

Soil Conservation and Watershed Management Programs/Activities

(Definition, Objective, Scope, and Working Strategy)

Version-3



Degraded land rehabilitation, Pereni, Dang (1992)



Degraded land rehabilitation, Pereni, Dang (1995)



Government of Nepal
Ministry of Forests and Soil Conservation
Department of Soil Conservation and Watershed Management

Babarmahal, Kathmandu
September, 2015



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Foreword

Department of Soil Conservation and Watershed Management (DSCWM) has been planning, implementing and monitoring soil conservation and watershed management (SCWM) programs based on the principles of integrated watershed management (IWM). Recently endorsed Forest Policy 2015 of Nepal has emphasized the soil conservation and watershed management as prime focus. The forest policy envisions that the sustainable watershed management contributes to local and national prosperity. Likewise, the goal, objectives and strategies have further emphasized the integrated watershed conservation and management for enhancing land productivity, improving livelihood, balancing the ecosystem and boosting climate change adaptation.



In this context, the DSCWM has recognized the need for a clear guideline for SCWM activities to guide the program implementation. This technical guideline has been facilitating the Department and District Soil Conservation Offices (DSCOs) in planning, implementing and monitoring program/activities.

This guideline provides definition, objectives, scope and working strategies for different types of soil conservation and watershed management related programs and activities. This guideline would also be useful to professionals, technicians and local stakeholders who are directly and indirectly involved in designing, planning and implementing the soil conservation and watershed related activities at the field level.

This guideline was prepared through participatory approach. Existing policies, guidelines and relevant documents were reviewed to find gaps and guide the further process. Extensive consultation workshops and meeting were conducted with local communities, line ministries, representative DSCOs and national level stakeholders by mobilizing a team of experts. Eventually, the document was finalized through a national level workshop conducted on 7 June, 2015 by involving experts, policy makers and implementers. As a result, this precise technical document was produced to guide the development programs/activities of the Department.

Successful completion of this work was possible with support and cooperation of various stakeholders, officials and experts who were directly and indirectly involved in this rigorous process. I would like to express my sincere appreciation to all of them. I would like to thank Dr. Krishna Bahadur Karki, Executive Director of Sustainable Natural Resource Management Pvt. Ltd for providing his valuable services during the processes. My thanks also go to Mr. Uddhaw Bahadur Ghimire, DSCO, Kaski for coordinating the overall works and facilitating the processes on behalf of the Department. The Department is also thankful to its line ministries, district offices and the personnel for their invaluable supports in many ways. We are very much thankful to CARE Nepal for providing technical and financial supports through USAID funded Hariyo Ban Program. I hope the document will be useful for achieving the intended goal of DSCWM.



Pem N. Kandel

Director General

Department of Soil Conservation and Watershed Management

Babar Mahal, Kathmandu

September, 2015

ACRONYMS AND ABBREVIATIONS

ADB	Asian Development Bank
AusAID	Australian Aid
BIWMP	Bagmati Integrated Watershed Management Project
BCRWME	Building Climate Resilience of Watersheds in Mountain Eco-region
CRMP	Community Resource Management Plan
CDFWCP	Community Development and Forest/ Watershed Conservation Project
DSCWM	Department of Soil Conservation and Watershed Management
DoF	Department of Forests
DoFRS	Department of Forest Research and Survey
DSCO	District Soil Conservation Offices
DDC	District Development Committee
DANIDA	Danish International Development Agency
EU	European Union
GIS	Geographical Information System
GTZ	German Technical Cooperation Agency
GoN	Government of Nepal
IGA	Income Generation Activity
IKS	Indigenous Knowledge Systems
IWM	Integrated Watershed Management
JICA	Japan International Cooperation Agency
M&E	Monitoring and Evaluation
NGO	Non-Governmental Organization
SWM	Sustainable Watershed Management
SCWMP	Soil Conservation and Watershed Management Program
VDC	Village Development Committee

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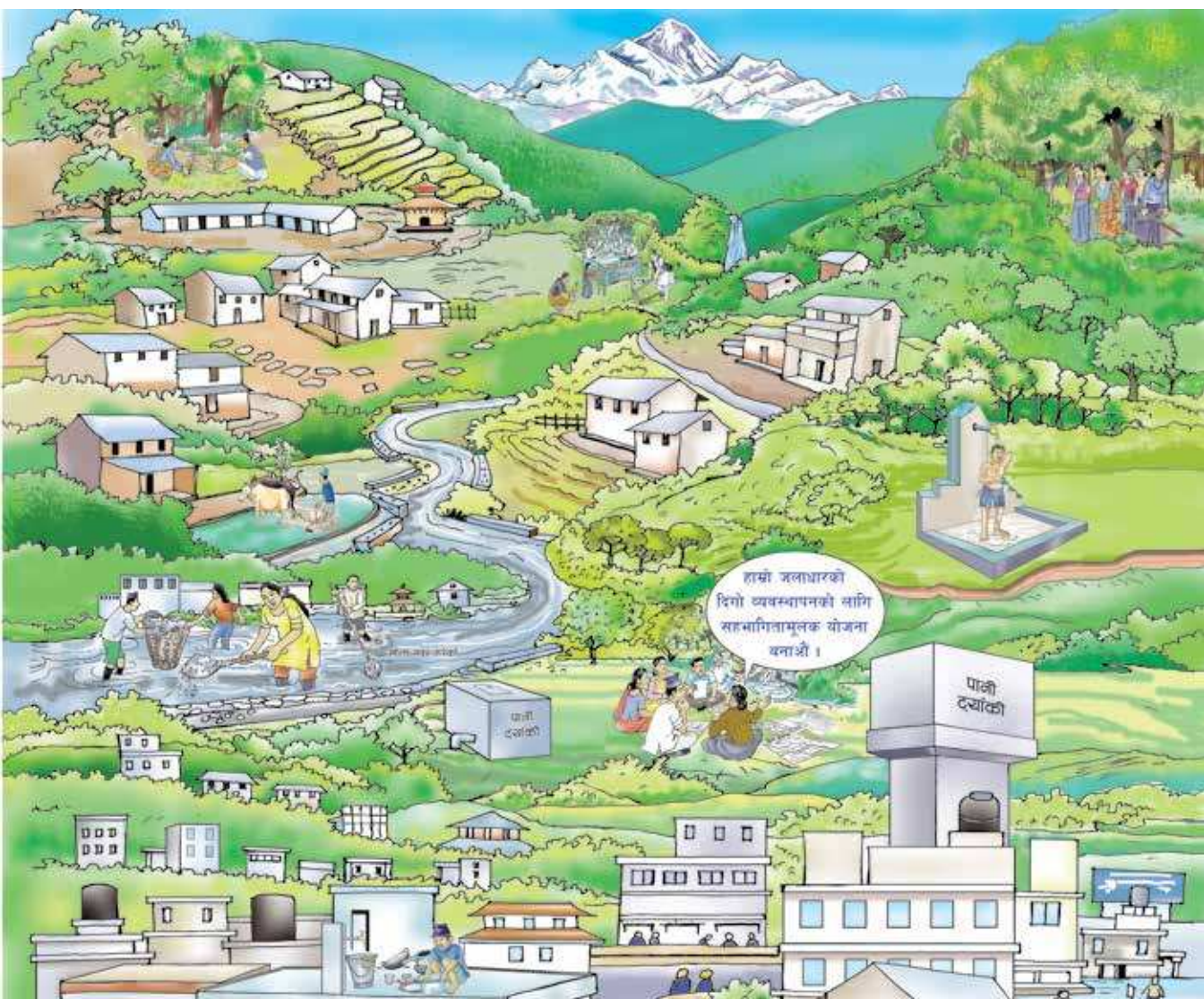
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SECTION-1: INTRODUCTION



1.1 About This Book

What is this book?

Department of Soil Conservation and Watershed Management (DSCWM) recognized the need of a guiding document for Soil Conservation and Watershed Management (SCWM) programs to implement soil conservation and watershed management (SCWM) activities in Nepal. This recognition led to the preparation of the Soil Conservation and Watershed Management Activities (Definition, Objective, Scope and Working Strategy) (also called Green Book) in 1991 and updated in 2001 (also known as White Book). The DSCWM felt the need of updating and revising of White Book and accordingly initiated updating with financial support from Hariyo Ban/CARE Nepal. This book is the 3rd version of Green Book. It is a tool aimed at charting the desired direction that the soil conservation and watershed management should take.

Why is this book?

The DSCWM has been providing its soil conservation and watershed management services through 61 District Soil Conservation Offices (DSCOs) based on White Book. It has not been updated to address the changing and emerging issues to date. Therefore to update the document and to encompass the emerging issues and challenges and move ahead with the pace of changing context, this update was necessary. The DSCWM has published different guiding documents such as People's Participation Mobilization Guideline-2050, Green Book, White Book, Income Generating Activity Guideline etc. This book is needed to embrace essence of these documents and changing issues and challenges as well. In this context, this book is envisaged to be a guiding document for SCWM programs/activities implementation in the field.

How was this book developed?

The inception workshop was held with the DSCWM officials (Annex-1) on July 31st 2014 to receive suggestions for revision. Sharing and consultative workshop with DSCWM officials (Annex-2) was held in June 7th, 2015 to validate and finalize the document. Finally all the comments and suggestions were taken into consideration to bring the document into final shape.

Who is this book for?

