R | Western Highland | 75,912 | West (Nile) | Mediterranean Sea |
| 10 | Rift Valley Lakes | L | Arsi and Central HL | 52,000 | South | Chew Bahir |
| 11 | Mereb | R | Adigirat HL | 5,900 | West (Nile) | Swamp in Sudan |
| 12 | Aysha | D | No flow | 2,223 | NF | Internal |

*Source: Basin Master Plan Studies.*
*Legend: HL- Highland, D- Dry river course, R-Flowing River, L-Lake, NF-No Flow*

### 4.3.2 Watershed Codification Tool Logical Requirements[4]

CSM-PSNP project developed the practical codification tool for watershed codification described above using GIS software. The codification tool should take a standard set of data inputs and automatically populate all of the fields in a community level Micro-watershed file. All Micro-watersheds will be

[4] Watershed Codification Guidance is under preparation through the support of EU/CSM-PSNP

processed no matter what their size. A post-processing stage may be required to manually merge or split micro-watersheds that fall outside the Guidelines.

**The Data Inputs required:** River Basins, Sub-basins, Major-watersheds, Micro-watersheds, Region, Zones, Woreda and Kebele.

## Output

The micro-watershed layer's codification attributes are populated with information from the input layers.

## Functional Requirements

The tool should open the Micro-watershed file and cycle through each of the features (micro-watersheds). Each feature should be tested against the input files to extract:

- The Basin name or code
- The Sub-basin name or code
- The Major-watershed name or code
- The Region name or code
- The Zone name or code
- The Woreda name or code
- The Kebele name or code

The Micro-watershed features should be contained within the higher-level hydrological units, they may or may not be contained by the administrative units. The basic GIS comparison is intersect. If the Micro-watershed feature does intersect with the input feature, then the area (in Ha) / proportion of intersection will be recorded. Each of the values will be stored in a separate field to enable sorting on that field. The full combined code will be stored in an additional field.

There are a number of options for the implementation of the codification tool but there is only one that is both practicable and appropriate which is to use the Python programming language with the GDAL/ORG spatial library. Note that GDAL/OGR is a standard software library used by many GIS software solutions.

## Micro-watershed Field Definition

The micro-watershed attribute table will have the following fields. The field names are the actual names used in table 6 below.

TABLE 6: MICRO-WATERSHED FIELD DEFINITION

| Field Name | Data Type | Width | Remark |
|---|---|---|---|
| Region | Int | 2 | |
| Basin | Alpha | 2 | |
| sub_basin | Int | 2 | |
| Zone | Alpha | 1 | a=0, b=1, c=2, … j=9 |
| Woreda | Int | 2 | |
| major_ws | Alpha | 2 | A=0, B=1, C=2, … J=9 |
| Kebele | Int | 3 | Needs to be more than 100 |
| micro_ws | Alpha | | a=0, b=1, c=2, … j=9 |
| Code | AlphaNumeric | | |

## 4.4 Elements and Characteristics of Watershed: Overview

### 4.4.1 Biophysical (Water, Land, Vegetation)

The elements of a watershed include:

- Climate (temperature, rainfall, and wind);
- Water bodies and streams,
- Geomorphology and geological composition which govern the related topographic features (gradient and length of slopes, shape and direction and past/current erosion features - rills, gullies, landslides, etc.) as well as soils and drainage conditions
- Vegetation and land use, including homesteads, cultivated land, grazing land, natural and managed forest and degraded areas used for various purposes.

Watershed development applies to areas with productive potential as well as those with less potential; both are not only interconnected but their productivity can also be recovered or improved on with the application of specific rehabilitation and management measures.

### 4.4.2 Socioeconomic

The socio-economic elements and characteristics of a watershed include the population, their farming systems, social setups, economic activities, land tenure, vulnerability profile, gender, and the like. Watershed development planning is the principal means of dealing with these variables and it also fits with the concept of community level planning. It aims to improve the livelihoods of the community. It is a democratic process that treats men and women alike. In this context it embraces the views of various categories of people in the watershed(s). And although it is intended that all community members should benefit from watershed development, specific attention is required to address problems of resource poor and vulnerable families and promote the empowerment of women. Specific initiatives involve:

- Equal participation in planning, wage and employment opportunities for women and most vulnerable households;
- Preferential allocation to resource poor households of usufruct rights over the common land resources before starting planning;
- Development of marginal lands assigned to resource poor families and women headed families on a priority basis;
- Location of water harvesting structures nearer to the lands owned and cultivated by resource poor families;
- Providing support (assets building) to land poor, landless and labor constrained families through multiple interventions undertaken through community efforts as solidarity and mutual-help schemes.

### 4.4.3 Watershed Degradation Features

**Depletion of water resources**: Ethiopia suffers from what is referred as a “recurrent wastage of most of its rainwater”. With loss of water through surface runoff and soil erosion, thus triggering the whole chain of negative consequences leading to chronic food insecurity. In most developing countries, only 20–50% of total surface runoff is controlled and effectively used. Ethiopia is among them as topography, inadequate farming practices, and lack of conservation measures hamper water and moisture retention and its efficient

use. Runoff is the portion of rainfall that does not infiltrate into the soil and flows over the surface frequently scouring it.

Wastage of rainwater occurs: (1) when it does not infiltrate into the soil to satisfy the crop water requirements; and (2) when there are excessive flows over the surface of soils that have lost their vegetation cover as a result of poor tillage or livestock management practices. When rainwater infiltrates rapidly it also has a high potential to recharge aquifers and, under the right geological conditions, make groundwater available for small-scale irrigation or replenish springs. The depletion of water resources is directly linked to the disappearance of vegetative cover and absence of surface protection systems. High runoff also implies high erosion rates resulting in further soil degradation: lower infiltration rates; loss of soil organic matter and nutrients and impoverished physical conditions for rooting. This creates a vicious cycle deteriorating soil conditions.

Scarcity of water for domestic and livestock use is a major consequence of soil degradation in Ethiopia, with serious repercussions on health, incomes and quality of life of people. Only 24% of Ethiopia's population has access to safe drinking water. There is a close and evident relationship between watershed conditions and the availability of water: it can clearly be shown that the more watersheds are degraded the scarcer becomes the availability of water. The implementation of watershed development practices is therefore the most effective means of ensuring that of surface and subsurface water sources can be harvested and utilized for both domestic, livestock and other uses.

**Soil erosion and land degradation**: Soil erosion is one of the most important aspects of land degradation as it results in the reduction in soil depth, fertility and moisture holding capacity. It is caused by the removal of soil fine particles as a result of rapid flows of water or wind over exposed surfaces. It is always the result of exploitative use of the land. These include: excessive tillage and related poor husbandry practices which leave unprotected soil surfaces exposed to water and wind; cultivation of excessively steep slopes; overgrazing, and deforestation, even in closed areas. If land and water resources are not protected against the forces of erosion, there are many symptoms of degradation that are occurring which are not only visual but also physical, biological and chemical.

**Impoverishment of the vegetative cover**: Vegetative cover within watersheds becomes impoverished when biomass is reduced through its mismanagement and over utilization. In forests this results primarily from unmanaged deforestation for wood or charcoal; in pasture lands from poor pasture management practices such as overgrazing and burning of bush and grasslands; and in crop lands from the cultivation of inadequately protected lands (without contours or terraces or the retention of crop residues). In all three cases this leads to increased exposure of the land's surface results in accelerated wind and water erosion and reduced soil fertility and may also be exacerbated by climate change. Without appropriate watershed management therefore the associated natural resources (soil, water, fauna and flora) are degraded rapidly and in due course are no longer available for the betterment of humans.

It is clear that without the application of appropriate watershed management practices a vicious cycle occurs in which reduced vegetative cover leads to degradation of the land resources (exposure resulting accelerated erosion) inevitably in the depletion of the water resources (decreased infiltration and recharge, increased runoff, sedimentation of storage facilities and water distribution infrastructure). The repetition of this cycle causes continuous deterioration of the soil, water and vegetation and the increased degradation of the watershed. Unchecked this cycle ultimately leads to desertification and the loss of the land's potential to sustain life and livelihoods.

**Damage to infrastructure**: Absence of a protective vegetative cover results in severe soil erosion, damage to road networks, increased sedimentation and decreased capacity of water reservoirs and damage to irrigation schemes. Given the huge ongoing costs of maintenance and repairs, these can largely be avoided by following good watershed approach and practices.

### 4.4.4 Existing and Untapped Potentials for Optimizing Water and Soil use in a Watershed

**Water harvesting:** includes those measures necessary for conserving moisture in situ and for effective use of surface runoff. As such, it is an integral part of watershed development and needs to be seen as a key element in restoring and enhancing land productivity, supporting the rehabilitation of degraded lands, and enhancing the development of natural resources. The construction, operation and maintenance of the necessary small-scale infrastructure provide income generation opportunities, thus contributing to the wellbeing of the community. Figure 4 shows how to recognize conservation-based water harvesting potentials in a watershed.

There is immense and barely exploited potential for production and conservation-based water harvesting in the Ethiopia's, highlands and lowlands. Several interventions are listed in the watershed planning guidelines, information kits and support documents which provide valuable experiences from which to draw lessons and expand best practices. These need to be expanded. It is necessary to keep in mind however that water harvesting practices are only possible where appropriately integrated with suitable soil conservation and watershed development measures. The correct watershed planning approach for any given area must also identify which water harvesting measure is most appropriate there.

## 4.5 Land Rehabilitation, Reclamation and Productivity Enhancement

In Ethiopia degradation can be recorded on all land use categories associated with arable agriculture and herding but over 60% of the erosion occurs on cultivated lands. Large parts of entire Woredas and regions are affected and are thus prime areas for implementation of water harvesting initiatives. Even among these areas though, there is significant variation with the higher erosion rates being recorded in areas with high potential for cultivation. This implies a need to establish priorities for the conservation and protection of watersheds across the country. There are still vast areas of severely eroded land that could be converted to productive units for crops, fodder or trees. The rehabilitation of such areas is essential in order to more fully exploit their water harvesting potential and to protect and enhance their potential to support agriculture, livestock production or forestry.

Land reclamation interventions may be appropriate where degradation is either very severe or where land is considered unsuitable for production because it is too arid or affected by other problems such as salinity and frost. There are also excellent opportunities for reversing such trends by using watershed development principles. Such interventions may be costly, but they are often worth than the investment. For example, use of rainfall multiplier systems (systems for retention of water at the surface in ponds, dams, or aquifers, and in the soil) for very dry areas (up to 250 mm rainfall) enables food, fodder and tree crops to be grown, grazing reserves to be developed and dry land forests to be established. Large gully networks can be harnessed through a combination of vegetative and physical measures, including innovative approaches such as soil storage overflow dams. Overall, the watershed development approach highlights potentials that exist in every land use and its conditions, even most degraded ones.

**Protection, development and sustainable management of forests:** Watershed development also involves the greening of landscapes, including protecting existing natural forests or reforesting denuded areas with multipurpose species. This activity has multiple functions, such as increasing access to forest products (firewood, forage, fruits, timber, dyes, and gums) and also to forest related activities like bee-keeping. As with agriculture in which more stable, productive and resilient systems are highly diversified, forestry monocultures, are generally less resilient and offer less opportunity for diversified income generation with multiple benefits. This is also true in complex landscapes, in which the hydrology and access to water is more heavily dependent on the composition and extent of forest coverage and the status of re-vegetated areas. “Money grows on trees” is an expression used to describe systems that foresee trees and other planting materials as an integral part of the agricultural system, able to ensure environmental and economic benefits and stability. In this vision local people, and women in particular, become shareholders of the “green factory”, intended to perform as forests and agro-forestry systems. Nursery areas are part of such systems and, in degraded and deforested environments, a point of departure to improve and manage rehabilitated areas in a stable, diversified and risk-averting manner. Furthermore, revegetation in watershed development means water harvesting opportunities can be multiplied significantly. In this way degraded areas can made to generate considerable income as a result of reforestation so long as they are supported by conservation-based water harvesting measures.

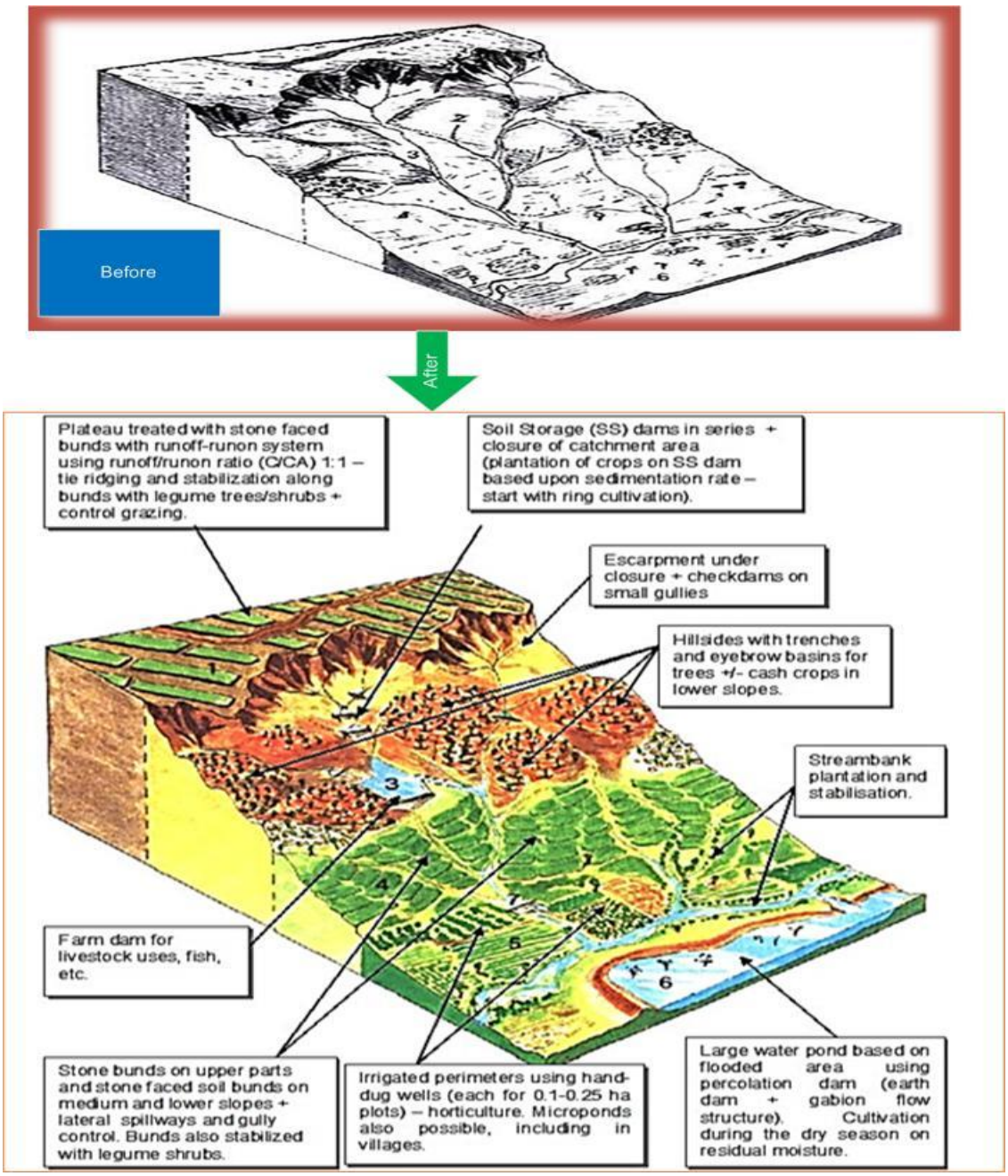



Figure 4: Recognizing People's and watershed potentials for conservation-based water harvesting

**Sustained, long lasting and effective use of rural infrastructure**: Well-planned watershed development can be of immense benefit for feeder roads and other major road networks particularly in fragile and steep terrain. Even where major road networks have been established prior to the rehabilitation of the concerned watersheds, they will in due time benefit from this activity. In the case, however, of inter-community feeder roads and mountain tracks, these should be included in the community-based watershed planning from the design to the management stages. The same applies to community ponds, larger reservoirs and related irrigation schemes.

**Promotion of income generation activities;** Watershed development is also intended to enable series of new income-based activities to emerge and expand, taking advantage of the multiple benefits generated by water harvesting and moisture conservation, increased productivity and diversity of crops, fodder and trees. Small cottage industries, specific high value crops, bee-keeping, dairy, fattening, improved packaging and eco-tourism are but a few options that need to be exploited to increase and diversify incomes, and promote off-farm and on-farm employment for the poor.

**Watershed development and conflict resolution**: Lack of opportunity combined with competition for access to scarce natural resources tends to exacerbate divisions within rural communities. This erodes traditional social cohesion patterns, provokes uncontrolled outmigration and triggers various forms of conflict over the use of natural resources. Conflict over the use of grazing lands and water points is a typical case in point. It also needs to such things as the detrimental encroachment onto steep slopes and damage to downstream areas. Participatory watershed development has a built-in conflict resolution procedure to be applied during the planning and implementation stages. This depends on building the assets base of farmers or pastoralists and generating a wide range of new opportunities. Social conflicts may, however, also erupt as a result of these very same opportunities and benefits. The management of watersheds must therefore be governed by agreed and functional management structures, incorporating a sound legal environment and continuous support from technical and social departments within and outside the agricultural sector.

# PART 1: SECTION A (2) PLANNING PROCEDURES AND STEPS

## 5. PLANNING METHODOLOGY AND STEPS

This Section provides planning steps and procedures that will be applicable to mixed farming system areas and pure pastoral livelihoods systems. In the former, it focuses on watershed planning methodologies, procedures and steps which, during their implementation, adhere strictly to the watershed logic and the principles of CBPWD presented in chapter 4. In the latter, the CBPWD approach will be adjusted to consider the livelihoods, environment and settlement and mobility pattern of people living in these areas.

This planning process incorporates both human and natural resources elements and recognizes that comprehensive and integrated natural resource development is a means to the end and not an end itself. It further acknowledges that the planning must begin with a focus on the human element and be designed to be fully participatory, gender and nutrition sensitive, and to pay due attention to the issues of vulnerable social groups. The approach also recognizes women's significant role and contribution in natural resource management and climate change adaptation and that men and women may be impacted differently by the extreme environmental conditions likely to be exacerbated by climate change. Emphasis is also placed on involving and thus empowering communities so that they have the interest and confidence to own the processes and are knowledgeable about what technical or management procedures are likely to succeed and what local resources or external supports are available to them.

CBPWD contributes to the realization of the wider rural development and food security policies and strategies including the Climate Resilient Green Economy (CRGE). Particularly, climate smart agriculture approach that has three pillars will be considered in planning and implementation: (1) sustainably increasing agricultural productivity and incomes; (2) adapting and building resilience to climate change; and (3) reducing and, where possible, removing greenhouse gas emissions. This concept is now applied to CBPWD to achieve three key objectives: (i) reducing people's vulnerability to climate change by reducing exposure, reducing sensitivity and increasing adaptive capacity (ii) increasing the resilience and sustainability of watershed development investments in relation to climate change and ; (iii) supporting climate change mitigation wherever possible and appropriate.

The CBPWD plan is integrated and diverse, covering sectors ranging from those related to natural resource management, to irrigation and drinking water supply works, crop and livestock development, rural social infrastructure and services, and income generating livelihood activities. The planning process, therefore, requires the involvement of range of technical specialists such as agricultural/ irrigation engineers, road engineers and economists, agronomists, livestock specialists, foresters, social development specialists, disaster risk management and early waring specialist, environmentalists etc.

The planning process follows a very important and pragmatic process starting from the initial preparation of plans at Woreda level to the actual planning with communities involving the following steps:

1) Identification and prioritization of watersheds/rangelands;
2) Pre planning preparation at the community level;
3) Actual planning work including biophysical and socio-economic surveys;
4) Intervention identification, prioritization and safeguard considerations;
5) Approval of intervention plans by the wider community;
6) Organizing the intervention plans; and

7) Formulating implementation strategies.

Climate change, disaster risk, ecosystem management & restoration, gender and social development, family planning, nutrition, environmental and social safety issues are mainstreamed into these planning steps. The details of these steps including, the stakeholders involved and the procedures and tools to be used are well elaborated in this document. More information on the key tools and concepts for conducting the planning process is to be found in Annexes Part I and Part III for Mixed Farming Areas and Annexes Part 2 and Part III for Pure Pastoral Areas.

The procedures used in assessing community settlement and livelihoods in pastoral areas are somewhat different to those applied in watershed delineation in the mixed farming system areas. In pure pastoral areas it is necessary to tailor the approaches used in the conventional watershed management approach to account for variations in terms of settlement, environment and livelihoods. In this context watershed delineation may not be relevant or practical, given the settlement pattern and topography of the land. It is still possible, however, to determine the smallest planning unit and apply watershed approaches such as participation of the community, and many other CBPWD principles. Based on present experience, the choice of activities is likely to focus on factors that are important to pastoral livelihoods such as: grazing land rehabilitation, water point development and rehabilitation, control of invasive species, and SWC schemes forming part of rangeland management. Flexibility is generally required to ensure that the various activities planned and implemented in pastoral areas are consistent with local conditions.

The planning process involves use of various participatory techniques to promote local participation. These originate from different methodologies which have been widely applied globally. In Ethiopia, they originate largely from the Local level Participatory Planning Approach (LLPPA), Participatory Rural Appraisal (PRA), Farming System Development (FSD), and Participatory Land Use-Planning (PLUP). These techniques are designed to ensure involvement of the whole community in the exercise, while also enabling the planning team to obtain as much information as possible within the limited time available. In general, participatory watershed/pastoral area development planning is designed to be as simple and practical as possible, so that one or more Development Agents (DAs) and the community can prepare a plan together.

Finally, it needs to be emphasized that this guideline and the planning approach outlined in it, including the methods and the tools and instruments presented, are widely applicable throughout Ethiopia. It considers all situations from settled to pastoral areas, from highlands to lowlands, and from drought-affected food-insecure areas to high-potential land areas in which the natural resources are at risk of deterioration. The guideline is intended to be used as a planning tool for all programs and projects dealing with, sustainable land management, food and livelihood security or rural development. These include regular government programs, donor funded ones, or projects being executed by NGOs. The eight planning steps presented in this guideline result in the formulation of a comprehensive Multi-Year Plan (MYP). This will usually continue for three to five years each selected micro-watershed and require the production and implementation of a detailed annual action plan each year.

The planning steps are presented in three sections. Part 1 (section A.1): Mixed farming planning steps (steps 1 to 3), Part 1 (section A.2): Pure Pastoral planning steps (steps 1 to 3) and Part 1 (section A.3) Common planning steps for Mixed farming and Pure-pastoral areas (Steps 4 to 8). Each of these sections are presented as follows: -

# PART 1: SECTION A (2)-1 MIXED FARMING AREAS PLANNING STEPS

Community based watershed development in mixed farming areas involves eight inter-linked planning steps. This section presents the first three planning steps as it applies to these areas. Namely: Step1: Getting started at Woreda level, Step2: Getting started at community level and Step 3: Socio-economic and biophysical survey.

## 5.1 STEP 1: GETTING STARTED AT WOREDA LEVEL

Community is at the heart of any development planning including watersheds. However, they need guidance and direction from higher level administrative bodies. Thus, Woreda as responsible for all communities within the Kebeles under its governance is responsible for some key activities that involve into CWDP. Some of its key activities include: (i) stakeholders' analysis, establishing planning teams, undertaking some preparatory activities and initial visit to the communities. These are presented in detail in the sections below.

Step 1: Getting started at Woreda level

- Stakeholders Analysis
- Establishing Woreda Watershed Team (WWT)
- Undertake Woreda level preparatory activities
- Establishing Kebele Watershed team (KWT)
- Undertake initial visit to communities

### 5.1.1 Stakeholder Analysis

As a first and key step in the planning processes stakeholder analysis considers the identification of stakeholders and partners (government sector offices, NGOs, private sector, etc.) who have a stake in watershed management, & management of natural resources and rangelands in pastoral areas. Before starting the planning process, it is therefore essential to identify and define the roles and responsibilities of the key stakeholders. This must include those: (i) who make and implement decisions, (ii) who are affected by the decisions made, and (iii) who can assist or impede implementation of the decisions. A preliminary discussion should then take place with them to establish their involvement in, and commitment to, the plan. It is important to note that stakeholders are more likely to become involved if they are shown a clear plan for their engagement and the benefits of their participation.

Key stakeholders include: communities as main beneficiaries of the plan, communities negatively affected by the plan, government sector institutions/offices, NGOs, project and programmes and others. It creates a collaborative and integrated approach for planning as it have high potential for joint efforts, creation of synergies, sharing of knowledge and experiences and avoiding of duplication, etc. It would also include those who can provide technical input and assist with resources for planning and implementation efforts, and those who are good at resource management and conflict resolution. The nature of stakeholders varies based on their influence and importance for the planning and implementation of the plan. For example, those who make decisions on resources such as release of finance for implementation of the plan has more importance and influence than others. Thus, identifying stakeholders based on their influence and importance is crucial for the successful implementation of development plans. The *Woreda* Office of Agriculture (WoA) in mixed farming areas is responsible for initiating and coordinating multi-stakeholder involvement.

### 5.1.2 Establishing Woreda Watershed Team (WWT)

This section highlights preparatory activities at Woreda level that ensure proper planning and implementation of CBPWD. These include: identification of stakeholders and partners, collection of basic Woreda data on disaster risk and early warning information, food insecurity hot spot area and weather information, organizing WWT for mixed farming areas and WRT for pastoral areas, setting preliminary goals, delineation and codification of watersheds and reconnaissance visit to communities.

There should be a "Core 24Woreda Watershed Team (WWT)", composed of experts assigned by Woreda Offices of Agriculture and other Woreda line offices, to support and provide follow-up on work and technical issues. Additional experts can be assigned by the Woreda to further strengthen the WWT in response to the extent of planning in various Kebeles, the range of activities being undertaken, and the level of integration required. The team leader for the WWT team will be assigned from NRM process on merit basis, and the Woreda office of agriculture will take the overall leadership role and facilitate the activities of the team. Under ideal conditions, the WWT is composed of the following experts:

TABLE 7: COMPOSITION OF WWT

| *No.* | **Expert** |
|---|---|
| *1* | Soil Conservation Expert |
| *2* | Forestry/Agro-forestry Expert |
| *3* | DRM and Early warning expert |
| *4* | GIS specialist |
| *5* | Agronomist (plant management, IPM) |
| *6* | Water Harvesting /Irrigation Expert; |
| *7* | GSD (Gender and Social Development) Expert |
| *8* | Livestock Expert |
| *9* | Land Use and Administration Expert |
| *10* | Food Security/livelihoods Expert |
| *11* | Cooperative/Marketing and Inputs Expert |
| *12* | Rural Road Engineer |
| *13* | Sanitation and nutrition expert |

**The WWT will have the following functions**:

i. Collect and analyze secondary information on disaster risk (prevalent hazards, vulnerabilities, exposure and local coping capacities) and early warning information, food insecurity hot spot area and weather information
ii. Participate in the selection and prioritization of community watersheds;
iii. Identify major interactions between community watersheds - ensuring coordination between Community Watershed Teams and DAs during planning, implementation and M&E for those areas where there are watershed clusters or common watershed boundary situations (micro/community watersheds, sub watersheds, major watersheds, broader territorial units, and others);
iv. Organize the events: orientations, experience sharing and training for development agents/ community facilitators – where applicable, and community representatives in watershed planning and implementation;
v. Provide technical support to Development Agents/Community Facilitators during plan preparation;

vi. Provide technical support, especially on use of technologies (such as application of Google earth map, GPS and tablets for planning) as well as in estimating and quantifying the work volumes and resource requirements for agreed interventions that are to be included in multiyear and annual plans;
vii. Collect and review watershed development plans, prepare aggregated plans, and make use of the plans for developing/upgrading *Woreda* strategic plans;
viii. Assist in mobilizing and coordinating resource requirements (from the community, government, external support, and others) for the implementation of plans;
ix. Assist in screening environmental and social impacts of the identified and prioritized interventions;
x. Identify key stakeholders and devise ways to maximize their involvement;
xi. Coordinate additional technical support from various levels (*Woreda*, zone or region) and partners as required;
xii. Prepare proposals for linkages/synergies/networking with other relevant institutions and sectors
xiii. Ensure that participatory result-based monitoring approaches are institutionalized and functional both at *Woreda* and community level, and that the plans are reviewed by DAs and communities annually
xiv. Assist in proper documentation and dissemination and networking of watershed area development activities in the *Woreda*.

**Note:** Where there are insufficient numbers of *Woreda* experts for their fulltime assignment to the proposed initiatives, the respective *Woreda* Agriculture Office is expected: (1) to arrange the schedules of the existing experts to ensure their availability; and (2) to identify mechanisms for capacity building through the provision of technical training. In this regard, the suggested minimal technical support team considered sufficient for participatory watershed development consists of:

1 Soil Conservation Expert;
1 Agronomist (plant management, IPM);
1 Water harvesting /Irrigation expert;
1 Livestock expert.
1 Disaster risk management and early warning expert

Tasks related to forestry and simple feeder roads will be handled by the soil conservation expert. The agronomist will provide support on issues related to nutrition related activities, farming inputs and marketing. The technical support team members will also deal with overall food security issues as they occur. This composition of a minimal technical support team is considered as temporary and SHOULD NOT be followed in Woredas that already have these staff as part of their normal WWT. This minimal team composition is then only permitted in areas with limited manpower availability. As soon as additional manpower becomes available, steps should be taken to achieve the standard composition.

### 5.1.3 Woreda level preparatory activities

In view of the functions described above, the WWT/WRT has to finalize the pre-planning tasks required at the Woreda level. The major preparatory activities are as described under the headings (i) to (vii) below:

**(i) Collection of Basic Woreda data:** The starting point for any developmental planning should be an initial level of situation analysis on disaster risk (hazard, vulnerability, exposure and coping capacity) and early warning information, food insecurity hot spot area identification and weather information. This will guide the WWT in terms of defining focus areas and setting preliminary goals. This analysis can be done based on secondary data available at various level such as central statistical authority

(CSA), Woreda risk profile, weather information from metrological sites and use of another relevant tool.

**(ii)** **Set preliminary goals:** A fundamental step in selecting and prioritizing watersheds in mixed farming areas and sub-kebeles in pastoral areas is to agree on the long-term development goals for the whole area under consideration during planning. These goal(s) will be refined throughout the planning process to represent the shared goals of all the stakeholders. Concrete objectives with measurable targets and indicators will then be developed with which to measure progress through subsequent discussions with communities and other stakeholders.

**(iii)** **Identification and mapping of major watershed and sub watershed units in the *Woreda for mixed farming areas*:** The WWT will begin with marking major drainage courses (consisting of rivers/streams, other drainage lines, and any other relevant topographic features) using 1: 50,000 scale topo maps and the collective knowledge of the *Woreda* experts. They will demarcate major watersheds (which may vary widely in size from 6,000 to 20,000 ha), and which can also be divided into sub-watershed units (each ranging from 2,000 to 6,000 ha). These units may contain one or more *Kebeles* and several communities. The *Woreda*-level prioritization of the sub watersheds should also be in accordance with priorities established by the *WWT*. The principal criteria used by the WWT in selecting the sub watersheds should include:

- The position of the sub-watersheds within major watershed (starting in upper sections of large watersheds);
- The levels degradation (specific watersheds in a *Woreda* may be more degraded than others);
- Levels of food insecurity (to decide what options are appropriate);
- The levels of protection required;
- The specific objectives (water conservation, flood protection, major reclamation, etc.);
- Manpower and resources availability;
- Level of vulnerability and associated risks- climate change mitigation and adaptation objectives.

A combination of most of the above criteria will usually be used to select the broader units (major and sub watersheds) within which the community-based watersheds will be identified.

***Box 1: Relevance of major watershed units:***

The concept of major watershed units is highly relevant as these often represent areas which are important from both hydrological and socio-economic standpoints. These units may include several interacting communities (1 or sometimes 2 or 3 *Kebeles*) with their respective sub-watersheds and micro-watersheds that belong to a common and strongly linked watershed. They may consist of broader watershed units, clusters, or other combinations of these in which it is envisioned that a logical and achievable set of initiatives can be undertaken. These must be sustainable and have significant impact in terms of the resulting increases in productivity and development of the natural resources base for a defined number of strongly interdependent communities.

Although the scope of the Guideline is to provide DAs and communities with a workable planning tool at community level, the goal is to achieve the complete treatment of these watershed units through the

systematic and logical treatment of each of the smaller community watershed units and through this to achieve multiple and mutually reinforcing results. It is suggested that, at least at a higher strategic level, this approach be systematically embedded into a more robust classification and coding system as explained in the next section,

### 5.1.4 Establishing Kebele Watershed Team (KWT)

For better coordination of community/micro-watersheds within sub-watersheds, a Kebele-level watershed team (KWT) must be established by bringing together selected members from each Community Watershed Team (CWT). The composition of the KWT will include: the (1) *Kebele* Chairman; (2) *Kebele* manager; (3) three DAs and the head of the *Kebele* office of agriculture; (4) one male representative/leader of each community (gott, *kushet*, genda); (5) one female representative/leader of each community (*gott, kushet, genda*); (6) a youth representative; (7) a *Kebele* land administration expert; (8) a cooperative agent; (9) a health extension worker; (10) the school head; and (11) a private sector representatives (if any).

The role of KWT will include the following

(i) liaison between *Kebeles* and sites for those activities that need to be undertaken on a priority basis and completed through joint efforts;
(ii) Coordination between all the community/micro- watershed sites belonging to a common sub-watershed for specific activities of common interest and benefit.
(iii) Ensuring that community-based planning is organized in each community watershed;
(iv) Setting priorities based on needs and watershed logic
(v) Coordinating interventions that concern more than one community or two *Kebeles*;
(vi) Responsibility for resources allocation;
(vii) Assisting in targeting and quality control;
(viii) Settling disputes and provision of support on specific issues such as land certification;
(ix) Providing overall guidance on watershed management
(x) Assisting communities in monitoring and evaluating, compiling reports, training and organization of field days and experience-sharing within and between *Kebeles*
(xi) Holding progress review meetings once every two weeks;
(xii) Resolving conflicts between adjacent micro-watersheds/*Kebeles*.

### 5.1.5 Kebele level preparatory activities

**i. <u>Identification of community watersheds within broader units</u>**: Each of the prioritized sub-watersheds (2,000-6,000 ha) can be further subdivided, based on community locations, into community/micro-watersheds having an area of about 500 ha. Wherever possible, the watershed should include the selected community area and one or more of the villages if they are small and scattered. The communities are sometimes demarcated by narrow and steep sided sub-watersheds lying in gorges or gullies. The same may occur between *Kebeles*. The "community/micro-watershed" should still follow these boundaries for major community planning purposes as they fulfill the "ridge to valley" logic of interventions. The DA and the community watershed team should, however, also mark the sub-watershed

boundaries outside the community/micro ones for those measures that need both the communities' involvement (for example to treat the gully). Some examples of this are provided in the following pages

These planning steps at this level should remain flexible and practical. Normally, a community/micro-watershed will include most, if not all, of one community area (*gott*, and the like). There may, however, be cases where it is better to group two communities together to form a community watershed. This is recommended when there are strong linkages between the communities which also have common sub-watershed boundaries.

**NOTE:** Watershed planning is a **BINDING ELEMENT** for community planning in mixed farming areas. In other words, each DA should develop *Kebele* and community plans with interventions designed based on watershed interactions and potentials. This should be done for each *Kebele* and community by delineating and understanding watershed and sub-watershed influences within and outside the *Kebele* and community boundaries. These influences are from: (1) upper ridges; (2) the treatment of adjacent sites; and (3) downstream effects and overall outcomes. From a socio-economic perspective, this means that each community development plan will include interventions based on the application of watershed planning principles and logic. From a coordination and intervention perspective, it means that *Woreda* experts and DAs will identify which activities should be implemented to treat their respective portion(s) of sub-watersheds based on the agreements with the various gots/*kushet*s/*genda*s or *Kebeles*.

ii. **Prioritizing community/micro-watersheds with respect to resources**: It may be necessary to prioritize the micro-watersheds depending on the resources available for implementation (e.g. financial budgets, *Woreda* manpower and logistics, etc.). In this instance, the community/micro-watersheds can be arranged in priority order using a combination of the following parameters: (i) agro-ecological diversity; (ii) agricultural potential; (iii) watershed logic and sequence (location/orientation in the upper reaches of the broader watershed); (iv) severity of land degradation and encroachment; (v) food insecurity and support activities; and (vi) similarities of hazards and vulnerabilities (including origin of risks) to disaster risk and climate change

iii. **Community watersheds, administrative and socio-economic units:** The following are common scenarios of watershed and community interactions where a given community or *gott/ kushet/genda* may be: (a) Exactly located within a specific sub-watershed; (b) Include part of its land within one sub-watershed and the other part with another one or more sub-watersheds (for example where divided by a stream or gorge); (c) included as part of the larger sub-watershed (for example in the lower portion); or (d) in a combination of (b) and (c).

**Scenario a.** It is the easiest and simplest case. In this, specific interventions for water development, feeder roads construction and the like may require the involvement of one or more adjacent communities. The treatment of other adjacent community watersheds might enhance recharge of water tables, protect infrastructure and reduce runoff and flooding reaching downstream areas. In this situation, the DA and the *WWT* should recognize those potentials and plan for additional community watershed plans.

**Scenario b.** This happens quite commonly in the field. Here, community/micro-watershed plans might include two or more parts of sub-watersheds that must be shared between adjacent communities lying in relatively higher and lower elements of the watersheds. Figure 6 shows one broader unit, which includes two community/micro-watersheds. However, the administrative line (boundary) dividing the two

communities follows a river and does not overlap the sub-watershed line except in the upper ridges. In this case, there are elements of the watershed that lie within the boundaries of community No 2. The two planning units can be delineated by identifying both types of boundaries. In this case the community watershed plans for each community may include activities that fall outside their community boundaries but within the physical boundaries of the watershed they inhabit.

**Scenarios c** and **d.** These are represented in Figure 7 and may seem complicated, which they are, as the way they interact, and the watershed logic are not clear. All the three communities have interactions with each other – some more than others.

**Community watershed relationships – Example A**

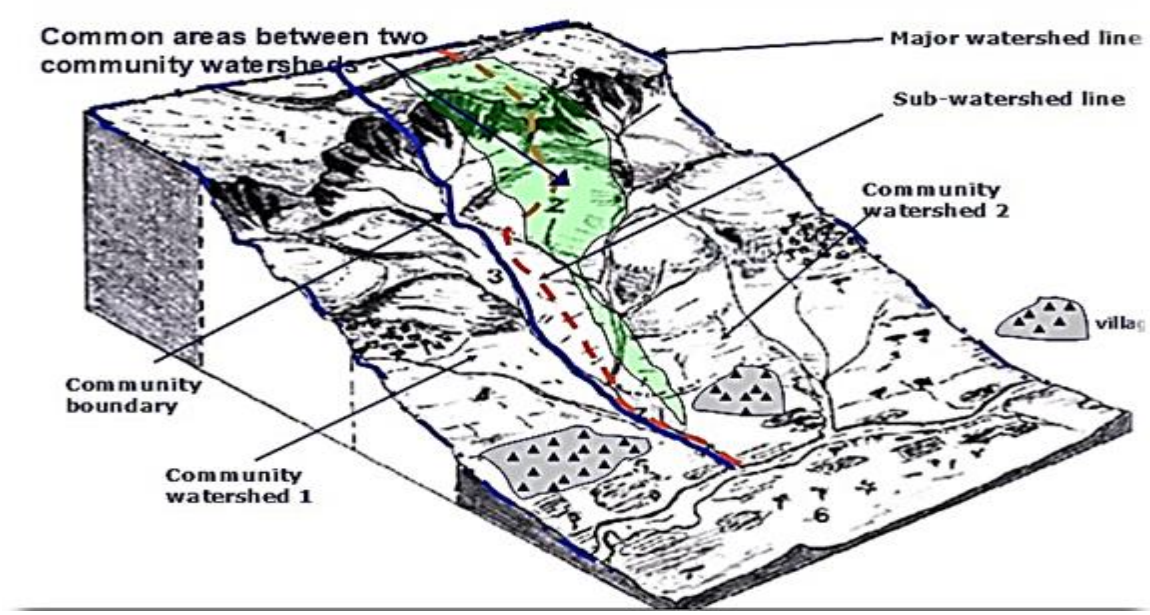



FIGURE 2: COMMUNITY WATERSHED RELATIONSHIPS – EXAMPLES A & B

As indicated in figure 6, communities 1 and 3 largely depend on the treatments undertaken by Community 2, which is in the upstream portion of the watershed. Community 3 has two sub-watershed areas, one of which is shared between the three communities. Community 1 is likely to benefit the most from the treatment of the watershed areas of communities 2 and 3 as it is in the lowest lying portion of the whole watershed It will have higher water-tables that allow for construction of hand-dug wells and will have greater availability of water for irrigation and domestic purposes.

It is more likely, however, to need flood protection of lower lying agricultural land and settlements. This illustration shows the need to identify and understand the interactions between sub-watersheds for each community. This example also indicates something of the priorities governing when interventions should be undertaken. Obviously, the priority is the treatment of Community 2 watershed, which will then create suitable conditions the appropriate for downstream treatments. There are also, however, specific micro-watershed and sub-watershed activities that can be initiated before the treatment of the upper watershed is completed.

**Community watershed relationships – Example B**

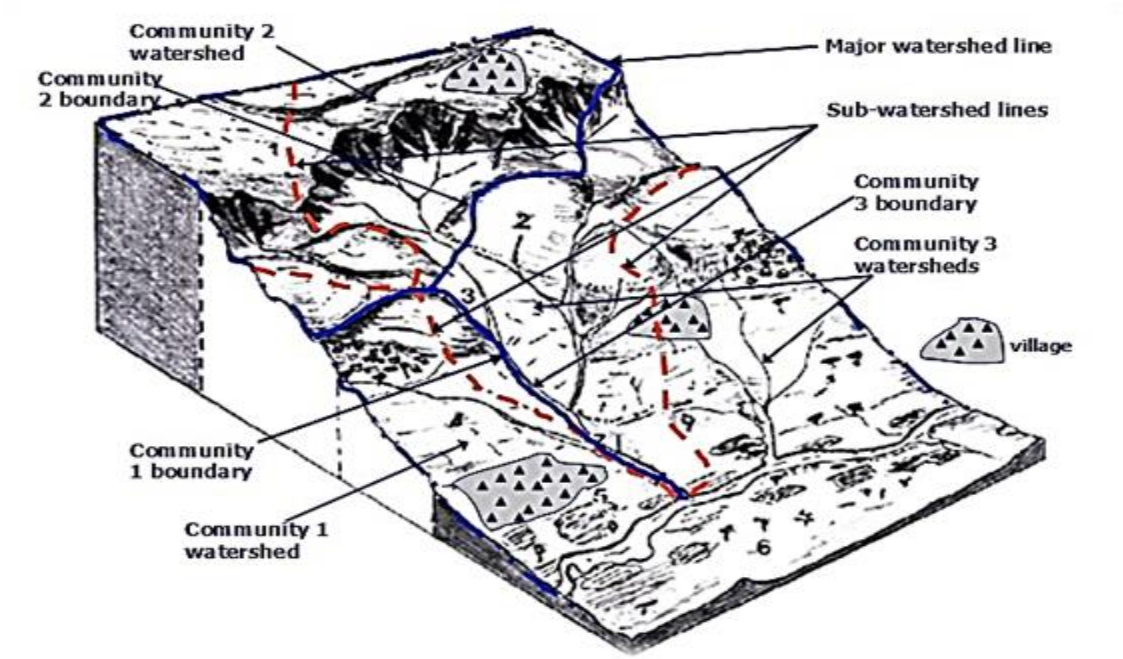



FIGURE 3: COMMUNITY WATERSHED RELATIONSHIPS – EXAMPLES A AND B

These examples are intended to facilitate community planning and accommodate watershed principles within community areas and administrative units. In all circumstances *Woreda* experts and DAs should indicate where the village boundaries lie within the boundaries of the sub-watersheds. This also means that there could be series of plans for two or more adjacent communities to satisfy watershed interactions and logic.

**NOTE**: The *WWT* may not be able to delineate each community watershed with enough precision but can probably delineate the broader/major watershed units and a first draft of community/micro-watersheds. The final community-based/micro-watershed planning units will be determined only after reconnaissance visits at community level.

### iv. Identification and organization of DAs' tasks

The WWT should undertake the following tasks to ensure that the DAs can competently fulfill their responsibilities with respect to watershed planning and data management of the required sub-watershed initiatives.

