Community Investment for Watershed Services

Debre Yacob Learning Watershed

Water and Land Resource Centre-Addis Ababa University Co-conveyor Upstream Sediment Management Pre-congress workshp, Dedicated Paralle Session During teh congress and Post Congress Study Tour

This information is prepared by WLRC-AAU for World Hydropower Congress Event

5-11, May 2017, Addis Ababa Ethiopia

Amhara National Regional State Agricultural Bureau

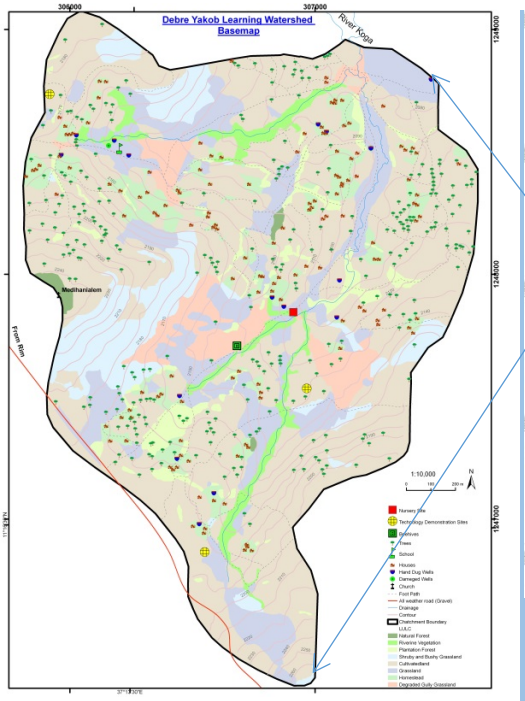
Amhara Regional Agricultural Research Institute

UNIVERSITÄT BERN

CDE CENTRE FOR DEVELOPMENT AND ENVIRONMENT

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development and Cooperation SDC



Debre Yacob Learning Watershed

Location: Located in Lake Tana Sub-basin, Mecha District in West Gojam, at 11^0 16'' 59' N latitude and 37^0 13" 45' E longitude and elevation of 2200m above sea level.

Challenges: At the baseline situation, the natural resources are characterized by devoid of vegetation and over grazing. More than 50% of the watershed area is moderately to extremely degraded. The major problems identified were land scarcity, low productivity, feed shortage, unsafe drinking water, free and over grazing, inadequate supply of inputs, lack of machineries and veterinary services, poor access to market, and poor credit services.

Implementers: Amhara Bureau of Agriculture, Amhara Regional Agricultural Research Institute, Water and Land Resource Centre, and Center for Development and Environment of University of Bern.
Financer: Swiss Development Cooperation (SDC)

Learning Watershed Initiative

Learning Watershed (LW) is an initiative, which is aimed to support and strengthen technical, institutional, and knowledge management of integrated watershed development efforts. Learning Watershed is an entry point used as learning site for implementing integrated watershed management practices and agricultural technologies, and documentation of lessons for scaling up. It involves active participation and collaboration of land users, local community organizations, extension agents, researchers, and policy makers at all stages of watershed development. It aims to integrate goals for natural resources conservation, agricultural production, and livelihood improvement by demonstrating best practices, approaches and coordinated actions among actors; and monitoring and documenting processes and impacts on environment, livelihoods and sustainability. The initiative demonstrates to streamline the scaling-up of best practices and integrated watershed approaches and experiences. Debre Yakon LW is one of the six LWs initiated by WLRC since January 2012 and showed major changes both biophysically, and livelihoods of communities.

Integrated approaches

The Learning Watershed initiative uses participatory approaches that engage farmers, extension agents, researchers and policy makers and that involve collaborative planning, implementing, collective decision making and adaptive learning, and integrating multiple functions. In doing so, combination of approaches and tools were applied.

Collective actions: Community participation has been initiated by establishing a watershed development committee 30% of which are women elected by the community. Community voluntary labor mobilization was facilitated through community organizations (1:5 work team and development group) with the leadership and supervision of Rural Command Post, an ad hoc committee composed of representatives of rural sectors.

Planning process to design shared objectives: Initially, baseline survey was conducted through which biophysical and socioeconomic situations of the watershed were assessed in order to identify constraints, opportunities, and needs of the community. The baseline survey was supported with spatial maps including *base map, land degradation map, detailed land use and land cover map,* and *soil map.* Subsequently, integrated interventions and implementation strategies that respond to the constraints and needs of people were planned through consensus and stakeholder discussions.