The book "Soil Conservation and Watershed Management Programs/Activities" in Nepal includes all soil conservation and watershed management related programs and activities in the country during the period of 1991 to 2015. The major users of this book are professionals and technicians of soil conservation and watershed

management, who plan or implement the activities in the actual field either through the direct involvement of community groups or through contractors or non-governmental organizations (NGOs). Mainly, this book will be helpful to the district soil conservation offices (DSCO) for the planning and implementation of soil conservation and watershed management activities in watersheds/sub watersheds. The book is equally useful to the academia, researchers and others stakeholders working in the field of soil conservation and watershed management.

How to best use this book?

This book is divided into 4 Sections: **Section 1** describes basic introduction of watershed management; **Section 2** focuses on policy and institutional settings; **Section 3** focuses on watershed management planning; **Section 4** focuses on soil conservation and watershed management programs/activities.

Feedback and Revision

This book will be periodically reviewed and updated to take account of learning gained from use in the field and also to address temporal requirements.

1.2 Watershed Management

Watershed is a topographically delineated area that is drained by a stream system i.e. all of the land draining its rain, snowmelt and ground water into a stream or river (Corn, 1993; Swallow et al., 2001). Broadly, watershed management is “the process of guiding and organizing land and other resources use in a watershed to provide desired goods and services without adversely affecting land resources.

Watershed management integrates various aspects of hydrology, ecology, soils, climatology and other sciences to provide guidelines for choosing acceptable management alternatives within the socio-economic context taking into consideration the interactions and implications among land resources and the linkages between upstream and downstream areas” (Brooks et al., 1991; Sen et al., 1997).

Watershed management is a rational utilization of the land for optimum production with minimum hazard to natural resources. It essentially relates to soil and water conservation in the watershed, which means proper land use protecting against all forms of deterioration, building and maintaining soil fertility, conserving water for farm use, proper management of local water for drainage, flood protection, sediment reduction and increasing productivity, from all kinds of land uses.

1.3 Integrated Watershed Management

Integrated Watershed Management (IWM) is a comprehensive multi-resource management planning process, involving all stakeholders within the watershed, who together as a group, cooperatively work toward identifying the watershed's resource issues and concerns as well as developing and implementing a watershed plan with solutions that are environmentally, socially and economically sustainable (Botero, 1986; UNEP, 2004). The holistic approach allows organizations and stakeholders to consider a system in the context of the higher levels in which it is embedded and provide insight into the significance of phenomena at lower levels. It deals with the management of natural resources but also involves community development and economic activities. Promoting integrated watershed development programs through the effective participation of local people is intended to prevent further ecological imbalance. Such an approach is needed for conserving, upgrading and using land, water, plant, animal and human resources (Mountain, 2002). IWM encompasses the holistic approach to managing watershed resources that integrates forestry, agriculture, pasture and water management, which can be broadened to rural development with a strong link to the livelihoods of the local people. Therefore, the watershed management approach has become an increasingly important issue in many mountainous countries, including Nepal.

The objective of IWM is to implement watershed management program/activities with the aim of land improvement, soil and water conservation, and forest management in mountain areas. The holistic nature of an ecosystem requires holistic management since one sector's activity will affect another's responsibilities.

1.4 Monitoring and Evaluation System of Watershed Management

There are always some uncertainties about the SCWM project activities that they will be carried out exactly as planned based on climatic condition focusing the water induced disaster; that they have the exact effects on the resource and on other human activities as anticipated; that the resource, environmental and other changes brought about by the project will effect human welfare in the way anticipated. Because of these uncertainties it is necessary to closely monitor and evaluate watershed development program/activities, their effects on resource and environment, and their impact on human welfare to determine what changes in policies, practices and activities may be required to meet the desired goals. This also ensures maintenance of achieved land productivity conservation, natural hazard prevention and development infrastructure protection in short term and sustainability of natural resources in long term of the watersheds. For this purpose, the monitoring and evaluation of implementation, operation and maintenance, management and utilization and benefit sharing are made an integral part of the DSCWM for the sustainability of the program.

1.5 Soil Conservation and Watershed Management in Nepal

Soil Conservation and Watershed Management (SCWM) program was for the first time recognized as an important program by the Government in 1974 when a new department, Department of Soil and Water Conservation, was established under the umbrella of the Ministry of Forests. Later the name of the department was changed to Department of Soil Conservation and Watershed Management (DSCWM). After that Soil Conservation Offices were established in districts basis. At present DSCWM is providing SCWM service to 75 districts of Nepal through 61 DSCOs.

An “Organization and Management Study”, which was recently conducted recommended for switching to the basin approach from the existing political boundary approach for the implementation of the SCWM program. Now, the DSCWM is planning to convert the current management system to the basin approach. DSCWM prepared a log-frame of Soil Conservation and Watershed Management Program since the Fiscal Year 2063/64 and the Ministry of Forest and Soil Conservation has approved the log-frame.

A watershed approach is a flexible framework for managing natural resource quality and quantity within the specified drainage areas. This approach includes stakeholder involvement and management actions supported by sound science and appropriate technology. The watershed planning process works within this approach by using a series of cooperative, iterative steps to characterize existing conditions, identify and prioritize problems, define management objectives, develop protection or remediation strategies, and implement and adapt selected actions as necessary.

The outcomes of this process are documented or referenced in a watershed plan. Now, it is advocated that we need to move from Integrated Watershed Resource Management (IWRM) to “adaptive” watershed management. Adaptive management recognizes that watershed resource systems operate in an uncertain environment and, hence, there is a need for flexible management tools that can adapt to change and uncertainty. The overriding criteria for IWRM and/or adaptive watershed management are:

Economic Efficiency in Natural Resources Use: Because of the increasing demand on natural and financial resources and their finite and vulnerable nature, natural resource must be used with maximum efficiency.

Equity: The basic right of all people to have access to natural resource of adequate quantity and quality for the sustenance of human well-being must be universally recognized.

Environmental and Ecological Sustainability: The present use of the resource should be managed in a way that does not undermine the life support system, thereby compromising the use by the future generation of the same resource.

Adaptability: The natural resources policies, programs and plans need to be “adaptive” (as against “rigid”) in response to additional data collection, uncertainty of results and desired outcomes.

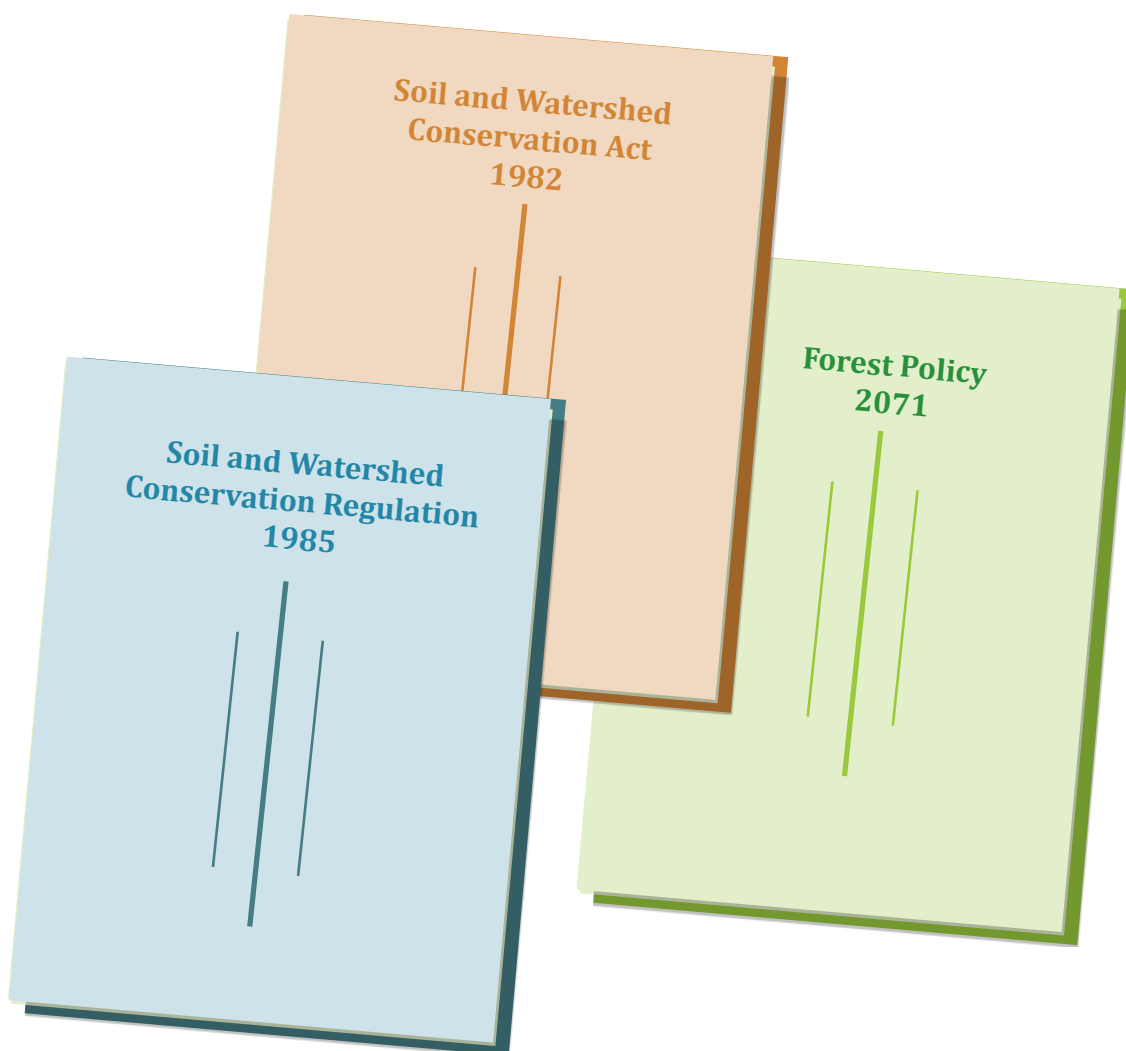
Water Resource Strategy, 2002 and National Water Plan, 2005 mainly include the planning and management of ecosystem, i.e. land, forest and water system. They include reservoir system, hydropower generation, irrigation, flood control, navigation, recreation, downstream water requirements and others like the inter watershed/sub watershed development for the purpose of economic growth and social development of the nation.