- **Meet DAs to discuss pre-selection of major and sub-watersheds and community/micro-watersheds**: The *WWT* should take advantage of regular monthly or quarterly meetings with DAs to explain the watershed development planning principles and request DA's assistance in discussing the position of *Kebele* and communities within their respective micro-watersheds.
- **Undertake the training of DAs on community based participatory watershed development planning steps and technologies.** DAs may have broad understanding of the concepts of watershed development planning but may not possess sufficient skills in mapping, socio-economic and biophysical assessment, risks and climate smart analysis of interventions and the other necessary

technical skills related to specific measures that need to be undertaken. In such instances, training should be organized at *Woreda* and training materials be provided. A specific area and community could be selected for practical exercise.

- **Organize materials and equipment**: for both training and surveying/planning work it is essential that the following items be available:
  - Teaching aids: for example, enlarged copies of watershed sketches highlighting micro- macro interactions, enlarged maps of the *Kebele* and sub-watersheds (if available), stationery, planning modules, etc.;
  - All the necessary annexes for biophysical and socio-economic survey;
  - GPS for geospatial data collection;
  - Copies of the info-tech document;
  - Clinometers for slope measurement;
  - 1:50,000 scale topo-maps for sketching (both soft and hard copies);
  - Measuring tape and/or string for distance measurement;
  - Line levels and range poles; and
  - Other items of relevance

**v. First visit at community level**

**Reconnaissance visits at Kebele and Community level and validation of pre-planning work.** This work is undertaken by the WWT together with the DAs of the selected Kebeles where the broader watershed units have been delineated and prioritized. Some sub-watershed units may be already identified and prioritized but need to be checked and validated in the field by the WWT based on such criteria as: location of watershed, level of degradation, level of food insecurity, potential for change, level of vulnerabilities to risk and climate change, coping, adaptation and mitigation potential, and the presence of other key intended objectives and resources. The delineation/boundaries of the micro-watersheds should be verified and corrected.

**First discussion with *Kebele*/community leaders and DAs**. The *WWT* and the DAs should introduce and explain watershed management principles to the *Kebele* leaders and representatives. This should include explanation of the intervention logic and provide some concrete examples of typical watershed interactions such as: flood control, drought mitigation, water-table recharge, and spring development, gully control, etc. The community representatives should be allowed to reach conclusions on what constitutes the important watershed interactions based on their own experience in the locality.

Using topo-maps and visual references discuss the following items with DAs and *Kebele* leaders:

i. The major watershed within which *Kebele* is located - draw/verify boundaries of the *Kebele* and see how much they overlap with the major watershed – discuss major watershed interactions between *Kebeles* if there are any of relevance;
ii. Proceed to the field and delineate the location of gotts/*kushet*s/gendas within the broader/ major watershed units;
iii. Traverse the watershed and locate each of the relevant sub-watershed units within the major watershed unit - for each community/*gott/kushet/genda* mark the sub-watershed or several sub-watersheds within which the community is located;
iv. For each community discuss and mark the main watershed interactions (upper, lower and adjacent) for upcoming planning work (this step is very important as the WWT together with the *Kebele*

leaders and the DAs must identify preliminary key treatment requirements that may involve one or more communities);

v. Also, with the DAs and Kebele leaders, visualize the various potentials and logical sequence of activities needed to rehabilitate the whole area;
vi. Risk patters and weather changes in the watershed (including where risks could originate and reveal itself)
vii. Hold a final meeting with the *Kebele* leaders and the DAs to discuss the next steps for planning and prioritization of communities based on watershed logic and other criteria established above, and to organize the Community Watershed Teams (CWTs);
viii. Discuss and prepare a supervision plan to assist DAs during planning work;
ix. Prepare enlarged watershed maps identifying major watersheds, sub-watersheds and community boundaries - leave one copy of the map with the DAs and the *Kebele* leaders.

At this stage, the major watershed unit within which each of the sub-watershed units are located should have been identified and the different community boundaries delineated. Each community/micro watershed development plan should include both the socio-economic dimension of the whole community and its area as well as the watershed dimensions, both within and outside the community boundaries.

## 5.2 STEP 2: GETTING STARTED AT COMMUNITY LEVEL

**Step 2: Getting started at community level**

- Call for general assembly
- Establish CWT
- Establish KRT or Sub-kebele rangeland team
- Agree on timing for planning

At this stage, meeting the community and call for a general assembly will be the first activity**.** The DA will start from the community having the greatest priority in the watershed area identified during the WWT planning process described above. Together with *Kebele* leaders, the DA will introduce the relevance of watershed principles and management issues to the community. This presentation will include an explanation of sub-watershed interactions and some of the results of land degradation including: topsoil loss resulting in low productivity; reduction of landholding size; incidence of droughts; flood damages; the disappearance of springs, perennial rivers and forest coverage; and any other issues that may be locally relevant.

The discussion will then focus on the importance of watershed planning in broad terms. This should include: water harvesting possibilities; the available physical and biological measures; forestry options; the benefits of improved agronomic practices and sound utilization of agricultural inputs; potentials for small infrastructure development, and other related issues. It is important for DAs not to raise expectations and to limit the discussion or any commitments to topics on which they all fully competent and which are within their mandates. If the members of the community/target group are not convinced, they should not be pressured to agree to what is being suggested or recommended. “Try again” should be the motto. There may be cases where two communities/*gotts*/*kushets*/*gendas* may agree on joint actions if their areas are not too large and they form a common sub-watershed area. This will facilitate planning work between communities sharing small watersheds (a few hundred hectares).

Emphasis must be placed on the need to involve both men and women and the views of both should be sought. It is crucial for technical staff to show good manners and to be respectful and friendly, avoiding any type of coercion or demonstration of superior attitudes. Farmers and households in general should be made aware of the participatory nature of the methodology. It is important to emphasize to both the men and women land users that they will be the final decision-makers and that the selection of measures will take place together with them based on feasible solutions and local constraints.

Once interest raised, the community should be asked about: the area in which initiatives are planned and the reasons for their selection; and the interactions between their community and others located upstream, downstream and adjacent to their community. Before ending the general meeting, the community should be informed that all members are welcome to participate in the planning process. As it is difficult, however, to deal with each member of the community individually, the recommendation should be made for the community to elect a dedicated and representative planning team (see below). In all circumstances, during field surveys the elected watershed team must meet community members, either as individuals of groups (based on specific interests).

**The need to form a representative CWT:** Each community/*gott/kushet/genda* should select a planning team to deal with watershed planning issues both within the community boundaries and outside them especially where there are major interactions with other communities. As mentioned above, where two small communities wish to join forces, they can create a combined planning team. The community watershed teams should consist of both men and women, including representatives of youth, community leaders and other relevant stakeholders.

A representative CWT should be elected to provide constant communication between the DA, the community and the target group. The composition of this should take into consideration local customs and practices. It may be possible to have one team, or in some instances two gender-based teams may be necessary. The composition of CWT involves consideration of three key issues: Gender, wealth status, and geographical representation.

- The formation of **gender balanced CWT** for the whole community is obviously the recommended option. This has the advantage that where problems are encountered, solutions and responsibilities implementing them are identified jointly by men and women and are shared. Different approaches may, however, be used based upon cultural norms and planning unit composition. In some instances, it is necessary to establish 'women only' assemblies. This happens where cultural barriers hinder women's free participation in community meetings or, interfere with their ability to discuss activities that benefit them. Such assemblies enable women to explore and discuss their work burdens and ways to reduce them. Women's needs should be included in the planning phase of all the different interventions.
- **Geographical representation**: It is essential to ensure that the team includes representatives from villages in the upstream, middle and downstream parts of the watershed.

**IMPORTANT NOTE:** The role of the DA is crucial where cultural barriers inhibit the participation of women. In case of a joint watershed review (WR) exercise involving both men and women the DA should intervene on a regular basis to ensure that the women participate and express their views. It may be useful in some instances to have a subsequent and separate meeting with the female members to confirm and refine the WR findings.

After the WR exercise has been performed with the community and a realistic profile obtained of the social status and assets of the community members they should be asked to elect 12 people's representatives, drawn from among each of the main social groups, to form the **"CWT".** Of the 12, half should be women who not only represent different social groups but are also influential and outspoken.

In general, the community should elect a CWT that includes:

- Four male heads of household representing different social groups (including vulnerable households) living in different parts of the community/micro-watershed;
- Two females from male headed households living in different strata of the community;
- Two females from vulnerable and female headed households living in different strata of the community;
- Two youth representatives, one male and one female;
- Two more (one male and one female) as required by the community (innovative farmers/agro-pastoralists, respected/ influential people, women's group, or other representative groups).

Note that the CWT will elect one Team Leader and one Secretary.

**Functions of the CWT:**

- Serve as a permanent contact with the DA, the rest of the community/target group and local leaders during planning, implementation and monitoring and evaluation;
- Actively participate and cooperate with the *Woreda* experts, and DAs during identification of problems and opportunities, priority setting, overall plan preparation processes and during implementation;
- Ensure the liaison with other neighboring communities located within the broader watershed unit;
- Initiate and seek administrative and technical support from responsible organizations for the legal establishment of Community Watershed Users Association (WUA);
- Coach and maintain awareness of farmers during all steps of planning and implementation;
- Facilitate access to labor and material contributions agreed with the community and make these available, as and when required, in accordance with the plan;
- Participate in identifying and selecting a community facilitator who meets the minimum requirements established for this assignment;
- Consult and get consensus from the community for establishing a community wide watershed management by-law;
- Identify and facilitate formation of various economic user groups to sustainably manage and use resources of the watershed;
- Ensure equitable use of created community assets arising from watershed development and rehabilitation activities;
- Address grievances of the community in the event that benefits are not equally and equitably shared and that this leads to conflicts among beneficiaries;
- In case that the CWT is unable to address these grievances, they should be referred to the *Kebele* administration;
- If still unresolved by the Kebele Administration submit the case to the *Woreda* NRM desk for their review and a decision; and
- Initiate and work with the concerned entity for the establishment of the WUA.

**Note**: The CWT will serve only until the establishment of a legal community watershed users association (WUA). Once the latter established, duties and function of the CWT will transit to the executive committee of WUA. Additional roles and functions of the WUA is described under step 8.

## 5.3 STEP 3: SOCIO-ECONOMIC AND BIOPHYSICAL SURVEY IN MIXED FARMING AREAS

This is an information-gathering step, designed to characterize the watershed and the people living within its boundaries. It involves: a watershed resource inventory and assessment, including current land uses and any associated risks and problems; definition of the socio-economic situation of the community; definition of watershed potentials, opportunities and limitations; and prioritization of core problems and solutions. The information gathered in this step provides the basis for identifying and prioritizing the interventions to be implemented in the watershed. This is also a critical step for integration of disaster risk and climate change issues, which must be addressed in the analysis to inform disaster risk reduction and climate-smart planning and mainstreaming of GSD and nutrition issues.

Step 3: Socio-economic and Biophysical Survey

- Participatory Rural Appraisal tools
- Socio-economic Assessment
- Biophysical Survey

The approaches and tools to be used for socio-economic and biophysical survey/analysis of community watershed are provided as follows:

### 5.3.1 Socio-economic survey

Participatory community and sub-watershed description: The CWT and the DAs will proceed with a community and sub-watershed familiarization exercise. Community boundaries and major features can be identified using simple sketching techniques such as, (1) participatory mapping and (2) transects. These will be used to describe the principal biophysical conditions and interactions of the people with the various levels of the major sub-watersheds. These two exercises provide useful information about land resources in the sub- watersheds and facilitate the assessment of the internal and external opportunities for proper watershed development as well as the major issues and limitation that may hinder this. For example, the existence of land features shared with other communities that may require special remediation such as: gullies, steep hillsides, and other problematic features. The DA should transcribe these maps to paper for future reference and discussion.

**Mapping and Survey Methods (transects and simple mapping approaches)**

**Participatory mapping:** The tools for technical mapping are presented in the guidelines - Annexes Part I and II Socioeconomic and Biophysical Survey Tools for mixed farming and pure pastoral areas respectively, sections 1.1 and 1.3. Mapping and transects are complementary to one another. Both make use of the farmers' "mental maps" of the area which makes it easy to: identify available resources, assess infrastructural elements and access to them, and even to identify wealth/social groups and relationships. They also stimulate discussion and debate. Participatory mapping, in particular, promotes interaction and helps in the villagers to visualize using their **"mental maps"**. The team has first to determine the type of map it wants to draw. It can be: a social map (social services, health status of individuals, population and housing); a natural resource map (forest, water, wildlife, village use of natural resources, fields and land use, soils, water resources, etc.); a risk map (which shows the various hazards, vulnerabilities, exposure and available coping capacities) or a spatial arrangement of a house, and the use of space by different social groups.

**Participatory transects**: A transect is a cross-section or straight-line traverse, cutting through the community/watershed to capture the greatest diversity or ecosystems, and land use. Transects can be geographical, historical, or based on other criteria. A geographical transect is a diagram of principal land use zones. It facilitates the comparison of the main features such as the, resources, risks and problems of different zones. Historical transects are simply time lines that cut across time (see the following sections). The most useful or suitable transect line can usually be identified on a map. A transect walk should involve careful observation and semi-structured interviewing with villagers met during these walks.

**i. <u>Problem identification (PI) and ranking</u>**. Following the ground mapping and transect exercises, the CWT and the DA should carry out the **problems and risks[5] identification exercise**. The purpose of this is to identify the most important problems and risks of the community and target group(s) as well as to accomplish preliminary assessment of possible solutions. Two or more problem and risk identification exercises may be undertaken based on gender commitments or following the interests of different land user groups. The CWT should attempt to prioritize the most urgent needs, risks particularly to those related to agriculture, natural resources and water developments (tapping them at every stage). No promises should be made at this stage and the priority should be on identifying solutions that can be handled by the farmers and community members themselves. Annexes Part I and II, section 1.2 includes basic procedures for the PI exercise.

The PI process should start in a positive setting with the discussion of the people's **vision for change** or how the community would like to see the development of their area. Then proceed to discuss what the constraints impede the achievement of that vision. In this manner participatory watershed management can become a **solution-oriented approach.** Still, it is very important that the problems and risks are carefully defined in the first step of the planning process and that they are accompanied by a set of workable solutions/options. Problems are generally recognized as: biological (pests, animal diseases), physical (water logging, landslide), environmental (drought, deforestation, soil erosion), economic (lack of credit), institutional, social or cultural factors, but there may be others.

In defining problems and risks, it is important to keep in mind the need to:

1. Distinguish problems and risks from causes and effects
2. Distinguish between symptoms and problems and risks
3. Identify and understand the Interactions between problems and risks (one risk could lead to another one).

There are four types of ranking commonly used in participatory planning – preference ranking (ranking by voting), direct matrix ranking, pair-wise ranking and wealth ranking. The pair-wise ranking tool is explained in Annexes Part I & II, section 1.2.

**ii. <u>Community level socio-economic survey</u>**: The problem and possible solutions identification should be supported by more in-depth socio-economic surveys and diagnosis. The following sources of information and methods may be used to undertake this survey.

**iii. Review of existing reports**: Existing reports on general socio-economic conditions of the *Kebele* and community should be collected and reviewed before planning detailed studies in any specific

[5] A problem is a matter or situation regarded as unwelcome or harmful and needing to be dealt with and overcome. While a risk is a probability of facing danger or crisis.

community. The existing reports, which may be available at *Woreda* or higher levels, will provide the planning team with basic information, which may be valuable for the preparation of survey proposals and the related forms and questionnaires. It is important therefore that existing studies be carefully reviewed. Avoid repetition of previous work - households are usually tired of being asked the same questions over and over again, particularly when changes in rural areas are often slow to happen.

**iv. Socio economic surveys** provide the baselines for M&E: The subject of socio-economic surveys is likely to include a vast array of social conditions and economic activities in a watershed. Before beginning the survey, a series of decisions should be made on: enumeration approaches, types of baseline data, sampling methodology, total sample size, period of survey, and any other relevant factors. For practical purposes a complete module, including a socio-economic questionnaire, is attached as Annexes Part I & II, section 1.4. This can be used as a reference for planning purposes. However, different procedures and questionnaires both can be used for PI and socio-economic surveys based on consideration of local conditions, skills and manpower.

The socio-economic survey and constraint analysis should be conducted with the CWT following a defined checklist divided into subject areas. The questionnaire covers the general community background, crop production, livestock production, fuel supply, water supply, infrastructure, marketing, land degradation, role of women in development, land tenure, risk patterns (expanding, changing and emerging risks) and others. Each section should be analyzed in the community and with the CWT. DAs and the CWT should understand the reason for and importance of each question, particularly in relation to the linkages between the different components of the farming system, the watershed and the community, and the problems of the target group.

Primary data collection and analysis tools and participatory tools suggested in this guideline include: the resource/village map, transect walk, seasonal calendar, historical profiles/time lines, proportional piling or pie chart, institutional analysis, vision of change exercise, participatory problem identification (PI) and ranking, contextual gender analysis, and socio-economic interview checklists for semi-structured interviews.

**v. Resource/Village map**

A resource map includes information related to natural resources, such as village land areas, land uses (farm, forest, settlement, grazing, etc.), catchments/watersheds, water sources (e.g. ponds, rivers, springs), etc. In participatory rural appraisal (PRA), a resource map is used to establish a dialogue between: different groups of the community; between the community and the PRA team; to construct a picture of different groups of the local environment; to document access to, and control over resources; to create a baseline reference for use in further discussion; and to identify problems, resources and potentials of a given area. The village mapping exercise promotes interaction and helps visualization of the villagers' "mental maps". Participatory mapping is also a good starting point for identifying important livelihood resources in the community, and for discussing the hazards affecting the community. These may be particularly weather-related but may also include other hazards and how people are currently responding them. This provides a basis for further discussions on livelihoods and climate linkages.

**How to produce a village map.**

- Choose an appropriate site from which the CWT can see most of their area;

- Decide what sort of map should be drawn (social, natural resources, farms, climate related hazards, etc.);
- Choose a suitable medium for the maps (ground, floor, paper) and marking device (sticks, stones, seeds, pens, pencils, chalks);
- Ask the CWT to sketch the selected map of the community and major watershed units on the ground or on a flip chart – the simplest way to do this is to draw a map on the ground using sharp sticks and other simple materials such as stones, pebbles, straws, etc.;
- On this map record the main land uses based on CWT's perception of the value in terms of productivity, and as basic community assets (e.g. drainage lines, villages, cultivated lands, grazing land, bush land, waterlogged areas, homesteads, schools, religious structures, input stores, health posts, road, foot paths, markets, mountain peaks, lakes, streams, etc.);
- Select a volunteer who knows the area and the purpose of the mapping exercise, and who is willing to share his/her knowledge;
- Help the people get started but let them draw the map by themselves - be patient and don't interrupt - consider it their map! - sit back and watch but facilitate the process.
- Ask participants to indicate the location of the following elements of the map using symbols
    - Settlement areas and critical facilities in the community – not necessarily every house, but the general area where houses/villages are located, and also facilities such as FTC's, cooperatives, churches/mosques, health clinics, schools;
    - Identify and locate community and household resources important to their livelihoods, - including forested areas, SWC works, closed areas, irrigation schemes, farmlands, crops, erosion gullies, water bodies (ponds, dams, and springs), water harvesting structures, the grazing lands etc.
    - Hazards, vulnerability and exposure mapping (which hazard strikes where) identification and mapping – start this after the community members have agreed that the map is representative of their community;
    - Important weather and non-weather-related hazards affecting livelihood resources - participants should identify and list hazards related to floods, forest fires, mass movement of animals, human activity (e.g. deforestation) from other watersheds and market areas that aggravate or reduce the impact of the hazard (where possible indicate the location of these on the outer boundaries of the map).
    - Other factors outside of the community boundary that aggravate the effect of these hazards – to be done after other hazards have been located on the map – if necessary, assist the participants in responding to this**.**
- Allow men and women to do their own map, even if they belong to the same planning team;
- After the map is finished stand around and discuss it;
- Make sure that appreciation is expressed about the work done and endeavor to trigger discussion around resources, assets, access, degradation level, institutions, etc.;
- Keep permanent records on paper including the mappers' names to give them credit - A photograph of the map is a good way to document it;
- A map showing locations affected by climate hazards can be overlaid on the community village map (See Annexes Part I & II, figure 1.1 on Example of Village Map).

**vi. Transect Walk**

A transect is a cross-sectional traverse cutting straight through the community/watershed to capture the greatest diversity of ecosystems, and land use. It is used to compare the main features, resources, uses and problems of different zones. Suitable transect lines are usually first identified on a map. A transect walk should then involve careful observation and semi-structured interviewing with villagers met during walks.

Procedures of a transect walk exercise:

- Divide the watershed into three parts: upper, middle and lower (If it is small and homogenous dividing into two parts may suffice);
- Make sure the cross-section captures the greatest diversity of land uses, and other features that might help in the observation of as much biophysical diversity as possible in a short distance;
- Divide the group (planning team) into two or three and add any available knowledgeable people of the village to join the walk;
- Ask the group to finalize their drawing after completing their walk;
- Ask each group should make a short presentation about the transect;
- Ensure that the facilitator takes appropriate notes and proper drawings of the transect (it helps in this to understand the biophysical conditions);
- Brainstorm with the planning team about what they have observed in each land unit and ask them about solutions and opportunities - while discussing these refer to climate hazards identified in the participatory map and ask how people are currently responding;

These procedures not only help to internalize the problems and priorities but to:

- Foresee the development options for each land unit;
- Better understand the different components of land resources and the processes associated with them and to interlink process of land degradation, with land management and productivity loss;
- Help the planning team to discuss different opportunities available to them and to realize the land management initiatives that should be undertaken under different sets of conditions (i,e, what should be done where) – Refer Annex, Part I & 2, Annex 1 for mapping diagrams; and finally
- To identify areas affected by climate hazards such as extended droughts and floods or erosion due to heavy rainfall

**vii. Seasonal Calendar**

The seasonal calendar deals with temporal variations of activities over the year. This is useful in exploring linkages/connections and identifying problems, risks (which risk is high at which season) and opportunities in development works. It is also helpful in identifying the community's slack periods so as to prepare appropriately timed activity action plans for watershed development interventions. It can also be used to analyze seasonal changes in activities and periods of stress or scarcity, to identify important livelihood activities, to document community observations of changing trends in seasonal patterns, and to highlight the increasing uncertainty associated with climate change.

**vi. Historical profiles/Trends Analysis**

This tool reveals important information for contextual understanding of situations in the community (e.g. the causal link between land rights and deforestation and erosion). It provides a summary overview of the key historical events in the community and their importance within the context of the present situation. It

also helps to provide insights into trends of disaster risk, climate change and the associated intensity of related events. This opens the opportunity for dialogue on the need for climate resilience through improved watershed management and improved crop and livestock husbandry practices.

**vii. Proportional piling or pie chart**

This is useful for quantifying proportions of a whole, particularly where: absolute values of the whole may be difficult to calculate (e.g. household expenditure); or where participants may be unwilling to give quantities (e.g. numbers of livestock). It is a useful tool for investigating the division or relative importance of various components e.g. crops grown vs total land, soil types vs total land, land use vs total land, income vs sources, income vs expenditures etc.

**viii. Institutional analysis**

Venn Diagrams (also called a chapatti diagram or institutional diagram): these diagrams show the key institutions and individuals in a community, their relationships and their importance in decision making. This is an important tool for identifying and understanding the different perceptions of power or group relations within the community and between the community and outsiders, it can also be used to identify constraints, e.g. the absence of an institution, means the lack of service.

The procedures of institutional analysis using the Venn diagram are as follows:

- Ask farmers to make a list of all organizations that they know;
- Then ask the farmers to draw a large circle to represent their area;
- Ask them to prepare a circle for each organization;
- Then to place the organization circles near the circle representing their area;
- When farmers have finished the drawing, ask questions such as: why some organizations have strong links; why some organizations are more important; is the development agent/community facilitator represented; and what is their relationship to the community, etc.

**ix. Vision of change exercise**

**Dream**: This is the exercise in which the planning team is allowed to dream about what would they like their village to be if there were no limitations?

**Realization**: This is the exercise in which the planning team selects those activities that they can handle within the existing set of conditions (i.e. and outside the context of their dreams). At the end this facilitates the identification of priority intervention areas and major problems.

**Advantages of dream and realization**

**Dream:**

- Helps communities to imagine what seems impossible but what may in fact be possible;
- Opens people's minds to change;
- It helps them to be creative;
- It facilitates good participation.

**Realization:**

- Helps to develop mutual trust;

- Helps to understand opportunities and major constraints;
- Helps to assume the different intervention areas (or development options);
- Helps to set priorities and understand entry points.

### 5.3.2 Detailed biophysical survey and mapping

Detailed biophysical assessments and land use/watershed maps complete the above exercises. Mapping should be undertaken using 1:50,000 topo maps or sketch maps for this purpose. Technologies such as GIS/GPS can be used for mapping boundary delineations. Additionally, secondary data analysis should be undertaken if and as necessary.

**Mapping work:**

***1. Boundaries and sub-watersheds***: Maps can be prepared using simple techniques (see Annexes Part I & II, section 1.5 for detail description). They should start with the delineation of the community boundaries and the sub-watersheds within and outside the community boundaries. Each identified sub-watershed should be divided into community/micro-watersheds and each micro-watershed assigned a number for easy identification.

***2. Land use, topography, soils and past erosion***: The information required for the preparation of a community watershed plan should include at least: data on the climatic and ecological conditions; the name size and location of the watershed; the delineation of its boundaries; its general elevation; and where possible, relevant data on soils, risk locations, geology and geomorphology. Drainage patterns should be analyzed, with respect to stream density order, and channel profile. The watershed conditions in each land use unit must be assessed and described using simple survey methods (see Annexes Part I & II, section 1.5) with respect to: topography and slope gradients; soil depth, texture and stoniness; vegetation; drainage; land use; water resources; and infrastructure

Since erosion is a major problem in most watersheds, the collection of erosional data becomes a very important part of the overall survey. The past and present human activities causing the watershed degradation should be described and are likely to include: cultivation practices – particularly on steeper slopes, deforestation, overgrazing and heavy trafficking by livestock, road construction, quarrying etc. The types of soil erosion that are occurring (sheet, rill, gulley, wind, fluvial, mass movement etc.) and the coping strategies adopted by the local inhabitants should also be identified as these unlikely to provide a starting point two understanding what measures may ultimately be successful and for prioritizing watershed reclamation and management options.

### 5.3.3 Synergies of biophysical and socio-economic survey results: analysis of focus areas and priorities

The foregoing studies including the transect walk, mapping exercise and inventory of resources results in the identification of the existing the watershed potentials, opportunities and limitations for future development. **Based on this the DA and the CWT should then analyze the relationship between the identified problems, the socio-economic survey results, and the biophysical resources**. This analysis will help to identify and prioritize the short, medium, and long-term community-based initiatives that might contribute to resolving the watershed use and management problems and subsequently contribute to their achieving food security and improved livelihoods and socio-economic conditions.

This exercise will result in the production of a large-scale BASE MAP on which could be placed all the information identified above. The most suitable scale for this community map would be in the range of 1:2,000 to 1: 5,000. Farmers' maps and transects should be also recorded on paper, or digitally, for later reference and for comparison with the base maps. At the end of Step 3 a general meeting should be arranged with all community members to present the results of the work achieved thus far. The presentation should be made by the CWT(s) and the whole community should be encouraged to participate in the discussions. This provides an opportunity to revise the relative urgency of the problems identified and the priorities previously assigned to them.

The general meetings at this stage are useful because:

- They either confirm the problem identification and the preliminary solutions and priorities proposed by the watershed planning team(s) or provide a community-based rationale for changing these;
- They provide the whole community with the opportunity to accept or suggest changes to the planning work achieved so far;
- Confirm that the work undertaken thus far by the planning team is in accordance with the ideas and aspirations of the different community groups;
- Involve as many people as possible in the planning exercise to ensure greater community empowerment and encourage active community participation;
- Engage women and reinforce the importance of gender issues in the watershed development planning.

# PART 1: SECTION A (2) - 2 PURE PASTORAL PLANNING STEPS

Pure pastoral areas exhibit different socio-economic and biophysical characteristics than the mixed farming areas entailing the need for contextualized watersheds/rangelands development planning steps. Planning in these areas also involves eight inter-linked planning steps. This section presents the first three planning steps in the context of these areas. Namely: Step1: Getting started at Woreda level, Step2: Getting started at community level and Step 3: Socio-economic and biophysical survey.

## 5.4 STEP 1: GETTING STARTED AT WOREDA LEVEL

Community is at the heart of any development planning including pastoral area watersheds/rangeland development activities. However, they need guidance and direction from higher level administrative bodies. Thus, Woreda as responsible for all communities within the Kebeles under its jurisdictions is responsible for some key activities that evolve into pastoral area rangeland and other community development plans. Some of its key activities include: (i) stakeholders' analysis, establishing planning teams, undertaking some preparatory activities and initial visit to the communities. These are presented in detail in the sections below.

Step 1: Getting started at *Woreda* level

- Stakeholder Analysis
- Organizing *WRT*
- Collection of basic Woreda data
- Setting preliminary goals
- Reconnaissance visits to communities
- Determining Minimum Planning Unit
- Role of customary institutions

### 5.4.1 Stakeholders Analysis

This is the first and key step in the planning processes. It involves the identification of stakeholders and partners (government sector offices, NGOs, private sector, etc.) who have a stake in rangeland management, & management of natural resources in pastoral areas. Before starting the planning process, it is therefore essential to identify the key stakeholders. This must include those: (i) who make and implement decisions, (ii) who are affected by the decisions made, and (iii) who can assist or impede implementation of the decisions. A preliminary discussion should then take place with them to establish their involvement in, and commitment to, the plan. It is important to note that stakeholders are more likely to become involved if they are shown a clear plan for their engagement and the benefits of their participation.

Key stakeholders include: communities as main beneficiaries of the plan, communities negatively affected by the plan, government sector institutions/offices, NGOs, project and programmes and others. It creates a collaborative and integrated approach for planning as it have high potential for joint efforts, creation of synergies, sharing of knowledge and experiences and avoiding of duplication, etc. It would also include those who can provide technical input and assist with resources for planning and implementation efforts, and those who are good at resource management and conflict resolution. The nature of stakeholders varies based on their influence and importance for the planning and implementation of the plan. For example, those who make decisions on resources such as release of finance for implementation of the plan has more importance and influence than others. Thus, identifying stakeholders based on their influence and importance is crucial for the successful implementation of development plans. The W*oreda Pastoral Development Office* (WPDO) is responsible for initiating and coordinating multi-stakeholder involvement.

### 5.4.2 Establishing Woreda Rangeland Team (WRT)

Pastoral Rangeland Management (PRM) requires an integrated approach that seeks to improve the wellbeing of the pastoral community as well as the sustainable management of natural resources; it therefore requires the involvement and commitment of various disciplines. Hence, there should be a group of core team "*Woreda* Rangeland Team" (WRT) for these areas that guides the woreda development. It comprises team of experts assigned by *Woreda* Pastoral Development Office and other woreda line offices, to support and follow-up work and technical issues. Additional experts can be assigned by the woreda to further strengthen the WRT depending on the extent of planning, the range of activities, the result of stakeholder analysis and integration required. The team leader for the WRT team will be assigned from NRM or Rangeland Management Process (equivalent to the NRM process). The W*oreda Pastoral Development Office* will pull in relevant sectoral line offices and take the overall leadership role and facilitates the activities of the team. The WRT Leader will be responsible for the day-to-day activities of the team. Under ideal conditions, the *woreda* core team is composed of the following experts:

1. Soil & water Conservation expert
2. Rangeland Management Expert
3. Livestock Expert
4. Forestry/Agro-forestry Expert
5. Water Harvesting /Irrigation Expert
6. GSD (Gender and Social Development) Expert
7. Land Use and Administration Expert
8. Food Security/livelihoods Expert (Economist/Socio-economist/Agro-economist)
9. Cooperative/Marketing and Inputs Expert
10. Rural Road Engineer
11. DRM/Early warning expert
12. Representatives from relevant stakeholder analysis as required

**Note:** In case, where there are insufficient numbers of *Woreda* experts available, the *W*RT should be organized with the minimum number of experts available that can cover the responsibility of missing ones. Besides, the WoPD should support the team in allocating the necessary budget, transportation and office facility as required.

The WRT will have the following roles and responsibilities:

- Identify and prioritize major problems within the *Woreda* such as prevalence of invasive species, floods, drought and degraded rangelands disaggregated by Kebele.
- Participate in the selection and prioritization of manageable planning units of community rangelands within the kebeles and then areas for intervention (based on agreed set of criteria e.g. prevalence of invasive species, water scarcity and level of degradation of rangelands etc).
- Identify major inter community rangeland interactions within and between Kebeles. Ensure coordination taking place between Kebele Rangeland Teams (KRTs) /DAs during planning, implementation and M&E for those areas that need forming logical continuum both within and between Kebeles (the later representing a broader territorial unit e.g. rangelands crossing Kebele boundaries);
- Closely support and ensure the planning and implementation of activities in the community rangelands as planning unit still adhere to watershed (ridge to valley) logic as much as possible since watersheds and flow of water exists in every landscape including those in the pure pastoral areas;

- Organize the events: orientations, experience sharing and training for development agents/ community facilitators – where applicable, and community representatives in participatory rangeland development planning and implementation;
- Provide technical support to Development Agents/ Community Facilitators during plan preparation
- Provide technical support especially on use of technologies (such as application of Google earth map, GPS/GIS and tablets for planning) as well as in estimating and quantifying the work volumes and resource requirements for agreed interventions that are to be included in multiyear and annual plans;
- Collect and review Kebele level participatory rangeland development plans, prepare aggregated plans, and make use of the plans for developing/ upgrading woreda annual and strategic plans;
- Assist in mobilizing and coordinating resource requirements (from the community, government, external support, and others) for implementation of the plans;
- Assist in screening and implementation of mitigation measures environmental and social impacts of the identified and prioritized interventions
- Identify key stakeholders and devise ways to maximize their involvement
- Coordinate additional technical support from various levels (zone, region and federal) and partners as required
- Prepare proposals for linkages/synergies/networking with other relevant institutions and sectors
- Ensure participatory result-based monitoring approaches are institutionalized and functional both at woreda and community level, and that the plans are reviewed by DAs and communities annually
- Assist in proper documentation and dissemination and networking of Rangeland development activities in the woreda

In line with its delegated functions above, the WRT needs to finalize the key pre-planning tasks required at the woreda level. The key preparatory tasks include: Basic woreda data collection, setting preliminary development goals, identification of Kebeles and communities needing special support, preparation of maps of the community rangelands, training of development agents/ and community facilitators, and ensuring the required materials and equipment are secured for surveys and planning work.

### 5.4.3 Establishing Kebele Rangeland Team (KRT)

Coordination between Kebele and communities requires the formation a *Kebele* Rangeland Team (KRT), by bringing together members from each community rangeland Teams (CWT) (to be established on the second step). The KRT shall ensure (i) liaison between *Kebele*s and community rangelands of smallest planning unit or sites for those activities that need to be prioritized and reach coverage through joint effort; and (ii) coordination between all the community rangelands sites belonging to kebele or beyond for specific activities of common interest and benefit. The composition of the KWT will include: the (1) *Kebele* Chairman; (2) *Kebele* manager; (3) three DAs and the head of the *Kebele* office of agriculture including the animal health extension worker; (4) one male and one female representative of the *kebele*; (5) one clan leader of the kebele ; (6) a youth representative; (7) a *Kebele* range land administrator (local representative); (8) a health extension worker; (9) the school head; and (10) a private sector representatives (if any).

The role of KRT will include the following

i. Ensuring that rangeland planning is organized in each community rangelands;
ii. Setting priorities based on needs, degradation level and watershed logic;

iii. Coordinating interventions that concern more than one community or within the brooder rangeland management;
iv. Assisting in targeting and quality control;
v. Settling disputes and provision of support on specific issues such as access and use of rangelands;
vi. Providing overall guidance on community rangeland management;
vii. Assisting communities in monitoring and evaluating and compiling reports;
viii. Holding progress review meetings once every two weeks;
ix. Resolving conflicts between adjacent community rangelands or *Kebeles.*

### 5.4.4 Woreda level preparatory activities

The WRT should engage in a Woreda level preliminary activities involving the collection of Woreda basic data, setting goals, identification and mapping of kebeles and rangelands, coordination between Kebeles and communities, and preliminary visits to communities.

1) **Basic woreda data collection**: the WRT should be capable of leading the overall rangeland development in the woreda. Hence, the team before starting the planning work, they should be equipped with the relevant data of the woreda that will help or facilitate the planning process. Some of the relevant data to be collected includes, metrological data (rainfall, temperature, windspeed, sunshine hours), water resource data, woreda land use land cover data, Woreda soil type data, woreda CSA data, major crops growing in the woreda and their coverage, climatic hazards, woreda disaster risk profile, shape files of administrative boundary of the woreda and kebeles etc.

2) **Set preliminary goals:** This will be a fundamental step for visualizing changes anticipated within the Woreda, in which five to ten-year development goal is set on how to improve the overall Woreda development. The goal/s will be refined throughout the planning process to represent shared goals among stakeholders. Concrete objectives with measurable targets and indicators to measure progress will then be developed through consecutive discussions with communities and other stakeholders.

3) **Identification and mapping of Kebeles, community rangelands and important features in the** *woreda* by using 1: 50,000 topo maps, GIS tools and the collective knowledge of *woreda* experts and other key informants. The WRT should prepare woreda level map consisting important features, e.g. identify interesting features and characteristics that influence mapping and management, such as seasonal grazing areas, drought reserves, corridors, water points, patterns of mobility (livestock and people) both within the Kebele and the broader rangeland area, etc. The woreda level mapping will be further verified by proceeding to the field and delineate the location of these features and locations of gendas/ villages/ communities within the Kebele. Besides, the WRT should support the DAs in preparing base and development maps of community rangeland during the preparation of community rangeland development plans. Community rangeland development maps may contain land use, location and size of rangelands, water points, settlements, hot spot areas for climatic hazards and may also be possible to mark major drainage courses (consisting of rivers/streams, other drainage lines) as well as features of land degradation, location and area coverage of invasive species, and recommended technologies as required.

**4) Identification and organization of DAs' tasks**

- Undertake DAs training on participatory rangeland development principles and technological options: DAs may have broad concept of participatory rangeland management (PRM) planning but may not possess sufficient mapping skills, socio-economic planning, participatory methods and technical skills on specific measures. Woreda training should be organized and training materials provided. A specific rangeland area and community could be selected for the exercise and serve both purposes of planning and training.
- Organize materials and equipment: for both training and surveying/planning work. Such items include:
  - Teaching aids: 1:50,000 scale topo maps, stationery, planning module, and others
  - Copy of the info-tech document
  - Measuring tape and/or string for distance measurement
  - Line levels and range poles
  - Other items of relevance
- Meet DAs to discuss pre-selection of community rangelands: The Woreda Rangeland Team should make advantage of regular monthly or quarterly meetings with DAs to explain pastoral rangeland planning and management principles and request DA's assistance to discuss the position of *Kebele* and communities within the respective pastoral Kebeles

**5) First visit at Kebele level**

- First discussion with *Kebele* /community /clan leaders and DAs. The WRT and the DAs introduce and explain participatory rangeland management issues and principles to the *Kebele* leaders and representatives. The Team explains the intervention logic and provides some concrete examples of typical rangeland ecosystem interactions, for example flood control, water table/ water well recharge, overgrazing and land degradation, rangeland encroachments, enclosures /rotation grazing and regeneration of rangeland vegetation, etc. Besides, the WRT will discuss with KRT on how the kebele is divided in to suitable community rangeland planning units. Let the community representatives reach some of these conclusions based on their own experience in the locality. Using topo maps 1:50,000 scale, discuss with DAs and *Kebele* leaders/ and clan leaders/ community leaders the following points:

- The broader rangeland boundaries within which the *Kebele* is located. Draw/verify boundaries of the *Kebele* and see how much they overlap with the broader rangeland territorial units, and the major interactions within and between Kebele communities within the broader rangeland unit. **This exercise helps in validating the selection and reaching agreement over boundaries and resources to be included**. In communal rangelands, this is an important step for ensuring that a suitably large-scale approach is used, breaking out of highly localized and village-level planning. Engage knowledgeable elders/ clan leaders to explain the trends and changes in recent years, as well as brief on the historical context and any relevant details prior to beginning the mapping exercise e.g. identify interesting features and characteristics that influence mapping and management, such as seasonal grazing areas, drought reserves, corridors, water points, patterns of mobility (livestock and people) both within the Kebele and the broader rangeland area, etc. Proceed to the field and delineate the location of these features and locations of gendas/ villages/ communities within the Kebele and divide the kebele in to mangable planning unit of community rangelands.

- For each community discuss and mark key rangeland resource related issues and main interactions within and between Kebeles. This is very important as the Woreda Rangeland Team together with the *Kebele* leaders and the DA(s) will identify preliminary key treatment requirements and solutions that may involve one or more pastoral communities or even more Kebeles nested in a broader rangeland unit. The team will also visualize the various potentials and logical sequence of activities needed to rehabilitate the whole area.
- With consensus reached so far, hold a final meeting with the *Kebele* leaders and the DA(s) to discuss the next step(s) for planning, and for establishing and organizing Kebele Rangeland Team (KRT) and Kebele/Sub-kebele/Village CR teams
- Discuss and prepare a supervision plan to assist DAs during planning work.

Prepare enlarged maps with the targeted pastoral community boundaries and of the Kebele and the wider rangeland boundary in which the targeted Kebele (s) are nested in and benefiting from. Leave one copy of the map with the DA and *Kebele* leaders.

At this stage, the target Kebele boundaries, important land units within the boundaries are identified and delineated, major features and resources located, and preliminary information on inter community and inter Kebele linkages and interactions within the broader rangeland unit/ boundary identified and documented. The minimum acceptable planning units for the pure pastoral areas (community rangeland) will be identified.

## 6 Determine Minimum Unit of Planning

In the guideline updating process the planning unit for pastoral area as kebele was tested for its practicality and simplicity and it was found that the total area coverage of most of the test kebeles were found from 16,000ha to more than 30,000ha which revealed that bringing together planning members of rangeland teams together with scattered settlement pattern and application of tools to conduct the socio-economic survey, biophysical survey, especially carrying out transect walk surveys, for understanding the problem of the kebele was found really difficult and unpractical. Hence, manageable size of planning unit by dividing the kebele in to community rangelands is recommended. Community Rangeland, with manageable size suitable for participating communities and plan development interventions, represents the smallest possible planning unit for interventions in *pastoral livelihood* systems.

The planning process should be initiated with the participation of the community, identify development interventions and to be endorsed by themselves who regularly access and utilize the rangeland resources residing for most of the seasons within the Kebele. The planning and implementation of activities should still consider watershed (ridge to valley) logic as much as possible since watersheds and flow of water exists in every landscape including those in the pure pastoral areas, called rangeland watersheds. However, it should also be noted that pastoral communities almost always have seasonal/ reciprocal rights to rangeland resources over a wide geographical area and usually these resources fall outside the designated planning unit and administrative boundaries even at kebele and woreda level. And management of those rangelands at different levels by pastoralist communities can intersect, overlap, and sometimes conflict with administrative boundaries in complex ways.

In principle planning should, therefore, cover the full scope of resources that the communities regularly access and use. A possible approach to addressing these challenges is working on the broader rangeland boundaries within which the *Kebeles are located*, analyze major connections and interactions between the communities of the different Kebeles within the broader rangeland unit, and devise mechanism for coordinating efforts. The geographic extent of the rangeland unit can be defined on the basis of existing customary territories (e.g Arda or Madda in Borana) that have established geographical extent and approximate borders. With multi-level planning approach, the main planning can take place at community level, with planning and discussions to be held at the lower levels (e.g. single or groups of close settlements/ villages/ communities) as appropriate.

A 'community rangeland' as defined here, is a single or group of close settlements or villages around a rangeland area that the communities regularly access and use within a kebele. The rangeland management plans of the targeted community nested within the broader rangeland boundary are then linked and coordinated through the Kebele Rangeland Teams working together with appropriate traditional rangeland governance structure/ institutions and overseen and supported by the Woreda Rangeland Teams.


*Source: PRIME 2015.*

**FIGURE 4: THE BORANA RANGELAND UNITS**

## 7 Identify and involve relevant traditional institutions, governance structure and functions in pastoral communities

Rangeland resource management is based on a complex set of temporary or semi-permanent claims on pasture, water and other resources, as well as on the underlying principles of flexibility and reciprocity. The resource bases of pastoralists-land-is therefore largely not a fixed individually owned capital, but rather a flexible asset with specific uses and access mechanisms. Livestock, rangeland and water resources use and management are core components of the customary institutional system. Management of these resources are closely bound to the pastoral livelihood and strictly observed by the local traditional leaders (elders, clan and sub clan heads, Abba-Gadaa, sultan, Ugaz). Every member of the community is required to respect the customary laws, enforced by the pastoral indigenous institutions run by elders with accumulated knowledge of the ecology and experiences. These customary institutions are still important although there has been gradual erosion of cultural norms, and of the role and influence of these traditional institutions.