Linkage of extension and research: Development and research linkages were enhanced through joint planning, demonstrations and promotion of agricultural technologies, and monitoring and evaluation activities among the agriculture extension, research institutes and the community. At grassroots level, Farmer-Extension-Research Group (FREG), which constitutes farmers, extension agents, and researchers was established with the intention to bridge the technology transfer gaps from research to extension. It is composed of 20-30 members of farmers, researchers, development agents (DAs) as a platform for joint learning and active participatory role they can play in terms of evaluation, selection, demonstration, farmer exchange of knowledge and technology, and wider dissemination and adoption.

Benefit sharing mechanisms: Creating multiple benefits and equitable share among users is a determinant factor for the success and sustainability of watersheds. Accordingly, community agreed bylaw was formulated to advance equitable benefit sharing and utilization arrangements on communal resources. User groups are entitled to use rights for sharing benefits generated on communal lands.

Performance assessment: Regular performance assessment guideline was developed to assess performances of interventions using multi-criteria indicators. Based on the evaluation outcomes, adaptive management actions were designed to mitigate those interventions with low performance rates.

Knowledge exchange: All stakeholders involved and shared experiences through regular monitoring and evaluation, and field days and experience sharing visits. A field day is the prime knowledge exchange and dissemination tool. Decision makers at different government structures, steering committee members, development actors in the locality, extension agents, researchers, and community organizations were actively participating during annual field days at which lessons and experiences were shared.

Impact monitoring: Impact monitoring mechanisms were put in place to measure social, economic, and ecological outcomes of the Learning Watershed interventions. Temporal landscape changes, particularly capturing changes in hot spot areas were explored using repeat photography and remote

sensing techniques. Monitoring impact pathways on stream flow (both base flow and runoff), biomass cover and productivity, community perceptions and change in practices, and livelihood took place regularly.

Best Practices

Community free labor investment

Soil and Water Conservation (SWC) Terraces are planted with fruits, spices and rahmnus to make them productive and economically attractive for the farmer

Voluntary community labor was mobilized to implement physical soil and water conservation measures on cultivated lands; gully damage area; and severely degraded lands. The watershed community contributed a total of 59,667 person days (men and women) by constructing soil and water conservation (SWC) terraces. As a result, the SWC terraces retained 10-15cm of sediment every year. The fodder legumes planted on SWC terraces and local grass added additional fodder biomass for feed which averagely amounts 7.65 kg of fresh biomass harvested from 5m SWC terrace length per season. Farmers also adapted planting cash crops like fruits on SWC terraces integrated with appropriate water management techniques to increase the productivity of lost land by SWC terraces on farmlands.

Rehabilitation of degraded lands

Addressing gully erosion challenges:

Gully damages converted to productive land in four years

Gully erosion is the major source of erosion in the watershed. About 8 ha of gullies were rehabilitated with integrated physical and biological practices. As shown in the picture, the gully covering 4.5 ha was fully rehabilitated and produced fodder. Three user groups (97 beneficiary farmers) shared the fodder biomass (20-85 ton/ha per season) which could be harvested 2 to 3 times every year.

Rehabilitation of severe gullies can take about two years until gully sections are fully covered with vegetation, check dams silted up, scouring effect of runoff reduced, upstream expansion of gully heads minimized. Eventually, gullies became developed to be productive lands of fodder and fruit. Consequently, local communities and experts have gained knowledge of conservation which enabled

them to strengthen collective actions and benefit sharing, and mitigation of neighbors' conflict over gully erosion.

Area closure as a measure to rehabilitate degraded hillsides

Picture showing rehabilitation of degraded hill within four years

It aims to address severe soil degradation, loss of vegetation covers and low water holding capacity of degraded lands by rehabilitating and restoring the natural resource bases and by enhancing the productivity and environmental functions. Extensive areas of the watershed (about 92 ha) were moderately to extremely devoid of vegetation due to degradation out of which 66 ha was highly degraded. After implementation, all degraded areas were closed so as to prevent them from animals and humans for free and unregulated use. The communities set bylaws for group use and joint management after the closed areas are rehabilitated is ongoing very well.

Moreover, the degraded areas were treated with in-situ water harvesting structures (hillside terrace, trenches and micro-basins) and enriched with multipurpose fodder and tree species so that more than 184 farmers could benefit from grass biomass harvest. Area closure practice also contributed to: improving the soil cover, reducing surface runoff and soil loss, increasing above-ground biomass and plant diversity and habitat, soil moisture and water holding capacity, surface water availability, and the recharging of stream flow in the dry season.