Common features of watershed planning process are:

- ❖ Watershed planning is an iterative and adaptive process
- ❖ Watershed planning is a holistic approaches
- ❖ Watershed planning is geographically defined
- ❖ Watershed planning should be integrated with other planning efforts
- ❖ WM and climate change: ever since the inception, WM has been evolving;
 - **First**, it focused on flood control and erosion
 - **Then**, it included broader terrestrial and aquatic environments as well as social issues in natural environment management,
 - **Now**, it should gear towards adaptation to Climate Change
 - **In future**, it will building ecosystem and community resilience

Department and district-level offices have multi-disciplinary staff – mainly in forestry, agriculture, and engineering – to provide the services necessary to carry out integrated watershed management program.

SECTION-2: POLICY AND INSTITUTIONAL SETTINGS



2.1 Soil Conservation and Watershed Management in Forest Policy

Soil conservation and watershed management has been emphasized in Forest Policy-2071. Sustainable watershed management is envisioned to support local and national prosperity. Likewise, rational conservation, promotion and utilization of watershed have been envisaged to contribute to employment generation, income enhancement, livelihood improvement and balancing ecosystem. Out of five objectives, protected watershed conservation and management has been mentioned as its first objective.

Water and land conservation is mentioned as a means to land productivity enhancement. Integrated watershed conservation and management has been taken as the third out of seven policies. Policy (3) - integrated watershed conservation and management for land productivity enhancement through water and land conservation - is the major policy for watershed management.

Strategies to reach aforementioned policy (3) are as follows:

- ❖ Watershed conservation and management based on river basin approach;
- ❖ Land management based on its appropriateness and through declaration of sensitive watershed area as protected watershed;
- ❖ Sustainable integrated management of Chure, Terai, and Inner valley ecosystem.
- ❖ Identification, documentation and management of wetland areas;
- ❖ Identification, classification, and prioritization of watersheds for soil erosion, flood, landslide, desertification and river control;
- ❖ Soil and watershed conservation programs implementation based on people's participation on priority basis and plan formulation in order to establish upstream-downstream linkages;
- ❖ Technology handover on low cost soil and water conservation, and agro-forestry system through action research;
- ❖ Soil conservation programme implementation integrating forest and agriculture system to contribute to food production and food security;
- ❖ Integrated conservation and management program implementation based on River System classifying Chure, Terai, and Inner Valley area according to National Landuse Policy;
- ❖ Capacity enhancement designating responsible authority for conservation and management through identification and classification of all wetlands; and
- ❖ Wetland and its watershed biodiversity conservation and sustainable utilization in participatory manner.

2.2 Policy of People's Participation

In the past, people's participation was usually conceived in terms of the percentage they contributed to a project's total cost and their contribution was generally in the form of voluntary labor. But, since the local people cannot contribute cash, their contribution is most significant in activities that require a lot of unskilled labor. During the Sixth Plan (1980-85), the spirit of community participation was first incorporated in the process of planning and implementation at the district level by focusing users' committees. However, due to lack of understanding of mechanisms of people's participation among the members, the users' committees could not mature. Also, in the absence of legal framework for people's participation in the past, influential persons tried to get all the benefits of a project's activities in the name of community participation. Some of the issues and experiences of people's participation in watershed management in the past are as follows:

- ❖ Watershed management focused on public lands and activities like conservation plantation and gully control were popular. Work was carried out in the field either by directly hiring local laborers or by operating through a contractor. The beneficiaries were hardly involved.
- ❖ Mass education materials were published and disseminated, but extension services were focused on privileged and well-off people.
- ❖ Users' committees were seldom formed. Participation was limited to political leaders and local elites, and users' meetings were organized only to satisfy the formalities.
- ❖ Few activities such as water source protection, water supply and hill irrigation channel improvement received contributions from the people in terms of their labor. However, these activities were nominal and unsustainable.
- ❖ Activities accomplished by peoples' participation did not adequately represent women, underprivileged castes and ethnic communities.

Participation means taking part in a process with a view to determine or at least influence the outcome of the process. In watershed management, it is vital that local farmers, users and beneficiaries play an active role. Their participation should start from the initial stage of problem identification and continue into the subsequent stages of planning, implementation, monitoring and evaluation. Different models of people's participation which are commonly practiced in watershed management projects in Nepal are:

- 1) **No participation model:** Information about programs, budgets and project evaluation is given only to the members of the parliament.
- 2) **Information sharing model:** The project shares information with the district level political unit and discusses project evaluation.

- 3) **Political participation model:** The project field staff share information with the village level political unit and elicit input about identifying, planning, monitoring and evaluating activities.
- 4) **Users' participation model:** The resource users form groups and put pressure on village and district level political units to identify, plan, implement, and maintain project activities. Projects negotiate with the users' groups through field staff. The context specific SCWM programs such as big landslide, stream bank cuttings, etc., will be executed even without people's participation as the sites are far from the settlements and local communities cannot provide their participation.
- 5) **Individual participation model:** In this model, the individual farmer is considered in planning and implementing farm-level conservation packages on private land. Projects negotiate with individual farmers, who in turn strengthen the users' groups.

2.3 Soil Conservation and Watershed Management Policy

The Soil and Watershed Conservation Act was promulgated in 1982, followed by the Soil and Watershed Conservation Regulation in 1985. These give authority to the government to declare any watershed as a "Protected Watershed" and to implement various conservation measures in these areas. Statutory amendments or additional regulations may be needed. For the Ninth Five Year Plan period (1997-2002), the main objectives of the forestry sector were the mobilization, conservation and management of forest resources to equalize their demand and supply; the creation of income-oriented and employment opportunities for poor and marginal families; the mobilization of people's participation for productivity enhancement; and the adoption of proper land-use plans. Activities of IWM are given high priority. Benefit monitoring indicators are to be maintained in setting the objective and targets of each program in a participatory way. Through the preparation of simple working plans for sub-watersheds, income generation, poverty alleviation, and production programs as well as the system of inter unit co-ordination and mobilization of savings and resources of rural people are to be adopted. In addition, the productivity of land is to be increased. Formation, operation, and strengthening of users' group are co-ordinated and integrated in sub-watersheds.

The watershed management programs under the Ninth Plan period are to be carried out in order to mitigate the negative impact that may be caused by the destruction of resources in the watershed areas of large hydro-electricity and irrigation projects. Integrated resource management and mobilization are to be carried out through people's participation in the functional sub watershed areas of 15-25 km². Presently, almost all the DSCOs are implementing their SCWMP in the sub watersheds and higher priority has been given to soil conservation work while carrying out development activities. Their major activities include controlling landslides and carrying out conservation of watershed areas, developing bioengineering system by selecting non-timber vegetation like fruit tree species, fodder/grass species, medicinal plants

etc. These species may help in income generation of the local communities. In order to implement soil conservation and watershed management activities in line with the policies, principles, and objectives of the government, these programs have been identified by the Department: 1) land use development and planning; 2) land productivity conservation; 3) natural hazard prevention 4) development infrastructures protection; and 5) community soil conservation and extension.

Land use development activities include the preparation of community development or livelihood improvement watershed/sub watersheds management and development plan. Land productivity conservation programs promote the restoration and improvement of the productivity of the community and private land and include planting of forage and legumes, cardamom, and fuel, fodder and fruit trees. Natural hazard prevention focuses on reducing the damage to life, property and valuable natural resources caused by different types of hazards. It includes landslide treatment, gully stabilization, torrent control, stream bank protection and degraded land rehabilitation using various structural and vegetative measures. Development infrastructures protection program includes those measures which protect and stabilize basic development infrastructures such as reservoirs, irrigation systems, trails, and roads in order to prevent losses to the national economy. Similarly, community soil conservation programs include water source protection for clean drinking water supply, user group nursery establishment for seedling production and community plantation, soil conservation extension, school level conservation education, soil conservation and user group capacity strengthening training and study tours, and conservation and environment day celebrations.

The DSCWM has adopted the following policies and strategies for SCWM in Nepal:

- ❖ Ensure proper land use by rational land use planning;
- ❖ Implement integrated SCWM package programs to tackle erosion problems;
- ❖ Take a sub- watershed as the working unit of soil conservation and watershed management;
- ❖ Ensure multiple uses of land and water to fulfill diverse needs of people;
- ❖ Operate SCWM programs in line with IWM approach and on the basis of watershed conditions;
- ❖ Establish linkage and network with all other related sectors like forestry, agriculture, livestock, water and land resources;
- ❖ Ensure people's participation by developing appropriate technologies and through conservation extension, education and demonstration;
- ❖ Adopt ways and means of minimum damage to the environment during the construction of development infrastructures;
- ❖ Protect watershed near hydroelectric dams, irrigations systems and riverbanks through plantation and other conservation techniques;
- ❖ Expand and institutionalize SCWM services in all districts of Nepal; and
- ❖ Focus on conservation activities in the Chure and other marginal lands.