Some donor funded projects (e.g. PRIME in Oromiya and Afar) engagements with local governments helped revitalization and potential sustainability of upgraded traditional pastoralist rangeland management systems and customary institutions. Building on traditional structures, rangeland management units/ councils were developed and/or strengthened at different levels (see Figure 9 and 10). The system is based on the customary territorial system (e.g. the dheeda, arda and reera territories in Borana), and the multi-level organizational structure mirrors the traditional system, but with government representation at reera and arda level management councils. The elders selected to sit on councils typically include customary leaders in the traditional governance structure, and this establishes a key linkage to that system. Traditionally, the rangelands of Borana have been managed by the Borana traditional grazing systems, with ownership of the land vested in the community and supervised by an intricate governance mechanism with a hierarchy of organization at the "Olla" (several households), "Arda" (a cluster of Ollas), "reera" (collection of close Ardas) and "Dheeda" (a larger grazing area) levels. Madda: Lit. 'Aquifer' or 'permanent water source' also refers to a territory organized according to water sources. It is the second largest leadership unit after dheeda.These associated community institutions were used to manage the diverse ecological zones effectively with clear delineation of key resources and drought reserves.

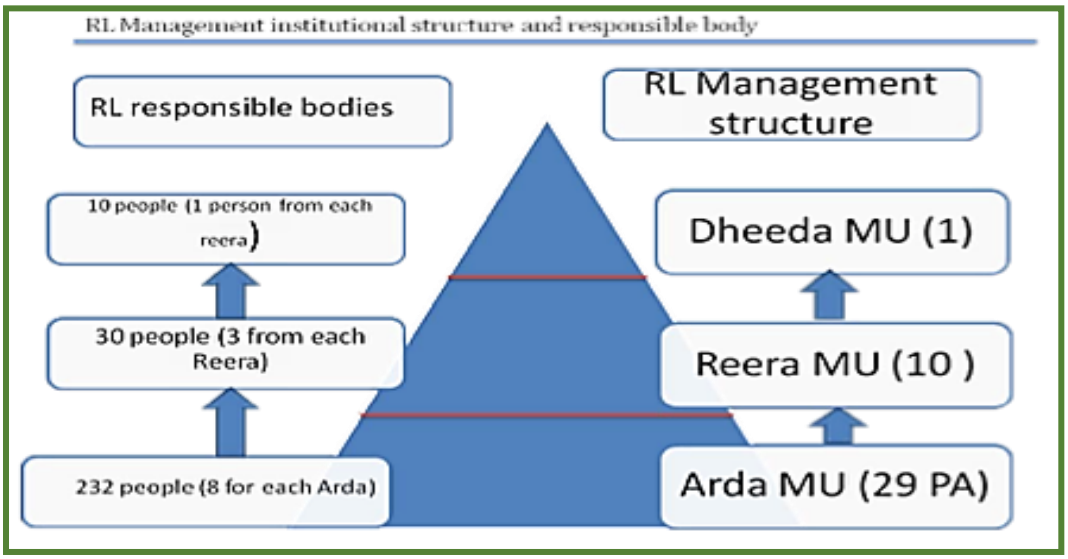



FIGURE 5: MANAGEMENT STRUCTURES STRENGTHENED IN PRIME INTERVENTION AREAS AS PART OF PRM IN BORANA

**Note on figure 9:** Arda management units, organized into 10 reera management units, and the 10 reeras in to one dheeeda management unit. Arda is more or less commensurate with kebele therefore taken as PA. The rangeland councils at arda level include 8 members (five members from the local officials and three elders) therefore a total of 232 people for the 29 ardas. The five members from local officials include the peasant association (PA)-level Security Council representative, officers of Women and Children Affairs and of Youth Affairs, the development agent (DA), and the PA chairman. All the arda committee members from all the ardas of a particular reera meet together and assign three people to serve as abba reera (30 people in total). The three-abba reeras from each reera come together at dheeda level and select the abba dheedas (10 people). The community representation is based on community members who are elected by the people and included into the arda-level grazing committees. Members of arda-level committees are classified as permanent and non-permanent. The permanent members are the three elders. The other five members—the government representatives—may change their position or move to other PAs or be replaced

by other newcomers. In this kind of situation, the person who will take the position of that particular individual will take over the responsibilities and roles of the former person. There are no reserved spots for women or minorities. Women typically are represented in the arda committees by virtue of the fact the government officer for Women's and Children's Affairs is usually a woman

In Somali region, traditional leadership is based on clan ties where the clan chief, called *Ugaas*, plays the ultimate role in resource management, conflict resolution or prevention, and political and administrative matters affecting the community. Every clan has its own *Ugaas* responsible for its affairs. Different clans give different names to the *Ugaas*, such as *Sultan*, *Gareda*, *Waber*, *Malaq*, etc., but all have functions and authorities similar to those of an *Ugaas*. Below the *Ugaas* in the hierarchy of leadership is a council of elders, representing the different sub-clans or houses of the clan. The council meets only if there are critical issues concerning the clan to discuss. The sub-clan representatives are responsible for issues related to the daily lives of the community at village level, or *Reeri*. Most issues are handled by elders at grassroots level, including the socialization of young people, land allocation for cultivation, and deciding the directions and times for mobility. At both clan and sub-clan levels, leaders and elders play an important role in conflict resolution, ruling on the use of natural resources, and the implementation and enforcement of customary laws.

The Afar sustain their production system through the indigenous institutions *Medaa* and *Adaa*. The *Medaa* is the customary legal system that makes decisions and governs the management and use of the rangeland, dealing with issues such as conflict resolution, natural resource management (including livestock and rangelands), mutual assistance, external relationships, and emergency situations (such as drought). *Adaa* is the set of rules (customary laws) set by the *Medaa*. Authority is based on clan ties, with a structure of clan leader (*Kedo Aba)*, vice clan leaders (Dala *Aba)*, youth leaders (*Fei'ma Aba)*, and council of elders (locally called *Edola*). The *Kedo Aba*, *Dala Aba*, and *Edola* have decisive roles in resolving disputes between clans, individuals, and other ethnic groups, strengthening the clan, segregating members of their own clan from other clans, and advising clan and sub-clan members regarding their safety and well-being, as well as in managing access to land.

Most decisions pertinent to the arbitration and settlement of disputes over social and economic issues and the management of rangeland and natural resources are taken by these leaders, who also manage and protect the *Adaa* (customary laws), Islamic religious practices, and the Afar pastoral way of life. Land in Afar is divided into *sultan*ates, which are further divided into tribe and clan territories. Each clan usually presides over a number of strategic resources, such as wet and dry season grazing areas and water points. The *Kedo Aba* is the primary decision-maker related to land use and rights, including about land allocation to 'outsiders.' The *Du'abe* ("rangeland managers") are the ones who facilitate and mobilise the movement of livestock and the rotation of grazing land, under the authority of the clan leaders.

They decide when and where new grazing sites are required and will mobilize representatives from the sub-clans (through the *Dala Aba)* to go out and assess the quantity and quality of rangeland resources. Decisions made by the clan leaders and elders are passed on to *Fei'ma'Aba* youth leaders for implementation. The *Fei'ma'Aba* are the enforcers of the elders' decisions and are also responsible for gathering information on key resources, condition of herds in grazing areas, status of pasture, security and hazards, which they give to the clan leaders and *Du'abe*.

The different pastoral community groups in SNNPR and Gambella have important traditional systems and institutions, which need to be considered. Some of the pastoral communities in SNNPR are territory-based, non-political 'sections' (e.g. Nyangatom in South Omo). Traditionally these sections had no fixed boundaries but rather they reflect the relative positions of the settlements and the nomadic routines of their members.

The top leadership in the hierarchy, of the traditional governance structure, has key roles on making decisions on matters of rangeland use and management, and has absolute power on how, where, and when livestock is grazed or browsed and how the land is used.


**FIGURE 6: MANAGEMENT STRUCTURES STRENGTHENED IN PRIME INTERVENTION AREAS AS PART OF PRM IN AFAR**

The Mursi are patriarchal in nature and have a socio-political structure in which kin, clans, and local groups called bhuranyoga (singular bhuran) are the most salient modes of organization. While there is freedom to move within and across local districts, control over local resources, such as land and watering holes, is generally managed by individuals and their respective clans. While grazing lands are an open access resource, people tend to remain within their own local groupings (bhuranyoga). The Hamer (the other main pastoral group in SNNPR) have traditional offices held either hereditarily or through public election, following nominations by elders. The leaders holding these offices are involved in the day- to-day socio-ecological, economic, ritual, and cultural affairs of the people (zersi) and the governance as well as use of resources on the land. Decisions emerge in a roundabout way through informal and formal debates amongst the elders (Donza). Depending on the situation, these debates may concern villages (gurda), larger territorial units (tsinti, nowadays considered as kebele), or the whole of Hamer territory (Hamer pe).

In common with most pastoral groups, the Nuer in Gambella also have their own customary system and governance structure. There is no hereditary leadership in Nuer traditional governance structure – rather, leaders are elected on the basis of personal qualities. These include lineage, age, seniority in the family, large number of wives and children, marriage alliances, wealth in cattle, prowess as a warrior in youth, skill in debate, and some ritual powers, which combined produce a suitable personality for a leader. The Nuer also have a *Kuaar Twac*, who is the ritual leader, and the *Kuaar Muon*, the custodian of the land. A *Guock* is a religious leader who performs different types of religious ceremonies and rituals. All these groups of people play a central role in the decision-making processes of the community, including those related to land use planning and rangeland resource management. They also settle disputes in the community and

manage mobility and decide when and where the community should move to grazing sites. Information on the status of pasture, security, and anything that could help the well-being of the community and their property is collected by youth acting as cattle herders and scouts, who also carry out patrols to protect the livestock from robbers.

## 5.5 STEP 2: GETTING STARTED AT COMMUNITY LEVEL

The DA together with Kebele leaders will call members of the community rangeland communities for general assembly, care should be taken in selecting the meeting date to ensure majority of the members of the communities participate. During the general assembly, the DAs and kebele leaders provide an introduction of the relevance of rangeland resource management issues to the community, discuss the present situation with the rangeland resources, the need for changes/ improvements in resource use and management. Let the community members reflect on the issues based on their own experiences. Encourage the involvement of as many community members as possible and ensure the views of women heard in the discussion. Do not raise expectations and remain within the range of activities and problems within your mandate and capacity.

Step 2: Getting started at community level

- Call for general assembly
- Establish KRT
- Establish community rangeland team
- Agree on timing for planning

This discussion must lead to consensus on the next steps on planning including the formation of Community Rangeland Team. But if the community members are not convinced, do not push them. Just try again. It is crucial that technical staff shows good manner, respectful and friendly behavior, avoiding any type of coercive and superior attitudes. The community should be made aware of the participatory nature of the methodology. It is important to clarify that they will be the final decision-makers and that selection of measures will take place together with them based on feasible solutions and local constraints.

Before ending the general meeting, the community should be informed that all members are welcome to participate in the planning process. However, because it is practically difficult to deal with each and every member of the community, and that the community needs to elect a dedicated and representative planning team. In all circumstances, during field surveys the team will always meet community members, either as individuals of groups (based on specific interests). Emphasize also the fact that the team will be closely working with the exiting traditional rangeland systems and institutions, as appropriate, and that their roles will be defined and agreed in the planning process.

Composition of the Community Rangeland Team considers key issues such as gender, social and wealth status, and geographical representation (members representing different corners of the communities in a rangeland unit). In pastoral areas where women are engaged in pastoral livelihood, their presence in the community team should get due concern and enhancement. After the wealth ranking exercise has been performed with the community and a realistic profile obtained of the social status and assets of the community members, they should be asked to elect 12 people's representatives, drawn from among each of the main social groups, to form the **"Community Rangeland Team (CRT)".** Of the 12, half should be women who not only represent different social groups but are also influential and outspoken.

**IMPORTANT NOTE:** The role of the DA is crucial where cultural barriers inhibit the participation of women. In case of a joint rangeland planning exercise involving both men and women, the DA should intervene on a regular basis to ensure that the women participate and express their views. It may be useful in some instances to have a subsequent and separate meeting with the female members to confirm and refine the wealth ranking findings.

Composition of the CRT team will include the following: -

- Four male heads of household representing different social groups (including vulnerable households) living in different parts of the community/village;
- Four female members representing different social groups (including vulnerable and female-headed) and living in different strata of the community;
- Two youth representatives, one male and one female;
- Two more as required by the community (representative of local governance members/ respected/ influential people, women's group, or other representative groups).

The CRT will elect one Team Leader and one Secretary. The roles of CRT will include the following

- Ensure community-based planning is organized in each rangeland community
- Coordinate interventions that concern more than one community
- Assist in targeting and quality control
- Settle disputes and provide support on specific issues as they arise
- Provide overall guidance on rangeland management requirements
- Hold a regular meeting once in two weeks to review progress made
- Participate in conflict resolution in adjacent communities within and between Kebeles
- Serve as a permanent contact with the development agent, the rest of the community/ target group and local leaders during planning, implementation and monitoring and evaluation
- Actively participate and cooperate with the woreda experts, and DAs during identification of problems, opportunities, priority setting, overall plan preparation processes as well as during implementation
- Initiate and seek administrative and technical support from responsible organizations for the legal establishment of Community /Kebele Rangeland Users Association
- Coach and aware pastoral HHs in all steps of planning and implementation
- Facilitate labor and material contributions agreed with the community and make available according to the planned time and place
- Consult and get consensus from the community for having a community wide rangeland management by-law
- Identify and facilitate formation of various economic user groups to sustainably manage and use resources of the rangeland watershed.

At the end of the meeting achieve agreement on a date for carrying out the planning exercise. At this stage key resource persons may already have been tentatively identified who will coordinate community members or groups during the problem identification, socio-economic and field surveys exercises.

## 5.6 STEP 3: SOCIO-ECONOMIC AND BIOPHYSICAL SURVEY IN PURE PASTORAL AREAS

Most of the socio-economic and biophysical survey tools described in the mixed farming areas are applicable to pastoral areas as well. It is mainly an information-gathering step, designed to characterize the community rangelands, community rangeland resources, and the people living within its boundaries. It involves resource inventory and assessment, including current rangeland resource use and problems associated with it, socioeconomic situation of the pastoral community, potentials, opportunities and limitations, and prioritization of core problems and solutions. The information gathered in this step provides the basis for identifying and prioritizing interventions to be implemented in the pastoral community grazing land under consideration.

**Step 3: Socio-economic and Biophysical Survey**

- Participatory Rural Appraisal tools
- Socio-economic Assessment
- Biophysical Survey

The approaches used for socio-economic and biophysical survey/analysis include Participatory description of the pastoral community grazing lands: This involves participatory mapping and transects. Using these methods, the main biophysical conditions and interactions of the people and resources within the community grazing land boundary and linkage and integration at the broader rangeland boundary, nesting the Kebele(s), will be assessed and analyzed. These two exercises provide useful information about rangeland resources and assess the opportunities and the major issues and limitations that are important for the development of the area.

### i. Participatory resource mapping:

Pastoral communities retain a wealth of knowledge about their environment and resources, their use and management, and historical trends. With this knowledge participatory resource mapping enables communities (i) to collectively develop visual picture of their landscape, natural resources, land use systems, settlements, seasonal grazing movements, etc and (ii) to reveal and analyze issues, challenges and opportunities for addressing them. Resource maps can be combined with climate vulnerability analysis to assess climate change trends and impacts on vegetation growth patterns, livestock feed access, and pastoral livelihood in general.

FIGURE 7: VILLAGE /RESOURCE MAPPING

Source: CARE Ethiopia, 2015

The overall objective of Participatory Community Rangeland Planning is to improve the livelihood of pastoral communities through comprehensive and integrated rangeland resource management and development planning. Therefore, participatory resource maps are prepared in an integrated development-planning framework. Depending on the objectives of the mapping exercise, resource maps may include the following details:

- Wet and dry season grazing areas,
- Drought grazing areas/reserves
- Communal and/or private enclosures
- Riverine areas/ belts
- Hazard and exposure areas (flood plains, malaria prone areas etc)

- Water points/ water sources for human and livestock consumption
- Areas of conflict (over water and pasture, etc)
- Areas of tick or other insect infestations
- Areas of Invasive alien species
- Rangeland productivity 'hot spots'
- Biodiversity 'hotspots'
- Veterinary and health posts
- Markets, Schools and etc…

ii. **Mapping mobility:** Another key feature of a pastoralist community's resource map is mobility routes: showing where people and livestock travel. Mobility routes and destinations can be drawn for single or multiple ethnic groups, for certain groups of households, or at a single household level, or for different family members within a household and for different livestock types. After completing the basic resource map participants can use ash, different colored soil, stick-drawn lines or rope to show the desired mobility features, including:

- Seasonal livestock movements
- Seasonal use of rangeland resources
- Seasonal food availability and access
- Seasonal risks (malaria, waterborne diseases, flooding, heat wave etc.)
- Preferred trekking routes
- Dates, seasons and frequency of travel
- Route, distance and destinations
- Primary and secondary purposes
- Gender disaggregated movements and etc…

iii. **Interpretation of the resource map/ present situation maps:** Based on the resource map/ present situation map community members will then identify problems associated with each resource in the rangelands and the opportunities that exist. At this stage community members may focus on significant problems that affect their livelihoods and unpack the root cause or factors that contribute to those problems. A resource matrix (Table 8 below) can be used to list key resources, in their order of importance to the community, and ranked list of threats to these resources and opportunities.

TABLE 8: RESOURCE MATRIX

| Resources | Key challenges/ threats |
|---|---|
| **Water systems** (rivers, ponds, wells, boreholes, birkas, etc), | ▪ Reduced water levels (from climate change induced rainfall variability, upstream abstraction, etc), Breakdown of water supply infrastructure, Poor water quality, Catchment forest deforestation, Water related conflicts |
| **Pasture** | • Overgrazing, Drought induced pasture shortage, Impact of climate change, Insecurity preventing traditional grazing movements, Unmanaged fires, Invasive species, Pasture related conflicts |
| **Bushland/ woodland** | ▪ Deforestation, Overgrazing, Unmanaged fires |
| **Livestock** | ▪ Prevalence of animal disease, Lack of adequate vet service, Lack of access to profitable livestock market |

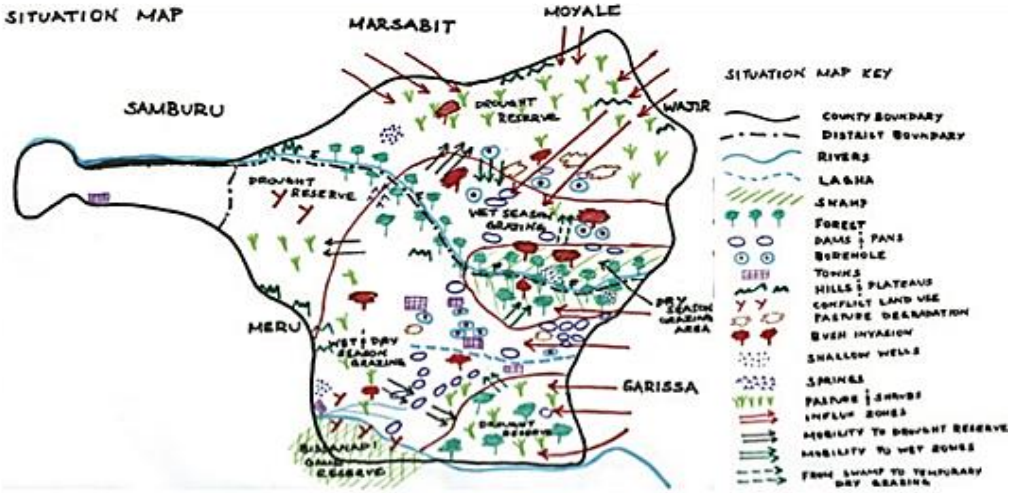



**FIGURE 8: PRESENT SITUATION MAP OF WASO RANGELANDS, BORANA**

SOURCE: IUCN, PARTICIPATORY RANGELAND PLANNING: A PRACTITIONERS GUIDE

The map shows the current status of resources within the Waso rangelands, as identified by the local community. It clearly shows the locations of important resources, mobility patterns and routes during dry and wet seasons, drought reserve areas, settlement patterns, degraded areas, and bush encroachment. The map also indicates the routes used by neighboring communities who depend on the Waso rangelands mainly during drought periods.

iv. **Vision mapping:** The vision map is produced based on information in the resource present situation map. Vision maps show the aspirations of the community in relation to their rangeland landscape and resources over the next 5-10 years period. On vision map, communities indicate how they would like use and manage their resources in the future. The content of the vision map feeds into the discussions in the planning stage, during which communities identify solutions to current problems, and opportunities to enhance their livelihoods.

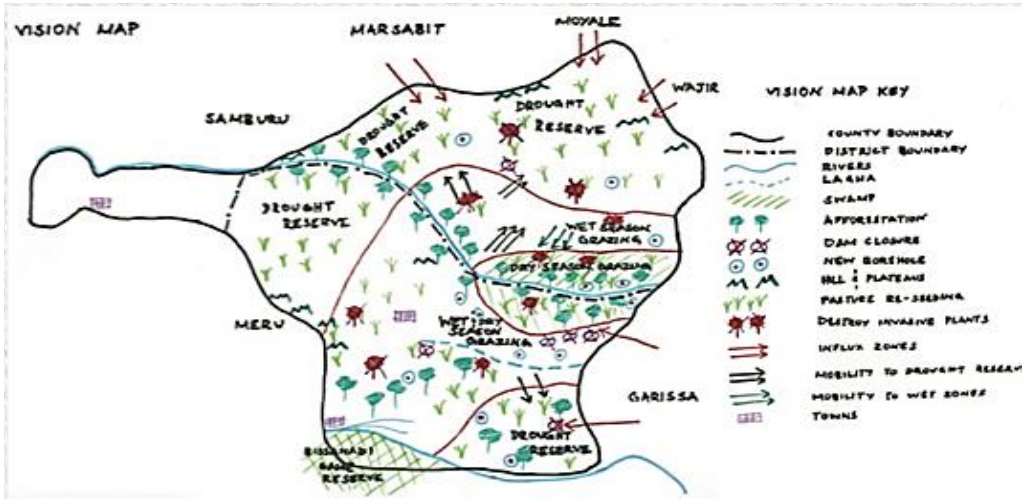



**FIGURE 6.8:**

**FIGURE 9: COMMUNITY VISION MAP OF WASO RANGELANDS, BORANA**

**SOURCE: IUCN, PARTICIPATORY RANGELAND PLANNING: A PRACTITIONERS GUIDE**

v. **<u>Taking care with boundaries</u>: While the minimum of unit planning is still the community rangeland,** it is advisable not to start mapping with an administrative boundary, such as that of a woreda or kebele, as the pastoral communities almost always have seasonal/ reciprocal rights to rangeland resources over a wide area and usually these resources fall outside the administrative boundary. The initial mapping exercise should, therefore, cover the full scope of resources that the communities regularly access and use. Questions on various boundaries including that of kebele may be raised and discussed at the final stage of the mapping process. And the boundaries delineated should be verified at a later date with neighboring communities.

vi. **<u>Standardizing symbols</u>:** It is important to standardize use of materials as symbols in the mapping exercise. These should be locally available materials, and include ash, leaves, sticks, twigs, animal dung, stones, pebbles, wet and dry grass, charcoal, etc. During the mapping exercise, ash can be used to indicate grazing routes/ seasonal movements, stones for water points, grasses for wet and dry season grazing areas, etc. Participants may use sticks or twigs to represent woodlands/ bushlands, and if possible, sticks or twigs of different trees used to represent different types of trees and woodland/ bushland resources.

vii. **Paper maps and digitization:** Participatory resource maps facilitate community-led mapping process, help in identification of key features, and reveal a lot of relevant information on important resources, but they are not accurate for their use in planning and management over extensive area. Important information on these maps can be retained in the form of photographs, taken immediately after the participatory mapping exercise is completed, and used in the preparation of a more advanced GIS supported resource maps.

# PART 1: SECTION A (2) - 3 COMMON PLANNING STEPS FOR MIXED FARMING AND PURE PASTORAL AREAS

## 5.7 STEP 4: GENDER & SOCIAL DEVELOPMENT (GSD), NUTRITION, AND INTEGRATED RISK MANAGEMENT

### 5.7.1 GSD and Nutrition

Step 4: GSD, Nutrition and Integrated Risk Management

- GSD and Nutrition Mainstreaming
- Contextual Gender Analysis Tool
- Integrated Risk Management
- Climate Smart Mainstreaming
- Climate Smart Planning

GSD focuses on the promotion of gender equality and on the inclusion of the poor and vulnerable by empowering them to undertake their own development, to improve their social and economic position, to acquire their rightful place in a cohesive and resilient society. The focus of GSD in the watershed planning and implementation is to ensure appropriate and adequate consideration of the needs and opportunities for women, and other vulnerable social groups such as people with health, physical, and mental issues, or people facing stigma due to their social or ethnic minority status, or people living with HIV/AIDS, etc. By the same token, interventions within the watersheds should address the nutritional status of women, children and other segments of the community.

In so doing, all the watershed development initiatives should start with contextual GSD analysis Annexes Part III, annex 2 covering all the groups mentioned above. It is a tool that examines the differences in the lives of women and men in a given context, and it systematically looks at different impacts of potential and current development programs and interventions on women and men, and on boys and girls. It is intended to identify and analyze the underlying causes of these inequities and to propose strategies for bridging the gender gap. Contextual gender analysis in a watershed development planning helps:

- to identify that women's and men's lives, experiences, needs, issues and priorities are different in a given community and watershed;
- in the recognition that the needs and priorities of women are not the same as those of men, nor are they homogenous (i.e. they depend on lifestyle needs and priorities which may vary from one group of women to another depending on age, ethnicity, religion, health and disability status, social position, education and income levels, employment status, marital status, sexual orientation and whether they have dependents) and
- Findings from the gender analysis of a community in a given watershed are highly critical in ensuring that the gender issues are mainstreamed through the planning and other stages of interventions and that the design of the proposed watershed development projects is appropriate and sustainable. It also indicates the strategies that should be adopted in order to achieve equitable outcomes for women and men; and different groups of women in a given watershed.

Thus, mainstreaming of the GSD and nutrition are part of a key strategy ensuring that gender, social development and nutrition issues form an integral dimension in the design, planning, implementation, and M&E of watershed developments. Particularly, the following key issues should be considered: -

- Ensure equal representation of men and women in decision making (planning, monitoring and evaluation)
- Genuine participation of men and women in planning team and general assembly.
- Participation in the implementation of watershed management should consider women workload and their triple roles in the community (Reproductive, Productive and Social roles)
- Technology selection should consider gender disaggregated problems and nutrition requirements of the vulnerable groups (children, women, people with disabilities and HIV Affected) in the community
- Capacity development interventions should consider the knowledge and skill needs of women and vulnerable groups
- There should be fair women representation in watershed users' association
- Women and other vulnerable groups (the poor and youths) should be given livelihoods opportunities following the creation of assets within the rehabilitated watersheds

The findings of these and gender and social analyses should be used to ensure elements are appropriately included in the responsive planning, budgeting, recruitment of technical expertise, and in the subsequent M&E.

### 5.7.2 Mainstreaming of Integrated Risk Management (Climate change, disaster risk reduction, ecosystem management and restoration)

For this guideline, mainstreaming integrated risk management into the watershed management practices means considering and addressing risks associated with disasters and climate change in assessment, planning, implementation, monitoring and evaluation of watershed management measures. This significantly contributes to the sustainability, effectiveness and efficiency of the soil and water conservation measures which are put in place. For instance, the size and quality of the check-dams, soil and stone bunds have better chance of sustainability if they consider potential extreme weather events (climate predictions) in their design. Disaster risk reduction and climate change adaptation measures that are not based and consider the proper management of the watershed tend to fail. The practical approach on how to do it are presented below.

Disaster risk reduction (DRR) is the concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events. Climate change adaptation (CCA) is the adjustment in natural or human systems in response to actual or expected climate stimuli or their effects, which moderates harm or exploits beneficial opportunities. The term 'climate-smart' is widely used to describe an approach to agriculture that has three pillars: sustainably increasing agricultural productivity and incomes; adapting and building resilience to climate change; and reducing and/or removing greenhouse gases emissions, where possible.[6]

Ecosystem Management and Restoration (EMR): Ecosystem management– is the degree to which an ecosystem's functions require human intervention in order to maintain ecosystem health (i.e., stakeholder agreed methods to ensure multiple objectives can be met). Is an integrated process to conserve and improve ecosystem health that sustains ecosystem services for human wellbeing, also planned administrative

[6] FAO (2013). *Climate-Smart Agriculture Sourcebook*. Retrieved from http://www.fao.org/docrep/018/i3325e/i3325e.pdf

functions that develop, implement, and monitor the ecosystems health. Ecosystem restoration – is an intentional activity that initiates or accelerates the recovery of a degraded, damaged, or destroyed ecosystem with respect to its health, integrity, services, and sustainability.

In applying this concept to CBPWD, a set of approaches has emerged that are intended to achieve three key objectives:

**(i) Maximizing the contribution in terms of reducing people's vulnerability to climate change**

Climate change is more and more characterized by extreme weather events that include: increasingly high temperatures; very intense rainfall and flooding; and more frequent and intense drought conditions (see https://ccafs.cgiar.org/publications/climate-smart-agriculture-ethiopia#.XObd-ohKiUk). As stated in that document *"Climate risk management interventions and long-term adaptation actions need to match localized vulnerabilities and impacts"*. In very general terms there are three inter-related approaches that can be adopted to reduce people's vulnerability to these events: reducing their exposure; reducing their sensitivity to them; and increasing their adaptive capacity. All of these falls within the label of climate smart agriculture. The reduction of exposure to extreme rainfall events includes the design and installation of measures, including structures that protect infrastructure and livelihood activities from flooding.

The reduction of sensitivity, particularly to drought, generally involves making changes or adjustments to livelihood activities that lessen the impact of these events. This might for example include the installation of efficient small-scale irrigation systems or improved fodder production and storage for livestock. These two foregoing examples represent the concept of co-benefits which will be discussed further below. Increasing adaptive capacity depends on a variety of inter-related factors including knowledge, skills and access to information, services and resources. As such these factors are strongly influenced by social status and educational levels in which gender is a significant factor. Building awareness and responsive capacity is therefore a key consideration in building adaptive capacity and requires a strong and gender equity component to ensure it is well disseminated through the community. For CBPWD interventions to contribute to reducing vulnerability to climate change, a combination of these three pathways is necessary and there should be a linking of these to public works activities that decrease exposure with livelihood interventions that reduce sensitivity. At the same time measures should also be taken to increase access to the knowledge, information and resources that enable adaptive management of livelihoods.

**(ii) Increasing the resilience and sustainability of watershed development investments in relation to climate change.**

Integrated watershed development already involves investment in both livestock and crop husbandry practices that require engagement of the whole community in changing their existing approaches to natural resource management (NRM). A good example of this is the introduction of climate smart agricultural husbandry practices such as; minimum tillage practices, with the crop residue retention and intercropping (for instance with beans in maize production). The introduction of these changes may also influence the entire management of the community lands and infrastructure. In planning these interventions, therefore, the manner in which they are likely to be affected by climate change events over time and the very significant threat of these events to their effectiveness and sustainability should be kept in mind. In this context, integration of climate-smart thinking is critical to ensure that investments are resilient to weather extremes and are sustainable over the longer term, taking climate change into account.

**(iii) Supporting climate change mitigation (where possible and appropriate)**

Wherever possible and appropriate, climate change mitigation co-benefits will be pursued. Mitigation co-benefits include reduction in use of fuels such as diesel, petrol, wood and charcoal, through for example, fuel-efficient technologies or development of alternative energy sources such as biogas and solar power. They also include increased carbon sequestration through tree planting and protection of existing forests, as well as agro-forestry and improved rangeland management practices. When these measures support climate resilience, the mitigation co-benefits provide an additional motivation to implement them.

### 5.7.3 Climate Smart Planning

Climate-smart watershed development interventions are aimed at reducing the impact of weather-related hazards on communities' high value resources and/or increasing the quality or availability of resources to render them less sensitive to climate impacts. Climate-smart livelihood interventions are intended to support adjustments to existing livelihood activities so as to reduce their sensitivity to climate impacts by enabling better risk management and climate change adaptation by women and men. This usually involves natural resources management interventions that protect or enable access to resources that are needed for new or adjusted livelihood activities, and complementary strategies that support diversification of income sources (such as the climate smart husbandry practices mentioned in the preceding paragraph). Climate-smart planning therefore requires the application of integrated approaches, bringing together watershed management interventions with livelihoods options to maximize impacts. Given that Integrated Watershed Development must address and analyze livelihoods issues, it is important that consideration goes well beyond the immediate NRM related issues, to explore how extreme weather hazards are already, and will continue to impact the community. This provides a critical basis for identifying activities that will reduce vulnerability to climate change. Guidance and tools are provided in (Annexes Part III, annex 1) for incorporating a watershed climate analysis to complement the other dimensions in this step of the CBPWD planning process; as well as tools for including a matching intervention in the Watershed Climate Analysis, the Climate-Smart Prioritization of Interventions and the Climate-Smart Screening of the Community Watershed Plan.

For climate smart outcomes to be achieved, thus improved community resilience to climate induced shocks, natural resource management activities should be integrated with livelihoods related income generating activities for the community. The different IGAs should undergoes risk analysis that anticipates the changing environment and the anticipated climate change induced hazards that might affect their business. This require the communities to develop what we call business plan before they engage in any of the livelihoods activities that follows series of steps provided in Annexes Part III, annex 5.

In order the business plan to be prepared in adequate manner, the community members and DAs/ or woreda experts or any other facilitator should clearly understand the following information that come from various sources including community consultation and client capacity assessments.

First, any community member who want to engage in business activities should be clear about the type of IGA (s) he or she is willing and able to implement. This should come partly from the awareness created during the community consultation and partly from technical training given by DAs to Community members about livelihoods development. Ask key questions such as: do community members have the necessary skills/experiences and knowledge needed to operate this activity? Do they have time to operate

the activity and do they know the seasons/period of investment to be profitable? What risks will business face: how likely are to occur & what is planned to mitigate and adapt such risks?

Second, the communities need a clear information on financial services (savings and loans) available. If loan provisions are one of the services, the technical advisors (DAs, woreda experts, financial institution loan officers, RuSACCO staffs, etc.) must make sure that community members are clear about the size, terms and conditions of the loan in relation to the identified IGAs and other working capital costs.

Third, Community members should also demonstrate readiness to commit part of their own resources to the Business Plan (IGA investment) whenever applicable. However, contribution from own sources should be voluntary because households have several other commitments for which own resources may have already been committed. Therefore, facilitators should demonstrate with evidence the advantages of increasing the capital from own sources (e.g. higher returns from increased investments; diversified IGAs to reduce risk).

Fourth, Community members also need information on input sources and market linkages. Different IGAs require different inputs and their market outlets also vary. Information regarding inputs should come from the extension service, and information regarding product and labor markets should come from the market value chain analysis and product and linkage study done for the kebeles and the woredas.

In addition, the BP should consider important cross cutting issues such as (i)identification and access to feasible income generation activities (IGAs) from gender perspective, (ii) the need for stakeholders' collaboration and coordination during preparation and implementation of interested community BPs, (iii) recommendations of IGAs specific to youth /groups and (iv) Environmental and Social Management Framework (ESMF) compliance in accordance with section 5.8.5 of this guideline.

### 5.7.4 Disaster Risk Reduction

Disaster risk reduction provides short term to mid-term solutions based on the scale of the disaster considering the past and present experiences. Promotion of drought tolerant seed varieties and animal breeds, building of embankments, early warning systems, contingency plan, temporarily evacuating people from flood plains, water harvesting, promotion of drought tolerant animal breeds, mangrove plantation along costal lines, check dams, retention walls, saving and credit schemes, temporarily migration with livestock to pastor and water areas, destocking and restocking, provision of food for work/cash for work etc. All these are measures to address short term to mid-term needs of vulnerable communities. However, these measures should be carefully selected and prioritized in their contribution for multiple positive impacts specifically to the rehabilitation and management of degraded watersheds. Experience showed that some disaster risk reduction measures in drought prone areas were done at the expense of the ecosystem. In some places target communities were clearing indigenous trees at a bank of a river to get access to fertile land and water in order to plant drought tolerant seeds. On the other hand, engaging communities in DRR activities (construction of check dams and retention walls through cash for work programs) have significantly reduced tree cutting and charcoal burning to address short term cash needs. Village saving and credit scheme (as part of DRR measures) has shown multiple positive impacts on vulnerable households.
Well-selected Climate Change Adaptation Measures could also help to protect and even ensure the lasting benefits of DRR measures that have put in place. In order for DRR measures to serve as adaptation measures

too, they have to be futuristic-looking and consider not only the past and present hazard experience but also its severity and magnitude in the future. For instance, a flood embankment constructed to retain a flood magnitude of 2 meters high, may not be good enough to block potential floods in the same location in the next ten years. This magnitude of flood could even be better managed through a well-managed and properly selected trees (natural wall) than a concrete wall.

## 5.8 STEP 5: IDENTIFICATION, PRIORITIZATION AND SAFEGUARDS OF INTERVENTIONS THAT BRING CHANGE

Step 5: Identification, prioritization and safeguards of interventions that bring change

- Identification of interventions and prioritization elements
- Technical and social aspects related to watershed planning
- Sequencing of activities
- Safeguards mechanisms for identified interventions

After completion of Step 4, the DA and the CWT/CRT will have gathered a considerable amount of information from the community, key informants, focal groups, field surveys and mapping work. As a result, the DA and the CWT become much more aware of the constraints faced by the community and the potentials and opportunities for resolving them and for development. At this stage it is now necessary to relate the various socio-economic issues to the biophysical measures that might be taken both within and outside the community watershed in order to select the interventions that will result in the desired changes. Interventions should be technically feasible and implemented in the correct sequence meeting appropriate quality criteria. Poor quality work fail to generate sustainable change, may eventually worsen the situation and generate mistrust: it always represents a waste of resources.

### 5.8.1 Identification of interventions and prioritization elements

**Pool of experience and options:** in order to select the most appropriate measures, particularly those related to natural resource development and productivity enhancement, the DA and the CWT should carefully assess land use, soil, slope, vegetation features, the source and magnitude of the risk they are facing and resources they have to mitigate or prevent it. They should identify those measures that are most suitable under the various agro-ecological conditions based on the problems identified, demands made, or priorities identified by the community. The principal pool of activities is categorized and summarized in table 9 and is intended to provide guidance in the selection of measures. More details and practical information on the most relevant measures are provided in the Info-tech support Section (B) of this Guideline

i. **The role of traditional knowledge:** Traditional Ethiopian conservation measures involving physical and biological measures and water harvesting have in the past played an important role in land husbandry. They still continue to contribute to controlling erosion that would otherwise be even worse than what can now be observed. Nevertheless, in many areas, traditional methods cannot cope with current trends of land degradation and affected lands are being progressively abandoned. The situation has been exacerbated by increased demands on the available land and water resources to feed a growing population. This has contributed to the adoption of more exploitative farming practices that have tended to replace the old ones. Regardless of their limitations, traditional experience and knowledge in SWC and farming

should be capitalized on by field technicians and used effectively to identify, select, design and implement improved natural resources development and productivity intensification measures. If for no other reason, that many farmers are familiar with them. The farming practices are the product of local circumstances and evolved based on farmers' perception of what functions well and what does not under the existing conditions. There is thus likely to be a benefit from the adoption of many of these practices on a wider scale and so it is important to have knowledge of them, as they may often be the key to success. The limitations to expanding their use may be technical, financial or related to tenure. In many circumstances, their more widespread adoption may be resolved through the process of awareness building, training, and the involvement of government institutions.

ii. **Measures and target groups:** Some measures should be implemented with individuals, others at group, community, and inter-community levels. These groups are often interconnected and should have a common understanding of which activity would be most logical and advantageous, which to start on first, or which should be done simultaneously. For example, the joint treatment of the upper parts of the community watershed with simultaneous treatment of contiguous areas in adjacent communities may result in sufficient water-table recharge to allow hand dug wells to be established for many households (i.e. at the individual level). In this case the treatment of the upper watershed area with trenches or eyebrows will precede the introduction of the hand dug well technology. The treatment of such mostly communal areas, will require community commitment and the introduction of by-laws restricting use of communal grazing land and agreements to share the future benefits (trees, fodder). In such situations the DA and the CWT must tentatively decide on the measures to be implemented and submit the proposal during the general assembly meeting of the whole community for their comments and approval.

iii. **The Role of the Development Agent:** The DA plays a facilitating and technical role, leaving the CWT to own the planning process. This increases their sense of responsibility and confidence. In this respect, DAs professional skills and experience must guide them towards activities that are sound and beneficial to the community and the target group.

iv. **Addressing women's needs**: The reduction of workloads and environmental hardships are key elements of community watershed planning. The DA should therefore ensure that the CWT places equal importance on activities that benefit women. This might mean, for instance, the promotion of activities that specifically benefit women or their inclusion, as appropriate, in activities that can be carried out jointly by men and women. Women's workloads are already high, particularly in women-headed households. It is still probable, however, that women would be very interested in the treatment of upper watersheds mostly because of the impact on water-tables and thus on the recuperation of springs and wells and the filling of ponds. The establishment of mixed woodlots near or around residences is also an activity they might appreciate and desire. Most importantly, however, they are likely to be interested in measures improving the productivity of their homesteads, participating in income generation activities, credit schemes and other skills improvement. The DA should also promote joint community or group efforts to assist the most vulnerable women-headed households, particularly those affected by labor shortages.

NOTE: It may also happen that solutions to some problems and risks are beyond the mandate of the SWC and the DA. If there is an opportunity for cooperation and integration with other institutions at this stage, so much the better. Problems and risks tackled by a multidisciplinary and coordinated team are likely to be much better addressed and resolved. Care and the use common sense are indispensable when the DA is acting alone in selecting measures. Decisions concerning issues that the DA or SWC are unlikely or unable to resolve should be delayed until they can be made with more appropriate support. At times the DA is

likely to encounter activities that are within their mandate but should still not be selected because of a lack of appropriate skills or because the necessary resources are unlikely to be made available. In such instances WWT should be consulted for assistance in resolving such problems and amending the plan.

v. **Promote participatory technology development for new and untested measures.** Farmers may well be very doubtful about engaging in new activities that the DA might wish to introduce but with which they are unfamiliar. This might include initiatives such as the introduction of unfamiliar crops types or crop varieties, or of new spatial arrangements of crops and other land management practices that are intended to produce benefits. For this reason, it is always advisable for the DA to initiate small-scale trials where the farmers can assess the performance of the proposed measures. If results are seen to be beneficial and manageable, they are likely to be adopted and implemented on a wider scale so long as the necessary resources are available. Such on-farm trials or simple trials near homesteads or in accessible nursery spaces should be carefully monitored and evaluated and if possible include the application of a simple cost-benefit analysis.

### 5.8.2 General technical and social aspects related to watershed planning

In planning development activities, the DA will notice that where there are problems and risks of common interest to households which make it easy to reach agreement on the measures that should be implemented to address the problem and reduce or even prevent risks. For example, the problem of water shortage can be solved by rehabilitating a spring and/or constructing a pond which will have an immediate positive impact and be greatly appreciated by farmers. Such spring development is only be possible, however, if there is sufficient flow; thus, only if the water-table is being actively recharged. The same applies to community ponds; they can be constructed only if sedimentation from gully or sheet erosion is controlled through appropriate measures such as gully stabilization and closure of the upstream catchment area. In both cases, the successful implementation of these activities depends on effective management of the upstream areas adjacent to, but not within, that in which the activity is to be implemented. It is evident from this that planning, and sequencing of the activities is crucial for any successful community-based natural resource infrastructure development and sustainable risk reduction.

It is also necessary to take great care when planning activities that might require farmers to contribute or sell land on which they are to be implemented. It is essential to keep in mind the individual farmers are decision-makers concerning the land they own and cultivate and that they must be consulted in relation to any proposed initiatives that may affect its use. Their involvement in identifying and approving solutions is absolutely essential. In such instances the DA must spend the time necessary to contact and fully discuss the design and objectives of the various initiatives with farmers. This should include the design, the pros and cons, the possible adaptations and the sequencing of the works.

It may also happen that solutions to some problems and risks are beyond The DA's mandate. If cooperation and integration with other institutions is taking place at this stage, so much the better, as it is best to have problems and risks addressed and resolved by a multidisciplinary and coordinated team. If the DA is acting alone, however, in the selection of measures it is advisable to apply a good measure of common sense and to reject or postpone solutions to problems and risks that are difficult or impossible because of lack of skills or the necessary resources. In such situations the WWT should be requested to resolve the problems and risks, and the plan should only be amended after this consultation and the receipt of feedback from them.