No free grazing practice (Zero Grazing)

Change in practice from open access to cut and carry grazing system

The traditional grazing system is generally characterized by free grazing. As a prior action in watersheds, no free grazing practice was fully practiced in conserved private and communal grazing and degraded lands. It leads to improved biomass of vegetative planting materials on bunds, and increases the leftover of residues on crop lands and vegetation cover on rehabilitated degraded lands. No free grazing has gradually become a common practice of farmers. Strong enforcement of bylaws and support of the local leaders are most important drivers for the adoption of the practice.

Integrated homestead development

Homestead developemnt as part of IWM to improve livelihoods, income and food security (Note the first three pictures are timely progressing of one homestead and the lower three represents different homesteads developed in three years)

Agricultural intensification is the key element of watershed management not only for improving household income but also facilitating quick adoption and acceptance of watershed interventions. Homestead development was implemented by integrating horticulture, fodder, fattening, apiculture, poultry, compost, and water harvesting interventions through cost sharing. Farmers involved in hometead development contributed 25% of the costs of improved technologies. The 75% seed money contribution from the project was used as a revolving fund for dissiminating improved technologies. To be specific, the number of farmers involved is presented as follows: 144 in fruit development, 131 in using energy saving stoves, 95 in fattening and 32 in poultry production.

Improved agricultural technologies

Scaling up of highly performing improved wheat and teff varieties and Wheat raw planting combind with SWC

With active engagement through research, available and adaptable improved agricultural technologies in crop production, livestock production, and agricultural machineries were demonstrated and scaled up to watershed communities. As a result, all households in the watershed used improved teff and wheat varieties and thereby improved the productivity by 15% to 60%. Animal health services were provided through trained para veterinarian technicians, namely, Community based Animal Health Workers (CAHWs). So far, 1700 animals were treated so that more than 300 farmers benefited.

Promotion of farm machineries

Farm machineries including multi-crop thresher, manual feed chopper, and hay baler were distributed in the watershed for group use while a number of mold board plows, teff row seeders, maize manual shellers and single yolk harness have been distributed and used by individual farmers. Farm mechanization service providers (school dropouts) were organized to provide threshing operation services for farmers. They charged service costs based on operation hour of the machine. Unlike the traditional threshing, where a normal pile of crop need at least 6-7 ox and 3 people for 3-4 days, the machine requires 2 hours to complete the threshing operation.

Lessons

Improved natural resources management: Application of appropriate land and water management practices have led to improved biodiversity and regeneration of waste lands and degraded lands, and to minimizing soil erosion and increasing productivity. Communal resources are also get protected and managed. The approach as well helped to increase the regulation and provisional ecosystem services such as an increase in stream flows, improved diversity of plant species, and fodder and crop productivity.

Intensification of Watersheds: Maximum productivity and sustainability of watershed management practices can be achieved when economic production interventions are well integrated with natural resources management practices. Integration of improved agricultural technologies (e.g., crop and forage varieties, agricultural machineries, breeds) together with physical watershed development interventions can ensure the adoption and sustainability of watershed management. Furthermore, conducting research with integrated watershed management approach can also enhance agricultural intensification, the case in point, is households who actively engaged in the production of improved agricultural technologies improved their land productivity and incomes. Especially land users who were involved in homestead management, production of high yielding crop varieties, and animal husbandry built assets.

Incentives for Watershed Management: Land users are motivated to implement watershed management if they are provided with incentives such as fodder and crop productivity gains, benefits obtained through an equitable share of common resources in area closures and gullies, support of improved crop seeds and income generating options. Supply of seedling materials for vegetative soil conservation measures and homestead development are critical interventions in the Learning Watershed approach.

Sustainability of Watershed Services*:* Sustainability of developed watersheds is greatly dependent on the proactive participation and ownership of land users. Moreover, establishment and strengthening of multi-actor platforms for achieving coordinated planning, implementation, and monitoring and evaluation is essential to make them productive, sustainable and to govern developed watersheds. To legalize the watershed users' association and cross-sectoral and inter-institutional policy implementation, and work for the effectiveness of the watershed practices, policy interventions are fundamental institutional frameworks. Collective actions, incentives and strong enforcement of bylaws are also vital to control free grazing and protect damages to area closure that greatly affect the successes.