2.3.1 Non-government Organizations (NGOs)

Under the DSCWM, many unilateral and multilateral projects were implemented with the support of different partners. The major partners and International Non-governmental Organizations are: DANIDA (Natural Resources Management Sector Assistance Program), AusAID (Natural and Community Resources Management Program), GTZ (Chure Soil Conservation and Watershed Management Program), CARE Nepal (Begnastal Rupatal Watershed Management Project, Upper Aandhikhola Watershed Management Program, Sarlahi-Mahottari Watershed Management Program, Jaladh Watershed Management Program), EU (Bagmati Integrated Watershed Management Program), etc. The partners adopted their programs according to the policies and strategies of the DSCWM.

Additionally, other partners, like JICA funded Community Development and Forest/ Watershed Conservation Project (CDFWCP) and Participatory Watershed Management and Local Governance Project (PWWLGP) directly involved VDCs taking ward as a planning unit for watershed resources conservation and community development by bringing the local people together. Currently, DSCWM is implementing Building Climate Resilience of Watersheds in Mountain Eco-region (BCRWME) under the Pilot Program for Climate Resilience financed by the Strategic Climate Fund. The Strategic Climate Fund is administered by the Asian Development Bank. The project aims to provide access to more reliable water resources for domestic purposes and irrigation for communities living in the watersheds which are significantly vulnerable to climate change.

2.3.2 Community Based Organizations (CBOs)

Local organizations are being mobilized by a number of watershed management projects. Viable local institutions enable people's participation in planning, implementation, and maintenance of project activities. The main thrust of institutional building in watershed management is to examine management procedures that secure better performances from local organizations. Institutional capacity guides the institutional performance and can be strengthened to improve the work performance of local organizations. In the past, grass root institutions managed forest, rangeland, and water resources successfully in the hills of Nepal (Gurung, 1995; Poudel, 1997; ICIMOD, 1986).

Mountain watershed plans are targeted at more marginalized groups in the watershed, such as women, the landless and marginal farmers. Any watershed management activities should address equity in the watershed where most investment is taking place on land. Until recently, programs and projects, which aimed at improving the socio-economic conditions of the people, tended to be initiated, designed, and implemented by top level agencies and institutions without systematic consultation and involvement of the intended beneficiaries.

First, the concept of institutional design helps to explain why community organization was needed and how the designed organization has been supporting to communities in a particular socio-economic context. It tries to define drivers of the institutional design and understand the process and outcome of the design, which includes the actions and steps involved, interaction among actors and procedural rules. The design consists of rules for resource use, monitoring and enforcement, which guide the behavior of actors.

Second, the resource management institutions do not operate in a vacuum; rather they interact with other existing institutional arrangements which impinge on the effectiveness of the institutions in question. These interactions have been conceptualized as 'institutional relationship'. The assumption behind the idea of relationship is that the interaction between/among institutions can influence their respective outcomes. The outcomes might be positive or negative depending on the nature of the relationship: coordination or conflict. Similarly, there are District Development Committees (DDCs) and Village Development Committees (VDCs), which are responsible for development activities at local level.

2.4 Prioritization and Management Planning of Sub Watersheds

Land and water resources are limited and their wide utilization is imperative where the population pressure is continuously increasing. The resource development programs are applied generally on watershed basis and thus prioritization is essential for proper planning and management of natural resources for sustainable development. Watershed deterioration is a common phenomenon in most parts of the world. Among its several causes, the major ones are improper and unwise utilization of watershed resources without any proper vision, which is observed in developing countries like Nepal. In order to combat and address these problems, sustainable development is no doubt the appropriate policy strategy. Drainage basins, catchments and sub-catchments/sub watersheds are the fundamental units of the management of land and water, identified as planning units for administrative purposes to conserve natural resources.

The watershed management concept recognizes the inter-relationships among the linkages between uplands and low lands, land use, geomorphology, slope and soil. Soil and water conservation is the key issue in watershed management while demarcating watersheds. While considering watershed conservation work, it is not feasible to take the whole area at once. Thus the whole basin is divided into several smaller units, as watersheds or sub-watersheds, by considering its drainage system. In Nepal, sub-watersheds prioritization is generally carried out using criteria cutting

across land use, land system and socio-economic parameters using Remote Sensing and Geographical Information System (GIS). Due to limited budget, programs and technical manpower in developing countries, it is not possible to implement watershed development and management programs in all the areas at a time. Hence the concept of prioritization plays a key role in identifying areas which need immediate attention. Taking this into consideration, the DSCWM has been prioritizing sub-watersheds/sub-projects or VDCs through an integrated approach with an objective to select sub-watersheds to undertake soil and water conservation measures in the landscape.

2.5 Community Mobilization and Empowerment

Community Mobilization is a process of stimulating the motivation amongst community members and of passing on the necessary skills so that they can effectively carry out development activities. The effective implementation of any development activities requires that three basic criteria are met: i) no person or group (by caste, gender, religion, ethnic group, age, etc.) should be excluded from participation; ii) the nature, form and process of any development activities must be agreed upon through informed choices decided upon by democratic processes; iii) community members must be empowered and enabled to resist any pressures from outside or within their community. Communities are groups of people that may or may not be spatially connected, but who share common interests, concerns or identities. 'Empowerment' refers to the process by which people gain control over the factors and decisions that shape their lives. It is the process by which they increase their assets and attributes and build capacities to gain access, partners, networks and/or a voice, in order to gain control. Community empowerment necessarily addresses the social, cultural, political and economic determinants that underpin health, and seeks to build partnerships with other sectors in finding solutions.

Basically three phases are involved in the implementation of the watershed management programs under the DSCO. These include: a) identification of primary users and formation of a committee as well as planning activities; b) implementation; and c) monitoring of planned activities. The DSCOs identify primary users as well as their priority problems and programs through field-level consultations with stakeholders and communities. Then, DSCO officials and user groups jointly prepare an implementation plan, which lays down watershed management activities, level of participation from users, government contribution, work assignment and time schedule. The local bodies i.e. VDCs' consent is taken as a crucial part in plan implementation. The DSCOs provide necessary tools, equipment, and technical and financial support to the users' group to implement the plan and monitor its implementation. The groups make internal rules and regulations for maintenance and benefit-sharing among members and also arrange local people's participation in the program.

The watershed management policies and programs have proved to be very successful in building the local capacity to take over the responsibility of sustainable management of watershed resources. The DSCWM has gained good experiences of participatory watershed management through community development group (CDG) during NARMSAP period, ward coordination committee (WCC) during Samudayik Bikas Tatha Hariyali Bikas Aayojana (SABIHAA) period and so forth. The community development committee (CDC) representing all households in the community, irrespective of caste, gender, economic class and ethnicity, youth and women has been the main vehicle for implementing the watershed development activities. The members of CDG elect a committee called CDC, which takes over the responsibility of planning and mobilizing all local resources. Many communities have shown keen interest in sharing not only labor but also cash. Furthermore, saving schemes were another successful venture launched by many projects and DSCOs. The trend in household income shows that watershed settlers have been gradually adopting watershed-friendly activities such as agro-forestry, on-farm conservation, fruit tree plantation, grass/fodder plantation and improved agriculture farming. The organization of community under the CDG/WCC and conduction of income generating activities by the DSCO for the watershed settlers are helpful for the community mobilization and empowerment.

2.6 Watershed Management: Upstream Vs. Downstream Linkages

Upstream and downstream linkage is a unique feature for the management and utilization of watershed resources. Conflicts between upstream and downstream users of land, forest and water are on the rise because of limited access of poor people to these resources. It is not possible to ensure the long-term protection of downstream river banks without conservation of upstream land. For example, the Churia and Bhabar region is important for the ecological and economic development of the Terai region because it is the recharge zone for the groundwater of the Terai. This region receives higher rainfall than the Terai and Mid-hills and recharges aquafer crucial for agricultural productivity of the most densely populated region of Nepal. In Nepal, about one-fourth of the people live below poverty line and lack access to good quality land and off-farm employment opportunities. Therefore, they are compelled to encroach upon forests and pastures for fulfilling their basic needs of food, fodder and fuel. Increasing depletion of forests has destabilized the whole system to such an extent that the future of both the highlanders and lowlanders of Nepal is at risk.

The majority of poor people who live in the hills or the Terai of Nepal, or upstream or downstream of any watershed, rely on agriculture for their employment, but they spend a high proportion of their income on food and other basic needs such as clothing Department of Soil Conservation and Watershed Management, Nepal and shelter.

Therefore, intensifying sustainable agriculture through technological and managerial innovations, along with management of forest, land and water resources, continues to be crucial to the people of Nepal to achieve the twin objectives of poverty reduction and sustainable conservation.

A watershed is the area of land that feeds water into a river, through the process of precipitation draining through the landscape, into tributaries and into the main river channel. Various components that make up the landscape within a watershed, for example forests, grasslands, cultivated areas, riparian areas and wetlands, form groups of ecosystems. These are defined as the benefits obtained from the ecosystems within a watershed that support downstream water users, including ecosystems. Watersheds provide a wide range of goods and services to both urban and rural population and play an important role in supporting urban life and development. Watersheds are also a source of economic goods that are vital to livelihoods and economies, and provide spaces for recreation and cultural heritage (PEDRR, 2011).