**NOTE**: Each land user is responsible to not damaging other people's land and for conserving and managing their own land. Conservation works on cultivated land must therefore be planned together with all the land users cultivating a given sub-watershed area and consensus achieved on the layout of the necessary infrastructure. Elements such as Irrigation and drainage ditches are usually continuous, and these cannot be disconnected between the land of one farmer and the next, to suit individual demands or preferences. Since not all land users will experience the same degree of impact or benefit, consideration must be given to those who will be negatively affected should be compensated. For instance, in the case of a farmer who cannot afford to treat its own affected plot of land, he/she should be supported by other community members with sufficient work force to accomplish the work based on the work norm (Annexes, Part I and II annex 2) required for the intended activities.

Many degraded watersheds contain extensive and severely eroded cultivated lands which need simultaneous and systematic treatment. This can be achieved by combining self-help resources from land users supplemented by various other forms of assistance (free labor support, tools and materials and capital input) depending on the degree of vulnerability of the households. Moreover, it should be kept in mind that the treatment of these cultivated lands is directly linked successful treatments in upper watersheds and should occur only if these upslope areas have been treated first (or simultaneously if and when time and resources allow). The comprehensive treatment of hillsides with moisture conservation measures (trenches, eyebrows, etc): (1) controls runoff and diminishes the risk of flooding on the lower lying cultivated lands; (2) encourages re-vegetation; (3) increases yields and decreases the risk of crop failure on the lower lying cultivated fields in the event of drought; and (4) helps to recharge water-tables.

Agricultural lands that are already degraded or unproductive and affected by serious erosion problems are usually considered to be communal or abandoned lands and are mostly used for rough grazing and/or for the collection of woody materials for fuel. The improvement or reclamation of such lands is often beyond the capability and interest of a single farmer or a group of farmers but may be essential for the protection of downstream cultivated areas, for water harvesting and for biomass regeneration. The whole community should be engaged in planning for the rehabilitation of such lands. This is necessary because specific agreements and by-laws must be agreed to by all members of the community in order to respect the rights all affected farmers and to ensure that all eventually receive benefits (e.g. from the increased availability fodder and wood, as well as the opportunity to once again grow crops on the reclaimed land). In such situations, the involvement of local administrators and other influential people is essential in meetings, in field visits and during the allocation of land-use certificates in order to avoid conflict and encourage active interest and engagement of farmers and land users.

### 5.8.3 Key elements for the Integration and Sequencing in the planning and implementation of watershed management activities

**Rationale:** Each of the many technical approaches that may be adopted for watershed and land-use planning has its specific design, layout, implementation and management criteria. However, these approaches are never applied in isolation and must be integrated with other measures (such as risk reduction and climate change adaptation) so as to strengthen and improve their effectiveness, ensure the future productivity of the land, reduce maintenance costs, and generate multiple benefits, including enhanced resilience in the face of climate change. Box 2 provides several examples of why and how these principles should be applied.

***Box 2: The integration of related watershed management measures***

(i) **Soil or stone bunds on steep slopes**: once bunds have been installed they benefit from vegetative stabilization with grass and legumes and the application of compost, particularly close to the bund area where the soil is deeper and the moisture higher. The husbandry practices above the bund should include contour plowing, an appropriate crop rotation, relay cropping, intercropping and the application of other soil management and agronomic measures that are consistent with the agro-climatic conditions and farming systems of the area.

(ii) **Check-dams**: the functioning of check-dams or sediment storage (SS) dams in gullies should be supplemented by the introduction of various plant species (including cash crops) on the gully walls and on the deposited soil sentiments. This may include, vegetative reinforcement along the check-dam embankments for which sisal (*Agave sisalana)*, euphorbia (Euphorbia spp), *Erythrina (Erythrina abyssinica*), bamboo, and species with similar growth habits may be used. For gully side reshaping and gulley filling Vetiver grass (*Chrysopogon zizanioides*), Golden wreath wattle (*Acacia saligna*) and other tree and fodder species can also serve well (see Annexes Part III, Annex 4). Specific grass species for pure pastoral areas are provided in Annexes, Part II annex 3.

(iii) **Water ponds**: these should be provided with silt traps and spillways and should be fenced with a tree or fodder belt. This acts as windbreak and as source of vegetation and flowers (for instance, pond surroundings are suitable areas for bee-keeping). Ponds should also be surrounded with a dry thorny fence to prevent children and animals from entering the area, particularly during the first few years before the vegetative fence provides an adequate barrier.

(iv) **Trenches for tree planting**: these should be excavated in a linear arrangement that will enable the trees to act in unison in impeding water and wind movement. When planting the trees a few handfuls of manure or should be placed in the trench and after the rainy season a grass mulch should be applied. Stabilization may be achieved by planting productive shrubs such as Pigeon peas (*Cajanus cajan*) or Sesbania (spp) and grass.

**i. Integration in relation to micro-watersheds:** The next level of interactions includes mutually reinforcing activities and essential linkages between activities within a micro-watershed unit covering as little as a few hectares. There may also be interventions consisting of multiple activities including area closures. At this level of integration, it is essential to ensure that the measures taken perform effectively and cause no damage. Box 3 provides examples of such interactions.

**Box 3:** ***Interaction at micro-watershed level***

(i) **Soil bunds**: these should be integrated with cutoff drains and area closure above the cultivated area. The area closure is by definition an integrated measure consisting of multiple activities such as: controlled grazing; avoidance of human interference and introduction of use rights arrangements; soil and water conservation measures to stop erosion and promote the infiltration of water; planting of mixed species and biomass management.

(ii) **Gully control**: this must be integrated with treatment of the upper reaches (again involving closure) and of the side slopes. Where cultivated areas are involved this usually involves the construction of bunds as well as the introduction of appropriate sharing and management arrangements. If large structures are to be involved, there may be the opportunity to install shallow dug wells below a series of soil storage (SS) dams and to support small-scale irrigation.

(iii) **Community Water Ponds**: Where the development of community water ponds is envisioned their development needs to be integrated with upper catchment protection. This again involves closure, and

gully control to avoid excess siltation and pollution of the pond. The excavation of trenches may be an integral part of such a closure. These ponds can be designed in various forms based principally on the type of soil in the closure area. Trenches can be integrated with eyebrow basins and other conservation structures on the upper steep slopes.

**ii. Integration of community watershed initiatives with the major watershed management:** it is essential to understand the interactions occurring and how to integrate the management measures being proposed at this level in order to be able to guide the sequencing of activities and increase the range and quality of the conservation measures being applied. This ensures the systematic treatment within and between sub-watersheds and broader units. Other development requirements such as health centers, schools, etc., should be considered as an integral part of watershed development in a major watershed. These issues need to be addressed and handled in consultation with the respective *Woreda* institutions.

***Box 4: Interactions in a community watershed***

(i) The classic example of such interactions is related to water management. If, for instance, only few hectares of hillsides are treated with trenches or other water harvesting measures for tree planting a positive effect may be generated in terms of biomass production and tree growth. The treatment will not, however, generate significant results in terms of groundwater recharge. On the other hand, if, in addition to the communal area within the community watershed, additional adjacent community areas are also treated, the combined effect of the treatments is likely to be very high and could generate multiple large-scale effects. This might for instance include sufficient replenishment of aquifers to allow hundreds of households to access water from shallow wells providing them the opportunity to: engage in horticulture activities; produce large amount of biomass for multiple uses (livestock, compost, mulching, timber, firewood, cash crops, etc.); and protect infrastructure such as ponds and feeder roads.

(ii) Systematic and productive treatment of upper reaches also enables large gulley networks to be reclaimed and become productive. This seldom occurs in Ethiopia except where the treatment is limited to small and medium size gullies. The combination, however, of upper hillsides treatments and soil storage dams (SS dams) can be used to convert larger gullies into excellent productive units, which can include small-scale irrigation.

(iii) Such multiple effects also allow for adoption and expanded use of agricultural inputs, even in areas previously considered degraded and of low productivity.

(iv) Even in watershed areas with higher potential and productivity their systematic protection and effective management will have the effect of multiplying the range of crops that can be introduced, cultivated and marketed.

**iii. Integration, linkage and sequencing interventions following watershed logic**: The example given under in Figure 14 below enables the practical visualization of possible interactions between micro- and macro-levels of watersheds. It may also explain to DAs and communities most of the concepts and possible interactions presented in various sections of the Guideline. The types of treatments that might be considered in community-based watershed planning can be divided into the following three main categories which are all linked to each other and intended to ensure a logical continuum of interventions.

1. Treatment of major watershed (A)
2. Treatment of sub-watersheds (B) within (A)

3. Treatment of micro-watersheds (C, C1, C2, C3) within (B)

The visualization exercise of watershed categories shown in Figure 14 starts from the watershed level and moves progressively down to micro-watershed level. Table 9 starts at the micro-level and describes interventions and linkages between progressively larger intervention units.

The measures explained on Table 9 highlight the interactions between land uses and watersheds. In this it should be noted that interventions for productivity intensification at homestead and farmstead level are greatly influenced by the watershed approach. The number of homesteads that can embark on multiple and productive activities increases exponentially, as a result of watershed treatments within and outside the boundaries of the communities.

### 5.8.4 Intervention areas: Description of measures and specific technologies

The measures listed below are organized based on the major agro-climatic zones and land uses. This categorization is simply indicative as several measures has multiple functions. Such is the case both for forestry and fodder introductions which have roles in both water harvesting and soil conservation, and also contribute to improved soil fertility and moisture conservation, etc.). For practical reasons, however, they are divided mainly on the basis of their primary or most relevant function.

The possible interactions between the different sub-watersheds of the main watershed is shown in Figure 14 below and the measures that can be adopted and their interaction with specific technical approaches is given in Table 9.

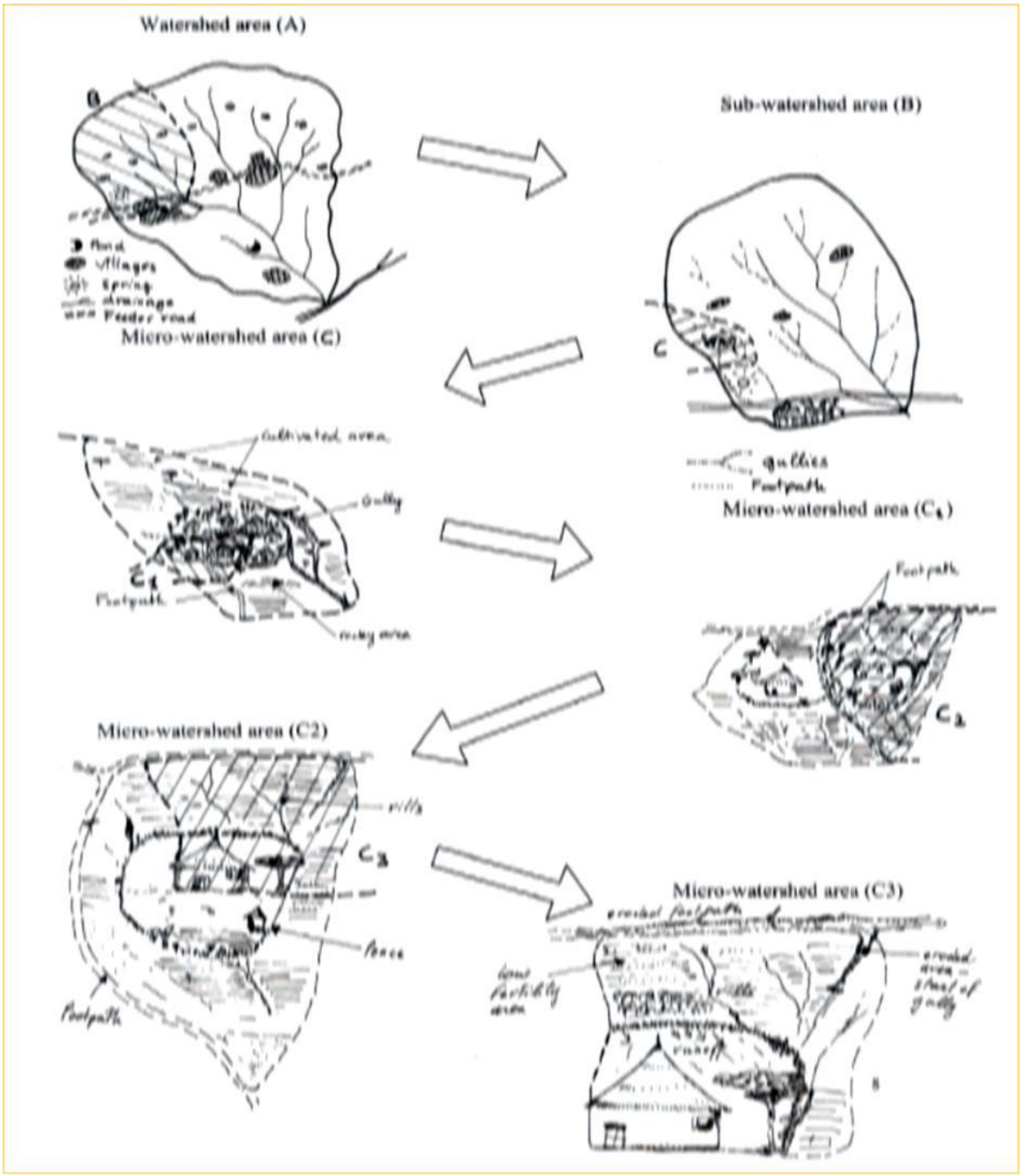



Figure 10: Watershed categories

TABLE 9: ANALYSIS OF POSSIBLE INTERACTIONS BETWEEN THE DIFFERENT SUB-WATERSHEDS OF THE MAIN WATERSHED

| Level | Description of watershed or sub-watershed | Interactions between sub-watershed units | Measures suggested to avoid negative effects and use runoff effectively to improve productivity |
|---|---|---|---|
| **C3** | Section of homestead showing the upper footpath, the eroded cultivated plot, the dry fence and part of the homestead compound. | Most of runoff scours a footpath and reaches the dry fence adding more water, to that from the neighboring higher and adjacent compounds. | 1. A double or triple row of vegetative fence in which the outer part consists of drought resistant/animal proof materials (euphorbia spp. etc.) + a series of small water collection pits linked one to another with a small stone spillway and planted with fodder/cash crops and shade/timber trees every 3 meters.<br>2. A paved stone foot path or with regular scours (every 1.5 m) + small diversions into a paved waterway linking to a micro-pond within homestead area (C2).<br>3. Mulching of infiltration pits and compost making.<br>4. Others. |
| **C2** | Section of 1 homestead showing micro-watershed of 300-500 $m^2$ surface leading to the lower portion of the compound and the cultivated land adjacent to the homestead. | Runoff from the compound to adjacent fields and footpath reach the lower part of the cultivated land near the lower fence of the homestead. | 1. Micro-pond construction using local materials (stone faced + local mortar, bricks, etc.). Use higher specifications if cement is available. Silt trap essential + a fence to avoid risks to children.<br>2. Hand-dug well if water-table is sufficiently high) within 10 meters) + stone/barrel ring, paved area and small canal for water flow to an irrigated area.<br>Conditioning and shaping area for horticultural production<br>4. Selection of crops suitable to markets – mostly non-perishable crops as market is distant. |
| **C1** | ○ Two extended homesteads with footpath above the cluster deviating excess runoff into cultivated land. Homestead area draining water into the lower boundary and cultivated fields.<br>○ Home with thatched roof, live fence only with few euphorbias and some eucalyptus trees. No compost, few livestock and one ox. | Runoff from the homestead and footpath drains into a small gully that links to a larger gully at the lower part of the (C) cluster, affecting the cultivated land of the cluster. | 1. In addition, treatment of 0.3 ha of cultivated land within fenced area with an infiltration bund and stabilization with different grass/legumes/cash crops + fruit trees on specific large ties + compost and mulch.<br>2. Section of the homestead area with 5 eye-brow basins for fruit trees and 5 multi-purpose trenches.<br>3. Row planting of crops in cultivated land + tie ridges on steeper part (testing) + zero-grazing for few livestock (demonstration). |
| **C** | ○ Micro-watershed includes a cluster of 7 homesteads and their adjacent fields (approx. 11 ha). Mostly cultivated land and small rocky outcrops, shallow soil used as grazing area (total 1 ha).<br>○ Homestead area threatened by nearby gully. | ○ Runoff across cultivated fields and footpath drains into gully that extends into fields within the cluster and contributes to the large gully of other fields below (village). | 1. Treatment of cultivated land with soil and stone-faced soil bunds and stone bunds. Trenches above soil bunds only on slopes >8% and bunds upgraded using fanya juu system. Bunds stabilized using mix of *Acacia saligna* direct sowing (double row), grass and pigeon peas. Sunflowers planted on trench or on lower bank of bund.<br>2. All HHs to make compost. Compost application needs to concentrate first 1-2 years along 2-3 meters of land above physical structures (maximum soil depth and highest water harvesting effect). |

| Level | Description of watershed or sub-watershed | Interactions between sub-watershed units | Measures suggested to avoid negative effects and use runoff effectively to improve productivity |
|---|---|---|---|
| | ○ Footpaths link the cluster to main village. Most homesteads have some eucalyptus plantations around them. Few shade trees. Cultivated land is mostly not fenced, but fenced near homes. | ○ Footpath becomes a small gully near the village as a result of runoff collecting from other areas.<br>○ Runoff from shallow soils and rocky outcrop used for grazing (above Cu) affects fields of 3 HHs and drains also into pathway and gully. | 3. Footpath to be completely stone- paved and away from small gully. Small gully treated with check dams + bush woods and head cut stabilization (stone carpeting, ripraps, and others).<br>4. Micro-ponds and/ or hand-dug wells dug in every HHs or some used jointly by more HHs to respect distance between well and avoid risk of overusing ground water<br>5. Joint cultivated fields fenced and linked to homestead fences.<br>6. Gully area converted into forage producing area and lower part of gully treated with 1 SS dam for poorest HH member in the cluster.<br>7. Shallow soil area used for grazing treated with stone bunds and infiltration pits for forage production and multipurpose crops in 30% of the area (test). |
| **B** | ○ Sub-watershed includes part of village No. 2 (approx. 200 ha). Hillsides grazed by HHs from this village only.<br>○ 1 Large gully dissects the area and expands to adjacent cultivated areas.<br>○ Presence of homestead clusters (mostly new settlers) on steeper parts of the area.<br>○ One spring available serving approximately 30% of the HHs with domestic water. | ○ Upper part of sub-watershed degraded (feeds main spring below).<br>○ Spring flow low in dry season. Grazing land depleted and not sufficient.<br>○ Lange gullies start from upper parts and cut through the different cultivated fields, including left side of cluster (C).<br>○ New settlers cultivate additional 10% of sloping degraded area (>30% slope) above village and cluster (C). Main feeder cut in three sections and needs repair. | 1. Treatment of small gullies with checks + stabilization.<br>2. Treatment of large gully with series of SS dams and conversion into cultivated/irrigated fields + some hand dug wells also possible between SS dams.<br>3. Overnight flow from spring stored into a relay system of micro-ponds for women's group income generation activities (IGA) + live fencing extended to as many HHs as possible.<br>4. Closure of 50% of hillsides during 1st year+ 25% 2nd year and 25% 3rd year + trenches and eyebrows for improved closure and replenishment of spring flow + recharge of water level in hand-dug wells.<br>5. Relay micro-ponds + cut-off drains at the foot for portion of hillsides near cultivated fields to provide supplementary irrigation during rainy season (upper part of closure treated with zero runoff trenches, lower part (20-30 meter strip) before reaching the cutoff drain area only closed) + silt traps.<br>6. Infiltration pits to further recharge water-tables at break of slope between hillsides and cultivated fields.<br>7. Micro-ponds, SS dams, use of spring priority to poorest HHs first.<br>8. Feeder road repaired and excess water guided into scour lines and drop structures feeding into micro-ponds near cultivated fields or into gully treated with large checks.<br>9. Compost making expended to every HHs + introduction of row planting. |

| Level | Description of watershed or sub-watershed | Interactions between sub-watershed units | Measures suggested to avoid negative effects and use runoff effectively to improve productivity |
|---|---|---|---|
| **A** | ○ Watershed includes (700 ha) 2 villages sharing communal grazing land on part of hillsides and major river outlet<br>○ The 2 villages included in the plan. For wider watersheds two plans (one for each village) need to be developed.<br>○ Three major drainage lines divide villages and large portion of cultivated lands are dissected by large and small gullies.<br>○ Homesteads partly aggregated to the main two villages and partly in small 2-5 homesteads clusters.<br>○ One main feeder road crosses the area and several foot paths link the two villages and the little clusters of homesteads.<br>○ Natural forests very limited, cultivation on steep slopes common, limited diversity of marketable crops.<br>○ First large market 20 km distance from villages.<br>○ One water pond and 1 spring available reaching approx. 50% of HHs – the rest have to fetch water from Muddy River (only 6 months flow) or larger river 12-15 km distance. | ○ Thirty percent of grazing land used by the two villages encroached on both sides (potential conflict).<br>○ Damage to main feeder road in various points.<br>○ Major water pond 40% silted and water of very poor quality – works only 6 months/year.<br>○ Large unproductive gullies threaten most fields as per cumulative runoff from hillsides.<br>○ Spring flow reduced every year. Drought years seem to increase number of affected people by 10-20% compared to previous drought.<br>○ Increased number of landless or farmers with small plots. | 1. If hand-dug wells construction expands urgent need to treat hillsides with trenches and eyebrows for maximum water retention and infiltration. Hillside terraces + tranches on stony areas also possible. Closures treated with trenches need to be handled on individual or small group's basis, for multipurpose use and related to different IGAs (compost makers, cash crops growers, bee keepers, basket making, fruit tree producers, and others.) + Certification.<br>2. Additional deep water pond possible, provided closure and gully treatment is achieved. Large double silt trap required.<br>3. Treatment of gully networks is to continue, targeted to assist poorest HHs, SS dams or SS bunds possible.<br>4. Treatment of cultivated lands with physical structures + compost application on infiltration zone + stabilization to extend in every cultivated land.<br>5. Systems of relay cutoff drain to feed micro-ponds close to cultivated fields also possible and recommended, particularly at the slope breaks. Micro-ponds and/or hand-dug wells in homesteads to expand and associated with row planting, introductions of cash crops and especially non-perishable high value crops.<br>7. Feeder road to to be repaired and assist in feeding runoff into fields (using drop structures and energy dissipation systems) or micro-ponds. Road side trenches also possible for shade tree planting.<br>8. Micro-niche development (see Carucci, V. 2000) near non-permanent stream possible for small scale irrigation during rainy season and productive land reclamation for poorest HHs.<br>9. Small runoff-run-on systems in abandoned land also possible for fodder production or low-fertility demanding crops.<br>10. Zia pits in degraded gentle sloping (crusted) lands also recommended at larger scale.<br>11. Joint watershed management committees and water management committees to be created.<br>12. Information system on markets required as integral part of water harvesting systems. |

### 5.8.5 Environmental and Social Screening of Interventions

#### 5.8.5.1 PRINCIPLES

The annual action plan for implementation of the community watershed plan consists of a number of discrete interventions planned, selected, scheduled prioritized by the communities. These are referred to here as Major Interventions for which the definition is provided in section 5.8.5.2, below. Although they are intended have positive outcomes, Major Interventions have sometimes done more harm than good, as a result for example, of poor design, selection of unsuitable locations, or a lack of integration between the Major Intervention and the surrounding environment or community(s).

To avoid such problems, it is necessary to check that each Major Intervention is environmentally and socially sound and sustainable. Fortunately, the specifications provided in this CBPWD Guideline already include good environmental practices. There are still, however, instances in which, depending on the environmental and social context, certain technologies might require the incorporation of site-specific mitigation measures into the final design so as to avoid negative impacts. In these instances, the onsite check, carried out at the final Major Intervention design stage, is known as 'Environmental and Social Screening', which we will abbreviate to 'Screening'.

Screening should be the responsibility of a *Woreda* specialist, but she or he may delegate it to the DA. Nevertheless, supervision and overall responsibility for screening remains at *Woreda* level. Ethiopia has laws and regulations addressing the environmental and social sustainability of such activities, e.g. Environmental Proclamations and related guidelines, the National Policy and Strategy on Disaster Risk Management (2013), the Federal Policy on the Environment (1997), the National Action Plan to Combat Desertification (2001) and the Climate Resilient Green Economy (CRGE), all of which are considered during the Screening procedure.

Some Major Interventions might require application of specialized procedures, for example those involving dam construction or pesticides. Suitable procedures approved by the Ethiopian government for such Major Interventions are annexed to this CBPWD Guideline.

In cases where a Major Intervention might have significant impacts that are complicated or difficult to predict, it may be necessary for it to be reviewed at a higher level before the final design is approved. When the screening procedure identifies such Major Interventions as being of environmental concern they will be submitted to the Regional Bureau of Environment and Forests (RBoEF) or its equivalent to establish whether an Environmental & Social Impact Assessment (ESIA) is required. The procedures to be followed in such cases will be determined jointly by the Regional or Federal Bureau concerned, and the agencies involved in the CBPWD program. They will take into account the requirements of the concerned Environmental Proclamation and related directives, the requirements of EIA Directive 1 of 2008 (*Directive to Determine Projects Subject to EIA)*, and the requirements of the program in which the Major Intervention is being implemented.

It is recommended that in general, Major Interventions likely to lead to involuntary loss of assets or resettlement not be included in CBPWD programs. But if they are included, they should be carefully managed and monitored by the *Kebele* and regional authorities to ensure, at the very least, that all negative impacts are avoided or fully compensated for and, and that no members of the community are worse off than they were before the Major Intervention was implemented. Attention should be paid to ensure that the social impacts of Major Interventions are positive and appropriate for the affected communities, especially those identified as being and particularly vulnerable or historically underserved.

### 5.8.5.2 DEFINITION OF A MAJOR INTERVENTIONS

To facilitate Major Intervention screening (and also M&E), it is necessary to determine, 'What constitutes a Major Intervention?' Since some activities cover a wide range of micro-scale interventions, often taking place in close proximity to each other, this important question needs to be addressed before the screening procedure can be finalized. There is no 'one size fits all' answer to this question; each of the DA and the various NRM interventions will have their own characteristics.

Where micro-scale activities with minor impacts are adjacent, they can collectively constitute one Major Intervention for screening purposes, such is the case for rangeland development activities within a contiguous area within the *Kebele*. But where one activity may have significant impacts of its own, such as developing a new water-point or SSI project, each activity constitutes a separate Major Intervention for screening purposes. Clear definitions of what constitutes a Major Intervention should be drawn up before the screening templates are finalized. In pastoral areas the same principle applies. In this guideline, the major interventions subject to screening is described as follows: -

**TABLE 10: DEFINITION OF WATERSHED DEVELOPMENT INTERVENTIONS CATEGORIZED FOR SCREENING**

| No. | Major Interventions | Definition |
|---|---|---|
| 1 | **Integrated physical and biological Soil and Water Conservation** | Interventions from 1.1 through 1.7 implemented in one contiguous area containing different activities from the different sub-interventions are screened as one under the heading **Integrated Physical and Biological Soil and Water Conservation** |
| 1.1 | Physical SWC | |
| 1.2 | Insitu Physical Moisture Harvesting Measures | |
| 1.3 | Surface Drainage Management Measures | |
| 1.4 | Gully Control Measures | |
| 1.5 | Biological Soil Conservation and Soil Fertility Management | |
| 1.6 | Area Closure for rehabilitation of degraded lands and management | |
| 1.7 | Agro-forestry and community forestry | |
| 2 | Wind Erosion Control Measures | One contiguous area containing many wind erosion measures |
| 3 | Structural Water Harvesting | Construction/rehabilitation of one new intervention, or of the extension of an existing water project |
| 4 | Water Lifting Technologies | One contiguous area containing many water lifting technologies |
| 5 | Small Scale Irrigation and Water Management | Construction/rehabilitation of one new intervention, or of the extension of an existing water project |
| 6 | Homestead and Livelihood Intervention* | Many livelihoods activities implemented in one contiguous area |
| 7 | Range Land Management Practices | One contiguous area managed by integrated activities |
| 8 | Feeder Roads | Construction/rehabilitation of one new intervention, or of the extension of an existing road constitutes |

Note: * individual activities will not have social and environmental impacts, but as the cumulative impacts of many livelihoods' intervention may exist different activities assessed together using livelihoods ESMF compliance methods

### 5.8.5.3 SCREENING PROCEDURE

**Part 1. Preliminary Screening**

Each CBPWD program should classify major watershed-based interventions identified during planning into three categories: Schedule 1, 2 and 3. According to Environmental Impact assessment guideline (2000), these different schedules are described as follows: -

Schedule 1: Interventions which may have adverse and significant environmental impacts such as large scale land reclamation, agricultural investments involving resettlement of 100families or more, large scale agricultural

mechanization, introduction of new breed, species of crops, seeds or animals, surface and ground water fed irrigation covering more than 10 hectares, drainage area of forestry lands or wild habitat covering an area of 10 hectares or more, river diversion and water transfer between catchments, etc

Schedule 2: Interventions having potential to cause some significant environmental impacts but not likely to warrant an environmental impact study. Examples include: wide spread introduction of fertilizers, large scale pest control programme, Surface and ground fed irrigation projects covering between 50 and 100 hectares, large scale protected forest reserves, intensive cattle rearing (> 50 heads), poultry (>500), large scale livestock fattening and beekeeping.

Schedule 3: Interventions which would have no impacts and does not require environmental impacts assessments such as all small-scale agricultural activities, surface and ground water fed irrigation covering less than 50 hectares, small scale protected and protective forest reserves, rearing of cattle (<50 heads); poultry (<5000heads), small scale livestock fattening and beekeeping.

**Part 2: Check for Environmental Concern**

This part will identify any aspects of the Major Intervention needing a higher level of scrutiny before it can be accepted and finalized. Typical issues could include major interventions:

- to be implemented close to areas of environmental sensitivity such as a national park, wetland of national and international importance, religious and cultural heritage areas, primary forests, areas which harbor protected, threatened or endangered species
- with dams;
- involving the use of pesticides, which may require an Integrated Pest Management procedure;
- involving medical waste; and
- with potentially significant negative impacts

**Part 3: Detail Screening**

This involves identification of possible adverse impacts and is conducted on site. The likely extent of each adverse impact is identified along with any mitigating measures required to avoid, minimize or manage it. If there are an excessive number of high-level adverse impacts, it will be necessary to refer the Major Intervention to the Regional authority for their attention. Otherwise the Screener will identify suitable mitigating measures for each potential adverse impact. The *Kebele* or community proponent will designate a person to be responsible for ensuring the mitigation measures are effectively implemented as specified, before, during and after construction. This will normally be the DA.

Annexes Part III, Annex 3 sets out a suggested template for Major Intervention screening, including typical potential adverse impacts that may need to be avoided, managed or mitigated in relation to various types of Major Intervention.

## 5.9 STEP 6: GETTING THE INTERVENTIONS APPROVED BY THE GENERAL ASSEMBLY

**Step 6 Getting the Options and Interventions Discussed and Approved by the General Assembly**

- Discussion with the community
- Discussion with the CWT from other communities

The draft **development plan must be prepared** that indicates the "what", "where", "when" and "how" of the selected measures. It outlines recommended measures selected by the CWT that are to be subsequently subjected to community review**.** This review must happen in a general assembly of the whole community in which their consensus and approval is achieved with respect to the adoption and approval of the proposed measures. In this way the Community Watershed Action Plan becomes a key document not only guiding the annual planning process but also assuring the community's participation in implementing the interventions.

Recognizing that climate change is not the only factor driving the prioritization of activities in the plan, a final check is recommended to ensure that the final plan is climate-smart and responsive to the issues identified in the climate analysis. Once these steps, which are discussed again below, have been fulfilled the development plan to be finalized.

### i. Discussion with the Community

**T**he CWT representatives should present the plan to the community, discussing each of its sections in turn and addressing the challenges encountered and the recommended solutions to these. The CWT should encourage people to express their opinions and raise questions and should also do its best to maintain a gender balance within the interventions. It is very likely that changes to the plan and other suggestions will be introduced that were not considered during the initial planning process. It is also likely that individuals and interested groups may change their minds or introduce additional ideas and suggestions during initial meetings. For this reason, sufficient time should be taken, not only to discuss, but to agree on the measures to be adopted. Particular attention needs to be given to those measures to be implemented on individually owned or usufruct lands.

### ii. Discussion with the CWT from other communities

The CWT should also consult and reach agreement with the communities located upstream, downstream or otherwise adjacent to them, about measures that need to be undertaken jointly to ensure that all watershed interactions are taken into account and acted on. This step is essential as these measures are often the entry point for multiple benefits. The role of the DA and of the *Kebele* level Watershed Team is especially important in the sequencing and prioritization these activities that are of mutual benefit for more than one community. To complete this exercise, draft plans must be revised so as to accord with the final agreement reached with the community. Each agreed measure/intervention must be described in detail including selection, technical design, inputs required, schedule of activities and possible expected benefits. See section 8.2. Organizing Watershed and Rangeland Intervention Plan.

This is the step in which the Community Watershed Team (CWT) and *Woreda* planning team prepare the community watershed development map, identify required inputs, set time frames for implementation, establish interim milestones and share the final plan with all concerned bodies.

## 5.10 STEP 7: ORGANIZING WATERSHED/RANGELAND INTERVENTION PLAN

This section provides how the activities done so far from planning step 1 to 6 will be compiled into a comprehensive strategic and operational plan. It involves the preparation of development map, determination of input requirement, detail action planning, establishment of interim mile stone and compiled full plan.

**Step 7 Organizing watershed intervention plan**

- Development map preparation
- Inputs for planned interventions
- Action plan preparation
- Establish interim milestones
- Reporting the prepared plan

### i. Development Map

The CWT must be able to identify on the ground the locations at which the various watershed development interventions are to be implemented. This development map is therefore, an essential instrument for identifying the actual locations and of all the types of development interventions and the existing land use types. This map will be used during implementation to determine the extent of the areas involved and the volume of inputs required. Points to be considered when preparing a development map include:

(i) The scale should be the same as that of the base map;
(ii) How the development blocks will be compartmentalized in accordance with phasing;
(iii) The locations of any major community assets and development works that have been previously implemented;
(iv) The proposed development works, including maintenance or rehabilitation of existing measures;
(v) Symbols showing the development interventions and other necessary information;
(vi) A standard legend that enables the user to easily read and use the map.

Typical examples of a Development Map, symbols for watershed base and development map are shown in Annexes, Part I and II, section 1.5.4.

Once it has been prepared an enlarged copy of the development map should be kept at the community and *Kebele* level offices for purposes of monitoring and building ownership in the project. As implementation proceeds the community and *Kebele* should identify on this map the areas in which the work has been completed.

### ii. Inputs

Once the preparation of the development map is completed, the next series of tasks include: (1) definition of the appropriate activities to be undertaken in each land use area and within each intervention category; (2) estimation and quantifying the work volume and required inputs for the multiyear plan as well as for the annual action plans, indicating specifically the timing for the supply of inputs. At this time the involvement and support of *Woreda* technical experts is essential in order to minimize any exaggerated under- or overestimation in quantifying work and input requirements for both multiyear and annual plans. The labor and material considerations that influence the amount of inputs include: the personnel required, surveying equipment, construction materials, seeds, seedlings, etc. The volume of these inputs depends on: the extent of the area in which work will be undertaken, the specifications for the work, the slope gradients, the soil texture and moisture and conditions and work patterns. For purposes of convenience during both planning and implementation, it is helpful to complete the input requirement action plan with the consent of the communities and using a table specifically prepared for that purpose.

### iii. Action plan

The multiyear watershed plan is used as a foundation document for preparing work plans and outlines the activities to be undertaken in years 1 to 5 (Annex 6). It should be thought of as a strategic plan for achieving long-term success. Annual work plans, on the other hand, focus on the specific actions that must be taken to achieve that vision. The

multiyear action plan should be carefully and accurately developed on the basis of the agreements with the community for the implementation of the proposed measures. It should include the first-year plan with complete details of the activities to be taken quarterly and monthly basis. At this stage the activities to be undertaken in subsequent years (2-5) are essentially strategic projections, to be adjusted and/or modified on an annual basis with the benefit of experience gained during the previous years' implementation activities and results. The action plan, including the schedule, and should be arranged both in consultation with the community and with concerned experts who may be more knowledgeable about the external supports and the types and availability of necessary resources. It should also embrace the overall capacity development needs of both men and women land users and development agents.

**iv. Establishing interim milestones:**

When designing an implementation schedule, it is important to establish interim milestones that will be used to assess the implementation of the activities included in the watershed plan. The milestones are usually indicated against relevant time scales: short-term (1 to 2 years), mid-term (2 to 5 years), and long term (5 to 10 years or longer). The following table provides examples that could serve as a common milestone in watershed management

| Possible milestones | Time frame |
|---|---|
| **---% of farmland area covered with planned activities** | 1 to 2 years |
| **---% of grazing lands with use plans** | 1 to 2 years |
| **---number of new springs emerging or increased volume of water from existing springs** | 2 to 5 years |
| **---% of degraded communal land rehabilitated and starting to be utilized with proper LUP in place** | 2 to 5 years |
| **Production and productivity increased by ---%** | 5 to 10 years |
| **% of communities reduced their risks of drought and floods (or % reduction of communities receiving food aid)** | 3 to 7 years |

**v. Communicating/ sharing the plan**

The watershed development plan should be submitted to the responsible organization in *Woreda, and to the Regions.* The items to be included in it are indicated in the box 5 below. Formats provided in the Annex 6 can be used for compiling the plan. If, however, the plan forms part of a project, a standard project report format should be used.

Box 5: ***A watershed development/management plan document***

At this stage, a plan should be completed and include: problem identification, socio- economic survey, biophysical assessment and base map, the development measures identified and the development map, input tables, an action plan and a schedule for implementation. The following points to be included in the plan document:

- Essential information about the watershed (extent, geology and geomorphology, land forms, soils, rainfall and distribution, vegetation types, settlements, population, land uses, weather and climate information etc.);
- Detailed descriptions of the characteristics of different land use types (limitations and potentials) of the sub-watersheds;
- Descriptions of the proposed interventions for each land use type;
- Climate Smart Analysis of the selected NRM and Livelihoods integration technologies
- A detailed activity plan with the corresponding budget for inputs, labor, community contributions and transport costs;
- Institutional mechanisms for implementation of proposed interventions;
- Community organizations or user groups that will be responsible for implementation of the activities and managing the results;
- Descriptions of the expected outputs and outcomes;
- Detailed mapping of present and post development land uses;
- Clear descriptions of the roles and responsibilities of stakeholders;

- ☞ Definition of training and other capacity development needs;
- ☞ The list of community and *WWT* members and their roles;
- ☞ Land use concept note describing the arrangements made for the utilization and management of the land during and after rehabilitation;
- ☞ GSD and Nutrition mainstreaming
- ☞ ESMF application
- ☞ Capacity development interventions
- ☞ Person days, capital budget and input requirement estimation
- ☞ While the final planning document will consider all the topics mentioned above, the planners must make every effort to ensure that the document is as brief, as clear and as handy as possible so that it is of maximum utility to the implementer's in the field

## 5.11 STEP 8: IMPLEMENTATION STRATEGIES

A work plan is the starting point for implementing watershed development but first requires the development of an implementation strategy involving: institutional/organizational arrangements, resource identification and mobilization, activity sequencing, consideration of gender and social aspects, identification of links with other projects and programs, and a capacity building strategy.

Step 8: Implementation strategies

- Organizational Management
- Resource identification and mobilization
- Capacity building
- Link with other projects and programs

### 5.11.1 Organizational Arrangement at Community/ Micro-Watershed Level

Once the plan is prepared, the next step is to determine the labor and material requirements which are mostly financed by the communities themselves. The assessment of labor requirements is based primarily on the established practices of traditional work parties. In this context the labor component may be thought of as a "**labor-based community watershed contract".** In this the resources are provided on the basis of self-help and/or other forms of assistance which can be translated into person days. The total cumulative person days can then be taken up as a credit that the able-bodied target group should "repay" to themselves or to the community as communal participatory actions, or to other specific groups (e.g. selected female-headed households and households headed by elders) that they themselves prioritize during a given year in terms of assets building for watershed development. **An essential step is to explore with the community and the different target groups their preferred options for implementing the watershed contract.** This can be part of a simple but effective participatory planning exercise, with the precise objective of making the best use of the contract that the group establishes for itself. The number of labor days available can be used entirely for community works (one option) or split into a combination of different sets of activities. For example, a given number of the labor days can be dedicated to achieving community-based interventions while other days may be set aside to build assets for needy individuals or to build their most productive lands/assets. Simple but highly powerful mechanisms such as the *wonfel* and similar working party arrangements can be adapted to fulfill such a contract and the preferred modality on how the target group will build such assets. There are countless possibilities that might be explored within the context of any labor-based community watershed contract. The most appropriate should be selected on the basis of each local situation.

In rural areas, there is great variance in the degree of sophistication, purpose and of timing or duration of the activities of traditional work parties, and even in the nomenclature used to describe them: jigii (western Oromia), jighe

(Gurage), and debo (in most parts of Amhara). These arrangements often involve significant numbers of people, even from relatively distant locations. Other variations of the nomenclature also exist, however. In Gurage for instance, there is a type of work party called *awule* which is applied to a full day's work on enset planting and hoeing involving an average of 10 people. Another type of traditional work party, usually involving a few close friends and/or relatives, coming together to fence, split wood, help in transportation, construct soil bunds, harvest grasses, hoe, plant enset, etc. This is known as known as *daboo* in Oromia, *gaez* in Gurage and *wonfel* in Amhara. These all generally entail immediate labor reciprocity. The basic principle that draws people together in such an arrangement is the presumption that working cooperatively increases per capita labor efficiency and ensures better quality outputs.

The following tasks and arrangements should be used for watershed planning and implementation. These are based on existing community work norms drawn from various parts of the country and from the implementation of watershed development interventions under different projects and programs: -

(i) Watershed development participants should be organized in work teams consisting of a minimum of 10 people, but depending on the complexity of activities, possibly including as many as 30. The work should be assigned to the entire work team, not to an individual. The number of work teams involved depends on the nature of intervention. There may be only one at a watershed site or, for larger projects/activities, several teams may be involved. Each team should be allocated the work it is expected to complete.

(ii) The composition of work teams should take into account the local cultural, gender and social norms. Thus, the teams should not to include: children under the age of 18, older persons over 60 years of age, the physically or mentally challenged, pregnant women, lactating mothers during the first 24 months after birth, primary caregivers of children under five who are moderately or severely malnourished, and other people who are temporarily unable to work because they are sick or malnourished.

(iii) Menus for farming system specific activities should be selected that can be undertaken using self-help resources and which would enhance household physical assets.

(iv) Households should be identified on whose holdings NRM activities can be undertaken in keeping with clearly defined watershed logic. This should be used to facilitate their organization into a number of *Wonfel* groups/watershed teams, so as to ensure timely accomplishment of the activity. The self-help activity should be linked to any other form of available support in different areas (highly food-insecure, for example).

(v) The *Wonfel* group members should be urged to contribute in kind to the tasks being carried out within their capacities and in accordance with the agreements made with them.

(vi) Eligible households should be identified for whom other assets are to be built using external support. The amount to be transferred to eligible groups should be determined as well as the effect of payments on the schedule.

*(vii)* Facilitate the accomplishment of agricultural/NRM tasks in and around the homesteads of disabled people following the spirit of *Wonfel*.

### 5.11.2 Decision-Making and Role of Women and Other Vulnerable Social Groups and Households

Watershed development should strive to ameliorate the position of women in general and female-headed households in particular. This point is related to the tasks and arrangements outlined above but emphasizes the use of a combination of self-help and other forms of assistance interventions to support women-headed households and other labor-poor households. The case is also made for people who are unable to build significant assets through work but who are able to manage them; for example, the elderly, the partially disabled, and others.

The first and most important aspect of involving women in the watershed management starts from ensuring their active participation in watershed planning. They should be adequately represented in smaller planning units such as the CWT and larger planning approval process (i.e. The community's endorsement of the watershed plan). This is mainly because watershed activities identified and prioritized by women might differ from those prioritized by men and other groups. The implementation plan should also consider the context of women and other vulnerable social groups and households within the community. Watershed management should consider community support and free labor contribution for the rehabilitation of degraded lands of labor poor female-headed households, people with disability, elderly headed households and other labor-poor households. The composition of the work team for watershed management may be organized in two modes; mixed groups including both men and women, and standalone women's groups. In both the many other family responsibilities falling to women must be respected with flexible time arrangement such as allowances for late arrival and early departure to and from the watershed sites. In the case of mixed groups, women should be given half as much work as men and engaged primarily in less physically demanding activities. In the standalone groups, women should be primarily be engaged in less physically demanding activities such as nursery management. Women who should be exempt from watershed development activities include those who are pregnant and lactating and might be attending pre and post-natal courses, or those caring for malnourished children under the age of five. Childcare centers should be provided at the work sites and the appropriate breaks provided to allow for breastfeeding.