The payment for environmental services (PES) is a noble mechanism in which “providers” (or sellers) of environmental services are paid by consumers or beneficiaries of these environmental services. There is increasing interest in PES and incentive-based mechanisms with growing demand of food, drinking water and energy combined with pressure on natural resources in most parts of the world. For a payment scheme to succeed and endure, the actions and change brought by upstream land and water managers should result in identifiable benefits for downstream water users. Therefore, clear cause-and-effect relationships between upstream land and water use practices and the provision of watershed services for downstream users need to be identified. Negotiations among buyers and sellers of watershed services are very important and time consuming. To complete these negotiations successfully, facilitators and stakeholders have to develop a shared understanding of the diverse interests, assets, capacities and power of the players. The aim should be the formation of an agreement that specifies the design and rules for operating a payment scheme that is effective, efficient, enforceable, transparent, equitable and sustainable (Smith et al., 2006).

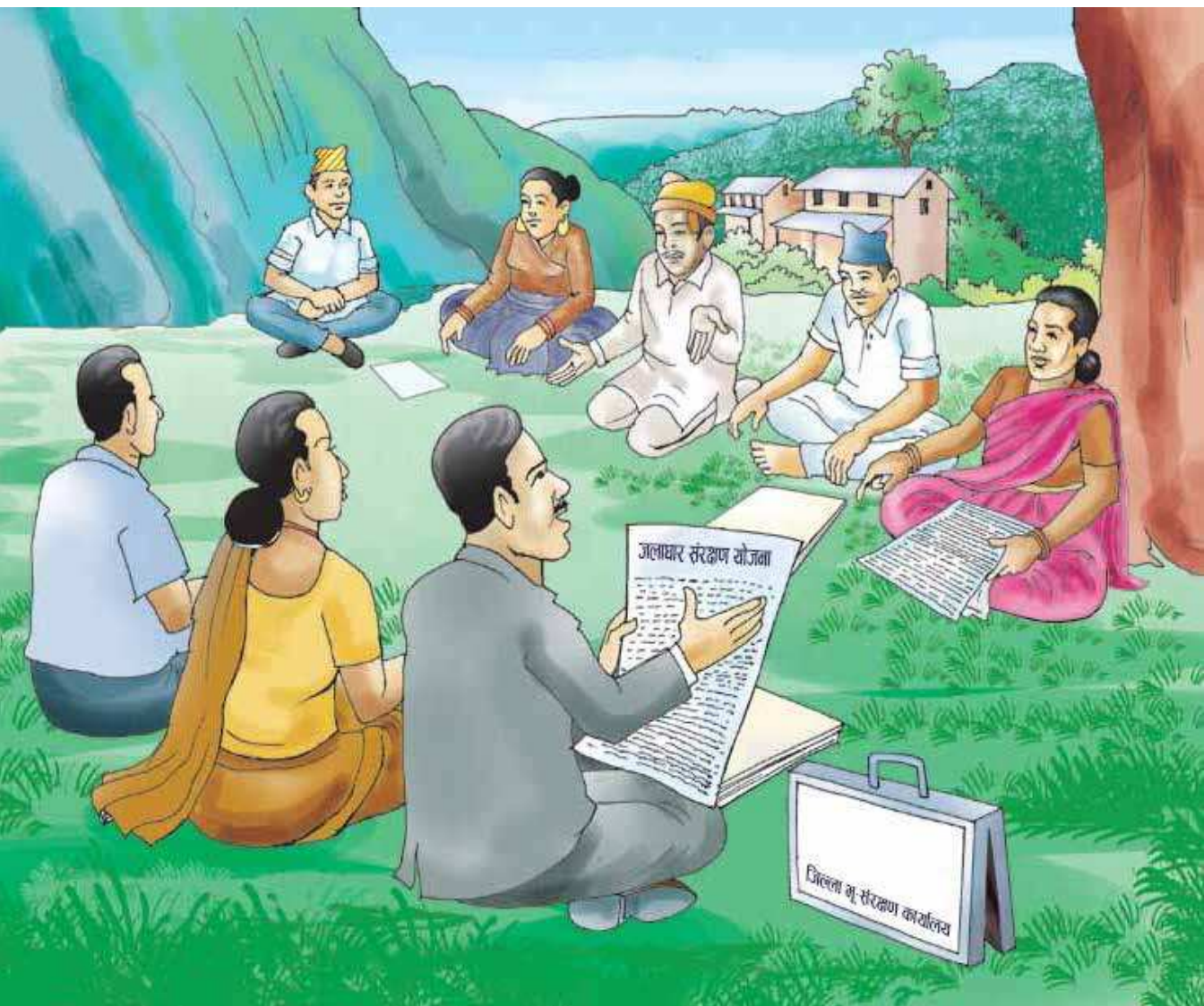
In Nepal, the PES of watershed system is implemented formally for the supply of drinking water from the upstream (remote villages) to the downstream of highly populated areas, e.g., Sundarijal water supply project for Kathmandu valley, Kathmandu Upatyaka water supply project for Kathmandu valley, Dhulikhel water supply project for Banepa and Dhulikhel in Kavre district, etc. Similarly, the watershed inhabitants are getting the PES from large projects of Nepal Electrical Authority (NEA) for the conservation and development of upstream watershed area of the project such as Kulekhani watershed in Makawanpur district.

2.7 Community Based Watershed Management

We often think of a river simply as water flowing through a channel, but river systems are complex and intimately connected to and affected by the characteristics of their surrounding watersheds – the land that water flows over and under on its way to the river. Everyone is an integral part of the watershed in which he or she lives. Many human activities that occur on the land, such as agriculture, transportation, mining, and construction, affect our river systems and how they function. Ecologically, watersheds provide critical habitat for many plant and animal species, as well as transport paths for sediment, nutrients, minerals, and a variety of chemicals. Watersheds also provide water to human communities for drinking, cleaning, recreation, navigation, hydroelectric power, and manufacturing.

Community-based watershed management is an approach to water-resource protection that enables individuals, groups, and institutions with inclusive and equitable in management outcomes (often called stakeholders) to participate in identifying and addressing local issues that affect or are affected by watershed functions. Proponents of community-based watershed management maintain that involving local stakeholders results in more locally relevant solutions that take into account each community's unique social, economic, and environmental conditions and values. Stakeholder participation is also thought to create a sense of local ownership of identified problems and solutions, thus ensuring long-term support for resulting management plans.

SECTION-3: WATERSHED MANAGEMENT PLANNING



3.1 Process of Watershed Management Planning

The planning process of integrated watershed management involves following basic elements: i) objective setting, ii) rationales for planning, iii) data collection, iv) analysis and v) plan formulation.

3.1.1 Objective Setting

The following are the objectives adopted by DSCWM for preparation of SCWM plans:

- ❖ To prepare land use development and improvement plan based upon scientific land capability;
- ❖ To protect life and property from natural hazards;
- ❖ To lengthen the economic life of development infrastructures such as roads, irrigation canals, dams, reservoirs, lakes, etc; and
- ❖ To develop knowledge and skills to raise the level of community awareness and participation in conservation activities.

3.1.2 Rationales for Planning

There are three important components of planning. They are i) watershed resources assessment, ii) people's needs assessment and iii) implementation capacity. Watershed resources assessment is the process of erosion status inventory applying the accepted technology of problem identification. This process states the nature of a problem and its magnitude. People's needs assessment incorporates the views of the people and other agencies involved in the field of soil conservation and watershed management in the planned area. Implementation capacity exhibits the planning that can be implemented with the existing human resources, financial resources and state of technology.

Watershed resources assessment is generally a top down approach of planning, whereas people's needs assessment is bottom up approach of planning. Institutional capacity and local knowledge of watershed and water resource management are the realistic aspect of planning and management of watersheds which can establish the bottom up process. When the institutional capacity is sensitive to the other two components, the plan has higher probability of success. Very often plan is a compromised set of intersection of these components.

3.1.3 Data Collection

A survey is done depending upon the resources available for planning, the sophistication and level of data collection. A detailed socio-economic survey and aerial photo interpretation along with other geographical information are carried out at places where resources are available. When resources are not sufficient to carry out socio-economic survey and aerial photo interpretation, data should be generated from already available information. Data from Land Resource Mapping Project (LRMP) publication and rapid rural appraisal (RRA) should be used. LRMP data provide the basis for watershed resources assessment and RRA helps in the people's needs assessment. Data on water management, livelihood resources, climate vulnerability, and disaster risk reduction should be collected.

3.1.4 Data Analysis

Classification/analysis of data is carried out for assessment of watershed resources, people's needs and implementation capacity. Watershed resources assessment generally involves ranking the sub-watersheds in terms of most erosion critical to least erosion critical. A composite map is prepared by overlaying LRMP land utilization and land system maps and the intersect areas are classified as high, medium and low erosion status. Some other methods such as soil loss estimation, erosion hazard classification, and land capability classification can be applied. Guidelines for these methodologies are available in DSCWM. DSCWM encourages assessment of watershed resources by using the technique of classifying the intersect areas as high, medium and low erosion status and ranking the sub-watersheds based on erosion status and watershed condition.

Information displayed in maps provides visual presentation. The maps of land use, land system, sub-watershed boundary and stream system presented separately and compositely provide necessary information on rainfall, geology, transportation network, population distribution. Since the maps also are drawn up to a scale, their spatial relations have quantitative representation as well.

3.1.5 Plan Formulation

Another important element of planning is the information on resource allocation, which generally includes information on what are the activities and how, where, when they will be done by whom and at what costs. The costs are listed according to the budget lines. Figure-1 shows the representational diagram of Operational Planning Components and their integration.

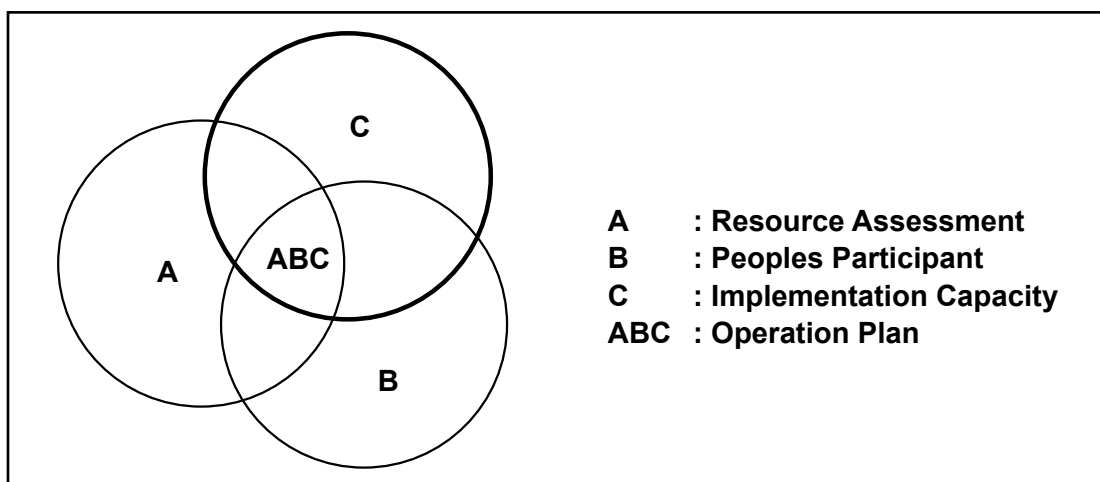


Figure-1: Operational Planning Components and their Integration

3.2 Level of Watershed Management Planning

Watershed Management Planning is the process of allocating scarce resources (such as funds, manpower, technology, etc) for achievement of the objectives and goals of the DSCWM. A plan also shows the nature and magnitude of the problems lying within the scope of the DSCWM objectives and the intended hierarchy of planning. The problem analysis should clearly explain the components and their elements based on which planning process is formed.

3.2.1 Hierarchy of Planning

The hierarchy of planning related to the soil conservation and watershed management in Nepal at present is defined by the level of the office executing the plan. The highest level of a SCWM plan execution is done at the Ministry of Forests and Soil Conservation. The lowest level of the SCWM plan execution is done at the field level. Different levels of planning are required to fulfill objectives of different management levels as mentioned in Table 1. Levels of planning are reflected by the mutual interaction of scale (information collected/available), purpose and resources available. For the watershed management, generally three levels of planning may be distinguished: reconnaissance, semi-detailed and detailed. The levels of execution and nature of the plan are:

3.2.1.1 Reconnaissance Level Planning

The general direction or policy preparation based on broad inventory of resources, development possibilities and identification is termed reconnaissance level planning. Economic analysis and land evaluation is general and qualitative. The level I generalized mapping is for use on 1:250,000 or small-scale landsat or aerial photographs with minimum ground checking.

3.2.1.2 Semi-detailed Level Planning

The broad need assessment and formulation of a project from physical as well as socio-economic aspects is termed the semi-detailed level planning. Economic analysis and land evaluation are usually semi-quantitative. Semi-detailed level planning also involves prioritization of area and programs for implementation. The Level II generalized mapping is for use on aerial photographs of 1:50,000 and 1:100,000 scale with moderate ground checking.

3.2.1.3 Detailed Level Planning

The total needs assessment and formulation of site specific programs with detailed technical and cost-benefit analysis for implementation is termed the detailed level planning. Parametric land evaluation is needed. The detail level planning III generalized mapping is used on 1:10,000 or larger scale aerial photographs with intensive ground checking.

Table- 1. Comparison of Three Levels of Planning (Modified After Sthapit, 1989)

Description	Level of Planning		
	Reconnaissance-I	Semi-detailed-II	Detailed-III
1. Kind of plan	Project proposal	Project Feasibility	Project Formulation
2. Normal map scale	1:250,000 or small	1:50,000 to 1:1:100,000	1:10,000 or large
3. Time horizon	Long (10 to 25 yrs)	Medium (5 to 10 yrs)	Short (1 to 5 yrs)
4. Appropriate size of area	Nation/Region/ Basin	District/Watershed	Area/Sub-watershed
5. Purpose	Policy Guidelines/ District Priority	Broad need assessment irrespective of resource available, prioritization of area and programs	Detail need assessment of programs irrespective of resource available, implementation procedures
6. Economic Analysis	Very general	Semi-quantitative	Quantitative
7. Land Evaluation	Qualitative	Semi-quantitative	Quantitative
8. Level of Soil Mapping	None	Reconnaissance	Reconnaissance
9. Land Capability	None	Present vs. Recommended use	Detailed to semi-detailed land capability classes
10 Plan Prepared	Central	Central/District	District

3.3 Approach of Watershed Management Planning

3.3.1 Top-down and Bottom-up Approaches

Top-down and bottom-up approaches have been the two management systems of watershed resources since the beginning of development. Top-down approach assumes comprehensive scope and strictly follows a formal process to give priority to the biophysical framework of watershed. In this approach, the government determines a targeted plan and implements it directly by involving a contractor or its own staff without consulting the local people. This approach encountered many difficulties in terms of cost, maintenance, management, and implementation. Since its inception during the early 1970s, the approach to resource management in Nepal has entailed top-down planning, implementing and monitoring of activities. Targets were fixed based on available budgets. The target oriented top-down approach was not very successful for watershed management.

The bottom-up approach involving decentralization of planning and policy formulation has become popular in developing countries over the last decade. It is built-up on the principle of devolution of power and authority to local communities for management, utilization and conservation of the resources. It includes the democratic process of participation of the local people in planning, implementing and decision making for community development at the local level. Bottom-up approach is practical for managing natural resources which provides authority and empowerment to the local people for the management and utilization. The Decentralization Policy in Nepal was initiated with adoption of the bottom-up approach in the early 1980s.

3.3.2 Participatory Watershed Management Approach

Participatory watershed management approach is a basic principle of conservation activities and natural resource management programs in most developing countries. It is generally believed to be a good thing in development theory and key feature of natural resource management. There has been a rapid expansion of participatory approaches, which involve interactive learning between professionals and farmers. Watershed management has evolved into a participatory multi-stakeholder exercise requiring institutional and organizational coordination to take into account the economic, social, political and cultural dimensions. Participation should include people's involvement in decision-making, implementation of programs, sharing the benefits of development and also in evaluation of such programs. The participatory approach has gained favor in development thinking in recent years and played a leading role in popularizing its adoption in both government and NGOs.

The approach to people's participation in watershed management in Nepal has been evolving since 1974 (Sharma and Wagley, 1996). Its evolution can be divided into

four stages. At each stage people's participation has been described in terms of a five-part project cycle: watershed resources assessment; project activity planning; implementation, maintenance, follow-up and benefit sharing; and extension efforts. People's participation in watershed management has gradually increased after the Decentralization Act in 1982 and it has been institutionalized since 1991.

3.3.3 Climate Sensitive Watershed Management Planning

Climate change is a crosscutting issue with the need for an integrated approach to food security, environmental quality, human welfare and other development goals. To address the issue of climate change, the Government of Nepal (GON) is adapting to the adverse impacts of climate change by making human activities and development process environment-friendly as per the concept of green development (Climate Change Policy, 2067). Agriculture is uniquely situated between climate change adaptation and mitigation strategies, because it is both a major contributor to the world's changing climate and a vulnerable socio-ecological system. Thus, it requires a landscape approach that considers the multi-functionality of land use practices and the need for cooperation at any level of watershed management and across all sectors.

The Building Climate Resilience of Watersheds in Mountain Eco-Regions (BCRWME), 2014-2020, developed in the framework of the Pilot Program on Climate Resilience (PPCR), aims to improve climate resilience of mountain communities focusing on climate vulnerable districts in Far-Western Nepal. The project's main outcome is that communities in selected climate-vulnerable mountain watersheds have access to more reliable water resources. The mechanism proposed to achieve these aims through integrated watershed management interventions to increase surface water storage, reduce erosion, enhance soil moisture and groundwater recharge and stabilize slopes and gullies. Similarly, Hariyo Ban Program (Aug 2011 – Dec 2016) also aims for intact and healthy watershed through threats, drivers and vulnerability assessment approach.

3.3.4 Log-frame for Watershed Management Planning

Logical Framework Approach is an analytical tool which helps to identify program/project goals, purposes, outputs, activities, and their cause and effect relationship. It also identifies the indicators which can be monitored to know if objectives have been met. In addition, it pre-estimates the external forces which could have an influence on the program/project success and failure. It is presented in a four by four matrix with goal, purpose, outputs and activities and the second column is written with the respective objective hierarchy indicators, the third column is written with means and methods of verifying the achievements on the indicators, and the fourth column with the assumptions or the risk factors which should be considered for the logic to work. The logic is that if input be given and the identified activities carried out, and the assumptions prevail, then it results to the output; if the outputs result and the assumptions still hold good, then in due course of time, the purpose will be met; and if purpose is met and the

assumptions prevail, then it is very likely that the goal will be achieved.

One goal, one purpose subdivided into five components, 39 outputs, 77 indicators, and 116 activities has been identified in the log-frame of DSCWM. Means of verification of each indicator have been determined and important assumptions for the following logic to work have been identified. Logic is, if activities are carried out, then outputs result; if outputs result, then purpose is met; if the purpose is met, then the goal will be achieved. The following goal, purpose and its components, outputs, activities, indicators, means of verification, and important assumptions have been identified in the log-frame of the DSCWM.