### 5.11.3 Link with Other Projects and Programs

It should not necessarily be assumed that the household contribution is sufficient to build the required assets on their land holdings without additional support. The feasibility of their being able to achieve this must first be verified on the basis of local conditions. Although some assets can be built using only the contribution of a local labor force, this may not possible in the case of larger scale integrated and multiple assets. Efficiency in the undertaking of multiple productivity enhancement functions can often only be achieved through economies of scale and integration between activities.

Large parts of the country consist of degraded and food-insecure areas requiring the implementation of multiple, often larger scale, activities in order to pass the test of quality. The impacts of few small and widely dispersed activities generally remain limited and ineffective for addressing the overall problems. The problems of households, however, are multiple and interrelated and as a result the solutions should also be multiple and integrated. Accordingly, the vulnerable *Woredas* should plan on the basis of a broad network of properly selected and designed watershed plans and activities. These should be based on: the number of vulnerable people, their food gaps and other problems, the priorities established with them and the available resources. This is very important because most of the food-deficit and drought-prone areas, particularly in cultivated zones, are also the ones most affected by severe soil erosion and experiencing the highest rates of land and other environmental degradation. Consequently, the main focus should be on conservation and water harvesting initiatives, both to increase the land productivity and to protect and improve infrastructure (roads, water reservoirs, etc.).

The case for building a critical mass of assets to overcome food insecurity is very important and for this reason the WWT, KWT and CWT should carefully and assess the conditions in the various land use zones to determine the need for additional resources to treat degraded areas. There may thus be differences between watersheds in respect of the projects and programs selected to solve their respective problems. It should also be kept in mind that planned projects or programs in a given watershed should also contribute towards any adjacent and already designed multi-year watershed development plans. As with regular government activities, these three entities will also have to develop their own annual work plans so as to ensure that the different intervention activities contribute towards common goals as established in the multi-year watershed development plan.

Hence, whenever additional resources are received by their areas, the DAs should ensure that any work plans for these interventions are aligned to the strategic plan of the respective *Kebele*. For example, at the moment there are programs such as the Productive Safety Net Programme, the Resilient Land and Livelihoods Project, NGO activities on food security and disaster management, and others working on watershed management. The resources made available through these programs and others can only be used efficiently if they are integrated into the multi- year watershed development plan.

### 5.11.4 Capacity Building

Capacity building is one of the major strategic elements for watershed implementation and can be approached from three perspectives; individual, organizational, and systematic.

a. Individual Capacity Building

The activities identified and prioritized through watershed development include various conservation technologies that demand an understanding of both the theoretical background and the practical application. Hence, a strategic capacity building plan involving, training on various technologies, experience sharing, and various job embedded capacity building activities should be included in to the annual watershed development plan. The identified capacity building activities should be based on proper identification of needs and include a clear cascading plan to reach the grass roots level implementers (CWT, DAs and Foremen/women).

b. Organizational Capacity Building

The building blocks for any organizations consist of the institutional arrangements, the physical facilities and the human resources. The MoA has good institutional arrangements down to the grass roots level; however, technical committees and task forces established to support watershed development at various levels need strengthening. This is particularly the case for the community watershed teams and the *Woreda* watershed technical committees who must take on responsibilities for which they are not necessarily equipped or qualified and consequently have to be furnished with the necessary physical facilities and technical skills.

c. System Development

The systematic approach to capacity building is fundamental to watershed development. For this to be achieved there must be a systematic approach to support both the individual and organizational capacity building. All capacity building materials for individuals should be developed on the basis of adult learning principles and be ready for use before any training is conducted. The systematic component of the organizational capacity building should include the following:

- A watershed development tracking system supported with GIS technologies;
- Clear procedures for compilation and documentation of best practices;
- Establishment of mini-libraries containing relevant catchment management documentation at *Woreda*/Kebele level;
- Clearly defined physical resource inventory procedures for better allocation of resources.

Various findings from regular and ad hoc reviews and evaluations indicated that pastoral regions for example, Afar and Somali, need special technical support to execute rangeland and watershed development activities to the required standards. Capacity gaps prevailing in pastoral areas arise mainly because most front-line staff lack the required expertise and/or skills in their fields and as a result the institutions are weak and lack the capacity to help respective *Woreda* and *Kebele* staff develop the required skills. This is largely because the harsh environment is a challenge to

the commitment of staff, which combined with the lack of proper induction methods and adequate retention measures, results in high staff turnover and frequent loss of competent staff. As a result, exclusive capacity building support schemes need be designed to diminish capacity gaps in planning, implementing and monitoring of watershed and rangelands development in pastoral areas. The regional governments these pastoral areas still need a comprehensive and wide-ranging capacity building program to enhance their implementation capability and the competence of the various regional experts down to the DA level

### 5.11.5 Establishment of Community Watershed Users Association

The need for, and composition of, the CWT is mentioned earlier (in step 2) as one of the key groups responsible for overseeing the planning and implementation of watershed development activities at community level. Despite many positive results obtained using these working arrangements frequent challenges and obstacles have however be encountered, which have undermined their performance and demonstrated their limitations. Included in these have been the critical issues of their inability: to enforce local by-laws, to formally open bank accounts, to make contract agreements for business, and to establish formal communications with other partners and government agencies.

It is essential to overcome these constraints as promptly as possible thereby enabling the communities to be able to effectively plan and implement their own watershed development activities. The precondition for this is the creation and legalization of the necessary community structures. With these in place it is then essential to provide the capacity development which will enable them to: identify and analyze problems; initiate planning activities; define financial needs and financing mechanisms; and finally, to implement remedial measures and management practices for the sustainable utilization of the land resources in their watershed. Consensus has been reached both at regional and federal level concerning the necessity and importance of these measures.

A principle means of institutionalizing and legalizing the CWT is to form a Community Watershed Users Association (WUA). This can be achieved simply by following the applicable national and regional level norms and regulations. Once this institution has been established in consensus with the community, most of the responsibilities of the CWT and additional responsibilities will rest with this association. Depending on the financial and human resources capacities of the community and available external supports, the association needs to consider having office, minimum administrative/financial staff and other personnel (e.g. a community facilitator).

The WUA must ensure or respected the following basic principles wherever there is voluntary provision of participatory community labor in targeted micro-watersheds:

- Provision of labor will be based on watershed management plans prepared with and agreed by the respective Community Watershed Teams (CWT) and approved by respective WUA;
- Labor incentives will be provided in the form of investments by the *Woreda* in community infrastructure, to be identified in the watershed management plans through a community-driven development approach;
- Un-paid labor for implementation of watershed development and management plans will only be provided by members of the respective WUA;
- Provision of labor for watershed development and management activities should not negatively affect anyone's ability to sustain their immediate or long-term livelihood, and should lead to direct or indirect benefits for the participating households;
- The voluntary nature of the provision of labor will be documented; and

- The voluntary nature of the provision of labor will be verified through the Social Accountability Program at the *Woreda* level.

### 5.11.6 Establishing User Groups

There are many IGA activities that result from watershed rehabilitation works and it is advisable to think about how best to implement interventions such as the formation of user groups with an effective approach that ensures group effort that will maximize the profitability and sustainability of their ventures. Examples of such ventures includes the management and utilization of rehabilitated closed lands by otherwise unemployed youth groups who may be engaged in beekeeping, livestock fattening or some other viable activities, which provides them with benefits while ensuring the sustainability of the investments made in rehabilitating the closed area. The group approach is also a preferred implementation modality for expanding climate smart and risk reduction activities (CSA) on individual lands. This is particularly the case where technical support initiatives can be made more effective and efficient by encouraging farmers with adjacent land holdings to engage in CSA activities as a group.

### 5.11.7 Sequencing of Activity Implementation

In the multiyear plan the implementation of the proposed activities should be phased sequentially over the years of the project each forming part of a specific annual action plan and not be done randomly or haphazardly. When preparing annual watershed operational plan, it is advisable to consider the following minimum scientific and social criteria for sequencing of activities.

- In the first couple of years it is wise to assign more importance to rehabilitation activities than to livelihood interventions (For instance, water use interventions depend on the initial achievement of water harnessing activities, likewise fattening activities are the result of achieving improvements in fodder biomass production);
- Priority should be given to overcoming constraints that seriously affect health, as success in overcoming these is likely to significantly boost the community's commitment and interest (e.g. If a community is in dire need of clean water and there is the opportunity to re-establish a spring by rehabilitating its recharge area, this should be given priority).
- Considerations should be given to the available human and financial and resources and the community's level of commitment during the annual plan preparation: while it is good to be ambitious, it is equally important to be realistic;
- There is great benefit to be gained from organizing experience sharing events between communities as apart of capacity development activities, particularly where one community can offer exemplary organizational planning and implementation experiences while the other is only initiating their watershed interventions;
- Care must be taken not to interrupt activities once implementation has started, as doing that might prove more costly than not starting the work at all (This is especially important where there are activities that must be completed during a specifically planned period and which would be damaged if left for the next season - e.g. check-dam construction without completing upstream water conservation structures, or leaving gullies untreated on farmland and assuming that the labor and other costs will be covered by the owner).

# 6 PARTICIPATORY AND RESULTS BASED MONITORING, EVALUATION AND REPORTING (P&RBM+E)

## 6.1 The Essence of Monitoring and Evaluation

One can readily understand the significance and importance of measuring progress towards the achievement of objectives using predetermined and quantitative indicators from the statements provided below.These reflect the thinking of development practitioners interested in making RBM+E an integral part of development interventions.

- If you don't measure results, you cannot tell success from failure;
- If you cannot see success, you cannot reward it.
- If you cannot reward success, you are probably rewarding failure.
- If you cannot see success, you cannot learn from it.
- If you cannot recognize failure, you cannot correct it.
- If you can demonstrate results, you can win public support.

Thus, it is important to adopt this concept of measuring results for the effective management of watershed and rangeland development interventions in contrast to conventional M&E system whereby the focus is activities monitoring and reporting. Hence, in RBM +E the focus is both on activities and results measurement. This entails that the CBPW/RD need to have an M&E system that shows logical relationship across the expected results from the implementation of watersheds/rangelands management interventions at micro-watersheds and sub-kebeles respectively, methods how to measure them and their use for informed decision making. It will also help to learn from weakness, optimize use of limited financial resources and person days in the planning and implementation process for effective and sustainable watershed and rangelands development.

Monitoring measures progress towards achieving a given plan, project, program or policy objectives. It enables the tracking of progress towards the achievement of the desired results over time and enables informed decisions to be made regarding the integrity and efficiency with which the financial resources are being used and the effectiveness with which planned activities are being implemented. It constitutes a periodic function over the course of the implementation of planned activities managed mainly by internal institutions and their staff. By doing so, it provides timely and accurate information for the community, government bodies, development partners and other principal stakeholders on the implementation status of planned activities/interventions, as well as progress towards the desired changes.

On the other hand, evaluation measures the extent to which changes brought within watersheds or sub-kebeles is because of the plan/intervention under consideration or other factors. It is used to measure how well an intervention/plan has met planned and expected objectives. In most cases, it is done by an external body with the ability to provide an objective view of plan/project achievements. In doing so, the primary aim is to determine the relevance and fulfilment of the objectives, development efficiency, effectiveness, impact and sustainability of a given watershed/rangeland development intervention. Thus, it is important to determine changes in the community's attitudes and behaviour towards, and use of, their land, water, pasture and other resources that can be attributable to the CBPW/RDP.

The basic reasons for doing evaluations are to confirm the policies under which the initiatives/plans have been implemented, and to be able to answer public accountability issues at least in relation to the use of public finances, but also in terms of benefits to the community. An important secondary purpose is also to be able to benefit from the lessons-learned in planning and design, community involvement and implementation strategies, and resource management issues, which can then be used in planning, design and management of future initiatives.

## 6.2 Setting the M&E System

In setting of the M&E system, it is crucial to follow systematic and agreed procedures, timetables and data collection tools in relation to the achievement of specific and quantifiable performance indicators. In the case of an ongoing

development intervention it enables the financing and management institutions involved, or whoever has monitoring responsibility, to provide timely and accurate information for the community, government bodies, development partners and other principal stakeholders on the progress towards the desired objectives.

Moreover, the M&E system will generate, aggregate and systematically record data and information from various levels (Regions, Zone, Woredas, Kebeles and Community-watersheds) as well as qualitative and quantitative surveys related to the project's outcome/results indicators, implementation progress and performance, and project characteristics. This information will be collected periodically to track implementation progress, identify bottlenecks for quick resolution, monitor process quality and analyse results.

In order to monitor, evaluate and report watershed/rangeland development intervention successfully, the M&E system should provide a proper guidance on how to set watershed/rangeland development objectives, develop indicators, determine baselines, set targets, design evaluation methods, methods of data recording, documentation and scaling up, reporting and use of monitoring.

### 6.2.1 Determining Objectives

The watershed and rangeland development plan objectives are designed based on the problem analysis conducted all the way through application of the participatory planning steps provided in this guideline. It is just like a solution for the problems and challenges identified within watersheds and rangelands through community participation. The overall objectives for implementation of a watershed/rangeland development plan/project or program will be depicted in a hierarchical structure that will have the following (see hierarchy of objectives from table 11):

1. **The Impact** – is the ultimate objective of the plan/project/programme i.e. the sustainable change of status among the beneficiaries such as improvement in HHs income, livelihoods and resilience to shocks in the face of climate change
2. **The Outcomes** - represent the changes directly attributable to the successful establishment of organizations, policies, programs or initiatives that singly or jointly contribute to the impact. For example, increased production and productivity of watersheds/rangelands (crop & livestock productivity) is part of an outcome;
3. **The Outputs** – represent the products and services derived from the activities of organizations, policies, programs or initiatives that contribute to the achievement of outcomes. In watersheds/rangelands these included developed water points for drinking and irrigation, areas of degraded lands rehabilitated etc;
4. **The Activities** – represent specific actions in capacity building, construction, the rehabilitation etc., that singly or jointly contribute to the required outputs. For example, capacity building training on watershed management, implementation/ construction of different soil and water conservation activities constitute an activity.

### 6.2.2 Setting Indicators and Developing Performance Management Framework

The M&E plan provides methods and approaches in which indicators will be monitored and evaluated to ensure effective M&E for the CBPW/RD. They may be quantitative measurable (measurable) or qualitative (observational) although quantitative indicators are preferable as they provide more accurate and defensible measures of change and progress. A performance indicator is neutral; it does not indicate a direction or change nor incorporate a target. It indicates how closely one aspect of an intervention is achieving its desired outcome. For example, **yield per hectare** is an indicator that does not indicate nature of change nor a target. The following themes should be considered in the process of developing indicators:

- The number of indicators should be reduced to the minimum necessary to meet the key management, learning, reporting and decision-making needs;
- Adequate time should be allocated in the planning process to engage stakeholder participation in the identification of indicators;
- Should be done by competent personnel with the requisite expertise in the design and application of M&E systems.

In relation to each indicator means of verification (MoV) must be identified which forms an essential element of the M&E plan for the overall watershed/rangeland development plan. It identifies the types of data to be generated, the sources of data, the methods of data analysis, the frequency of data collection, the body responsible for data collection, analysis and management; and use of information generated. This is summarized in what is called 'Performance **Monitoring Framework (PMF)' provided as an example and to be contextualized (**see Table 11 below).

The PMF shows the indicators that will be used to measure the achievements of the impact, the outcomes, and the outputs, how these indicators will be verified, how often and by whom. Its use will address whether inputs and activities incorporated in the watershed/rangeland development plan are in compliance with design budget, work plans, and schedules.

**TABLE 11: KEY NATURAL RESOURCE MANAGEMENT RELATED INDICATORS WITH DETAILED PERFORMANCE MONITORING PLAN**

| Hierarchy of Objectives | Indicators | Means of verification | | Frequency | Responsible Body | Information Use |
|---|---|---|---|---|---|---|
| | | Source of Data | Methods of analysis | | | |
| Impact<br>Improved HHs income, livelihoods and resilience to shocks in the face of Climate Change | Changes in household income and livelihoods<br><br>Changes in household adaptive capacity and resilience to climate related shocks | Household Survey | Use of IE methods | Two and half Years or more after implementation | Evaluation Expert | |
| Outcome<br>• Reduced Carbon emissions<br>• Increased Production and Productivity<br>• Improved Soil Fertility | Quantity of above and below ground carbon accumulation | Field Data Collection | Soil Laboratory Analysis<br>GIS application | | Carbon Expert | To measure progress towards outcome<br><br>To determine whether the watershed development is benefiting the community<br><br>To take corrective action |
| | Changes in biomass of the watersheds rehabilitated | Field level measurement | Amount of rainfall modified by local topography and drainage properties<br>DBH measurement | | SWC Technical Expert | |
| | Changes in vegetation cover | Satellite images | Land use land cover change | | GIS technical Expert | |
| | Improved crop productivity for major cereal crops in the rehabilitated watersheds<br><br>Improved productivity of livestock | CSA production data<br>Household Survey | Use of IE methods | | Evaluation Expert | |
| | Amount of reduced soil erosion in metric ton | Field level measurement | Revised Universal Soil Loss Equation (RUSLE) | | SWC Technical Expert | |
| | Amount of reduced runoff | Field level measurement | Curve Number hydrological model SCS-CN | | " | |
| Output<br>• Enhanced community infrastructures<br>• Enhanced environmental Rehabilitation<br>• Improved water supply for | Land area restored or reforested, Number of water points developed by types of service and number of beneficiaries, Increased area under irrigation | Monthly, Quarterly and annual Physical and financial reports at *Kebele*, *Woreda* | Compare target against achievements and analyze relevance, effectiveness, efficiency and sustainability of | Quarterly and annually | DAs | Informed decision making about quality of implementation |

| Hierarchy of Objectives | Indicators | Means of verification | | Frequency | Responsible Body | Information Use |
|---|---|---|---|---|---|---|
| | | Source of Data | Methods of analysis | | | |
| human and livestock consumptions | | and Regional levels | activities implemented | | | |
| Activities | Bio-physical SWC technologies, Forestry and Agro-Forestry activities, Rangeland Management, Water development for domestic and irrigation, Community roads construction, Nutrition sensitive watershed development activities, Capacity building (human and institutional) | | Compare target against achievements | Monthly, Quarterly and annually | Das | " |

Once objectives with indictors and MoV defined, it is necessary to determine the baseline condition, set targets and decide on the M&E system that should be adopted for measuring results.

### 6.2.3 Setting baselines

Baselines provide the essential quantitative or qualitative information on the conditions relating to the indicators at the beginning of, or just prior to, the implementation of an intervention or watershed/rangeland development plan (i.e. conditions of watersheds/rangelands before any initiative). It involves the collection of data during or before the start of the intended intervention. There may be indicators which don't require the collection of baseline data. In those instances, the baseline may simply be zero or may be reflected in the achievements of the most recent year for which relevant information exists or can be acquired. The baseline requirement and data available in a community watershed/rangeland should to a large extent be established using the socio-economic and biophysical survey conducted during the development of watershed and rangeland strategic plan (Refer to annexes, Part III annex 5 ). For specific impact evaluations detailed and separate baseline can be established or conducted as deemed necessary especially for indicators that might not be included during the analysis in planning step 3. The *Woreda* watershed technical team & DA are expected to summarize the data in a tabular form.

### 6.2.4 Setting targets

The targets indicate the planned level of results which are to be achieved within an explicit timeframe (quarterly, annually, interim, or over a five-year period). It thus consists of quantitative or qualitative indicators of the results (at the level of impacts, outcomes and outputs) that the community, government representatives (experts & DA) and financing organizations want to achieve in a given time. In setting targets, following considerations should be taken into account:

- Status of the baseline situation before the beginning of the intervention;
- Historical trends in the value of the indicator over time;
- Urgency and level of the development challenge based on expert judgments and research findings;
- Experience from other similar programs (lessons learned);
- Implementation capacity (community commitment, availability of external resources, available expert-time, etc.).

### 6.2.5 Setting evaluation methods

One other important aspect of an M&E system is setting of evaluation methods on how to assess the achievement of expected results associated with watershed and rangeland activities intervened at micro-watersheds and sub-kebeles level. As mentioned above, the key variables to be considered in evaluation are relevance, efficiency, effectiveness, impact and sustainability of development interventions. For watershed and rangeland interventions, the relevance measures whether the prioritized and implemented technologies reflect communities need or not. Efficiency is all about whether the resources (human, financial, material etc) invested for watersheds and rangelands development used optimally to achieve the desired objectives (inputs used compared against outputs generated), while effectiveness is concerned with attainment of objectives regardless of the way resources are used (outputs/results generated compared against results expected).

As to impact, in most cases changes brought by any interventions are determined based on comparing treated watersheds/rangelands with untreated one (treatment vs control). But it is unethical to treat one watershed/rangeland and leave the other for comparison purpose. Even it is more challenging in Ethiopian context whereby all communities engage in the rehabilitation of their micro-watersheds and development of rangelands, the so-called mass labour mobilization for natural resource management purpose every year. Also, it is difficult to establish control sites due to varying agro-ecologies indicating that it is not possible

to establish control micro-watersheds especially for bio-physical impact parameters. But, if conditions allow, it is possible to establish such micro-watersheds for socio-economic impact variables. Thus, the impact evaluation methods for assessing biophysical impact parameters should generally be based on what is called dose effect analysis (analysing the differences in extent, quality and amount of interventions within a given watersheds), or to focus on the with and without the intervention approach.

To do impact evaluations, a theory of change should be developed for a given intervention based on the expected and projected changes within the micro-watersheds and sub-kebeles. For example, biophysical soil and conservation measures will have direct onsite, intermediate and long-term impact as described in table 12 below which helps in the analysis of results expected to be generated from watershed and rangeland interventions.

**TABLE 12:SAMPLE THEORY OF CHANGE FOR BIOPHYSICAL SOIL AND WATER CONSERVATION AND RANGELAND INTERVENTIONS**

| Watershed Development Interventions | Output | Direct Onsite Impact (immediate impact) | Intermediate Impact | Long term Impact |
|---|---|---|---|---|
| **Biophysical Soil and Water Conservation and Rangeland Management** | Area (ha) of land treated/rehabilitated | • Reduced soil Erosion<br>• Reduced excess runoff on to cropland<br>• Improved soil Fertility<br>• Increased Moisture Holding Capacity<br>• Arrested loss of land<br>• Improved/ increased vegetation cover<br>• Area reclaimed (Increased total available productive land) | • Increased crop and livestock Productivity<br>• Increased availability of forage for livestock and bees | • Increased household income<br>• Reduced Mal-nutrition Rate<br>• Reduced vulnerability to shocks<br>• Increased dry season flows<br>• Reduced flash flooding<br>• Reduced Sedimentation<br>• Improved/increased biodiversity (fauna and flora) |

Also, as part of evaluation it is important to measure sustainability of watersheds and rangelands in order to know what happens to community watershed development intervention and what determines the long-term viability of implementation results. The sustainability of any project depends on whether the positive impact justifies the investments expended, and whether the local community values the plan/project sufficiently to be willing to devote their scarce resource to continuing with its support and maintenance. The answer to this lies in knowing what motivates communities to continue to own and rehabilitate their watersheds and rangelands after the completion and phasing out of intervention activities, which had been implemented in their areas? This analysis can be done using the following four aspects of sustainable watershed development:

- **Technical Sustainability:** The achievement of technical sustainability is the most important determinant of sustainable watershed rehabilitation. NRM interventions using proper standards for the layout and construction of physical structures will result in greater operational success for the rehabilitation of the environment. DAs should focus particularly on the designs and standards for the various intervention technologies described in this guideline
- **Economic Sustainability:** Economic sustainability of watersheds frequently depends on the existence of ownership rights; i.e., whether the rehabilitated gully, hillside or farmland is owned communally or through legal certificate by a private individual or individuals. There are always differences in sustainability of rehabilitated watersheds belonging to private individuals or those owned by the community. In general, where these resources are in private hands they are more sustainable than where they are under common ownership. In order to ensure economic

sustainability of community lands therefore, it is essential formulate a community agreement on: (i) ***how the rehabilitated environment will be utilized and protected*** and (ii) ***how the benefits derived from project intervention shared.***

- **Social Sustainability:** Social sustainability is the ability of any social system, such as a community in a watershed to indefinitely function at a defined level of social wellbeing. Socially sustainable communities are equitable, diverse, connected and democratic and provide a good quality of life for its members. DAs and *Kebele* administrators need to ensure that developed watersheds should have not to be a source of conflict, inequality and tension among the community and ensure the establishment of watershed/rangeland users association.
- **Ecological Sustainability:** Ecological sustainability of a watershed can be determined by looking at and analyzing the extent to which degraded land has been rehabilitated, with increased forest cover, reestablishment of absent wildlife, improvements in rainfall patterns and increases in water availability.

### 6.2.6 Data Recording, Documentation, Scaling up and Knowledge Management

In highly decentralized and demand-driven programs, a comprehensive Monitoring and Evaluation (M&E) system is very critical to assess and document timely progress towards outputs, outcomes, and intermediate results. Moreover, it is important to identify implementation gaps and challenges for proactive corrective actions; and document and incorporate lessons learned and captured during the implementation periods. Under the context of watershed/rangeland development intervention, monitoring and recording of implemented activities starts at community level and expected to be done through conducting on site direct observation, discussions and meetings based on annual watershed development plan.

Moreover, the quality of annual watershed plans developed at community level and later compiled at the Woreda also generally do not meet quality standards. Lack of proper data recording and documentation at the community watershed level has been identified as one of the main causes for these challenges. It is essential therefore to establish working arrangement and to make available a simplified data recording book or templates with traceable file documentation arrangements at both community and Woreda level. All stakeholders must pay close attention to this starting from the planning stage. This includes the Woreda Technical team, the DA and the CWT members. If this task is handled properly with a functional participatory M&E process that includes timely and quality reporting the subsequent planning processes will be easier and smoother. Frequency of data collection varies from one administrative hierarchy to the other. Implementation status of activities at micro-watersheds will be tracked on monthly basis, while, Woredas & Regions compile these achievements on quarterly basis and submit to the federal using quarterly achievement reporting template (annex 7, table 7.1). As part of monitoring, the federal will organize a bi-annual CBPW/RDG planning and implementation reviews based on per-defined survey tools. Similarly, the federal will conduct a mid-term and final evaluation of watershed and rangeland development interventions within sample micro-watersheds and sub-kebeles respectively.

Due attention should also be given to watershed/rangeland knowledge management to facilitate learning and scalability of successful technologies across micro-watersheds/sub-kebeles, Woredas, and Regions. The federal should have to adopt the SLM best practice compilation technique to document and scale up technologies. NRM should have to generate both types of data; geo-spatial and non-spatial, thus necessitating the establishment of GIS supported IT system for data management, dissemination and communication.

### 6.2.7 Reporting and use of monitoring

As the prime purpose of M&E is to serve as a management tool, performance progress and findings and the status of data collected must be reported on periodically, systematically and in a timely manner. The reports

produced are generally of two types: (i) those that compare watershed plans vs the actual achievements and (ii) separate indicator reports for various levels of objectives (output-outcome-impact). The former has been largely produced in NRM in the form of activities reporting. However, it has frequently been criticized for being incomplete, inaccurate and for not having been submitted in a timely manner by the various stakeholders. Thus, Regions, Zones & Woredas should make at most effort to ensure quality and timely reporting at grassroots level.

As to the latter, generally there is limited attention as the focus is only on implementation activities. But now a days there has been an increasing tendency to learn about results of implementation making RBM&E central to development agenda. As per this new orientation, reports should also focus on indicators. At least Woredas and Regions has to provide progress on output level indicators as far as the data is available in their premises. As a guide refer to box 6 below on how to do M&E reports using indicators set to measure watershed/rangeland interventions implemented at micro-watersheds and sub-kebeles level respectively. at

***Box 6: Content of M&E reports***

- Introduction (background to intervention, context of intervention area, purpose of report, M&E questions, and information about goals and objectives);
- Methodology of the M&E (M&E focus, data and data sources, data analysis, when and by whom the M&E was conducted, and limitation of the methodology);
- Key achievements of target activities, milestones and indicators in a tabular format organized around major results;
- Major challenges;
- Conclusions and recommendations;
- Annex (pictures and case stories).

Woreda and Regional level should be produced using contents provided in box 6 below.

The report needs to have reflection on the socio-economic and biophysical changes attributable to watershed and rangeland development plan implementation. It should have to give enough descriptions on the following key issues:-

- Identify what was achieved and what were the indicators of success;
- How actual results compare to expected results;
- Quantifying achievements whenever possible;
- Consistency (between sections);
- Balance (good and bad);
- Illuminating findings with quotes, testimonials, photos, etc.;
- The reasons for over or under achievement;
- Any unforeseen problems or opportunities that may require new strategies or a redesign of initiative;
- The involvement of others (partners, stakeholders and beneficiaries) and degree of attribution (if possible);
- Enough data to describe the effects of activities undertaken; and
- Clarity (inclusion of source)

The flow of information be it activities or indicators-based reporting should be from the grassroots level to the higher as depicted in figure 15 below. There should also be a feedback mechanism that suggest for any improvements in the reports coming from the grassroots level.

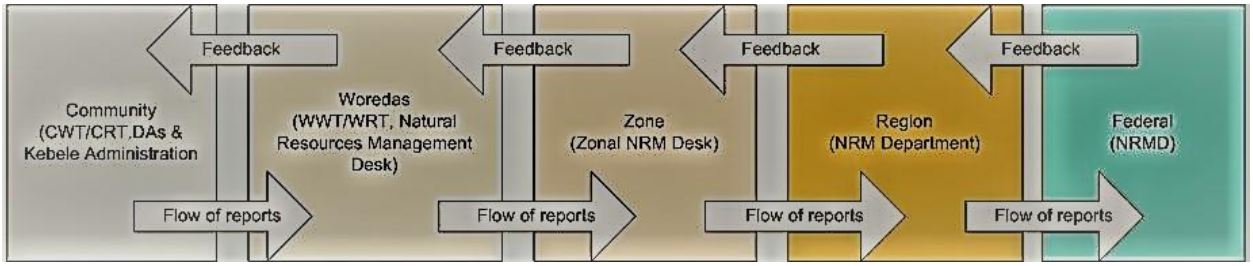



**FIGURE 11: REPORTING FLOW STRUCTURE**

Reports at community level can be submitted using a simple tabular format with a few descriptions on challenges faced and photos as an annex. The reporting can also be made on a monthly or quarterly basis depending on the type of intervention and duration, but this needs prior agreement with all stakeholders. It is advisable to organize a review meeting at least once every quarter at community level to discuss the report and make corrective decision with the participation of *Kebele* leaders, CWT, DA, Community facilitator and selected community representatives. The Woredas should guide the DAs on the types of reporting template used derived from the Woreda Quarterly reporting format provided in annex 7, table 7.1based on the specific conditions of watersheds and rangelands intervention types in their area.

M&E reporting at *Woreda* level is the responsibility of the Watershed Technical Team with the team leader, thus the natural resource head or technical expert, providing leadership and coordination. It should be compiled at least quarterly and should show the performance of each community watershed. Where possible comparison between watersheds should be made and the specific locations of any particular lessons learned identified. Review meetings involving oral presentations and discussions should also be organized at *Woreda* level in the presence of the *Woreda* & Keble leadership, the technical team, DA, community representatives and community facilitators to correct or improve on the work procedure is being applied. The reporting should also include use of budget estimated based on capital budget utilized and market price of forgone income from participating in community watershed and rangeland development using annex 7, table 7.2.

The Zone and Regions are also responsible for monitoring of implementation as well as compilation and consolidation of Woreda reports using quarterly activities reporting in addition to the indicators-based reporting provided above. The Federal NRMD is responsible for having a central data management system whereby it compiles and consolidates both implementation activities and indicators-based M&E reports.

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# ANNEXES

# PART I: PLANNING ANNEX FOR MIXED FARMING AREAS

## ANNEX I: SOCIOECONOMIC AND BIOPHYSICAL SURVEY TOOL FOR MIXED FARMING AREAS

### 1.1 VILLAGE/RESOURCE MAPPING EXERCISE

Figure 1.1: Village Mapping, Example

### 1.2 PROBLEM IDENTIFICATION AND RANKING

This is a relatively simple process in which a community group such the community watershed committee can be assisted to achieve a consensus in prioritizing the order in which problems might be addressed or in which any developmental options may and be acted on. It involves taking the following discrete steps:

**Step 1.** The group must achieve a consensus on the problems which have to be addressed, or depending on the situation, actions that might be taken towards taking advantage of local development opportunities. These should be listed in the format shown in Table 1.1 and not necessarily in any specific order of perceived priority.

**Table 1.1: Preliminary Problem Identification Exercise**

| Problems or opportunities | Major causes | Degree of severity | | | Proposed solutions |
|---|---|---|---|---|---|
| | | Severe | Medium | Low | |
| Problem No.1 | | | | | |
| Problem No.2 | | | | | |
| Problem No.3 | | | | | |
| Problem No.4 | | | | | |
| Problem No.5 | | | | | |
| Problem No.6 etc. | | | | | |
| Problem --- | | | | | |

**Step 2**. Once consensus has been achieved amongst the group on the problems or opportunities that are to be prioritized these should be listed as shown in Table 1.2 below. The problems (actions) should be assigned the same order on both the horizontal and vertical axes. For demonstration purposes we have chosen here to show seven problems. Though, there may be more or sometimes fewer problems (actions) to be considered. The table should thus be expanded or reduced to fit the numbers that have been identified in Table 1.1

**Table 1.2: Example of the ranking of problems using a pair-wise ranking**

| Problems/ Opportunities | Problem 2 | Problem 3 | Problem 4 | Problem 5 | Problem 6 | Problem 7 | Score | Rank |
|---|---|---|---|---|---|---|---|---|
| Problem 1 | 1/2 | 1 | 4 | 1/5 | 6 | 7 | 2 | 5 |
| Problem 2 | | 2 | 2/4 | 2 | 6 | 7 | 2.5 | 4 |
| Problem 3 | | | 4 | 5 | 6 | 7 | 0 | 7 |
| Problem 4 | | | | 4 | 6/4 | 7 | 4 | 3 |
| Problem 5 | | | | | 6 | 7 | 1.5 | 6 |
| Problem 6 | | | | | | 7 | 4.5 | 2 |
| Problem 7 | | | | | | | 6 | 1 |

**Step 3.** After inserting the problems horizontally and vertically, the community representatives will engage in a process of comparing the relative importance of each problem with every other one. So for instance, starting with the horizontal row for Problem No. 1, the group assesses which of Problem No.1 or No2 is the more important. In this example the decision is that 1 and 2 are of equal priority (how we deal with equal priorities will be further explained in step 4). Now proceed to do the same assessment between Problem No. 1 and No.3 (here No.1 takes priority). In the next comparison it is No.4 which takes priority. The same process should then be followed horizontally in relation to problems 5, 6 and 7 and then down all the horizontal rows below (in this example Problems No, 2, 3, 4, 5, 6, and 7).

**Step 4.** The next task to fill in the score column by noting the number of times a problem appears as a priority in the ranking table. Where problems are considered to have equal priority they may be assigned half a point.. In this example, for instance, Problem 1 was considered to have equal priority with problems 2 and 5. It thus appears (has priority) a total of two times Problem 2 has priority 2 5 times, Problem 3 never, Problem 4 has priority four times, Problem 5 has priority 1.5 times etc.

**Step 5**. The problem appearing highest number of times in the score column ranks as first and the others follow accordingly. In the event that two problems have the same ranking it is essential to look at each one individually and for the committee or community involved to make a consensual decision on which one of the two should be handled on a priority basis.

### 1.3 TRANSECT WALK EXERCISE

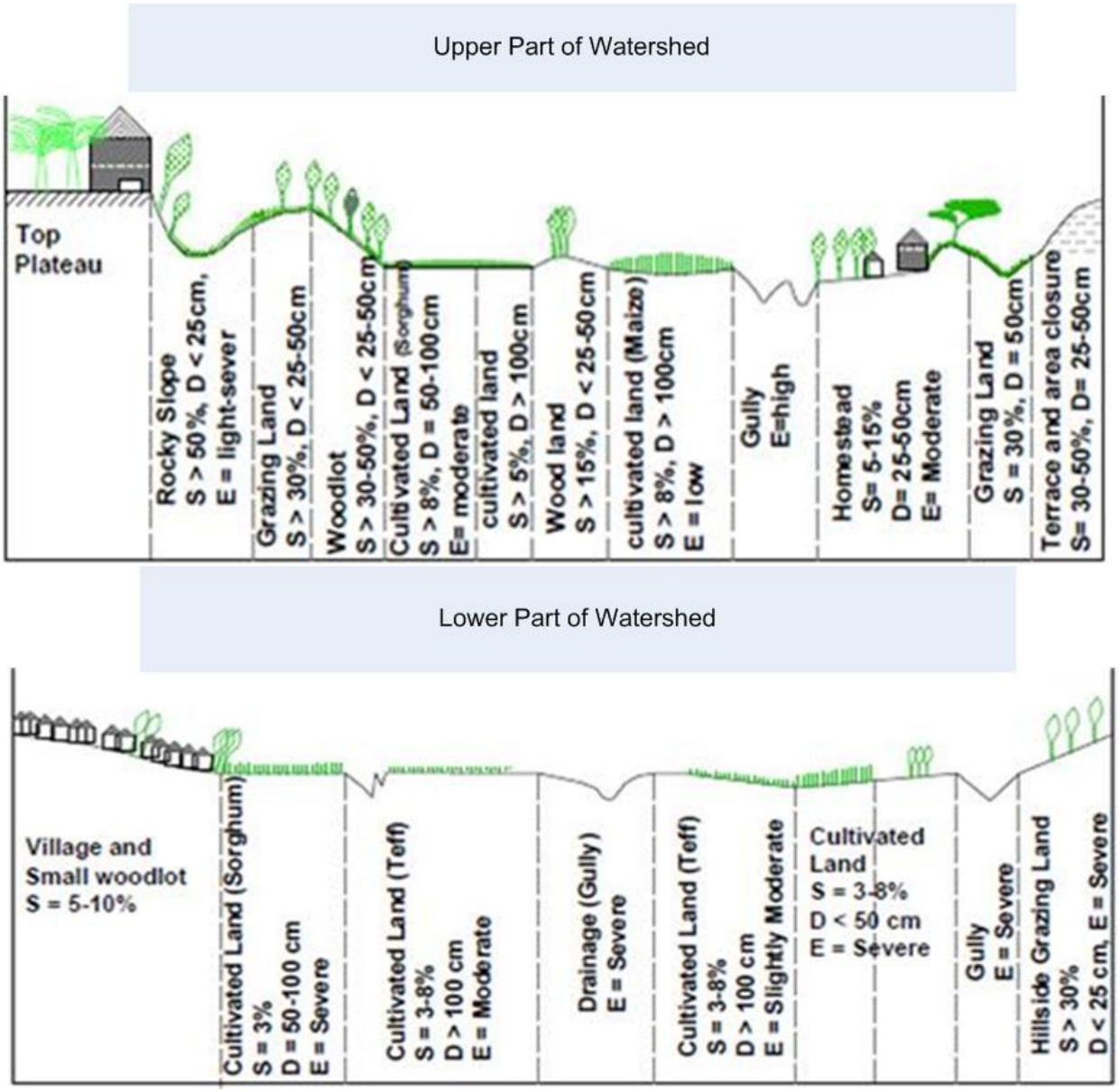


Figure 1.2: Transect Walk Exercise, Example

## 1. Format to be used to characterize community/micro-watershed through transect walk

Name of Woreda: _____Name of village: _____ Name of community /MW[7]: _____

**Table 1.3: Land feature information from transect stops**

| Features | Transect stops | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Elevation | | | | | | |
| Slope | | | | | | |
| Soil | | | | | | |
| Land use | | | | | | |
| Degradation features/indicators | | | | | | |
| Major crops | | | | | | |
| Livestock system | | | | | | |
| Tree system | | | | | | |
| Potentials | | | | | | |
| Challenges | | | | | | |
| Existing Interventions (SWC, Plantation, horticulture, livestock, etc.) | | | | | | |
| Future Recommendations | | | | | | |

### 1.4 SOCIO-ECONOMIC BASELINE

## I. Basic Information

Planning Year[8]:_____Region(Name):_____Zone(Name):_____Woreda(Name):_____Kebele (Name):____Basin:_____Sub-Basin:_____MajorWatershed:_____MicroWatershed_____

**Table 1.4: Community watershed basic data and planning team members**

| Name of Micro watershed | Area in Ha | Distance from Woreda | Altitude (masl) | | Outlet Coordinate | |
|---|---|---|---|---|---|---|
| | | | Max. | Min. | X | Y |
| | | | | | | |

| Community Watershed Team | | | | |
|---|---|---|---|---|
| **No** | **Name** | **Sex** | **Title/position** | **Remark** |
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |
| 10 | | | | |
| 11 | | | | |
| 12 | | | | |

[7] MW refers to micro-watersheds

[8] Planning year usually represents year in which the socio-economic baseline data collected

**Table 1.5: Population data**

| Population data | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No of Household Heads | | | | Micro-Watershed population | | | Average family size | Age Class in years | | | | |
| | Male | Female | Total | Male | Female | Total | | up to 13 | 14-17 | 18-35 | 36-55 | > 55 |
| No | | | | | | | | | | | | |
| (%) | | | | | | | | | | | | |

## II. Problem and solution analysis

### (i) Identification and prioritization of major problems, root causes and solutions to address them: (Preliminary)

**Table 1.6: Problem identification**

| Sector | Major problems | Problem ranking | Root causes | Effect of the problem | Measures/ solutions to address the problems/ root causes |
|---|---|---|---|---|---|
| Crop | | | | | |
| | | | | | |
| | | | | | |
| Livestock | | | | | |
| | | | | | |
| | | | | | |
| Natural Resource (Land, Forest, Water) | | | | | |
| | | | | | |
| | | | | | |
| Infrastructure (road, irrigation structures, water supply structure), and social services (school, health centers, FTC, market) | | | | | |
| | | | | | |
| | | | | | |
| Other socio-economic problems | | | | | |
| | | | | | |
| | | | | | |
| Others: specify | | | | | |
| | | | | | |
| | Any remark made can be written down here: | | | | |

## III. Agriculture – crop production

**Table 1.7: Main crops and their coverage in the micro-watershed**

| No | Meher (main rainy season) crops | Area (ha) | Productivity (qt/ha) | Belg (small rainy season) crops | Area (ha) | Productivity (qt/ha) |
|---|---|---|---|---|---|---|
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |

**Table 1.8: Crop calendar, (fill in months of the year)**

| Major crops | Ploughing frequency (1st, 2nd,3rd,4th ) | Sowing | Weeding | Harvesting | For food/market |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

- Existing crop rotation system including fallow
  - Crop 1_____year _____ from month _____to month _____
  - Crop 1_____year _____ from month _____to month _____
  - Crop 1_____year _____ from month _____to month _____
  - Crop 1_____year _____ from month _____to month _____

- Describe the crop rotation trend for the last ten years

_____
_____
_____

**Table 1.9: Crop coverage, Variety and yield in the watershed**

| No | Type of crop | Variety | Coverage in ha | Productivity (qt/ha) | |
|---|---|---|---|---|---|
| | | | | Good season | Bad season |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

**Table 1.10: Fertilizer usage and application**

| Type of fertilizer | Fertilizer Application (qt/ha) | | | Remark |
|---|---|---|---|---|
| | High (>75% of HHs) | Medium (50-75%) | Low (<50%) | |
| DAP | | | | |
| UREA | | | | |
| Organic fertilizer | | | | |
| Others | | | | |

**Table 1.11: Vegetables and Fruit Production**

| Vegetables | Yield (qt//ha) | Recommendation | Fruits | Yield (qt//ha) | Recommendation |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Describe if there are problems and constraints on production of fruit and vegetables in the area?

_____
_____
_____

**Table 1.12: Pests and Disease Condition in the Micro-watershed**

| Name of pest & disease including most common weeds in the area | Types of crops affected | Level of damage | | | Remark |
|---|---|---|---|---|---|
| | | High | Medium | Low | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

What method do the communities use to prevent pests and disease? Describe it further?

_____

_____

How do farmers justify the reasons for reduction of yield in their area?

_____

_____

In crop production, at what months of the year is labor a constraint?

_____

Describe some crop harvesting and storage problems?