Goal:

To contribute to the livelihood and well-being of the people through sustainable watershed management of the river basins

Purpose:

To increase the productivity and utility of land and water and to prolong the services of the development infrastructures leading towards livelihood improvement on an equitable and sustainable basis through integrated soil conservation and watershed management

Component purposes (P):

Component 1: Water and Sediment Yield

P1: To improve the water regime and water quality and to reduce sedimentation of lakes, reservoirs, and rivers in the nationally important and critical watersheds

Component 2: Land Productivity Conservation

P2: To increase the productivity of land and to increase the biodiversity through participatory soil conservation and watershed management

Component 3: Infrastructure Protection

P3: To protect the development infrastructures from erosion hazards promoting people's participation and collaboration

Component 4: Institutional Development

P4: To develop and strengthen the SCWM related institutions of government, non-government, community, and private sectors

Component 5: Program Management

P5: To manage soil conservation and watershed management programmers effectively

Some of the “Outputs” are as follows:

P1O1: Increased ground coverage of the watershed

P1O2: Increased crown coverage of the watershed

P1O3: Increased conservation farming practices

P1O4: Increased adoption of proper land use as per land capability classification

P1O5: Increased the number of stabilized landslides and gullies

Some of the “Activities” are as follows:

- ❖ Plant mainly conservation oriented grasses, shrubs and trees on *parti* land and degraded land
- ❖ Protect the degraded forest and grass land against grazing, lopping, felling of green trees, and forest fires
- ❖ Establish conservation farmers networks
- ❖ Demonstrate the conservation cropping practices
- ❖ Make the farmers aware of the conservation farming practices

Some of the “Indicators” are as follows:

- ❖ By 2025 the average ground coverage of the *parti* land of the intervened national watershed increased by x percent.
- ❖ By 2025 the average ground coverage of the degraded forest land of the intervened national watershed increased by x percent
- ❖ By 2025 the average ground coverage of the *parti* land of the intervened national watershed increased by x percent
- ❖ By 2025 x percent of the farmers adopted conservation farming practices
- ❖ Number of farmers adopting proper land use practices increased

Some of the “Means of verification” are as follows:

- ❖ Study report on land use and vegetation status
- ❖ DSCWM in collaboration with Department of Forests (DoF) and Village Development Committee
- ❖ Forest status report of Department of Forest Research and Survey (DoFRS) /DoF
- ❖ Study report of DSCWM on conservation farming
- ❖ PRA study of the adoption of proper land use practices
- ❖ DSCWM monitoring reports and landslide/gully stabilization status reports

Some of the “Important Assumptions” are as follows:

- ❖ The desired plant species will not be suppressed by unwanted species
- ❖ Intense forest fire will not occur
- ❖ Severe crown fire will not occur
- ❖ Farmers continuously adopt conservation farming practices
- ❖ Natural calamities like drought do not occur

3.4 Landuse Development Plans

3.4.1 Strategic Basin Management Plan

River basin management plans are management tools for Integrated Water Resources Management. They generally contain descriptions of the water resources in a drainage basin and water allocation plans. Integrated river basin management (IRBM) is the process of coordinating conservation, management and development of water, land and related resources across sectors within a given river basin, in order to maximize the economic and social benefits derived from water resources in an equitable manner while preserving and, deliberating, wherever necessary, restoring freshwater ecosystems.

3.4.2 Watershed Management Plan

Watershed management is an adaptive, comprehensive, integrated multi-resource management planning process that seeks to balance healthy ecological, economic, and cultural/social conditions within a watershed. Watershed management serves to integrate planning for land and water; it takes into account both ground and surface water flow, recognizing and planning for the interaction of water, plants, animals and human land use found within the physical boundaries of a watershed.

Watershed management provides a framework for integrated decision-making to help: assess the nature and status of the watershed; identify watershed issues; define and re-evaluate short and long-term objectives, actions and goals; assess benefits and costs; and implement and evaluate actions.

3.4.3 Sub-watershed Management Plan

Sub watershed management is the process of creating and implementing plans and programs to sustain and enhance the natural heritage features and functions of a sub-watershed. The process has become a generally accepted means of addressing environmental concerns over broad areas of land and contributes to the development of an overall land use management strategy.

3.4.4 Micro Watershed Management Plan

A micro-watershed comprising the catchment of a stream is the most appropriate management planning unit as it addresses the micro level planning related problems effectively. However, the micro-level planning requires a large number of activities for complete treatment and investment in necessary institutional arrangements.

The micro-watershed planning and implementation suggests the integration of technologies within the natural boundaries of a drainage area for optimum development of land, water, and plant resources to meet the basic needs of people and animals in a

sustainable manner. This approach aims to improve the standard of living of common people by increasing their earning capacity providing all the facilities required for optimum production. In order to achieve its objective, integrated watershed management suggests to adopt land and water conservation practices, water harvesting in ponds and recharging of groundwater for increasing water resources potential and stress on crop diversification, use of improved variety of seeds, integrated nutrient management and integrated pest management practices, etc.

3.4.5 Community Resource Management Planning

Community resource management planning (CRMP) has evolved as a way of maximizing benefits derived from natural resource whilst enhancing their status. It has been argued that the status of the resources and the way they are used are inseparably linked and there is a dynamic equilibrium between renewal and utilization. So, the development of CRMPs evolved as an attempt to establish, monitor and manage this equilibrium. The CRMPs are implemented through adaptive management to cope with the risk and cater for unpredictable and sometimes-unknown responses of resources and variation of other conditions. CRMPs are records of all community's development, utilization and conservation priorities for the implementation of resource management strategies and monitoring of impacts resulting thereof. The ultimate objective of developing CRMPs is the attainment of sustainable utilization of natural resources. Sustainable use of natural resources is socially defined and therefore not an absolute determinant or a standard measure. Its determination, therefore, is a process that involves participation and public discourse where development agents are facilitators ensuring that social groups have equal representation.

Resource management strategies are attempts to address the challenge of balancing resource conservation and utilization. The state of resources and how they are used are inseparably linked to ecological processes. Thus sustainable resource use should be based on socially responsible economic development while promoting the resource base and the status of the ecosystem. The efforts to attain social responsibility make indigenous knowledge systems (IKS) a crucial component of any development and conservation intervention.

SECTION-4: SOIL CONSERVATION AND WATERSHED MANAGEMENT PROGRAMS/ACTIVITIES



4.1 Disaster Risk Reduction and Natural Hazards Management (*Bipad Jokhim Nyunikaran Tathhaa Praakritik Prakop Byabasthaapan*)

Landslide inventory and documentation, hazards mapping, gully treatment, landslide treatment, torrent control, and stream bank protection activities using various engineering and vegetative measures may be required for the disaster risk reduction in practice. Check dams, retaining walls, diversion channels, grass sowing, and tree planting are the main types of works under these activities. Most of these activities would be in uncultivated streambeds, or on steep slopes, or on the area of lesser economic return, or on public lands; therefore, treatment usually causes minimum disruption to local land use. So, while implementing these activities, objections from the local people regarding ownership is less likely. However, these measures are very expensive and people's participation in cash will be more difficult.

4.1.1 Landslide Inventory and Documentation (*Pahiro Gananaa Tathhaa Abhilekhikaran*)

Definition:

Inventory is originally a commercial term meaning the record showing quantity and value of articles in a store. Document is a written, drawn, presented or recorded representation of thoughts which may be preserved or represented in order to serve as evidence for some purpose.

Landslide Inventory:

Land slide inventory is the process of taking all information that is in place. Landslide inventory is a data set that may represent a single event, regional event, or multiple events (usgs.gov).

Landslide Documentation:

Landslide documentation is the process of keeping records on landslides in detail for institutional memory to be used for the systematic address of landslides.

Objectives:

- ❖ To know the details of the landslides in the district
- ❖ To make the development efforts sustained
- ❖ To make proper planning for landslide treatment

Working Strategy:

The landslides in the districts will be identified and recorded with rigorous support of the

local people and stakeholders. The following landslide sheet can be used for landslide inventory and documentation for uniformity (Table-2).

Table-2: Landslide Inventory Sheet

S.N.	Name of Landslide	Location			Dimensions of Landslide				Land use			Slope	Remarks
		VDC	Ward	Tole	Length	Breadth	Depth	Volume	Bari	Kharbari	Others	degree	
	Historical Background: When: Cause : Other additional:				Effect and Impact of Landslide:				Rough sketch/ Photo showing whole landslide:				

Scope:

Generally, the activity includes:

- ❖ Preparation for inventory and documentation
- ❖ Concerned stakeholders' support in data collection
- ❖ Use of GIS, GPS, Landsat Imagery, Google Earth, different maps
- ❖ Production of landslide documentation book
- ❖ Revision of landslide book periodically
- ❖ Mobilization of local communities, resources

Unit: Number

Symbol:



4.1.2 Hazard Mappings, Vulnerability Assessment and Risk Mapping (Prakop Nakshaankan, Sankataasannataa Pahichaan Tathaa Jokhim Nakshaankan)

Definition:

A hazard is any biological, chemical, mechanical, or physical agent that is reasonably likely to cause harm or damage to humans or the environment with sufficient exposure or dose (en.wikipedia.org). In other words, it is the probability of occurrence of a potentially damaging phenomenon. More simply, it is the property that causes loss of life or damage.

Vulnerability is the degree of loss resulting from the occurrence of the phenomenon.

Risk is the probability that exposure to a hazard will lead to a negative consequence. In other words it is the probability of loss of life, injury, or damage. A hazard poses no risk if there is not exposure to it.