_____

_____

## IV. Agriculture – Livestock production

**Table 1.13: Number of livestock in the community watershed**

| **Type of livestock** | **No** | **Average per household** | **Percentage from the total** |
|---|---|---|---|
| Oxen | | | |
| Cows / heifer | | | |
| Goats | | | |
| Sheep | | | |
| Camel | | | |
| Donkey | | | |
| Horse | | | |
| Poultry | | | |
| Others | | | |
| Total | | | |

**Table 1.14: Productivity of livestock products (meat & milk)**

| **Type of livestock** | **Productivity by major livestock products** | |
|---|---|---|
| Oxen | Meat/kg | Milk/litre |
| Cows / heifer | | |
| Goats | | |
| Sheep | | |
| Camel | | |
| Others | | |
| Total | | |

**Table 1.15: Forage/fodder source of the community/ (mark xxx for very common, xx for common and x, rare)**

| Fodder source | In dry season | In wet season | Ranking |
|---|---|---|---|
| Grass on grazing land | | | |
| Grass from cut and carry (hay) | | | |
| Crop residue | | | |
| Concentrates | | | |
| Others | | | |
| | | | |

**Table 1.16: Source of water for livestock (Indicate "0" if no water is available)**

| Water source | No. available | Average Distance |
|---|---|---|
| Spring | | |
| River | | |
| Hand dug well | | |
| Pond | | |

**Table 1.17: Livestock health and disease condition**

| No | Disease types | Livestock affected | Level of damage | | |
|---|---|---|---|---|---|
| | | | High | Medium | Low |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Average distance from animal health center in km, _____
What are the common livestock management practices, free grazing, stall-feeding, rotational grazing, pastoral system, etc., being practiced by community members? -

_____
_____

Describe the problems in fodder and forage supply of the community?

_____
_____

Describe the management and problems related to communal grazing lands?

_____
_____

Explain the problems in forage production, management and utilization?

_____
_____

Is the area suitable for apiculture and honey production?

_____
_____

List some of the most common plants in the watershed that can be livestock/bee forage sources?

## V. Natural Resources

### (i) Land Use

**Table 1.18: Land use of the watershed**

| Current Land use | Area (ha) | Area (%) |
|---|---|---|
| Forest land | | |
| Cultivated land | | |
| Grass/ grazing land | | |
| Other land use (swamps/ marshy land, settlement, water bodies, etc) | | |

**Table 1.19: Status of forest in the Micro-watershed**

| Forest area (in ha) | Forest type | | Type of ownership |
|---|---|---|---|
| | Plantation | Natural | |
| | | | |
| | | | |
| | | | |

**Table 1.20: Type of tree and shrubs available in the watershed**

| Type of tree & shrubs | Current/ or possible use | Type of land use where it is growing | Propagation techniques | Remark |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

**Table 1.21: Source of fuel wood, (mark, XXX for very common, XX for common, X for rare, and 0 for nil)**

| Fuel source | Dry season | Wet season | Availability |
|---|---|---|---|
| Fire Wood | | | |
| Charcoal | | | |
| Animal dung | | | |
| Crop residues | | | |
| Others (specify) | | | |

Who is responsible for collection of dung? _____
Describe the main problem related to fuel wood availability and fetching?
_____
_____
How long does it take for an individual to collect fuel wood? _____
What is the status of private forest ownership? _____
Total number of households who have access to the forest area
Total: _____Male: _____Female: _____Average forest area (ha) _____
Describe if there is natural forest in the watershed, area (in ha) and major species combination?
_____
_____

How the natural forest management looks like?
_____
_____

**Source of seedlings** **Distance from the watershed in Km**

- Individual _____
- Government _____
- NGO's _____
- Others _____

Describe how the community addresses problems related to fuel and construction wood?

_____

_____

### (ii) Water resources

**Table 1.22: Source of water in the watershed**

| Source of water | Amount in Number | Purpose (what it is used for currently) | Average distance (km) | Flow seasons | Which source is used in the seasons (mark x as appropriate) | |
|---|---|---|---|---|---|---|
| | | | | | Rainy season | Dry season |
| River | | | | | | |
| Spring | | | | | | |
| Pond /Birka | | | | | | |
| Well /Ela | | | | | | |
| Lake | | | | | | |
| Dam | | | | | | |
| Other | | | | | | |

- Who is responsible to collect water?
  _____
- How long people travel to collect water (in km and hour)? Rainy season? _____Dry Season?_____
- How long livestock travel to get water (in km and hour)?_Rainy season? _____Dry Season_____
- Describe any issues/ problems related to access to water for domestic use (both human and livestock consumption) and how the community addresses the problems?

_____

_____

**Table 1.23: Water harvesting and small-scale irrigation**

| Existing structures | Quantity in No | No. of Beneficiary | Irrigated land (ha) | Potential irrigable land (ha) | Irrigation method utilized |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Is there water source that is not used for irrigation? Why?

_____

_____

Described if there are unused irrigation structures in the watershed? and why?

_____
_____
Describe problems about irrigation and water harvesting in the area?
_____
_____

**Land administration and certification (**use this part only if it is applicable**)** When did land registration and documentation start? _____
No of households, which received first level certificate in the watershed?
Male _____ Female _____ Total _____
No of households which received second level certificate in the watershed?
Male _____ Female _____ Total _____
Is there any land management and utilization change after the provision of certificates?
_____
Did land certification contribute for natural resource conservation, state some examples if any?
_____

## VI. Social infrastructure and services, market and labor supply/ availability

**Table 1.24: Distribution of Social infrastructure and service institutions in the watershed**

| No | Services/ Institutions | Location in the watershed or Outside | | Distance from watershed | Remark |
|---|---|---|---|---|---|
| | | Inside | Outside | | |
| 1 | Road | | | | |
| 2 | Market | | | | |
| 3 | School | | | | |
| 4 | Health center | | | | |
| 5 | FTC | | | | |
| 6 | Kebele administration | | | | |
| 7 | Telephone | | | | |
| 8 | Electric | | | | |

**Table 1.25: Market supply and demand of goods in the community**

| No | Produce/goods for market supply | Demand of goods from the market |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

**Table 1.26: Labor supply/ availability in the seasons**

| No | Month | Labor supply/ availability | | |
|---|---|---|---|---|
| | | High | Medium | Low |
| 1 | September | | | |
| 2 | October | | | |
| 3 | November | | | |
| 4 | December | | | |
| 5 | January | | | |
| 6 | February | | | |
| 7 | March | | | |
| 8 | April | | | |
| 9 | May | | | |
| 10 | Jun | | | |
| 11 | July | | | |
| 12 | August | | | |

## VII. Climate change – Community Knowledge, Attitude and Practice (KAP)

1. What do you understand by the term climate change?

_____

_____

2. How did you know about it?
    1. From your life experiences
    2. Heard from the media
    3. From relatives, neighbors etc. (Word of mouth)
    4. Through training courses at farmer/pastoral training centre
    5. From DAs
    6. From Woreda experts/official
    7. Other **PLEASE SPECIFY** _____
3. What do you think is the main cause of Climate Change? DO NOT READ OUT
    1 Human activity
    2 An act of God
    3 Something else
    4 Don't know
4. How worried are you about the impact of climate change on your livelihood?
    1 Very worried
    2 A little worried
    3 Not worried at all
    4 Don't know **DO NOT READ OUT**
5. Which of the following climate shocks have you experienced in the past year? **READ AND THICK ALL (can be more than one)**
    1 Flood
    2 Drought
    3 Increased temperatures
    4 Frost
    5 Heavy rain
    6 Hailstorm
    7 Erratic rainfall
    8 None

6. How can you protect your livelihood from climate shocks? **READ AND THICK THAT ARE AGREED**
    A Crop diversification
    B Water harvesting
    C Diversifying income sources (e.g. through non-agricultural work)
    D Migration
    E Doing soil conservation activities on my farmland
    E Planting trees
    F: Other SPECIFY _____
    F Don't know

### 1.5 Bio-Physical Survey Methods

#### 1.5.1 Watershed Delineation

The boundaries of a watershed in which planning, and management is to be undertaken can be easily delimited with in which land use types can be identified and a development map can be prepared. A number of different techniques may be applied to delineate watersheds which include:

(a). Using topographic maps (commonly used at field level);

(b). Aerial photographs - on which better delineation can be achieved through the use of stereo pairs[9] (with scale larger than 1:15000);

(c). Field mapping using GPS;

(d). Digital elevation models and use of GIS software to delimit the watershed boundary.

***Use of Topographic maps for watershed delineation:*** This technique is useful for enhancing the participation of the community but is a somewhat slow approach with limitations in the provision of accurate information. To successfully delineate a watershed boundary it is necessary to visualize the landscape as represented by a topographic map (See Figure 1.3 below). The following basic characters of contours must first be understood.

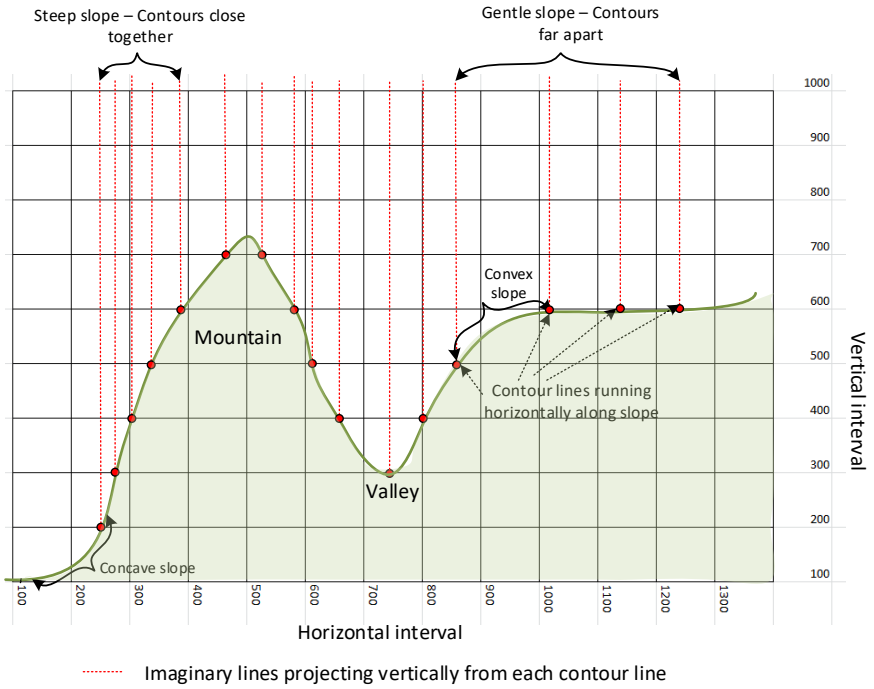


Figure 1.3: Surface relief as represented by contour lines

- The vertical interval between successive contours remains constant on any map (i.e. 100, 200, 300 etc.;
- Contour lines can never cross one another, because no point on the ground can be at two different heights above the mean sea level;
- At some point on the map the elevation of the adjoining contour lines will usually be shown;

[9] Sequential aerial photographs taken with a 60% overlap so that when the same surface features are viewed with a stereoscope they appear as a single picture of the object, with the appearance of relief in three dimensions and

- Closer contour lines express steep slopes while those further apart show more gentle slopes;
- The spacing between contour lines indicates the land form and the slope gradient type;
- A slope having regular vertical intervals is called an even slope;
- If the gradient is close to the top of the slope and then smoothens out near the foot it is called a concave slope;
- When the gradient at the foot of the mountain is steep and gradually decreases towards the top it is called a convex slope;
- If the elevation of the successive contours increases inwards it shows a summit. Whereas, if the elevation of successive contours increases out wards it shows a depression.

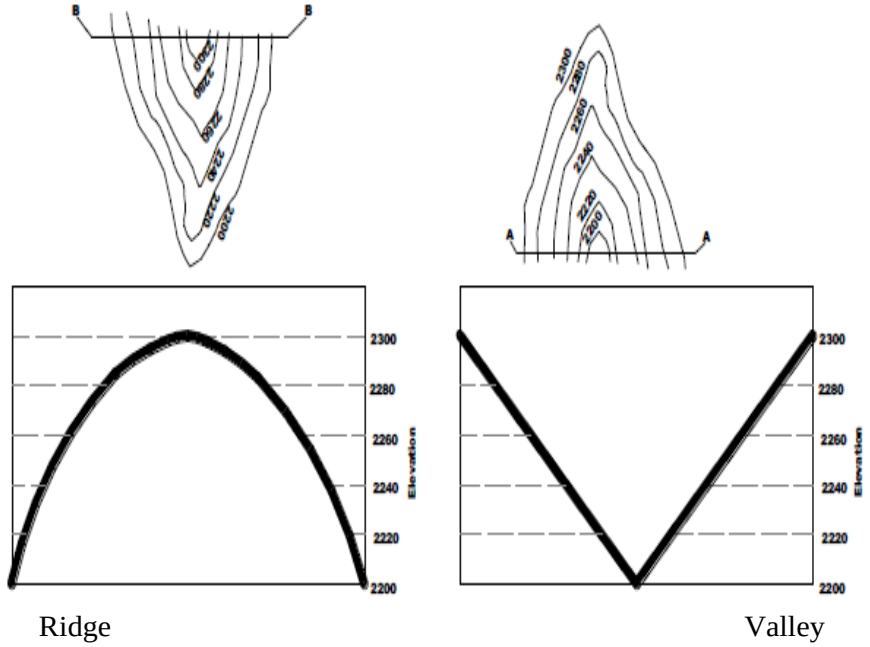


FIGURE 1.4 HOW CONTOUR LINES REPRESENT RIDGES AND VALLEYS

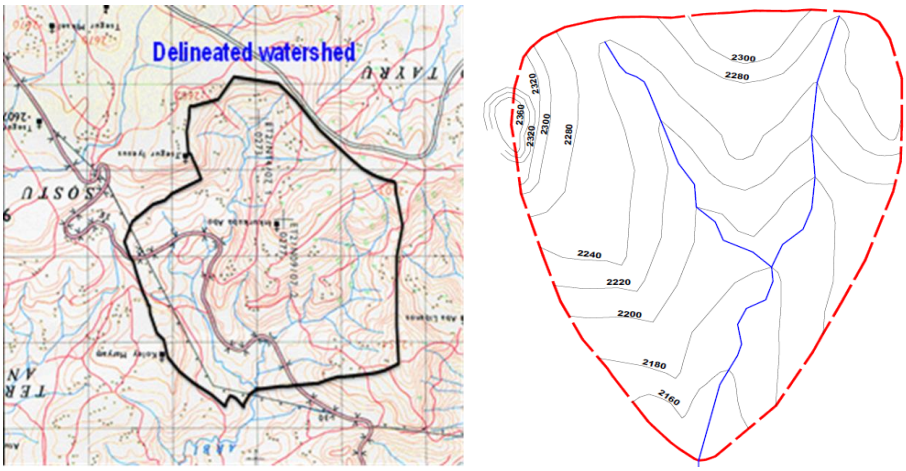


Figure 1.5: using Topographic maps for delineating watersheds

### 1.5.2 Soil and land use data collection

**Table 1.27: Present land use condition**

| Land use | Area in ha | Vegetation coverage (%) |
|---|---|---|
| **Farm land** | | |
| CL1 | | |
| CL2 | | |
| CL3 | | |
| **Grazing land** | | |
| GL1 | | |
| GL2 | | |
| **Forest land** | | |
| FL1 | | |
| FL2 | | |
| Village | | |

### 1.5.3 Land Capability Classification for Soil and Water Conservation Purpose

#### 1. General

Being able to recognize the inherent characteristics and productive capabilities of land is essential to making informed decisions about its various uses about the most appropriate types of soil conservation initiatives. The concept of land capability, as commonly applied, refers specifically to the ability of the terrain including the soils and its various associated characteristics (physical and chemical composition, depth and gradient etc.) within a specific agro-ecological zone to provide essential services to humans such as crop production, grazing and forestry. It should be noted that this does not necessarily take into account the other functions the land may have including, for instance, the capture of water for rivers, streams and aquifer recharge as well as the provision of habitat for numerous other species. In this case, however, the purpose of the classification is to prioritize the urgency for the application of soil conservation measures.

The land classification system for soil conservation proposed here is based on Ethiopian experiences and conditions. The range of characteristics of each land feature, which are used to assess the land classes, was tested in the field in the different agro-ecological zones of the country. The present land capability classification for the purpose of soil conservation is taken from Javier Escobedo – 1990, which was originally derived from work undertaken by USDA and FAO. In these guidelines, details are given on the principles and categories of the system, on the criteria and on how to observe measures and record the most important features of the landscape and the soils. Particularly those related to the soil erosion and soil conservation. This land capability classification procedure is thus primarily meant for SWC– not for land evaluation. Productivity/economic assessments are not made and the land is classified based on its limitations. The procedures for assessing these soil classes and developing the recommended soil conservation and management practices are described as follows.

#### 2. Scope of its Use

The land classes should be considered as part of the conservation planning process but the approach described here is more specifically designed for application in areas within a rainfall range of 400mm <LCCs < 1200mm. It provides the ability to quickly read landscape features and identify appropriate interventions. It can also be used as a tool to assess whether or not the land has previously been misused.

### 3. Principles

The soil properties and qualities presented here are essential for the design of physical and biological soil and water conservation (SWC) measures.

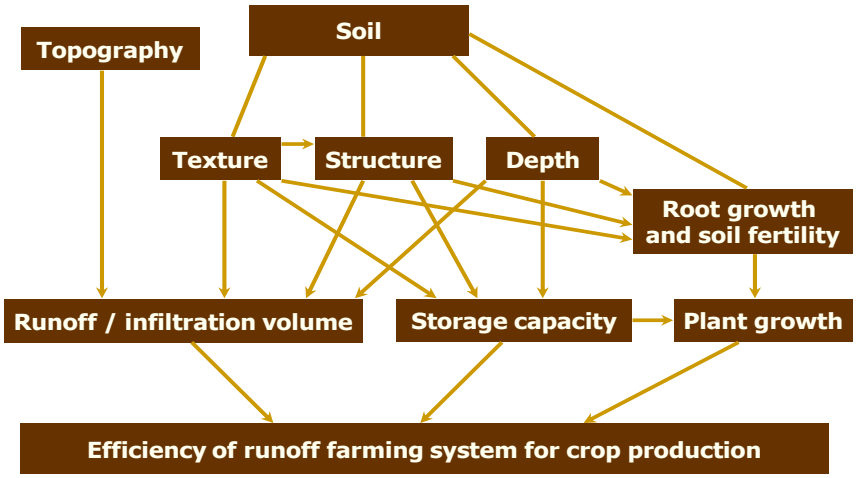


FIGURE 1.6: ELEMENTS TO BE CONSIDERED IN LAND CLASSIFICATION

### 4. The Soil and Water Conservation Requirement Classes (SWCRCs)

There are 8 SWCRCs, Namely; I, II, III, IV, V, VI, VII and VIII. The risk of erosion and requirement of conservation practices increases from classes I to IV and VI to VIII. Class V is a special case and is for wet lands.

**Land Capability Unit (LCU)** is the lowest category of the system having major **limiting factors** affecting the use of the land for agricultural purposes. These might be one or two of the following:

- Slope (L)
- Soil Depth (D)
- Past Erosion (E)
- Water logging (W)
- Infiltration (I)
- Texture (T)
- Stoniness (S)

SWCRC symbol + Major limiting factor(s) = LCU. Examples of LCU: **IIL**, **IIIL, IVD, VIIE, VIIT, VIIID, VW. Land Class Unit I is without any limitation.**

### 5. Most Suitable Land Use for each SWCRC

This Land Capability Classification is also intended to identify the MOST SUITABLE LAND USE for each SCRC. The following tables provide the criteria for establishing the SWCRCs and how the limiting factors should be applied in establishing the appropriate codes.

**Table1.28 land suitability classes for specified uses.**

| SCRC | Suitable Land Use |
|---|---|
| **I, II, III, IV** | Land, suitable for annual crops |
| **V** | Wet land – regularly waterlogged, may be suitable for temporary grazing and rice |
| **VI** | Land suitable for perennial crops or grazing |
| **VII** | Land suitable for forestry |
| **VIII** | Land not suitable for agriculture |

## 6. Criteria for Land Classification

**Table 1.29 Slope classes**

| SLOPE CLASSES (L) | % RANGE | CODE |
|---|---|---|
| **Flat or almost flat** | 0-3 | L1 |
| **Gently sloping** | 3-8 | L2 |
| **Sloping** | 8-15 | L3 |
| **Moderately steep** | 15-30 | L4 |
| **Steep** | 30-50 | L5 |
| **Very steep** | > 50 | L6 |

**Table 1.30: Soil depth classes**

| SOIL DEPTH CLASSES (D) | RANGE (cm) | CODE |
|---|---|---|
| **Very deep** | >150 | D1 |
| **Deep** | 100 - 150 | D2 |
| **Moderately deep** | 50 - 100 | D3 |
| **Shallow** | 25 - 50 | D4 |
| **Very Shallow** | < 25 | D5 |

**Table 1.31 Classes for past erosion.**

| EROSION CLASSES (E) | Code |
|---|---|
| **None** | E0 |
| **Slight** | E1 |
| **Moderate** | E2 |
| **Severe** | E3 |
| **Very Severe** | E4 |

**Table 1.32. Soil texture classes**

| SOIL TEXTURE CLASSES (T) | Code | Common Name |
|---|---|---|
| **Sand** | T1 | Coarse |
| **Sandy Loam** | T2 | Coarse |
| **Loam** | T3 | Coarse |
| **Silt Loam** | T4 | Medium |
| **Clay Loam** | T5 | Medium |
| **Silt Clay Loam** | T6 | Fine |
| **Heavy Clay** | T7 | Fine |

**Table 1.33: Infiltration classes**

| INFILTRATION CLASSES (I) | Code |
|---|---|
| **Good** | I0 |
| **Moderate** | I1 |
| **Poor** | I2 |

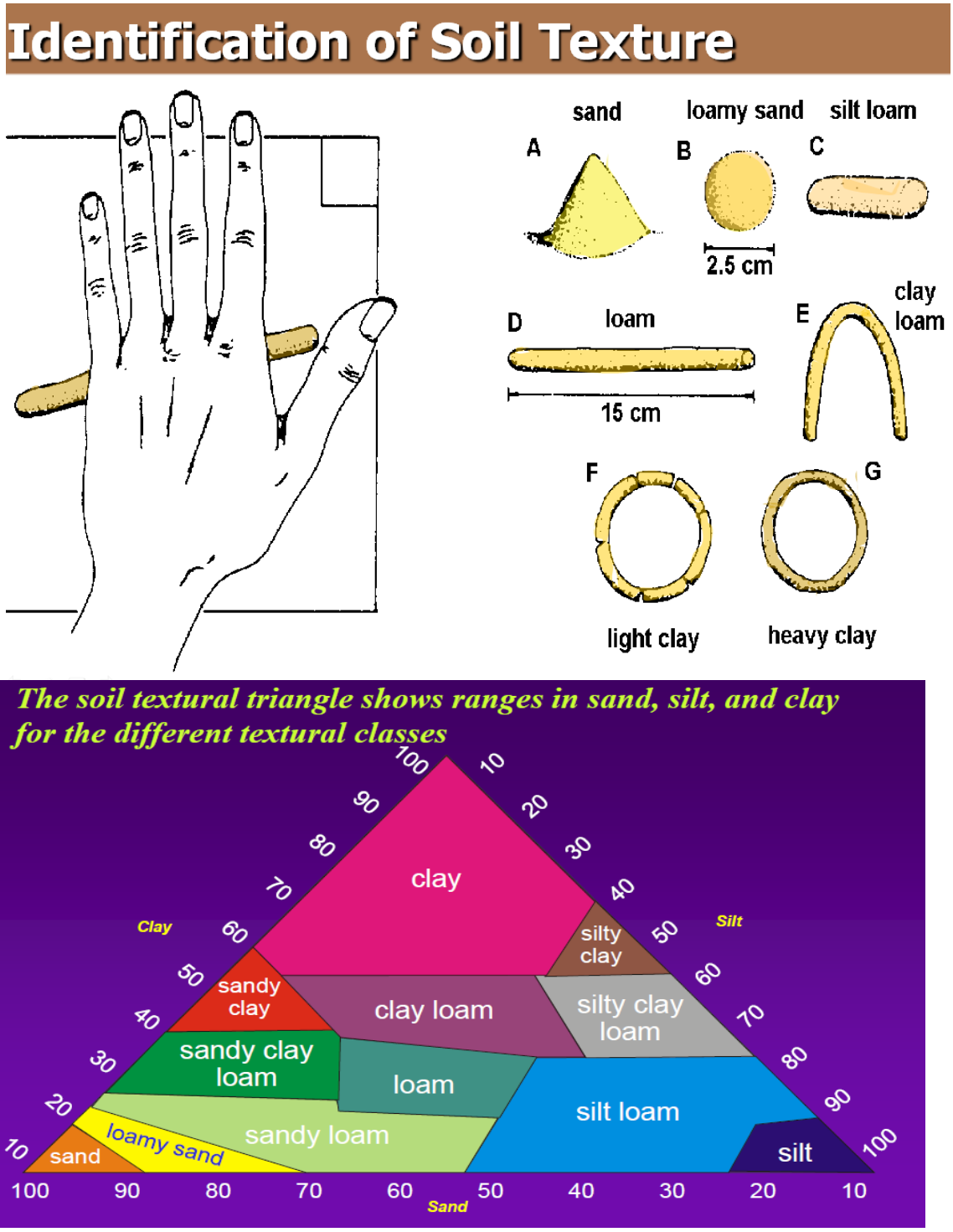


FIGURE 1.7: DETERMINING THE TEXTURE OF MOIST SOILS

Moisten soil and attempt to form it as shown – sandy categories shown no cohesion; loam will roll but not bend; increasing proportions of clay in part greater stickiness and cohesion.

| **Table 1.34. Coding for water logging classes** | | **Table 1.35. Coding for surface stoniness/rockiness** | |
|---|---|---|---|
| **WATER LOGGING CLASSES (W)** | Code | **STONINESS OR ROCKINESS (S)** | **Code** |
| **None** | W0 | **< 15%** | S0 |
| **Intermittently Waterlogged** | W1 | **15 – 30%** | S1 |
| **Regularly Waterlogged** | W2 | **30 – 50%** | S2 |
| **Swamps** | W3 | **50 – 90%** 10th | S3 |
| | | **>90%** | S4 |

## 7. Description of the SCRCs

**Table 1.36. Land class requirements**

| CLASS I's Requirements | CLASS II's Requirements | CLASS III's Requirements |
|---|---|---|
| • Suited to a wide range of plants and may be used safely for cultivated crops, pasture, range, woodlands and wildlife.<br>• The soils are deep, generally well drained, and easily worked. They hold water well and are either fairly well supplied with plant nutrients or highly responsive to inputs of fertilizer.<br>• Soils in Class 1 need ordinary management practices to maintain productivity -<br>• Slope: < 3%<br>• Soil depth: > 150 cm.<br>• No past erosion noticeable<br>• Texture: medium (T3 to T6)<br>• No waterlogging<br>• Good infiltration<br>• Surface stoniness: < 15% | • Have some limitations that reduce the choice of plants or require moderate conservation practices.<br>• Require careful soil management, including conservation practices, when the soils are cultivated.<br>• The minor limitations will include one or more of the following:<br>• Slope: < 8 %<br>• Soil depth: > 100 cm<br>• No past erosion noticeable<br>• Medium and fine textures (T3 to T6), heavy clay excluded<br>• No water logging problems<br>• Good infiltration<br>• Stoniness: < 30 %<br>• IIL, IID, IIT, IIS | • More restrictions than those in Class 2 and when used for cultivated crops the conservation practices are usually more difficult to apply and to maintain.<br>• Limitations of these soils restrict the use of this class of lands for cultivation; the timing of planting, tillage, and or some combination of these limitations.<br>• More restrictions and limitations will include one or more of the following:<br>Slope: < 15 %<br>Soil depth: > 100 cm<br>Nil to slight past erosion<br>○ Medium and fine textures (T3 to T7), heavy clay included<br>○ Non to intermittently water logging<br>○ Infiltration non to moderate<br>○ Stoniness: < 50 %<br>○ Fifth IIIL, IIIE, IIIW, IIIi |

| CLASS IV's Requirements | CLASS V's Requirements | CLASS VI's Requirements |
|---|---|---|
| • Have very severe limitations that restrict the choice of plants, require very careful management, or both.<br>• The restrictions and limitations are greater than class III and will include one or more of the following:<br>Slope: < 30%<br>Soil depth: > 50 cm.<br>○ Nil to moderate past erosion<br>○ Nil to regularly waterlogged<br>○ Infiltration good to poor<br>○ IVL, IVD, IVE, IVW, IVi | • Have little or no erosion hazards but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife food and cover.<br>• Class V soils have limitations that restrict the kind of plants that can be grown and that prevent normal tillage of cultivated crops.<br>• Class V is allotted to land unsuitable for intensive or perennial crops by reasons other than erosion hazard.<br>• Examples include swampy areas, temporary water courses and | • Have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife food and cover.<br>• The limitations will include one or more of the following:<br>○ If slope < 15-30%, soil depth > 25cm<br>○ If slope 30-50%, soil depth >50cm<br>○ Stoniness: > 85 % (boulders included)<br>○ Texture: all (except sand)<br>○ Past erosion: nil to moderate<br>○ Waterlogging: nil to regularly |

| | | |
|---|---|---|
| | intermittent river beds flooded every year during the rainy season.<br>• Temporary grazing could be possible during the dry season.<br>• VW, VF | ○ Infiltration: good to poor<br>○ VIL, VID, VIS (50-85%) boulders excluded |

| CLASS VII's Requirements | CLASS VIII's Requirements |
|---|---|
| • Soils in Class 7 have very severe limitations that make them unsuited to cultivation and that restrict their use largely to grazing, woodland or wildlife<br>• The limitations will include one or more of the following:<br>○ Slope: >50%<br>○ Soil depth: > 25cm, 25-50 cm<br>○ Nil to severe past erosion<br>○ Stoniness: <85% (boulders included)<br>○ Texture: all except sand<br>○ Water logging: nil to regularly<br>○ Infiltration: good to poor<br>○ VIIL, VIID, VIIE | • Soils and landforms in Class 8 have limitations that preclude their use for commercial plant production and restrict their use to recreation, wildlife, water supply or to aesthetic purposes<br>• Badlands, rock outcrop, sandy beaches, river wash, mine tailings and other nearly barren lands are included in Class 8.<br>• The limitations will include one or more of the following:<br>○ Soil depth: <25cm<br>○ Past erosion: very severe<br>○ Stoniness or rock outcrops: > 85 %<br>○ Texture: sand<br>○ Slope: all classes<br>○ Waterlogging: nil to regularly<br>○ Infiltration: good to poor<br>○ VIIID, VIIIE, VIIIT, VIIIS |

### 8.How to use the land classification table to determine the SCRC

The land classification table presented below is designed to enable the field staff to identify the land classes in a standard and objective way. The procedures for the use of this table are:

a) Use the data collected in the field and code it on a SOILS/LANDFORM DESCRIPTION FORM applying the criteria outlined in Tables 1.27 to 1.35
b) Start at the top left hand corner of Table 1.36 (SLOPE) and find the first occurrence of the slope category recorded in the field, moving from left to right.
c) Proceed down in the same column to the next feature, if the data recorded is within the range allowed, to the next feature. If not, move to the right along the line until you find the correct range. **You cannot go back to the left!**
d) Follow this procedure for all the features and you will reach the SOIL CONSERVATION REQUIEMENT CLASS at the bottom of the table.

**Remark:**

- For simplicity the range of codes allowed in a column is shown. For example as 1-7 inclusive (i.e. 1, 2, 3, 4, 5, 6 or 7) is allowed and the user can proceed vertically provided the code is within the stated range.
- If the column for the slope is subdivided into two, you have to continue in that sub-column when you reach SOIL DEPTH.

**Table 1.37. Land classification criteria for determining the SCRC**

| LIMITING FACTOR | RANGE OF CODES PERMITTED IN THE COLUMN | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Slope (L)** | 1 | 2 | 3 | 4 | 1- 4 | 5 | 6 | 1- 6 | 1 - 6 |
| **Soil Depth (D)** | 1 | 1 -2 | 1 - 2 | 1 - 3 | 1 - 3 | 1 - 4 | 1 - 4 | 1 – 5 | 1 - 5 |
| **Past Erosion (E)** | 0 | 0 | 0 - 1 | 0 - 2 | 0 - 2 | | 0 - 3 | 0 – 4 | 0 - 4 |
| **Water Logging (W)** | 0 | 0 | 0 - 1 | 0 - 2 | 0 - 2 | | 0 - 2 | 0 - 2 | 0 - 3 |
| **Infiltration (I)** | 0 | 0 | 0 - 1 | 0 - 2 | 0 - 2 | | 0 - 2 | 0 - 2 | 0 - 2 |
| **Topsoil Texture (T)** | 3 - 5 | 3 - 6 | 3 - 7 | 2 - 7 | 2 - 7 | | 2 - 7 | 1 - 7 | 1 - 7 |
| **Surface stoniness or rockiness (S)** | 0 | 0 - 1 | 0 - 2 | 0 - 2 | 0 - 3 | | 0 - 3 | 0 - 4 | 0 - 4 |
| **Soil Conservation Requirement class (SCRC)** | I | II | III | IV | VI | | VII | VIII | V |
| **LAND USE SUITABILITY** | **Land suitable for annual crops** | | | | **Land suitable for grazing or perennial crops** | | **Land suitable for forestry** | **Land not suitable for agriculture** | **Swampy areas, river bed** |

Use SOILS/LANDFORM description form from field. Start filling from left to right. You cannot go back to the left and by the time you reached the surface stoniness or rockiness row, one row down within the column is the SCRC.

### 8. Selection of SWC Measures for each LCU

In order to identify the appropriate conservation measures that should be taken within any land unit the following procedures should be adopted:

- Undertake land classification exercise and determine land class unit (SWC requirement class + limiting factors);
- Check the present land use;
- Check LCU against present land use assessed above;
- Select one or more SWC measures, seemingly appropriate within existing conditions;
- Submit/communicate the list of measures to farmers and negotiate.

Potential SWC interventions that can be selected and recommended according to the land capability classification and present land use are given in table below.

### 9. Soil and Water Conservation Options along the different SCRCs and Present Land Uses

**Table 1.38: Soil and water conservation options four LCUs.**

| LCU | Major Limiting Factor | Present Land Uses | | |
|---|---|---|---|---|
| | | Cultivated Land | Grazing Land | Forest land |
| I | Nil | Intensive cropping + maintained good vegetation cover + waterways | Convert to cultivated land; grassland improvement | Convert to cultivated land; Convert into agro-forestry; Maintain natural forestry (if exists) and enriching tree species |
| $II_L$ | Slope 2-8% | Contour cropping; Strip cropping; Grass strips; Alley cropping + waterways, cutoff drains | Same as above | Same as above |
| $II_S$ | Stoniness 15-30% | Removal of stones + apply options of Class I | Same as above | Same as above |
| $III_L$ | Slope 8-15% | Grass strip; Alley cropping; Combination of grass strip and bunds; Fanya Juu + waterways, cutoff drains | Convert to cultivated land; grass land improvement; convert to agro-silvipasture + cutoff drain | Same as above + strip plantation following the contours |
| $III_E$ | Slight past erosion | Cutoff drain + waterways + if slope 2-8% apply also the options of class $II_L$ | Same as above | Same for class I + cutoff drain + encouraging ground vegetation cover |

| LCU | Major Limiting Factor | Present Land Uses | | |
|---|---|---|---|---|
| | | Cultivated Land | Grazing Land | Forest Land |
| $III_W$ | Intermittently waterlogged | Drainage improvement; bed and furrows system (applied management measures of black clay soils); If slope 2-8% apply also the options of class $II_L$ | Convert to cultivated land; Grassland improvement; Convert to agro-silvi-pasture | Same as options for class II + selection of species resistant to water logging |
| $II_L$ | Slope 2-8% | Contour cropping; Strip cropping; Grass strips; Alley cropping + waterways, cutoff drains | Same as above | Same as above |
| $II_I$ | Moderate infiltration | Soil structure improvement; Deep plowing; If slope 2- | Same as above | Same as options for class I |

| | | | | |
|---|---|---|---|---|
| | | 8% apply also the options of class $II_L$ | | |
| $III_s$ | Stoniness 30-50% | Removal of stones; + If slope 2-8% apply also the options of class $II_L$ | Same as above + removal of stones | Same as options for class I |
| $IV_L$ | Slope 15-30% | Combination of grass strips and bunds; Alley cropping; Soil or stone bunds; Fanya Juu; Bench terraces | Convert to cultivated land; Convert to agrosilvipasture + cutoff drain and waterways | Same as options for class I + fuelwood plantation + encouraging ground vegetation cover |

| LCU | Major Limiting Factor | Present Land Uses | | |
|---|---|---|---|---|
| | | **Cultivated Land** | **Grazing Land** | **Forest land** |
| **$IV_E$** | Moderate past erosion | Waterways cutoff drains; Selective conserving crops + if slope 2-8% apply also the options of class IIL; If slope 8-15% apply also the options of class IIIL | Convert to cultivated land; Convert to agro-silvi-pasture Control grazing + waterways and cutoff drains | Same as above |
| **$IV_D$** | Soil depth 50-100cm | Selective shallow rooting crops + if slope 2-8% apply also the options of classIIL | Same as above | Same options as for class I + microbasins for site plantation |
| **$IV_W$** | Regularly waterlogged | Selective seasonal cropping; drainage improvement; Bed and furrow system + waterways; If slope 2-8% apply also the options of $II_L$ (graded structures) | Convert to cultivated land; Grassland improvement; Convert to agrosilvipasture + drainage improvement | Convert to cultivated land; Convert to agroforestry; Selection of species resistant to waterlogging |
| **$IV_i$** | Poor infiltration | Deep plowing; Soil structure improvement + if slope 2-8% apply also the options of class IIL (graded structures); If slope 8-15% apply also the options of class $III_L$ | Convert to cultivated land; Controlled grazing; Grassland improvement; Convert to agrosilvipasture | Change into cultivated land; Fuel wood plantation + encouraging ground vegetation cover |
| **$IV_L$** | Slope 30-50% | Establish perennial crops; Convert to grassland or forestland; Bench terraces for annual crops + waterways | Grassland improvement; Controlled grazing; Convert to Silvipasture + cutoff drains | Establish silvipasture site; Enriching tree species; Fuel wood plantation + micro basins |

| LCU | Major Limiting Factor | Present Land Uses | | |
|---|---|---|---|---|
| | | **Cultivated Land** | **Grazing Land** | **Forest Land** |
| **$VI_D$** | Soil depth 25-50cm | Convert to grassland or forest land; Establish perennial crops; If slope 2-30% the perennial crops should be on contour bunds | Grassland improvement; Controlled grazing; Covert to silvi-pasture | Fuel wood plantation + micro basins |

| | | | | |
|---|---|---|---|---|
| **$VI_s$** | Stoniness 50-85% | Removal of stones; Establish perennial crops; Convert to grassland or forest land; If slope 8-15% stone bunds; If slope 15-30% stone bench terraces for annual crops | Same as above + removal of stones | Same as above + stone micro basins; stone hillside terraces |
| **$VII_L$** | Slope >50% | Convert to forest land; convert to silvipasture; Hillside terraces for annual crops + cutoff drains | Convert to forest land; Convert to silvipasture: Control grazing + cut and carry | Fuelwood plantation; Tree plantation for catchment protection + pitting or microbasins |
| **$VII_D$** | Soil depth 25-50cm | Convert to forest land; Convert to silvipasture; Hillside terraces for annual crops | Convert to forest land; Convert to silvipasture; Controlled grazing | Fuelwood plantation; Tree plantation for catchment protection |
| **$VII_E$** | Severe past erosion | Area closure; Convert to forest land + gully control and cutoff drain | Area closure; Cut and carry + gully control and cutoff drain | Area closure; Tree plantation for catchment protection |
| **$VIII_D$** | Soil depth <25cm | Area closure; Convert to forest land (catchment protection); Cut and carry | Area closure; Convert to forest land | Protection of natural forest if it exists; Area closure; |
| **$VIII_E$** | Very severe past erosion | Area closure; convert to forest land (catchment protection); Gully control | Area closure; Cut and carry; Convert to forest land | Area closure; Encourage natural tree regeneration; Encourage wildlife |
| **$VIII_T$** | Sand texture | Not applicable | Area closure; Wind erosion control | Area closure; Encourage wildlife |
| **$VIII_s$** | Surface stoniness >85% | Area closure + tree planting | Area closure + cut and carry | Catchment protection; Encourage wildlife; Area closure |
| **V** | Swamps, river beds | Not applicable | Temporary grazing; Controlled grazing | Encourage wildlife and ecosystem conservation |

**Table 1.39 Proposed Activity Table**

| No | Proposed Activities | Hectares | Land use | Current status |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

1.5.4 Development Map, symbols for watershed base and development map

## ANNEX 2: WORK NORMS FOR MOST OF THE TECHNOLOGIES IN THE INFO-TECHS FOR MIXED FARMING AREAS

**Table 2.1: Applicable Work norms for New and Different Combinations of Technologies Presented in the Info-techs**

| NO. | ACTIVITY | UNIT | WORK NORM |
|---|---|---|---|
| 1 | Soil bund | PD/km | 150PD/km |
| 2 | Stone bund | PD/km | 250PD/km |
| 3 | Fanya Juu | PD/km | 200PD/km |
| 4 | Planting on bund | PD/km | 16PD/km |
| 5 | Hillside terracing | PD/k | 250PD/km |
| 6 | Cut-off drain construction | $M^3$/PD | 0.70 $M^3$/PD |
| 7 | Vegetative Waterway construction | $M^3$/PD | 1$m^3$/PD |
| 8 | Waterway construction (stone paved) | PD/$m^3$ work | 1 PD/0.75 $m^3$ earth/stone work |
| 9 | Bench terrace construction | PD/km | 500PD/km |
| 10 | Stone check-dam construction | $M^3$/PD | 0.5 $M^3$/PD |
| 11 | Stone check-dam maintenance | $M^3$/PD | 1 $M^3$/PD |
| 12 | Seedling production | PD/seedling | 15PD/1000 seedlings |
| 13 | Pitting | PD/pits | 1PD/15 Pits |
| 14 | Micro-basin construction | PD/MB | 1PD/5MB |
| 15 | Tree Seed collection (except *Grevillea)* | PD/kg | 20 PD/kg |
| 16 | *Grevillea* tree seed collection | | 60PD/kg |
| 17 | Seedling planting | PD/Plants | 1PD/50 plants |
| 18 | Site guarding | PD/Ha./year | 4PD/ha/year |
| 19 | Small farm dam construction | $M^3$/PD | 0.4 $M^3$/PD |
| 20 | Pond construction | $M^3$/PD | 0.5$M^3$/PD |
| 21 | Farm road construction | PD/km | 3000PD/km |
| 22 | Road maintenance/construction on <5% slope | PD/Km | 500PD/km |
| 23 | Spring development | PD/Spring | 1700 PD/spring |
| 24 | Stream diversion weir | PD/Weir | 3000 PD/weir |
| 25 | Grass and legume seed production (multiplication center) | PD/ha/year | 700 PD/ha/year |
| 26 | Bund maintenance | - | Self-help |
| 27 | Other structures/assets maintenance | - | Self-help |
| 28 | Bunds stone spillway + apron | PD/Spillway + apron | 2 PD/1 spillway + apron |
| 29 | Bund stabilization (grasses and legumes) | PD/km | 30 PD/km |
| 30 | Hillside terrace + trench construction | PD/km | 330 PD/km |
| 31 | Waterway check and drop + apron structure (CDA) | | 1 PD/ 3 CDA |
| 32 | Brushwood check dams construction - Double row | PD/LM | 1PD/3 Linear Meter |
| 33 | Brushwood check dams construction - Single row | PD/LM | 1PD/5 Linear Meter |
| 34 | Stone faced/soil bunds construction | PD/km | 250 PD/km |
| 35 | Gully re-vegetation | PD/ha | 500 PD/ha |
| 36 | Sediment storage dam (SS dam) (Sand dams) | PD/$m^3$ | 1 PD/0.75 $m^3$ earth/stone work |
| 37 | SS dams spillway construction | PD/$m^3$ | 1 PD/0.5 $m^3$ spillway |
| 38 | Gully cut and fill/reshaping/leveling | PD/$m^3$ | 1 PD/1 $m^3$ earth work |
| 39 | Compost making (Pit: 4mL x 2mW x 1.5mD) | PD/pit | 10 PD/pit |
| 40 | Compost making (heap: 4mL x 2mW x1.5mD) | PD/LM | 1 PD/linear meter |
| 41 | Eyebrow basin construction (EB) | PD/EB | 1 PD/2 EB |
| 42 | Trench construction | PD/Trench | 2 PD/3 trenches |
| 43 | Herring bone construction (HB) | PD/HB | 1 PD/4 HB |
| 44 | Improved pits for dry areas | PD/IP | 1 PD/5 Improved pits |

| | | | |
|---|---|---|---|
| 45 | Micro-trenches | PD/MT | 1 PD/3 micro-trenches |
| 46 | Mulching of trenches / eyebrow basins / herring bones, and others. | PD/structure | 1 PD/50 structures |
| 47 | Alley cropping | PD/km | 10 PD/km |
| 48 | Mulching of degraded land and long fallows | PD/ha | 250 PD/ha |
| 49 | Grass strips | PD/km | 30 PD/km |
| 50 | Grassland improvement | PD/ha/year | 20 PD/ha/year |
| 51 | Road Construction (Type 2 - surfaced/paved) | PD/km | 4000 PD/km |
| 52 | Manuring of planting pits | PD/pit | 1 PD/200 pits |
| 53 | Cow dung collection and distribution | | 6 PD/ 1 $m^3$ |
| 54 | Grass seeds collection (area closures, bunds, et | PD/$m^3$ | 10 PD/kg |
| 55 | Gabion structure | PD/$m^3$ | 1PD/0.25 $m^3$ of gabion check-dam |
| 56 | Vegetative fencing and stabilization | PD/km | 40 PD/km |
| 57 | Stone shaping (SS and rock fill dam walls, large gully checks) | PD/$m^3$ | 1 PD/0.5 $m^3$ shaped stones |
| 58 | Stone collection and transport | PD/$m^3$ | 1 PD/0.5 $m^3$ transp. to site |
| 59 | Sand bag check dam | PD/$m^3$ | 1 PD/05$m^3$ sandbag check-dam |
| 60 | Semicircular Bunds | 1PD/ $m^3$ earth work volume | 1PD/0.5 $m^3$ earth work volume |
| 61 | Runoff - Run-on Area Bunds/Barrier Lines | PD/km | 150 PD/km are appl. |
| 62 | Percolation Pits | PD/pit | 14PD/pit |
| 63 | Bamboo-mat check-dam | $m^3$ /PD | 1$m^3$ /PD |
| 64 | | | |
| 65 | Subsurface Dam in Gully | $m^3$ /PD | 1 $m^3$ /PD |
| 66 | Road Water Harvesting | PD /km | 250 PD /km |

# PART II: ANNEXES FOR PLANNING IN PURE PASTORAL AREAS

## ANNEX 1. SOCIOECONOMIC AND BIOPHYSICAL SURVEY TOOLS

### 1.1 VILLAGE/RESOURCE MAPPING EXERCISE

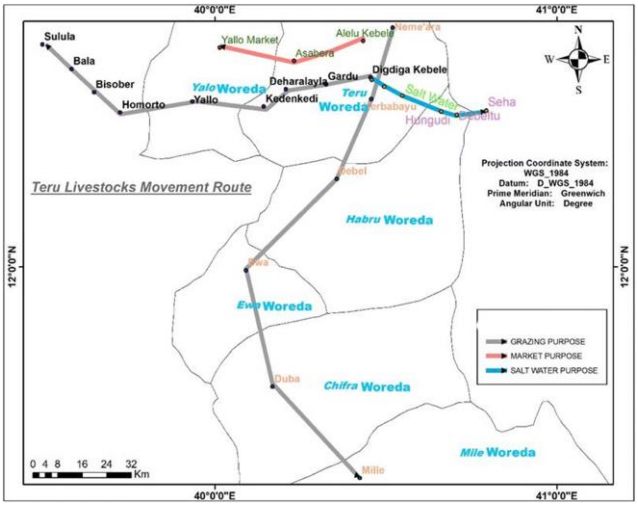


**Figure 1.1. Village/resource Mapping (left), Example, livestock movement route map (right)**

### 1.2 PROBLEM IDENTIFICATION AND RANKING

This is a process in which a community group such as village or sub kebele community committee or KRT can be assisted to achieve a consensus in prioritizing the order in which problems might be addressed or in which any developmental options may be acted on. It involves taking the following discrete steps:

**Step 1.** The group must achieve a consensus on the problems to be addressed, or depending on the situation, actions that might be taken towards taking advantage of local development opportunities. These should be listed in the format shown in Table 1.1 and not necessarily in any specific order of perceived priority.

**Table 1.1. Preliminary Problem Identification Exercise**

| Problems or opportunities | Major causes | Degree of severity | | | Proposed solutions |
|---|---|---|---|---|---|
| | | Severe | Medium | Low | |
| Problem No.1 | | | | | |
| Problem No.2 | | | | | |
| Problem No.3 | | | | | |
| Problem No.4 | | | | | |
| Problem No.5 | | | | | |
| Problem No.6 etc. | | | | | |

**Step 2.** Once consensus has been achieved amongst the group on the problems or opportunities that are to be prioritized these should be listed as shown in Table 1.2 below. The problems (actions) should be assigned the same order on both the horizontal and vertical axes. For demonstration purposes we have chosen here to show seven problems. Though, there may be more or sometimes fewer problems (actions) to be considered. The table should thus be expanded or reduced to fit the numbers that have been identified in Table 1.1.

**Table 1.2. Example of the ranking of problems using a pair-wise ranking**

| Problems/ Opportunities | Problem 2 | Problem 3 | Problem 4 | Problem 5 | Problem 6 | Problem 7 | Score | Rank |
|---|---|---|---|---|---|---|---|---|
| Problem 1 | 1/2 | 1 | 4 | 1/5 | 6 | 7 | 2 | 5 |
| Problem 2 | | 2 | 2/4 | 2 | 6 | 7 | 2.5 | 4 |
| Problem 3 | | | 4 | 5 | 6 | 7 | 0 | 7 |
| Problem 4 | | | | 4 | 6/4 | 7 | 4 | 3 |
| Problem 5 | | | | | 6 | 7 | 1.5 | 6 |
| Problem 6 | | | | | | 7 | 4.5 | 2 |
| Problem 7 | | | | | | | 6 | 1 |

**Step 3.** After inserting the problems horizontally and vertically, the community representatives will engage in a process of comparing the relative importance of each problem with every other one. So for instance, starting with the horizontal row for Problem No. 1, the group assesses which of Problem No.1 or No2 is more important. In this example the decision is that 1 and 2 are of equal priority (how we deal with equal priorities will be further explained in step 4). Now proceed to do the same assessment between Problem No. 1 and No.3 (here No.1 takes priority). In the next comparison it is No.4 which takes priority. The same process should then be followed horizontally in relation to problems 5, 6 and 7 and then down all the horizontal rows below (in this example Problems No, 2, 3, 4, 5, 6, and 7)

**Step 4.** The next task to fill in the score column by noting the number of times a problem appears as a priority in the ranking table. Where problems are considered to have equal priority, they may be assigned half a point. In this example, for instance, problem 1 was considered to have equal priority with problems 2 and 5. It thus appears (has priority) a total of two times problem 2 has priority 2.5 times, Problem 3 never, Problem 4 has priority four times, Problem 5 has priority 1.5 times etc.

**Step 5**. The problem appearing highest number of times in the score column ranks as first, and the others follow accordingly. If two problems have the same ranking it is essential to look at each one individually and for the committee or community involved to make a consensual decision on which one of the two should be handled on a priority basis.

**1.3** Transect Walk EXERCISE (sample for pastoral areas)

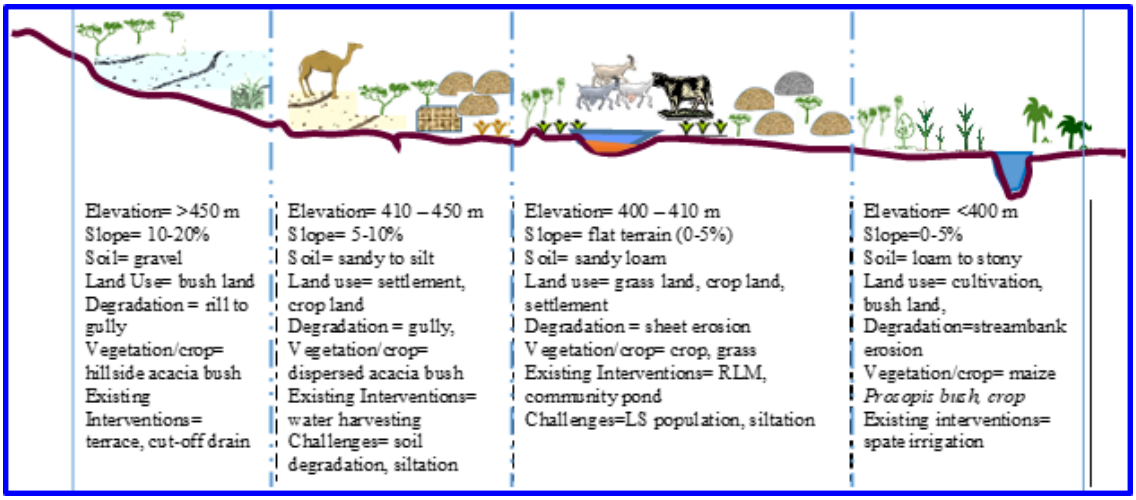


**Figure 1.2. Transect walk exercise, example**

**Format to be used to characterize village or sub kebele community through transect walk**

Name of Woreda/district: _____Name of Kebele/ _____
Sub kebele/village _____

**Table 1.3. Land feature information from transect stops**

| Features | Transect stops | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Elevation | | | | | | |
| Slope | | | | | | |
| Soil | | | | | | |
| Land use | | | | | | |
| Degradation features/indicators | | | | | | |
| Grazing system | | | | | | |
| Tree system | | | | | | |
| Potentials | | | | | | |
| Challenges | | | | | | |
| Existing Interventions (SWC, Plantation, livestock, etc.) | | | | | | |
| Future Recommendations | | | | | | |

## 1.4 SOCIO-ECONOMIC BASELINE

### A. Basic Information

Planning Year/ Year in which Data taken: _____Region (Name):_____
Zone (Name): _____ Woreda:_____ Kebele (Name):_____ Basin _____Sub-Basin_____ Major Watershed _____village/sub kebele_____

**Table 1.4. Kebele/ sub kebele community rangeland team record**

| Name of kebele/ sub kebele/ village | Area in Ha | Distance from Woreda | Altitude (masl) | | Outlet Coordinate | |
|---|---|---|---|---|---|---|
| | | | Max. | Min. | X | Y |
| | | | | | | |

| Kebele/ Sub Kebele/ village Rangeland Team | | | | |
|---|---|---|---|---|
| No | Name | Sex | Title/position | Remark |
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| … | | | | |
| 12 | | | | |

**Table 1.5. Population data**

| Population data | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| No of Household Heads | | | | Kebele/ sub kebele/ village population | | | Average family size | Age Class in years | | | |
| | Male | Female | Total | Male | Female | Total | | up to 17 | 18 - 35 | 36 - 60 | > 60 |
| No | | | | | | | | | | | |
| (%) | | | | | | | | | | | |

## B. Problem and solution analysis

### (ii) Identification and prioritization of major problems, root causes and solutions to address them: (Preliminary)

**Table 1.6. Problem identification**

| Sector | Major problems | Problem ranking | Root causes | Measures/ solutions to address the problems/ root causes |
|---|---|---|---|---|
| Livestock | | | | |
| | | | | |
| | | | | |
| Natural Resource (Land, Forest, Water) | | | | |
| | | | | |
| | | | | |
| Infrastructure (road, water supply structure), and social services (school, health centers, market) | | | | |
| | | | | |
| | | | | |
| Other socio- economic problems | | | | |
| | | | | |
| | | | | |
| Others: specify | | | | |
| | | | | |
| Any remark made can be written down here: | | | | |

## C. Livestock production

**Table 1.7. Number of livestock**

| Type of livestock | No | Average per household | Percentage from the total |
|---|---|---|---|
| Oxen/ bulls | | | |
| Cows / heifer | | | |
| Goats | | | |
| Sheep | | | |
| Camel | | | |

| | | | |
|---|---|---|---|
| Donkey | | | |
| Horse | | | |
| Poultry | | | |
| Others | | | |
| Total | | | |

| **Table 1.8. Forage /fodder source of the community / (mark XXX for very Common, XX for common and X, rare)** | | | |
|---|---|---|---|
| **Fodder source** | **In dry season** | **In wet season** | **Ranking** |
| Grass on grazing land | | | |
| Grass from cut and carry (hay) | | | |
| | | | |
| | | | |
| Others | | | |
| | | | |

| **Table 1.9. Source of water for livestock (Indicate "0" if no water is available** | | |
|---|---|---|
| Water source | No. available | Average Distance |
| Spring | | |
| River | | |
| Hand dug well | | |
| Pond<br>Birka/ Baska<br>Others | | |

| **Table 1.10. Livestock health and disease condition** | | | | |
|---|---|---|---|---|
| No | Disease type | Livestock affected | Level of damage (Insert medium) | |
| | | | High | Low |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Average distance from animal health center in km, _____

What are the common livestock management practices, free grazing, rotational grazing, pastoral system, etc., being practiced by community members?

_____

_____

Describe the problems with invasive species?

_____

_____

Describe the problems in fodder and forage supply of the community?

_____

_____

Describe the management and problems related to communal grazing lands?

_____

_____

Explain the problems in forage production, management and utilization?

_____

_____

Is the area suitable for apiculture and honey production?

_____

_____

Describe natural products (e.g. incense, gum, dates, etc), if any, with potential for income generation?

_____

_____

List some of the most common plants in the area that can be livestock/bee forage sources?

_____

_____

**D. Natural Resources**

(i) **Land Use and land resources**

**Table 1.11 Land use**

| **Current Land use** | **Area (ha)** | **Area (%)** |
|---|---|---|
| Forest land | | |
| Bush land | | |
| Shrub land | | |
| Cultivated land (if any) | | |
| Grass/ grazing land | | |
| Other land use (swamps/ marshy land, settlement, water bodies, etc) | | |

**Table 1.12. Type of tree and shrubs available**

| Type of tree & shrubs | Area (ha) | Current/ or possible use | Type of ownership | Remark |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

**Table 1.13. Source of fuel wood, (mark, xxx for very common, xx for common, x for rare, and o for nil)**

| **Fuel source** | **Dry season** | **Wet season** | **Availability** |
|---|---|---|---|
| Fire Wood | | | |
| Charcoal | | | |
| Animal dung | | | |
| Others (specify) | | | |

What is the status with forest/bush/shrub land ownership and management?

_____

_____

Who is responsible for collection of fuel wood? How long does it take for an individual to collect construction and fuel wood?

_____

_____

Describe the main problems related to construction and fuel wood availability and fetching, and how the community addresses them?

_____

_____

**(i) Water resources**

**Table 1.14. Source of water**

| Source of water | Amount in Number | Purpose (what it is used for currently) | Average distance (km) | Flow seasons | Which source is used in the seasons (mark x as appropriate) | |
|---|---|---|---|---|---|---|
| | | | | | Rainy season | Dry season |
| River | | | | | | |
| Spring | | | | | | |
| Pond /Birka | | | | | | |
| Well /Ela | | | | | | |
| Lake | | | | | | |
| Dam | | | | | | |
| Other | | | | | | |

- Who is responsible to collect water?
  _____
- How long people travel to collect water (in km and hour)? Rainy season? _____Dry Season? _____
- How long livestock travel to get water (in km and hour)?_Rainy season? _____Dry Season_____
- Describe any issues/ problems related to access to water for domestic use (both human and livestock consumption) and how the community addresses the problems?

_____

_____

_____

**(ii) Land administration and certification** (use this part only if it is applicable)

When did land registration and documentation start? _____

No of households, which received first level certificate in the kebele/sub kebele/village?

Male _____ Female _____ Total _____

No of households which received second level certificate in the kebele/sub kebele/village?

Male _____ Female _____ Total _____

Is there any land management and utilization change after the provision of certificates?

_____

Did land certification contribute for natural resource conservation, state some examples if any?

_____

## E. Social infrastructure and services, market

**Table 1.15. Distribution of Social infrastructure and service institutions**

| No | Services/ Institutions | Location in the kebele/sub kebele/village or Outside | | Distance (km) | Remark |
|---|---|---|---|---|---|
| | | Inside | Outside | | |
| 1 | Road | | | | |
| 2 | Market | | | | |
| 3 | School | | | | |
| 4 | Health center | | | | |
| 5 | Vet clinic | | | | |
| 6 | Kebele administration | | | | |
| 7 | Telephone | | | | |
| 8 | Electric | | | | |

**Table 1.16: Market supply and demand of goods in the community**

| No | Produce/goods for market supply | Demand of goods from the market |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |

## F. Climate change – Community Knowledge, Attitude and Practice (KAP)

10. What do you understand by the term climate change?

WRITE IN _____

_____

11. How did you know about it?
- From your life experiences
- Heard from the media
- From relatives, neighbours etc. (Word of mouth)
- Through training courses at farmer/pastoral training centre
- From DAs
- From Woreda experts/official
- Other **PLEASE SPECIFY** _____

12. What do you think is the main cause of Climate Change?
- Human activity
- An act of God
- Something else
- Don't know

13. How worried are you about the impact of climate change on your livelihood?
- Very worried
- A little worried
- Not worried at all
- Don't know

14. Which of the following climate shocks have you experienced in the past year

- Flood
- Drought
- Increased temperatures
- Frost
- Heavy rain
- Hailstorm
- Erratic rainfall
- None

15. How can you protect your livelihood from climate shocks?

- Adapt Irrigation farming
- Water harvesting
- Diversifying income sources
- Migration
- Doing soil and water conservation activities on my rangeland
- Planting trees
- Other SPECIFY _____
- Don't know

1.5 BIO-PHYSICAL SURVEY METHODS

1.5.1 KEBELE/SUB-KEBELE/VILLAGE DELINEATION

The boundaries of a Kebele/sub kebele/village in which planning and management is to be undertaken can be easily delimited with in which land use types can be identified and a development map can be prepared. A number of different techniques may be applied to delineate Kebele/sub kebele/village which include:

Using topographic maps (commonly used at field level);

Aerial photographs - on which better delineation can be achieved through the use of stereo pairs[10] (with scale larger than 1:15000);

Field mapping using GPS;

Digital elevation models and use of GIS software to delimit the Kebele/sub kebele/village boundary.

Kebele/sub kebele/village ***delineation:*** **Identification and mapping the targeted Kebeles and communities in the** *woreda* is carried out by using 1: 50,000 topo maps, GIS tools and the collective knowledge of *woreda* experts. The delineation/boundary of the Kebele/sub kebele/village and specific sites will be verified and corrected with ground checking during **the reconnaissance visits at *Kebele* and community level.** Kebele/sub kebele map may contain land use, location and size of rangelands, water points, settlements, and may also be possible to mark major drainage courses (consisting of rivers/streams, other drainage lines) as well as features of land degradation, location and area coverage of invasive species, etc.

It will also be important to delineate the broader rangeland boundaries within which the selected *Kebele/sub kebele* is located and see how they overlap, and analyse the major interactions within and between Kebele communities within the broader rangeland unit. **This exercise helps in validating the selection and reaching agreement over boundaries and resources to be included**. In communal rangelands, this is an important step for ensuring that a suitably large-scale approach is used, breaking out of highly localized and village-level planning. Engage knowledgeable elders/ clan leaders to explain the trends and changes in recent years, as well as brief on the historical context and any relevant details prior to beginning the mapping exercise e.g. identify interesting features and characteristics that influence mapping and management, such as seasonal grazing areas, drought reserves, corridors, water points, patterns of mobility (livestock and people) both within the Kebele and the broader rangeland area, etc. Proceed to the field and delineate the location of these features and locations of gendas/ villages/ communities within the Kebele/sub kebele.

1.5.2 HISTORY OF RESOURCE USE AND MANAGEMENT

Carry out trend analysis using the table below: changes in resources, their management/ use, problems associated with these changes and the overall direction in which the community is moving. Using the different PRA techniques such as the time line/ trends analysis methods, one can get a historical review of the community and find out what the major events were, their causes and how they have impacted the community. The trends of changes in resource use and management (trends analysis), problems associated with these changes and the overall direction in which the community is moving. This is followed by inventory and assessment of resources (people*, land, water, vegetation, livestock, etc.):

| Period | Trend Analysis |
|---|---|
| | |
| | |
| | |
| | |

1.5.3 LAND USE SYSTEMS/ CURRENT LAND USE

**Table 1.16: Present land use condition**

| Land use | Area (in ha) | Area (%) from total | Problems associated with each land use |
|---|---|---|---|
| **Cultivated land (if any)** | | | |
| CL1 | | | |
| CL2 | | | |
| **Grazing land** | | | |
| GL1 | | | |
| GL2 | | | |
| GL3 | | | |
| **Forest land** | | | |
| FL1 | | | |
| FL2 | | | |
| FL3 | | | |
| Village | | | |

1.5.4 Development Map, symbols for watershed base and development map for pure pastoral

# ANNEX 2: WORK NORMS FOR MOST OF THE TECHNOLOGIES IN THE INFO-TECHS FOR PURE PASTORAL AREAS

**Table 2.1: Applicable Work norms for New and Different Combinations of Technologies Presented in the Info-techs for Pure Pastoral Areas**

| NO. | ACTIVITY | UNIT | WORK NORM |
|---|---|---|---|
| **1** | Level Soil Bund | PD/Km | 210 PD/km |
| **2** | Level Stone Bund | PD/Km | 350 PD/km |
| **3** | Stone Faced Soil Bunds Construction | PD/km | 350 PD/km |
| **4** | Hillside Terracing | PD/Km | 350 PD/km |
| **5** | Hillside Terrace + Trench Constr. | PD/km | 462 PD/km |
| **6** | Bunds stone spillway + apron | Spillway + apron | 14PD/5 Spillway+ apron |
| **7** | Bund Stabilization (grass & legumes) | PD/km | 42 PD/km |
| **8** | Micro-trenches | PD/ MTs | 7PD/15 MTs |
| **9** | Micro-Basin Construction | Micro-basins/PD | 25 MB/7PD |
| **10** | Water collection Trench Construction | ***PD/ TRENCHES*** | 14PD/15 trench |
| **11** | Semicircular Bunds | 1PD/ $m^3$ earth work volume | 7PD/2.5 $m^3$ earth work volume |
| **12** | Runoff - Run-on Area Bunds/Barrier Lines | PD/km | 210 PD/km |
| **13** | Dry Stone Measures (DSM) | PD/Km | 350 PD/km |
| **14** | Percolation Pits | PD/pit | 20PD/pit |
| **15** | Grassed Waterway Construction | $M^3$/PD | 5$M^3$/7PD |
| **16** | Waterway construction (stone paved) | PD/$m^3$earth/stone work | 7PD/3.75$m^3$ |
| **17** | Waterway Check & Drop + Apron structure (CDA) | PD/CDA | 7PD/15CDA |
| **18** | Cut-off Drain Construction | $M^3$/PD | 0.5$M^3$/PD |
| **19** | Gully Cut & fill/reshaping/levelling | PD/$m^3$ earth work | 7PD/5$M^3$ |
| **20** | Loose Stone Check-dam Construction | $M^3$/PD | 2.5M3/7PD |
| **21** | Stone Check-dam Maintenance | $M^3$/PD | 5$M^3$/7PD |
| **22** | Gabion structure | PD/ $m^3$ of gabion check | 7PD/1.25 $M^3$ of gabion check dam |
| **23** | Brushwood check dam construction - Double row | PD/linear meters | 7PD/15 linear meter |
| **24** | Brushwood check dams construction - Single row | PD/linear meters | 7PD/25 linear meter |
| **25** | Sand bag check-dam | PD/ $m^3$ sandbag CD | 7PD/2.5$m^3$ sandbag CD |
| **26** | Sediment storage dam (SS dam) | PD/earth/stone work | 7PD/3.75$M^3$ |
| **27** | SS dam Spillway construction | PD/$m^3$ spillway | 7PD/2.5$M^3$ |
| **28** | Gully Re-vegetation | PD/ha | 700 PD/ha |
| **29** | Planting on Bund | PD/Km | 112PD/5km |
| **30** | Seedling Production | PD/1000 Seedling | 21 PD/1000 Seedling |
| **31** | Pitting | Pits/PD | 75Pits/7PD |
| **32** | Tree Seed Collection | Kg/PD | Kg/28PD |
| **33** | Grass (Range) seeds collection (ACs, bunds, etc.) | PD/kg | 14PD/kg |
| **34** | Seedling Planting | Plants/PD | 250Plants/7PD |
| **35** | Grass & Legume Seed Production (multicenter) | *PDS/HA/ YEAR* | 980 PDs/Ha/ year |
| **36** | Compost Making (Pit: 4mL x 2mW x1,5mD) | ***PD/PIT*** | 14 PD/pit |
| **37** | Compost Making (Heap: Lm x 2mW x1,5m High) | PD/linear meter | 7PD/5 linear meter |
| **38** | Improved pits for dry areas | PD/ Improved pits | 7PD/25 improved pit |
| **39** | Mulching of Trenches/eyebrow basins/herring bones, etc. | PD/structures | 7PD/250 structures |
| **40** | Mulching of degraded land & long fallows | PD/ha | 350PD/ha |
| **41** | Manuring of planting pits | PD/ pits | 7PD/1000 pits |
| **42** | Cow dung collection & distribution | PD/ $m^3$ | 42PD/5 $M^3$ |

| | | | |
|---|---|---|---|
| **43** | Grassland improvement | PD/ha/year | 28 PD/ha/year |
| **44** | Bush Clearing | PD/hectare | 125 PD/ha |
| **45** | Bush Uprooting | PD/hectare | 125 PD/ha |
| **46** | *Prosopis* pods collection | Kg/PD | 5 kg/PD |
| **47** | Clearing of P*arthenium* Weed | PD/hectare | 175 PD/hectare |
| **48** | Small Farm Dam Construction | $M^3$/PD | 2$M^3$ /7PD |
| **49** | Pond Construction | $M^3$/PD | 2.5$M^3$/7PD |
| **50** | *SPRING DEVELOPMENT* | PD/No | 2380 PD/No |
| **51** | Stream Diversion Weir | ***PDS/NO*** | 4200 PDs/No |
| **52** | Sub-surface dams in dry lands | $m^3$ /PD | 5 $m^3$ /7PD |
| **53** | Road Water Harvesting | PD /km | 350 PD /km |
| **54** | Farm Road Construction - | PD/Km | 4200 PD/Km |
| **55** | Road Maintenance/Construction on <5% slope | PD/Km | 700 PD/Km |
| **56** | Stone shaping (for SS & rock fill dam walls, large gully checks, etc.) | PD/ $m^3$ shaped stones | 7PD/2.5$m^3$ shaped stones |
| **57** | Stone collection and transport | PD/$m^3$ | 7PD/2.5$m^3$ |
| **58** | Vegetative fencing & Stabilization | PD/km | 56PD/km |
| **59** | Site Guarding | PD/Ha/Year | 28PD/5 Ha/year |

## ANNEX 3: RANGE/PASTURE PLANT SPECIES IN THE DIFFERENT RAINFALL ZONES

- High rainfall 600 – 1000 mm/year,
- Medium rainfall 200 - 600 mm/year
- Low rainfall <200 mm/year

**Table 3.1: Range or pasture land species adapted to different rainfall zones**

| No | Name of Species | T-Trees F- Forbs G- Grass | Rainfall Zones | | | |
|---|---|---|---|---|---|---|
| | | | High | Medium | Low | Irrigated |
| 1 | *Acacia ehrenbergiana* | T | | | ✓ | |
| 2 | *Acacia mellifera* | T | | ✓ | | |
| 3 | *Acacia nilotica* | T | | ✓ | | |
| 4 | *Acacia seiberiana* | T | ✓ | ✓ | ✓ | |
| 5 | *Acacia Senegal* | T | | ✓ | ✓ | |
| 6 | *Acacia seyal* | T | | ✓ | | |
| 7 | *Acacia tortilis* | T | | | ✓ | |
| 8 | *Acacia tortilis subsp. Radiana* | T | | | ✓ | |
| 9 | *Acacia oerfota* | T | | ✓ | ✓ | |
| 10 | *Aristida adscensionis* | G | ✓ | | | |
| 11 | *Sehima ischaemoides* | G | | ✓ | | |
| | *Aristida adoensis* | G | | ✓ | ✓ | |
| 12 | *Balanitesa egyptiaca* | T | | ✓ | ✓ | |
| 13 | *Blepharis edulis* | F | | ✓ | ✓ | |
| 14 | *Bothriochloa radicans (Lehm.)* | G | ✓ | ✓ | ✓ | |
| 15 | *Bracharia brizantha* | G | ✓ | ✓ | | |
| 16 | *Bracharia humidicola* | G | ✓ | ✓ | | |
| 17 | *Brachiaria obtusiflora* | G | ✓ | | | |
| 18 | *Brachiaria ovalis Stapf* | G | | ✓ | ✓ | |
| 19 | *Cajanus cajan* | F | | | | ✓ |

| | | | | | | |
|---|---|---|---|---|---|---|
| 20 | *Capparis decidua* | T | | ✓ | | |
| 21 | *Cenchrus ciliaris C. biflorus* | G | | ✓ | ✓ | |
| 22 | *Chrozaphora* | F | | | ✓ | |
| 23 | *Chrysopogon plumulosus (Hochst)* | G | | ✓ | ✓ | |
| 24 | *Citrullus colosynthesi* | F | | ✓ | ✓ | |
| 25 | *Clitoria ternatea* | F | ✓ | | | ✓ |
| 26 | *Corchorus fascicularis Lam., or olitorius* | F | ✓ | ✓ | | |
| 27 | *Crotalaria spp* | F | | ✓ | | |
| 28 | *Cymbopogom nervatus* | G | ✓ | ✓ | ✓ | |
| 29 | *Cymbopogon schoenanthus (L) Spreng* | G | | ✓ | ✓ | |
| 30 | *Cynodondactylon (L) pers* | G | | ✓ | ✓ | |
| 31 | *Cordia sinensis* | T | ✓ | ✓ | ✓ | |
| 32 | *Dactyloctenium scindicumboiss* | G | | ✓ | ✓ | |
| 33 | *Dinebra retroflexa* | F | | ✓ | ✓ | |
| 34 | *Desmodium dichotomum,* | F | ✓ | ✓ | | |
| 35 | *Dobera glabra* | T | | ✓ | ✓ | |
| 36 | *Chloris prieurii* | G | | ✓ | | |
| 37 | *Echinochloa colona* | G | | ✓ | ✓ | |
| 38 | *Faidherbia albida* | T | | ✓ | | |
| 39 | *Hyparrhenia rufa/ cymbaria* | G | ✓ | | | |
| 40 | *Indiogofera spp* | F | | ✓ | ✓ | |
| 41 | *Ipomoea cardiosepa* | F | ✓ | ✓ | | |
| 42 | *Ipomoea kordofana* | F | ✓ | ✓ | | |
| 43 | *Ischaemum bracyatherum* | G | ✓ | ✓ | | |
| 44 | *Ischaemum afrum* | G | | ✓ | ✓ | |
| 45 | *Leptadenia pyrotechnica* | T | | | ✓ | |
| 46 | *Leucaena leucocephala* | T | | ✓ | ✓ | |
| 47 | *Mediego sativa (Alfalfa)* | F | | | | ✓ |
| 48 | *Maerua crassifolia* | T | | | ✓ | |
| 49 | *Panicum turgidum* | G | | | ✓ | |
| | *Panicum coloratum* | G | | ✓ | ✓ | |
| 50 | *Phaseolus trilobis* | F | ✓ | | | ✓ |
| 51 | *Phoenix dactylifera* | T | | | ✓ | ✓ |
| 52 | *Salvadora persica* | T | | ✓ | ✓ | |
| 53 | *Setaria acromelanea* | G | | ✓ | ✓ | |
| 54 | *Sorghum bicolor* | G | | | | ✓ |
| 55 | *Sorghum purpureosericum* | G | ✓ | ✓ | | |
| 56 | *Sporobolus pellucidus* | G | | ✓ | ✓ | |
| 57 | *Sorghum sudanensis* | G | | | | ✓ |
| 58 | *Stylosanthes campograND* | F | ✓ | | | |
| 59 | *Tragus berteromianus* | G | | ✓ | ✓ | |
| 60 | *Tribulus terrestris* | F | ✓ | ✓ | ✓ | |
| 61 | *Urochula selerochiaena* | G | | ✓ | ✓ | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 62 | *Vigna radiata* | F | ✓ | | | ✓ |
| 63 | *Vigna trilobata* | F | ✓ | | | ✓ |
| 64 | *Zea mays (Maize)* | G | | | | ✓ |
| 65 | *Ziziphuss pinachristi* | T | ✓ | ✓ | ✓ | |

Bushes and shrubs which serve as feed for Camel, Goats and Cattle which are found in Afar Region (Afar Language).

1. Ribah
2. Heruwayto
3. Wayhara
4. Halel
5. Goraemun
6. Benketo
7. Legai

# PART III: PLANNING ANNEXES FOR BOTH MIXED FARMING AND PURE PASTORAL AREAS

## ANNEX 1: WATERSHED CLIMATE ANALYSIS, PRIORITIZATION AND SCREENING

**Step 1: Climate Change Context:** Identify and document climate change observations and projections from both scientific sources and community knowledge. Consult secondary sources, such as the National Adaptation Plan, for scientific observations. For the community observations, refer to the discussions on the Seasonal Calendar and the Historical Timeline from step 4 & 5 watershed climate analysis below.

| **Observations of Climate Change** | **Future Climate Change Projections** |
|---|---|
| *Community Observations (at watershed/ kebele level)* | |
| | |
| *Scientific Observations (INDICATE SCALE)* | |
| | |

**Step 2: Sensitivity of Livelihood Resources to Climate Impacts:** List livelihood activities and resources needed for each livelihood activities. Then use the table below to analyze the sensitivity of the livelihood resources to climate impacts. Assign each resource a ranking: 0 = Not sensitive at all, 1 = Low sensitivity to climate impacts, 2 = Medium sensitivity to climate impacts, 3 = High sensitivity to climate impacts

| **Livelihood Activities** | **Resources Needed for Livelihood Activities** | Sensitivity to Climate Impacts (0 = None, 1 = Low, 2 = Medium, 3 = High) |
|---|---|---|
| *Women's Livelihood Activities* | *Resources Important to Women's Livelihoods* | |
| | | |
| | | |
| *Men's Livelihood Activities* | *Resources Important to Men's Livelihoods* | |
| | | |
| | | |

**Step 3: Vulnerability Matrix (VM):** Identify climate related hazards (e.g. drought, flood, erratic rainfall, heavy rainfall, etc.) affecting the identified livelihood resources. Determine the effects of these hazards on the resources. Rate the level of effects as 3 = significant impact, 2 = medium impact 1 = low impact, 0 = no effect on resource. Hazards must be ranked through community discussion using pair wise ranking technique discussed in step 3 of the planning step.

| Livelihood resources | Hazards | | | |
|---|---|---|---|---|
| | Hazard 1 | Hazard 2 | Hazard 3 | Hazard 4 |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

**Step 4: Historical Timeline:** The objective here is to get an insight into past hazards, changes in their nature, intensity and behavior, make people aware of trends and changes over time and document community observations of changing hazard trends. It is advisable to have the same material as in the previous analysis.

| Year | Event | Year | Event |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

**Step 5: Seasonal Calendar:** This is to analyze seasonal changes in activities and periods of stress or scarcity, to identify important livelihood activities, document community observations of changing trends in seasonal patterns and to highlight the increasing uncertainty associated with climate change. It is advisable to have the same material as in the previous analysis.

| EVENT/ACTIVITY | S | O | N | D | J | F | M | A | M | J | J | A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

**Step 6: Impacts of Climate Hazards on Livelihoods and response strategies:** Fill in the table below, summarizing the direct impacts of the different hazards on livelihoods, as identified by the community members during the Vulnerability Matrix exercise (Step 3)

| Hazard | Direct Impact (on Women's/ Men's Livelihoods) | Current response strategies | Alternative responses |
|---|---|---|---|
| Hazard 1 | | | |
| Hazard 2 | | | |
| Hazard 3 | | | |
| Hazard 4 | | | |

**Step 7: Proposed Interventions to Reduce Climate Change Vulnerability**

| Impacts Identified by Communities | Interventions to Reduce Climate Change Vulnerability | | |
|---|---|---|---|
| | Watershed/ pastoral range land/ Management Interventions | Livelihoods Interventions | Other Interventions |
| Hazard 1 | | | |
| | | | |
| | | | |
| Hazard 2 | | | |
| | | | |
| | | | |

| Hazard 3 | | | |
|---|---|---|---|
| | | | |

**Step 8: Climate-Smart Prioritization of Interventions (Prioritizing watershed/ rangeland development interventions)**

| Proposed watershed management interventions | Resources that are climate-sensitive and/or important for livelihoods | Criteria (tick √, if the answer is yes) | | | | | | | | | Total number of √ s for the intervention |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Does the intervention reduce the impact of the hazard on the resources? | | | Explain how | Does the intervention increase the quality or availability of the resource? | | Explain how | Did the community identify this action as a priority? | Does the action contribute to CC mitigation? | |
| | | Hazard #1 | Hazard #2 | Hazard #3 | | Quality | Availability | | | | |
| Intervention 1 | | | | | | | | | | | |
| Intervention 2 | | | | | | | | | | | |
| Intervention 3 | | | | | | | | | | | |
| Intervention 4 | | | | | | | | | | | |

**Step 9: Climate-Smart Prioritization of Interventions (Prioritizing livelihoods interventions)**

| Proposed livelihoods intervention | Does the intervention make livelihoods less climate-sensitive? | | | Explain how | Does the livelihoods intervention enable risk management (RM) and climate change (CC) adaptation in livelihoods? | | | | Explain how | Did the community identify this | Does it contribute to CC | Total no of √ s for the intervention |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Does it adjust existing LH | Does it support diversification of LH | Does it promote efficient use of LH | | Does it increase access to climate information? | Does it increase flexibility in LH options? | Does it increase knowledge and skills on RM and CC | Does it increase access to services that support RM and | | | | |
| Intervention 1 | | | | | | | | | | | | |
| Intervention 2 | | | | | | | | | | | | |
| Intervention 3 | | | | | | | | | | | | |
| Intervention 4 | | | | | | | | | | | | |

**NB:** If yes, explain how. If not, identify adjustments or complementary activities to address this

**Step 10: Climate-Smart Prioritization of Interventions (Linking livelihoods options and watershed management interventions)**

| Prioritized livelihoods interventions | Is the activity at risk from any of the climate-related | If yes, identify NRM activities to address this. | Does the success of the activity rely on access to any of the climate-sensitive | If yes, identify NRM activities to address this. | What other interventions are needed to maximize the |
|---|---|---|---|---|---|

| | hazards identified in Step 3? | | resources identified in Step 2? | | potential for success of the intervention? |
|---|---|---|---|---|---|
| Livelihoods intervention 1 | | | | | |
| Livelihoods intervention 2 | | | | | |
| Livelihoods intervention 3 | | | | | |
| Livelihoods intervention 4 | | | | | |

**Step 11: Prioritized Watershed/ Rangeland Management Interventions and Livelihoods Options**
Based on the previous three steps, list the prioritized watershed management interventions and livelihoods options in the table below. These are the activities that should be included in the action plan. Where activities are linked (from Step 7– Proposed Interventions to Reduce Climate Change Vulnerability), list them side-by-side. These priorities must be combined with priorities identified based on problem analysis and solutions to decide which interventions will be included in the Community Watershed/ Pastoral Community Action Plan.

| Prioritized Watershed/ Rangeland Management Interventions | Prioritized Livelihoods Interventions | Other interventions |
|---|---|---|
| | | |
| | | |
| | | |

**Step 12: The Climate Screening of Community Watershed/ Pastoral Community Action Plan:** It is a final check on the Community Watershed/ Pastoral Community Action Plan, to ensure that the climate-smart priorities have not been lost when combined with other priorities (***under Section (i) - Compiled Socio-economic and Biophysical Analysis Results***), and to look at the plan in its entirety to ensure it is addressing different dimensions of vulnerability to climate change, achieves mitigation co-benefits if possible and is gender-sensitive. To do this, consider the following points to adjust the action plan.

| No | Key questions/ points to consider | Answer |
|---|---|---|
| 1 | Does the plan include interventions that reduce exposure to climate-related hazards identified in the Climate Analysis? | |
| | If yes, which interventions? If no, explain why not. | |
| 2 | Does the plan include interventions that reduce sensitivity of livelihoods to climate impacts identified in the Climate Analysis? | |
| | If yes, which interventions? If no, explain why not. | |
| 3 | Does the plan include interventions that enable risk management and climate change adaptation in livelihoods? | |
| | If yes, which interventions? If no, explain why not. | |
| 4 | Does the plan include interventions that achieve climate change mitigation co-benefits? | |
| | If yes, which interventions? If no, explain why not. | |
| 5 | Were future climate scenarios taken into account in the development of the plan? | |
| | If yes, how? If no, explain why not. | |
| 6 | Does the plan address the needs and priorities of both women and men? | |
| | If yes, how? If no, explain why not. | |
| 7 | Based on the responses to the above questions, provide an overall assessment of the plan in terms of how climate-smart it is. Suggested scale:<br>Answered yes to 1-2 questions: Weak<br>Answered yes to 3-4 questions: Medium<br>Answered yes to 5-6 questions: Strong | |

# ANNEX 2: GENDER ANALYSIS TOOLS - EXAMPLES

## 2.1 ACTIVITY PROFILE ANALYSIS TOOL

| Type of activities | Female | | Male | |
|---|---|---|---|---|
| | Adult | Girls | Adult | Boys |
| 1. Productive Role | | | | |
| Cattle herding | * | ** | * | ** |
| Goat/Sheep herding | * | -- | ** | * |
| Calf herding | - | - | *** | * |
| Land clearing | ** | * | ** | ** |
| Plowing | *** | x | *** | x |
| Watering (Irrigating) | ** | -- | ** | -- |
| Weeding | ** | * | *** | ** |
| Hoeing ' | ** | -- | *** | * |
| Harvesting | *** | ** | *** | ** |
| Etc..... | | | | |
| 2. Reproductive Role | | | | |
| Cooking | *** | * | - | - |
| Child care | *** | ** | * | - |
| Collecting Firewood | *** | ** | * | * |
| Water Fetching | | | | |
| Milking | | | | |
| Washing cloth | | | | |
| Milk Churning | | | | |
| Etc.... | | | | |
| 3. Community Role | | | | |
| Arbitration | * | - | *** | _ |
| Digging burial place/funeral service | - | - | *** | |
| Carrying the deceased | - | - | *** | * |
| Tent construction | | | *** | * |
| Serving Food | *** | - | * | * |
| Activities related to festivals | *** | | ** | |
| Community watershed management | | | | |
| Road construction | | | | |
| Stream Upgrading | | | | |
| Etc.... | | | | |

*** Fully Involved ** Mostly Involved * Sometimes involved - No involvement



## 2.2 ACCESS AND CONTROL OVER RESOURCE TOOL

| List of HH resources | Access | | Control | |
|---|---|---|---|---|
| | Women | Men | Women | Men |
| Land | | | | |
| Land (farm) | *** | *** | ** | *** |

| | | | | |
|---|---|---|---|---|
| Cattle | *** | *** | * | *** |
| Small Ruminants | *** | *** | ** | *** |
| Chicken/poultry* | *** | *** | *** | * |
| House | *** | *** | * | *** |
| Agricultural tools | * | *** | * | *** |
| Food processing tools | | | | |
| **List of community asset** | | | | |
| Land | | | | |
| Forest | | | | |
| Range land | | | | |
| Spring water | | | | |
| Roads | | | | |
| Health post | | | | |
| School | | | | |
| FTC | | | | |
| etc. | | | | |

***Full access ** Partial access * Less access - No access
***Full control over ** Partial control over * Less control over - No control over

## 2.3 Daily Activities of Men & Women in Slack & Pick Season

| Time/hour | Men | | Women | |
|---|---|---|---|---|
| | **Peak season** | **Slack season** | **Peak season** | **Slack season** |
| 4:00 - 5:00 am | Sleeping | Seeping | Baking Enjera | Sleeping |
| 5:00 - 6:00 am | Feeding oxen…. | Sleeping | Cooking /fetching water | Baking Enjera |
| 6:00 - 7:00 am | plowing … | checking cattle's in the barn | Milking …. | Fetching water …. |
| 7:00 - 8:00 am | plowing & Clearing | Collecting crop residue... | Deploying children to work | Milking cow/cleaning... |
| 8:00 - 9:00 am | Eating breakfast & continue plowing | Eating breakfast /drinking coffee | back to home & cleaning house, barn … | Serving breakfast and eating... |
| 9:00 - 10:00 am | plowing & Clearing /gulgualo | helping children to take cattle to grazing filed | Washing child cloth& water fetching | Cleaning , arranging home, Washing cooking utensils |
| 10:00 - 11:00 am | plowing & Clearing | Looking after cattle…... | Preparing lunch | cleaning barn making |
| 11:00 - 12:00 am | Plowing & Clearing /gulgualo… | Collecting crop residue for animal feed… | Providing lunch for children | Preparing lunch/taking care of children |
| 12:00 - 1:00 pm | plowing & Clearing /gulgualo | /Getting back to home &looking around | Taking lunch for husband to farm place | Preparing lunch/taking care of children.. |
| 1:00 - 2:00 pm | Eating lunch | Eating lunch &drinking coffee | Clearing farm plot /gulgualo | Serving, eating lunch &drinking coffee |
| 2:00 - 3:00 pm | Plowing | Taking rest | Clearing farming plot /gulgualo | Washing cooking utensils… |
| 3:00 - 4:00 pm | Clearing farming plot /gulgualo& taking weed outside the farm | Maintaining fences/farm equipment | Collect fuel wood | Spinning cotton /sifting grains/ Chatting with neighbor hood |
| 4:00 - 5:00 pm | Taking oxen to river for watering | Maintaining fences/farm equipment | Taking small farm equipment & collected wood to home | Fetching water / collect full woods wood |

| | | | | |
|---|---|---|---|---|
| 5:00 - 6:00 pm | Looking after oxen and taking weed out of farm | Leisure time with friends /colleagues | Brining goat, sheep, chicken and lumps from the field to home | Preparing dinner/ &local drinking(tella) |
| 6:00 - 7:00 pm | Feeding oxen … | Milking /Chatting with children… | Bringing back lumps to home from grazing field.. | washing & smoking milking utensil ,and |
| 7:00 - 8:00 pm | Washing own feet / taking rest… | chatting with family & | Preparing dinner/ | Serving dinner … |
| 9:00 - 10:00 pm | Eating dinner & praying | eating dinner | Serving dinner& preparing sleeping place | , churning milk ,Washing utensils and … |
| 10:00 - 11:00 pm | Sleeping | Sleeping | Washing &sleeping children | Sleeping |
| 11:00 - 12:00 pm | Sleeping | Sleeping | churning milk preparing& Washing utensils and | Sleeping |

Peak season: Men work for… hours
Women work for …hours

Slack Season: Men work for …….. Hours
Women work for….. Hours

## 2.4 Decision Making Matrix/Tool

| Qualitative Decision-Making Analysis Matrix | | | | | | |
|---|---|---|---|---|---|---|
| **Participation** | **FHH women** | | | **Men** | | |
| | **Always** | **Sometimes** | **Never** | **Always** | **Sometimes** | **Never** |
| In discussion | | x | | X | | |
| Making suggestion | | x | | X | | |
| Chairing meeting | | x | | X | | |
| Elect leaders | X | | | X | | |
| Make decision | | x | | X | | |
| *** Fully ** Mostly * Sometimes - No involvement | | | | | | |

| **Decision making structure** | **Quantitative Decision-Making Matrix** | | | | | |
|---|---|---|---|---|---|---|
| | **Members** | | **Chair person** | | **Secretary** | |
| | **F** | **M** | **F** | **M** | **F** | **M** |
| **Examples** | | | | | | |
| Community Watershed taskforce | | | | | | |
| Micro-watershed/ community watershed user's association | | | | | | |
| Kebele Appeal Committee | | | | | | |
| Economic Users groups | | | | | | |
| Others | | | | | | |
| Total number | | | | | | |
| *NB: put exact number of women represented in each decision-making structure* | | | | | | |

# ANNEX 3: PREPARATION OF ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK

## 3.1 STEPS FOR ENVIRONMENTAL AND SOCIAL SCREENING

In order to avoid or mitigate any undesirable impacts during watershed development projects, it is essential to maintain a high level of environmental. This is achieved through the implementation of the environmental and social management framework (ESMF) or initial environmental examination (IEE). It helps to ensure that appropriate natural resources and environmental management practices are integrated into watershed development planning and implementation activities. The ESMF/IEE checklist is used for different activities, including small scale projects such as: water harvesting, small scale river diversion, irrigation activities, community road construction, catchment treatment, etc. The following project screening checklists should be applied as per the definition of what constitute major interventions subject to such scrutiny to analyse the environmental impacts of integrated watershed interventions and assure the social integrity of the community.

***Step 1: Preliminary Screening: Classifying major interventions into different categories****

| **Major Interventions** | **Tick Yes/No According to preliminary classifications of the major interventions during screening** | | |
|---|---|---|---|
| | **Schedule 1** | **Schedule 2** | **Schedule 3** |
| Integrated physical and biological Soil and Water Conservation | | | |
| Wind Erosion Control Measures | | | |
| Structural Water Harvesting | | | |
| Water Lifting Technologies | | | |
| Small Scale Irrigation and Water Management | | | |
| Homestead and Livelihood Intervention | | | |
| Range Land Management Practices | | | |
| Feeder Roads | | | |

**Note that: to classify major interventions into the different schedules refer to the preliminary screening section in the body of the main text**

***Step 2: Check for Environmental Concern***

***Name of Major Intervention:*** _____

***Sub-Activities:*** _____

| **Check for environmental Concern** | **Yes/No** |
|---|---|
| to be implemented close to areas of environmental sensitivity such as a national park, wetland of national and international importance, religious and cultural heritage areas, primary forests, areas which harbor protected, threatened or endangered species | |
| Involves dams | |
| involving the use of pesticides, which may require an Integrated Pest Management procedure | |
| involving medical waste | |
| Having potentially significant negative impacts | |

***Step 3: Detail Screening: Identification of potential impacts for Major interventions***

Region: _____Zone:_____Woreda:_____
Kebele: _____Sub-Kebele/Micro-Watershed: _____
Name of Community Watershed/Rangeland Users Association: _____
Screening Year: _____Implementation Year:_____

| Potential Adverse Impacts | Level of Potential Adverse Impacts | | | | | |
|---|---|---|---|---|---|---|
| | None | Low | Medium | High | Unknown | Remark |
| Integrated physical and biological Soil and Water Conservation | | | | | | |
| Wet season soil disturbance | | | | | | |
| Potential for debris flows or landslides | | | | | | |
| Removal of native plant/tree species | | | | | | |
| Introduced plant/tree species invasion of native species | | | | | | |
| Wildlife habitats or populations disturbed | | | | | | |
| Environmentally sensitive areas disturbed | | | | | | |
| Insufficient capacity to manage catchment ponds | | | | | | |
| Insufficient capacity to prohibit or control open grazing | | | | | | |
| Insufficient capacity to manage new plantations/pastures | | | | | | |
| Other (specify): | | | | | | |
| Wind Erosion Control Measures | | | | | | |
| | | | | | | |
| Structural Water Harvesting | | | | | | |
| New access (road) construction | | | | | | |
| Existing water sources supply/yield depletion | | | | | | |
| Existing water users disrupted | | | | | | |
| Downstream water users disrupted | | | | | | |
| Increased numbers of water users due to improvements | | | | | | |
| Increased social tensions/conflict over water allocation | | | | | | |
| Sensitive ecosystems downstream disrupted | | | | | | |
| Local incapacity/inexperience to manage facilities | | | | | | |
| Other (specify): | | | | | | |
| Water Lifting Technologies | | | | | | |
| | | | | | | |
| Small Scale Irrigation and Water Management | | | | | | |
| Existing water sources supply/yield depletion | | | | | | |
| Existing water users disrupted | | | | | | |
| Downstream water users disrupted | | | | | | |
| Water storage requirement and viability (soil permeability) | | | | | | |
| Vulnerability to water logging (poor drainage) | | | | | | |
| Vulnerability to soil and water salinization | | | | | | |
| Sensitive downstream habitats and water bodies | | | | | | |
| Environmentally sensitive areas disturbed | | | | | | |
| Cultural or religious sites disturbed | | | | | | |
| Increased agric. chemicals (pesticides, etc) loading | | | | | | |
| Increased social tensions over water allocation | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Local incapacity/inexperience to manage facilities | | | | | | |
| Local incapacity/inexperience with irrigated agriculture | | | | | | |
| Other (specify): | | | | | | |
| Homestead and Livelihood Intervention | | | | | | |
| | | | | | | |
| Range Land Management Practices | | | | | | |
| | | | | | | |
| Feeder Roads | | | | | | |
| Soil erosion or flooding concerns (eg, due to highly erodible soils or steep gradients) | | | | | | |
| Number of stream crossings or disturbances | | | | | | |
| Wet season excavation | | | | | | |
| Creation of quarry sites or borrow pits | | | | | | |
| Significant vegetation removal | | | | | | |
| Wildlife habitats or populations disturbed | | | | | | |
| Environmentally sensitive areas disturbed | | | | | | |
| Cultural or religious sites disturbed | | | | | | |
| New settlement pressures created | | | | | | |
| Other (specify): | | | | | | |

## Categorization of impacts

**Low**: When the impacts of development activities have an insignificant effect on the ecosystem and socioeconomic activity of the people. E.g. When the construction of community road results in minimal soil erosion, which can be easily managed by the farmers, or there is damage to farmland is very minor and easily repaired.
**Medium**: Any impact between the two extremes (high and low) can be categorized under medium level.
**High**: When the impact of development activity has a significant effect on the ecosystem and/or socioeconomic activity of the people. E.g. If the construction of community road creates gullies, erodes farmlands, or floods villages then the impact is high.

**Template for recording environmental/social impacts**

| **B. Mitigation measures** | |
|---|---|
| If high or significant impacts are identified for any of the above environmental effects, describe mitigation measures for each identified high impact. If the impact is unknown further investigation is required. | |
| **Significant Impacts by Major Interventions** | **Description of *mitigation measures for each* identified high/significant impact** |
| Integrated physical and biological Soil and Water Conservation<br>1.<br>2.<br>3. etc. | |
| Wind Erosion Control Measures<br>1.<br>2.<br>3. etc. | |
| Structural Water Harvesting<br>1.<br>2.<br>3 etc. | |
| Water Lifting Technologies<br>1. | |

| | |
|---|---|
| 2.<br>3. etc. | |
| Small Scale Irrigation and Water Management<br>1.<br>2.<br>3. etc. | |
| Homestead and Livelihood Intervention<br>1.<br>2.<br>3. etc | |
| Range Land Management Practices<br>1.<br>2.<br>3. etc. | |
| Feeder Roads<br>1.<br>2.<br>3. etc. | |

## 3.2 Examples of Potential Mitigation Measures

The following mitigation measures may be required to help avoid or reduce the potential adverse impacts. These measures may sometimes be necessary in addition to the measures included in the main body of this manual as toolkits. Watershed communities and planning teams can prepare area specific lists of mitigating measures. The potential measures that could happen as a result of various interventions and the mitigation measures to be considered are described in the following table.

The following mitigation measures may be required to help avoid or reduce the potential adverse impacts. These measures may sometimes be necessary in addition to the measures included in the main body of this manual as toolkits. Watershed communities and planning teams can prepare area specific lists of mitigating measures. The potential measures that could happen as a result of various interventions and the mitigation measures to be considered are described in the following table.

| Potential impacts of interventions | Mitigation measures |
|---|---|
| Integrated physical and biological Soil and Water Conservation | |
| New access (road) construction | Ensure drainage controls on new roads and rehabilitate temporary access following subproject implementation |
| Wet season soil disturbance | Schedule activities for the dry season |
| Potential for debris flows or landslides | Prepare a watershed plan that identifies and address drainage/slope instability |
| Sensitive downstream ecosystems | Identify and avoid effects of diversion or dams on downstream ecosystems |
| Removal of native plant/tree species | Protect and encourage regeneration of endemic species. Ensure removal of invasive species. |
| Introduced plant/tree species invasion of native species | Ensure non-native species are compatible with native species |
| Wildlife habitats or populations disturbed | Identify and avoid effects on habitats and migration routes of key species |
| Environmentally sensitive areas disturbed | Identify and avoid activity in forest, riparian and wetland habitats with particular biodiversity |
| Land Acquisition | Avoid occupied land. Prepare procedures to ensure equitable resolution. |
| Private assets displaced | Avoid occupied land. Prepare procedures to ensure equitable resolution. |
| Informal land uses displaced or access restricted | Avoid interference with informal land users, and take measures to provide access to alternative lands or resources |
| Insufficient capacity to manage catchment ponds | Establish a water users committee, where appropriate, and/or kebele/village bylaws and provide training to water users |

| | |
|---|---|
| Insufficient capacity to prohibit or control open grazing | Establish a watershed committee, where appropriate, and/or kebele/village bylaws and provide alternative sources of fodder |
| Insufficient capacity to manage new plantations/pastures | Establish a local committee with appropriate, and/or kebele/village bylaws and provide appropriate controls |
| Other (specify): | |
| Wind Erosion Control Measures | |
| Wet season soil disturbance | Schedule activities for the dry season |
| Introduced plant/tree species invasion of native species | Ensure non-native species are compatible with native species |
| Possibly create conducive environment for rodents | Select plants, gasses which are repellant to rodents |
| Aggressively expand to cultivated lands | Select and plant noninvasive trees and grasses |
| Sheltering effect on cultivated lands | Select and plant with minimum sheltering effect |
| Insufficient capacity to prohibit or control open grazing | Establish a watershed committee, where appropriate, and/or kebele/village bylaws and provide alternative sources of fodder |
| Insufficient capacity to manage new biological measures | Establish a local committee with appropriate, and/or kebele/village bylaws and provide appropriate controls |
| Other (specify): | |
| **Structural Water Harvesting** | |
| New access (road) construction | Ensure drainage controls on new roads and rehabilitate temporary access following subproject implementation |
| Existing water sources supply/yield depletion | Assess water supply and existing demands, and manage sustainability |
| Existing water users disrupted | Identify and avoid negative impacts on existing water users in the system design |
| Downstream water users disrupted | Identify and avoid effects of diversion or extraction on downstream users in the system design |
| Increased numbers of water users due to improvements | Assess water supply and existing demands, and manage sustainability |
| Increased social tensions/conflict over water allocation | Establish a water users committee through the kebele/village leaders and prepare equitable rules for water allocation |
| Sensitive ecosystems downstream disrupted | Identify and avoid effects of diversion or dams on downstream ecosystems |
| Land Acquisition | Avoid occupied land. Prepare procedures to ensure equitable resolution. |
| Private assets displaced | Avoid occupied land. Prepare procedures to ensure equitable resolution. |
| Informal land uses displaced or access restricted | Avoid interference with informal land users, and take measures to provide access to alternative lands or resources |
| Local incapacity/inexperience to manage facilities | Establish a local committee, where appropriate, and/or kebele/village bylaws and provide appropriate controls |
| Other (specify): | |
| Water Lifting Technologies | |
| Inappropriate disposal of exhausted oil during services | Safe use of oil and disposal of exhausted oil |
| Downstream user disrupted | Identify and avoid effects of over extraction on downstream users in the system design |
| Possible soil quality reduction as a result of pumping poor quality water | Add leaching water during irrigation |
| Safety issues for operators specially children and women | Implement all safety precautions and measures (fencing and creating awareness) |
| Depletion of ground water resources | Recharging the catchment and efficient use of irrigation water |
| Conflicts among user groups for use | Set by law and regulation for use |
| Others specify | |
| **Small Scale Irrigation and Water Management** | |
| Existing water sources supply/yield depletion | Assess water supply and existing demands, and manage sustainability |

| | |
|---|---|
| Existing water users disrupted | Identify and avoid negative impacts on existing water users in the system design |
| Downstream water users disrupted | Identify and avoid effects of diversion or extraction on downstream users in the system design |
| Water storage requirement and viability (soil permeability) | Test the soil percolation and ensure and impermeable layer in the structure design |
| Vulnerability to water logging (poor drainage) | Assess soil characteristics and either avoid or provide drainage for areas prone to waterlogging |
| Vulnerability to soil and water salinization | Irrigation expert to assess the potential for high salinity and ensure appropriate irrigation practices to minimize impacts |
| Sensitive downstream habitats and water bodies | Identify and avoid effects of diversion or extraction on downstream ecosystems that depend on the surface or groundwater supply |
| Environmentally sensitive areas disturbed | Identify and avoid forest, riparian and wetland habitats with particular biodiversity. |
| Cultural or religious sites disturbed | Identify and avoid cultural or religious sites. If disturbance unavoidable, agreement on mitigating measures must first be reached with stake holders (eg community, mosque, church). If excavation encounters archaeological artifacts, halt construction and notify relevant authorities. |
| Increased agricultural chemicals (pesticides, etc.) loading | Develop an integrated pest management strategy and provide training to farmers |
| Land Acquisition | Avoid occupied land. Prepare procedures to ensure equitable resolution. |
| Private assets displaced | Avoid occupied land. Prepare procedures to ensure equitable resolution. |
| Informal land uses displaced or access restricted | Avoid interference with informal land users, and take measures to provide access to alternative lands or resources |
| Increased social tensions/conflict over water allocation | Establish a water users committee through the kebele and equitable rules for water allocation |
| Local incapacity/inexperience to manage facilities | Establish an operations and maintenance manual, authority and provide training to persons responsible for operating the system |
| Local incapacity/inexperience with irrigated agriculture | Provide training to farmers on sustainable irrigated agriculture |
| Other (specify): | |
| **Homestead and Livelihood Intervention** | |
| Inappropriate use of pesticide around homes | Apply IPM procedure |
| Risk of attack from bees | Minimize disturbing the bees and use personal protective equipment |
| Introduction of invading plants and grasses | Avoid introducing plants and grasses with invading nature |
| Risk of crating conducive environment for rodents | Select plants, gasses which are repellant to rodents |
| Risk human and animal live loss as a result of unprotected water harvesting structures | Protect the structures with fences |
| Risk of malaria infestation from the water harvesting structures | Disturb the water frequently and add some amount of exhausted oil |
| Risk of fire during operation and use of biogases | Frequent monitoring and create awareness for users and Avoid leakage |
| Others specify | |
| **Range Land Management Practices** | |
| Wet season soil disturbance | Schedule activities for the dry season |
| Removal of native plant/tree species | Protect and encourage regeneration of endemic species. Ensure removal of invasive species |
| Introduced plant/tree species invasion of native species | Ensure non-native species are compatible with native species |
| Wildlife habitats or populations disturbed | Identify and avoid effects on habitats and migration routes of key species |
| Environmentally sensitive areas disturbed | . Identify and avoid activity in forest, riparian and wetland habitats with particular biodiversity |
| Insufficient capacity to manage to pond | Establish a water users committee, where appropriate, and/or kebele/village bylaws and provide training to water users |

| | |
|---|---|
| Insufficient capacity to prohibit or control open grazing | Avoid occupied land. Prepare procedures to ensure equitable resolution |
| Insufficient capacity to manage new plantations/pastures | Avoid occupied land. Prepare procedures to ensure equitable resolution |
| Other (specify): | . |
| Feeder Roads | |
| Soil erosion/flooding concerns | Drainage control measures to be included within construction plans |
| Number of stream crossing/disturbances | Minimize water crossings in road location and alignment |
| Wet season excavation | Schedule construction for the dry season |
| Quarry sites/borrow pits created | Re-contour and rehabilitate sites/pits and avoid collection of standing water |
| Vegetation removal | Minimize temporary or permanent removal of natural vegetation. Where possible and remove/destroy invasive species. |
| Wildlife habitats or populations disturbed | Identify and avoid effects on habitats and migration routes of key species |
| Environmentally sensitive areas disturbed | Identify and avoid forest, riparian and wetland habitats with particular biodiversity |
| Land Acquisition | Avoid occupied land. Prepare procedures to ensure equitable resolution. |
| Private assets displaced | Avoid occupied land. Prepare procedures to ensure equitable resolution. |
| Informal land uses displaced or access restricted | Avoid interference with informal land users, and take measures to provide access to alternative lands or resources |
| Cultural or religious sites disturbed | Identify and avoid cultural or religious sites. If disturbance unavoidable, agreement on mitigating measures must first be reached with stake holders (e.g. Community, mosque, church). If excavation encounters archaeological artifacts, halt construction and notify relevant authorities. |
| New settlement pressures created | Ensure road development is coordinated with local land use plans and discuss with the kebele/village leaders |
| Other (specify): | |

*The mitigation measures mentioned here are indicated as examples; the planning team in consultation with the community can consider other alternative solutions

## 3.3 Environmental Management and Monitoring Plan (EMMP)

| **Prepare an environmental management and monitoring plan (EMMP) for all mitigation measures identified above by major interventions. Indicate timing for implementing each activity, duration of monitoring, responsible institutions, cost estimation, etc.** | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mitigative measures (MM) | Time of implementation | Responsible body to implement MM | Monitoring scheme | | | Responsible body to monitor | Estimated cost to implement MM and monitoring |
| | | | Indicator | Data source/method | How often | | |
| Integrated physical and biological Soil and Water Conservation | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Wind Erosion Control Measures | | | | | | | |
| | | | | | | | |
| Structural Water Harvesting | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Water Lifting Technologies | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Small Scale Irrigation and Water Management | | | | | | | |
| | | | | | | | |
| Homestead and Livelihood Intervention | | | | | | | |
| | | | | | | | |
| Range Land Management Practices | | | | | | | |
| | | | | | | | |
| Feeder Roads | | | | | | | |
| | | | | | | | |
| Name _____ | | | | | | | |
| Signature _____ | | | | | | | |
| Position/title _____ | | | | | | | |
| Date submitted_____ | | | | | | | |

# ANNEX 4: SUITABLE SPECIES FOR ESTABLISHMENT OR REMEDIATION IN THE THREE AGRO-ECOLOGICAL ZONES

**Table 4.1. List of suitable tree/shrub species in the three agro-ecological zones**

| No | Species | Agro-ecological zone | | |
|---|---|---|---|---|
| | | Dega | Weyna Dega | Kolla |
| 1. | *Acacia abyssinica* | ✓ | | |
| 2. | *Acacia albida (Faidherbia albida)* | | ✓ | |
| 3. | *Acacia decurrens* | ✓ | ✓ | |
| 4. | *Acacia mearnsii* | ✓ | ✓ | |
| 5. | *Acacia melanoxylon* | ✓ | | |
| 6. | *Acacia nilotica* | | | ✓ |
| 7. | *Acacia saligna* | | ✓ | ✓ |
| 8. | *Acacia senegal* | | | ✓ |
| 9. | *Acacia seyal* | | ✓ | |
| 10. | *Acacia tortolis* | | ✓ | |
| 11. | *Albizia gummifera* | | ✓ | |
| 12. | *Albizia lebbeck* | | | ✓ |
| 13. | *Annona senegalensis* | | | ✓ |
| 14. | *Arundinaria alpina* | ✓ | | |
| 15. | *Arundo donax* | | ✓ | ✓ |
| 16. | *Azadirachta indica* | | ✓ | ✓ |
| 17. | *Balanites aegyptiaca* | | | ✓ |
| 18. | *Boswellia papyrifera* | | | ✓ |
| 19. | *Cajanus cajan* | ✓ | ✓ | ✓ |
| 20. | *Cassia siamea* | | | ✓ |
| 21. | *Casuarina equisetifolia* | ✓ | ✓ | ✓ |
| 22. | *Chamaecytisus palmensis* | ✓ | ✓ | |
| 23. | *Cordia africana* | | ✓ | |
| 24. | *Croton macrostachyus* | ✓ | ✓ | ✓ |
| 25. | *Cupressus lusitanica* | ✓ | ✓ | |
| 26. | *Dodonaea angustifolia* | | | ✓ |
| 27. | *Ensete ventricosum* | ✓ | | |
| 28. | *Erythrina brucei* | | ✓ | ✓ |
| 29. | *Eucalyptus camaldulensis* | | ✓ | ✓ |
| 30. | *Eucalyptus globullus* | ✓ | ✓ | |
| 31. | *Eucalyptus saligna* | | ✓ | ✓ |
| 32. | *Grevillea robusta* | ✓ | ✓ | |
| 33. | *Hagenia abyssinica* | ✓ | ✓ | |
| 34. | *Juniperus Procera* | ✓ | ✓ | |
| 35. | *Leucaena leucocephala* | | ✓ | ✓ |
| 36. | *Melia azedarach* | | ✓ | ✓ |
| 37. | *Millettia ferruginea* | ✓ | ✓ | ✓ |
| 38. | *Moringa oleifera* | | ✓ | ✓ |
| 39. | *Moringa stenopetala* | | ✓ | ✓ |
| 40. | *Olea europaea* | ✓ | ✓ | |
| 41. | *Oxytenanthera abyssinica* | | | ✓ |
| 42. | *Parkinsonia aculeata* | | ✓ | ✓ |
| 43. | *Podocarpus falcatus* | ✓ | ✓ | |
| 44. | *Prosopis juliflora* | | ✓ | ✓ |
| 45. | *Rhamnus prinoides* | ✓ | ✓ | ✓ |
| 46. | *Schinus molle* | ✓ | ✓ | ✓ |
| 47. | *Sesbania sesban* | | ✓ | ✓ |
| 48. | *Syzygium guineense* | | ✓ | ✓ |
| 49. | *Tamarindus indica* | | ✓ | ✓ |
| 50. | *Terminalia brownii* | | ✓ | ✓ |
| 51. | *Ziziphus mauritiana* | | ✓ | ✓ |
| 52. | *Ziziphus spina-christi* | | | ✓ |

*The symbol (✓) shows that the particular species is suitable for the designated agro-ecological zone.*

**Table 4.2. List of suitable fruit tree species in the three agro-ecological zones**

| No | Species | Agro-ecological zone | | |
|---|---|---|---|---|
| | | Dega | Weyna Dega | Kolla |
| 1 | *Annona senegalensis* | | ✓ | ✓ |
| 2 | *Carica papaya* | | ✓ | ✓ |
| 3 | *Citrus aurantifolia* | | ✓ | ✓ |
| 4 | *Citrus lemon* | | ✓ | ✓ |
| 5 | *Citrus medica* | | ✓ | ✓ |
| 6 | *Citrus reticulata* | | ✓ | ✓ |
| 7 | *Citrus sinensis* | | ✓ | ✓ |
| 8 | *Malus sylvestris* | ✓ | | |
| 9 | *Mangifera indica* | | ✓ | ✓ |
| 10 | *Persea americana* | | ✓ | ✓ |
| 11 | *Prunus persica* | ✓ | ✓ | |
| 12 | *Prunus salicana* | ✓ | ✓ | |
| 13 | *Psidium guajava* | | ✓ | ✓ |

*The symbol (✓) shows that the particular species is suitable for the designated agro-ecological zone.*

**Table 4.3. List of suitable pasture species for the three agro-ecological zones**

| No | Species | Agro-ecological zone | | |
|---|---|---|---|---|
| | | Dega | Weyna Dega | Kolla |
| | ***Grasses*** | | | |
| 1 | *Avena sativa* | ✓ | ✓ | |
| 2 | *Choloris gayana* | | ✓ | ✓ |
| 3 | *Cinchrus ciliaris* | | ✓ | ✓ |
| 4 | *Dactylis glomerata* | ✓ | ✓ | |
| 5 | *Panicum maximum* | | ✓ | ✓ |
| 6 | *Pennisetum purpureum* | | ✓ | ✓ |
| 7 | *Phalaris aquatica* | ✓ | ✓ | |
| 8 | *Setaria anceps* | | ✓ | ✓ |
| | ***Legumes*** | | | |
| 1 | *Beta Vulgaris* | ✓ | ✓ | |
| 2 | *Cajanus cajan* | ✓ | ✓ | ✓ |
| 3 | *Desmodium uncinatum* | | ✓ | ✓ |
| 4 | *Lablab purpureus* | | ✓ | ✓ |
| 5 | *Macroptilium atropurpureum* | | ✓ | ✓ |
| 6 | *Staylosanthes guinanensis* | | ✓ | ✓ |
| 7 | *Staylosanthes hamata* | | ✓ | ✓ |
| 8 | *Trifolium species* | ✓ | ✓ | |
| 9 | *Vicia dasycarpa* | ✓ | ✓ | |

*The symbol(✓) shows that the particular species is suitable for the designated agro-ecological zone.*

**Table 4.4. List of suitable horticulture/cash crops in three agro-ecological zones.**

| No | Species | Agro-ecological zone | | |
|---|---|---|---|---|
| | | Dega | Weyna Dega | Kolla |
| 1 | *Allium porrum* | ✓ | ✓ | |
| 2 | *Allium cepa* | ✓ | ✓ | ✓ |
| 3 | *Beta vulgaris* | ✓ | ✓ | ✓ |
| 4 | *Brassica oleracea* | ✓ | ✓ | ✓ |
| 5 | *Daucus carrota* | ✓ | ✓ | ✓ |
| 6 | *Lycopersicon esculentum* | | ✓ | ✓ |
| 7 | *Solanum tuberosum* | ✓ | ✓ | |
| 8 | *Ipomoea batatas* | | ✓ | ✓ |

*The symbol(✓) shows that the particular species is suitable for the designated agro/ecological zone.*

# ANNEX 5: THE BUSINESS PLAN

**Type of IGA Selected and Business Plan Period:**

On-farm ☐ Off-farm: ☐ Both: ☐ Plan period (year): _____

Please give full description of the IGA (if more than one IGA, please write separately):

(a)_____

(b)_____

**Step 1. HHs' socio economic data**

Region_____ Zone_____Woreda_____Kebele_____sub-kebele

Name of client _____male___ female____ Name of spouse: _____

HH ID No. _____

Family size: Male _____Female_____ Total_____

Availability of literate member (yes/no) _____ Available skill type: _____

Access to land: Own _____ Rented: _____ other_____

Livelihood economic zone: _____

**Step 2. Recording own resources (total resources and productive resources)**

Productive/income generating resources/assets available at HH level should be recorded by excluding residence/non renting houses, other non-income bearing consumption assets as following:

**Table: (a) Total asset owned by the HH at the beginning of the business plan**

| No | Livestock (type) | No. | Birr value | Cereal crops (type) | Qt. | Birr value | Fruit/tree plants (type) | No | Birr value | Farm equipment (type) | No | Birr Value | Saving in Birr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | |
| | **Total** | | | **Total** | | | **Total** | | | **Total** | | | |

**Table (b):** productive **own resources committed to be part of the plan** (sum of birr value for each type)

| Livestock (in Birr) (a) | Cereal crops (in Birr) (b) | Fruit/tree plants (c) | Equipment (in Birr) (d) | Cash at hand (in Birr) (e) | Saving in birr (f) | Total own capital to be part of the plan (in Birr) f=(a+b+c+d+e+f) |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |

**Step 3. Identifying the required inputs and technologies**

**Table C: Input, technology and technical advice requirement plan**

| No. | Type of input/ technology required | Unit | Qt. | Unit price | Total investment | Locally available (yes/no) | When required (month/ season) | Planned source of input/ technology | Technical advice required for each input/ technology |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| | | | | | | | | | |
| **Total** | | | | | | | | | |

**Table d: Labour utilization plan for the identified IGA (s)**

| No | Activities | Division of labour (please ✔ ) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Head of household | | Spouse | | Able bodied youth | | Other household member (s) | |
| | | M | F | M | F | M | F | M | F |
| | | | | | | | | | |
| | | | | | | | | | |

**Step 4. Preparation of credit access and loan repayment plan:**

• Start-up costs: What supplies do you need to make the product or deliver the service?

• How much capital do I need to start the business?

• Do I need to take a loan? Yes --------- No-------

**Table E: Credit requirement**

| No. | Financial requirement | Amount (birr) | Please indicate the source of finance to fill the gap/financing requirement |
|---|---|---|---|
| 1 | Total cost/investment | | |
| 2 | Own capital (own sources) | | |
| 3 | **Financing gap (1-2)** | | |

**Table F: Loan repayment plan**

| Year (a) | Total loan (b) | Repaid (principal+ interest) in birr (c) | How much left (balance to paid back) d=(b-c (consider only the principal to know the remaining loan balance) |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

**Step 5. Production plan**

Production plan describe your product offering and outlines the production targets, capacity and costs associated with production process.

- What are production targets
- Ensure enough supply of raw materials/inputs or technologies
- What is the total production capacity of the client/family, and
- What quality control measures will be utilized

Table G: IGA (s) production plan

| No | Type of IGA | Cycle or rounds of production | Unit of measure | Quantity | Unit price (birr) | Total estimated production (birr) |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| **Total** | | | | | | |

**Step 6. Marketing plan**

The livelihood development activities are primarily for market. For example, in the case of fattening, the product is 100% for market. In the case of dairy, much of the milk and milk bi-products (say 75%-80%) should be made available for market. The reason behind this is that the finance used for investment (based on the business plan) is either fully or partially a loan with agreed interest rate from the financial institutions. Therefore, Community members are expected to repay principal plus interest based on agreed loan repayment schedule.

However, it should be noted that it is the HH who decides what proportion of the total production to sell, when to sell and where to sell. In the case of fattening, the decision is straightforward. It should be sold at the right time (e.g. during festive/holiday seasons such as Christmas, Easter, New Year,). Similarly, if the products are perishable, then they have to be sold immediately.

Therefore, it is imperative to consider how households differ in their operations from firms and what actions can be taken to support their transformation into enterprising household units.

- Market analysis should be done before a business commence by using input from VC analysis
- The market analysis will demonstrate that there is market for Community members' products.

How much would you expect to sell from the total production and where do you plan to sell?

- The business's products: What goods or services will I sell?
- The business's customers: Who will buy my product or service?
- The place of business: Where will the business be located?
- The competition: What other businesses sell similar goods/services in my area?
- Promotion: How will you let customers know about your products/services?

Table H: marketing plan

| No. | Product | Unit of Measure | Quantity | Unit price | Total sales (revenue) | Market name | | | | When (month or season) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Within Kebele | Outside Kebele | Within woreda | Other markets | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| **Total** | | | | | | | | | | |

**Step 7: Revenue and expenditure by month and quarter**

Accurate recording of revenue and expenditure is good practice of any BP. The client should know how much is spent on the plan and when it is spent; how much is earned and when it is earned. This will generate a cash flow of the plan and helps for business decisions. This practice is fundamental to institutionalize business planning among rural households in general and business-oriented community members in particular.

**Revenue and Expense statements of Livelihood BP**

**Table I: Expected revenue by month and quarter**

| No | Revenue | Month | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 1st quart | 4 | 5 | 6 | 2nd quart | 7 | 8 | 9 | 3rd quarter | 10 | 11 | 12 | Fourth quart | Remarks |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | **Total** | | | | | | | | | | | | | | | | | |

**Table J: Expected expenditures by month and quarter**

| No | Expenditure items | **Month** | | | | | | | | | | | | | | | | **Remarks** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 1st quarter | 4 | 5 | 6 | 2nd quarter | 7 | 8 | 9 | 3rd quarter | 10 | 11 | 12 | 4th quarter | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | **Total** | | | | | | | | | | | | | | | | | |

The format requires that the revenues and expenditures be recorded monthly and summarized for each quarter, demonstrates monthly templates/format). In the hypothetical and simplified example given below, it is assumed that a fattening scheme has three rounds:

- The business oriented HH constructs shelter, purchases ox, buys some feed and pays for veterinary expenses during the first quarter. This brings the first quarter expenses to Birr 3,750.
- During the second quarter, the he/she purchases additional feed and by this time, the ox is ready for sale. It is sold for Birr 8,000 and the HH purchases an ox for Birr 3,500 in Round 2. In each quarter, the HH should have an idea if the business is on the right track. However, the BP should give the expected overall performance of the business (profit or loss) at the end of the year as indicated in the Table K below. Accordingly, this hypothetical HH appears to be profitable. Although these are planning figures, they should be based on realistic prices considering expected increase in prices.

**Table K: Financial feasibility statement (Income/revenue (-) expenditure statement)**

| Quarter (a) | Income/revenue (b) | Expenditure (c) | Profit/loss d=(b-c) | Remarks |
|---|---|---|---|---|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| Total | | | | |

**Step 8: Declaration:**

**I,** Ato/w/o _____, certify that this plan reflects my capacity to implement the IGA that my family members and I have selected, and the information recorded is correct. I, Ato/W/o _____, the spouse, also confirm that this plan reflects our capacity to implement the IGA we have jointly selected and information is correct.

Client name _____ Signature_____ Spouse name_____ Signature_____ Date_____

Prepared by: _____Responsibility: _____ Signature: _____ Date: _____

# ANNEX 6. PLANNING FORMATS

**Table 6.1: Multiyear Micro- Watershed Development Plan format for five Years**

Region_____Woreda_____Kebele_____Micro-watershed name_____

Total Household _____Available working labor force _____Agreed number of working days/annum _____

Total PD planned _____Name of Watershed Users Association (WUsA) _____

| No. | Activities by major interventions | Unit | Work norm | Total five Years Plan | Total PD | Indicative Plan/target for three to five Years Watershed Development | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Y1 | PD | Y2 | PD | Y3 | PD | Y4 | PD | Y5 | PD |
| | | | | | | | | | | | | | | | |
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**Table 6.2: Multiyear Micro- Watershed Maintenance Plan format for five Years**

Region: _____Woreda: _____Kebele:_____ Micro-watershed name: _____

Total available person days for maintenance: _____ Agreed number of working days for maintenance/annum: _____Total PD planned for maintenance work: _____Name of Watershed Users Association: _____

| No. | Activities by major interventions | Unit | Work norm | Total five Years Plan | Total PD | Indicative Plan/target for three to five Years Watershed Development | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Y1 | PD | Y2 | PD | Y3 | PD | Y4 | PD | Y5 | PD |
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**Table 6.3: Annual Action Plan for Micro- Watershed derived from the strategic plan**

Region: _____ Woreda: _____Kebele: _____ Micro-watershed/rangeland name_____ Implementation Year_____

Total Household in the fiscal Year_____Available working labor force for the year_____Agreed number of working days/annum _____

Total PD for the Year _____Name of Watershed Users Association _____

| No. | Activities by major Interventions | Unit | Work norm | Annual Plan | PD | Yearly Distribution of target for implementation | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Q1 | PD | Q2 | PD | Q3 | PD | Q4 | PD |
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**Table 6.4: Annual Maintenance Action Plan for micro- watershed derived from the strategic plan**

Region_____Woreda_____Kebele_____Micro-watershed name_____ Implementation Year_____

Total Household in the fiscal Year_____Available working labor force for the year_____Agreed number of working days/annum

_____ Total PD for the Year _____Name of Watershed Users Association _____

| No. | Activities by major Interventions | Unit | Work norm | Annual Plan | PD | Yearly Distribution of target for implementation | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Q1 | PD | Q2 | PD | Q3 | PD | Q4 | PD |
| | | | | | | | | | | | | | |
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**Table 6.5: Materials and Inputs Required to Implement Annually Planned Activities Including Surveying and Mapping Instruments**

**6.5.1: General Inputs Requirement for the implementation of identified and prioritized watershed development**

| No. | Inputs | Unit | Target | Budget | |
|---|---|---|---|---|---|
| | | | | Unit Price | Total |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

**6.5.2 Specific Inputs Requirement by major interventions**

| Major Interventions | Specific Inputs Requirement | Unit | Target | Budget | |
|---|---|---|---|---|---|
| | | | | Unit Price | Total |
| | | | | | |
| | | | | | |
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**Table 6.6: Human Capacity development**

Level of Capacity Building: Region: _____ Zone:_____Woreda:_____ Kebele:_____

| Types of CD | Expected Outcome | Targeted groups | Number of target groups disaggregated by sex | | | | | | | | Estimated Budget |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Q1 | | Q2 | | Q3 | | Q4 | | |
| | | | Male | Female | Male | Female | Male | Female | Male | Female | |
| C1: Training | | Technical staff | | | | | | | | | |
| | | Leaders | | | | | | | | | |
| | | DAs | | | | | | | | | |
| | | CWT/CRT | | | | | | | | | |
| | | Foremen | | | | | | | | | |
| | | Forewomen | | | | | | | | | |
| | | Surveyors | | | | | | | | | |
| | | Others | | | | | | | | | |
| C2: Experience Sharing | | Technical staff | | | | | | | | | |
| | | Leaders | | | | | | | | | |
| | | DAs | | | | | | | | | |
| | | CWT/CRT | | | | | | | | | |
| | | Foremen | | | | | | | | | |
| | | Forewomen | | | | | | | | | |
| | | Surveyors | | | | | | | | | |
| | | Others | | | | | | | | | |
| C3: Workshops | | Technical staff | | | | | | | | | |
| | | Leaders | | | | | | | | | |
| | | DAs | | | | | | | | | |
| | | CWT/CRT | | | | | | | | | |
| | | Foremen | | | | | | | | | |
| | | Forewomen | | | | | | | | | |
| | | Surveyors | | | | | | | | | |
| | | Others | | | | | | | | | |
| C4: Others (Awareness creation, demonstrations etc) | | Technical staff | | | | | | | | | |
| | | Leaders | | | | | | | | | |
| | | DAs | | | | | | | | | |
| | | CWT/CRT | | | | | | | | | |
| | | Foremen | | | | | | | | | |
| | | Forewomen | | | | | | | | | |
| | | Surveyors | | | | | | | | | |
| | | Others | | | | | | | | | |

# ANNEX 7: REPORTING FORMATS

**Table 7.1: Quarterly reporting format**

Region_____Woreda_____Kebele_____Micro-watershed/ sub-kebele name_____ Implementation Period_____

| No. | Activities by major Interventions | Unit | Work norm | Annual Plan | | PD Used | | Current Quarter | | | | Cumulative | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Plan | | Actual | | Plan | | Actual | |
| | | | | Quantity | PD | Quantity | PD | Quantity | PD | Quantity | PD | Quantity | PD | Quantity | PD |
| | | | | | | | | | | | | | | | |
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**Table 7.2: Estimated budget spent by major interventions**

| No. | Activities by major Interventions | Budget spent by major interventions | | | |
|---|---|---|---|---|---|
| | | Person Days in monitory Value | Capital budget | others | total |
| 1 | Physical Soil and Water Conservation Technologies | | | | |
| 2 | In-Situ Moisture Harvesting Technologies – Physical Soil Moisture Storage | | | | |
| 3 | Drainage Management Structures | | | | |
| 4 | Gully Rehabilitation Technologies | | | | |
| 5 | Biological Soil and water Conservation, Soil Fertility Management and Conservation Agriculture | | | | |
| 6 | Area Closure, Rehabilitation of Degraded Lands and Management Practices | | | | |
| 7 | Agro-forestry Practices | | | | |
| 8 | Wind Erosion Control Measures | | | | |
| 9 | Rainwater Harvesting - Structural Storage | | | | |
| 10 | Water Lifting Technologies | | | | |
| 11 | Irrigation Water Application and Management | | | | |
| 12 | Homestead Development and Livelihood | | | | |
| 13 | Feeder Roads | | | | |
| 14 | Rangeland Management Practices | | | | |

**Table 7.3 Reporting format on capacity development interventions**

Level of Capacity Building: Region: _____ Zone: _____Woreda: _____ Kebele: _____

| Types of CD | Actual Outcome | Targeted groups | Annual plan by target groups | | | Current Quarter Achievement | | | Cumulative Achievement | | | Budget planned | Budget Utilized |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Male | Female | Total | Male | Female | Total | Male | Female | Total | | |
| C1: Training | | Technical staff | | | | | | | | | | | |
| | | Leaders | | | | | | | | | | | |
| | | Das | | | | | | | | | | | |
| | | CWT/CRT | | | | | | | | | | | |
| | | Foremen | | | | | | | | | | | |
| | | Forewomen | | | | | | | | | | | |
| | | Surveyors | | | | | | | | | | | |
| | | Others | | | | | | | | | | | |
| C2: Experience Sharing | | Technical staff | | | | | | | | | | | |
| | | Leaders | | | | | | | | | | | |
| | | DAs | | | | | | | | | | | |
| | | CWT/CRT | | | | | | | | | | | |
| | | Foremen | | | | | | | | | | | |
| | | Forewomen | | | | | | | | | | | |
| | | Surveyors | | | | | | | | | | | |
| | | Others | | | | | | | | | | | |
| C3: Workshops | | Technical staff | | | | | | | | | | | |
| | | Leaders | | | | | | | | | | | |
| | | DAs | | | | | | | | | | | |
| | | CWT/CRT | | | | | | | | | | | |
| | | Foremen | | | | | | | | | | | |
| | | Forewomen | | | | | | | | | | | |
| | | Surveyors | | | | | | | | | | | |
| | | Others | | | | | | | | | | | |
| C4: Others (Awareness creation, demonstrations etc) | | Technical staff | | | | | | | | | | | |
| | | Leaders | | | | | | | | | | | |
| | | DAs | | | | | | | | | | | |
| | | CWT/CRT | | | | | | | | | | | |
| | | Foremen | | | | | | | | | | | |
| | | Forewomen | | | | | | | | | | | |
| | | Surveyors | | | | | | | | | | | |
| | | Others | | | | | | | | | | | |