More simply,

$$\text{Risk} = \text{Hazard} \times \text{Vulnerability} \times \text{Exposure}$$

Exposure is the number of people, buildings, structures that are exposed to the hazard

Hazard Mapping:

It is a procedure for creating hazard map that highlights areas that are affected or vulnerable to a particular hazard (en.wikipedia.org). Hazard maps also provide detailed information about the causes, course, spatial scope, intensity and probability of occurrence of natural hazard events. It refers to map describing the areas at risk of natural disasters.

Vulnerability Assessment:

It is the process of identifying, quantifying, and prioritizing (or ranking) the vulnerability in a system (en.wikipedia.org).

Risk Mapping:

It is a procedure for preparing map considering hazard, exposure (or elements at risk) and vulnerability in addition to the hazard/susceptibility.

Objectives:

- ❖ To minimize the risk level based on most vulnerable threatening elements
- ❖ To help watershed management planning
- ❖ To decrease the magnitude of disasters by using it effectively
- ❖ To provide the information on the range of possible damage and the disaster prevention activities
- ❖ To provide information to establish an early warning system and evacuation system

Working Strategy:

There are different types of hazard maps e.g. flood hazard maps, debris flow hazard map etc. The hazard map will be prepared using GIS, GPS, Aerial photo, Satellite imagery, Google earth and with intensive consultation of local people. The map will be created with representations and contents that are understandable to non-professional people for its effective use.

Scope:

Generally, the activity includes:

- ❖ Hazard map preparation
- ❖ Risk assessment
- ❖ Vulnerability assessment
- ❖ Use of different maps

Unit: Number

Symbol:



4.1.3 Landslide Treatment (Pahiro Upachaar)

Definition:

Landslide is perceptible downward sliding or falling of a mass of earth, rock or mixture of the two under the influence of gravity, frequently occurring when the material is saturated with water

Landslide Treatment:

Refers to the vegetative and structural measures applied in the landslide area and its influential catchment

Objectives:

To reduce soil erosion and mass movement from landslide and reduce devastating effects on the downstream and surrounding area where landslide occurs sometimes threatening life and property.

Working Strategy:

The influencing drainage area along with landslide and immediate downstream vicinity will be taken as working unit and all the necessary vegetative as well as structural erosion control measures will be applied as package throughout the working area. Appropriate land use practices will be emphasized in the drainage area, whereas bio-engineering erosion control measures will be emphasized in the landslide and its immediate vicinity. Geological (natural) landslides are not advisable to be treated with expensive structures unless and until it affects habitation and rational infrastructures, e.g., road, reservoirs.

Implementation will be carried out with maximum people's participation. Participation will be sought right from planning to implementation, maintenance and benefit sharing. Emphasis will be given on implementation of the activity through user groups. In upstream and downstream areas where people's participation is not available, landslide treatment and other natural hazard prevention/control works can be carried out by using contract bidding/tender and other methods as appropriate according to prevailing financial regulations.

Scope:

Generally, the activity includes:

- ❖ Water management including diversion channels around and inside the landslide to drain water from the landslide
- ❖ Structural erosion control measures such as retaining walls, check dam
- ❖ Site stabilization by vegetation such as planting of trees and grass, contour wattling, and slope correction.
- ❖ Appropriate land use improvement in the drainage area
- ❖ Conservation pond to store and divert excess run-off
- ❖ Fencing for livestock control

Unit: Number/area of landslide in hectare/area of drainage area

Mapping Symbol:



4.1.4 Gully Treatment (Galchhi Upachaar)

Definition:

Gully is an erosion channel cut by concentrated run off but through which water commonly flows only during and immediately after heavy rains. A gully is sufficiently deep that it cannot be crossed by a wheeled vehicle or eliminated by ploughing.

Gully Treatment:

Refers to the vegetative and structural measures applied both in gully and its catchment.

Objectives:

To prevent further degradation of the gully and its watershed through controlling run off and erosion and to improve water quality and regimen.

Working Strategy:

The catchment area of the gully will be taken as working unit and all the necessary vegetative as well as structural erosion control measures will be applied in a package throughout the catchment area. Appropriate land use practices will be adopted in the catchment. Structures will be made only when the investment is economically justifiable and when the houses, lives and infrastructures are threatened.

Implementation will be carried out with maximum people's participation. Participation will be sought right from planning to implementation, maintenance and benefit sharing. Emphasis will be given on implementation of the activity through user group.

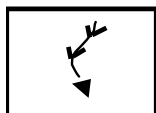
Scope:

Generally, the activity includes:

- ❖ Gully head diversion ditches
- ❖ Gully head plugging
- ❖ Gully rim edging
- ❖ Gully repair by building structures such as check dam
- ❖ Gully, gully bank and its catchment re-vegetation (tree and grass plantation), contour wattling and turfing
- ❖ Gully bank slope correction
- ❖ Conservation pond to store and divert excess run-off
- ❖ Appropriate land use improvement in the catchment
- ❖ Fencing of gully and its catchment for livestock control

Unit: Number/gully area in hectare/gully length in meters

Mapping Symbol:



4.1.5 Torrent Control (Khahare Niyantaran)

Definition:

Torrent is a stream of water flowing with great velocity or turbulence, generally causing river bank erosion and flood during heavy rains.

Torrent Control:

It refers to the vegetative and structural measures applied in the torrential stream and its catchment.

Objectives:

To reduce the stream bank erosion and sediment deposit caused by flash flow by run-off control through water management and erosion control measures

Working Strategy:

The catchment area of the stream will be taken as working unit and all the necessary vegetative as well as structural erosion control and water management measures and appropriate land use practices will be applied in a package throughout stream bank and its catchment area.

Implementation will be carried out with maximum people's participation. Participation

will be sought right from planning to implementation, maintenance and benefit sharing. Emphasis will be given on implementation of the activity through user group.

Scope:

Generally, the activity includes:

- ❖ Structures to protect stream bank from erosion
- ❖ Channelization efforts to manage the flood discharge
- ❖ Flood plain stabilization through bio-engineering measures
- ❖ Re-vegetation of barren lands in the catchment
- ❖ Silvi-pasture management in the catchment
- ❖ Gully treatment (also if there is any landslide) in the catchment
- ❖ Construction of conservation ponds for water management
- ❖ Appropriate land use improvement in the catchment

Unit: Number/catchment area in hectare/length of torrent treated in meter

Mapping Symbol:



4.1.6 River/Stream Bank Protection (Kholaa Kinaar Samrakshan)

Definition:

River/Stream Bank Protection refers to the land adjoining the stream and or river, where stream and or river cutting is actively destroying habitation, agriculture and forest land.

River Bank Protection:

It refers to the vegetative and structural measures applied in the area to protect the stream bank.

Objectives:

To prevent stream bank erosion and protect the land from river cutting

Working Strategy:

The area required to protect the stream bank erosion will be taken as working unit. This includes at least 5-10 meters distance from the stream bank and reclaimed area on the riverside. “*Nadi Ukas Jagga Upayog Tathaa Darta Sahamati Nirdeshika-2065*” will be taken as reference to assess high flood level area. All the necessary vegetative as well as structural measures will be applied as package. Structural measure alone without supportive vegetative measures will not be used.

Implementation will be carried out with maximum people’s participation. Participation

will be sought right from planning to implementation, maintenance and benefit sharing. Emphasis will be given on implementation of the activity through user group.

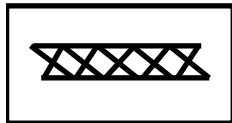
Scope:

Generally, the activity includes:

- ❖ Construction of revetments (protection walls)
- ❖ Construction of spurs (groynes)
- ❖ Construction of flow retarding structures
- ❖ Channelization efforts to manage discharge
- ❖ Flood plain stabilization through bio-engineering measures
- ❖ Vegetative measures (tree and grass plantation) on the bank
- ❖ Fencing of the area for livestock control

Unit: Length of stream bank protected in meter/ hectares of area vegetated/hectare of area reclaimed

Mapping Symbol:



4.2 Sustainable Land Management (*Digo Bhu Byabasthaapan*)

Sustainable land management measures are those, which develop and improve productivity of the land, and thus increase production through appropriate land use management on the basis of land capabilities. The emphasis is on change of management practices to permit to the extent possible natural processes to restore the land and bring land use in line with rational land utilization. Degraded land rehabilitation, diversion channel construction, on-farm conservation, fruit tree planting, silvi-pasture improvement, nursery, conservation plantation, conservation trenching are designated as productivity conservation measures. Productivity conservation measures need to be extensively applied throughout the watershed, on cultivated lands, range and pasture lands and degraded forests and public lands, and application of these measures may require interruption or change in the existing land use. Thus, while implementing these activities objections from the local people regarding land tenure may be likely. Measures such as terrace improvement and fruit tree planting, may result in temporary economic losses, and may require provision of some form of subsidy for the individual who undertakes the activity.

The program can be successfully achieved only when it is launched as a part of an integrated approach with a high degree of management and co-ordination. People's participation, incentives, motivation, education and extension are essential for success of the program.

4.2.1 Degraded Land Rehabilitation (*Chhetigrast Bhumi Punarutthaan*)

Definition:

It refers to the vegetative and structural measures applied on the degraded lands including forests, barren lands and graveled and sandy riverbeds.

Degraded Land:

Land degradation is a process in which the value of the biophysical environment is affected by a combination of human-induced processes acting upon the land. It is viewed as any change or disturbance to the land perceived to be deleterious or undesirable.

Land Rehabilitation:

It is a re-engineering process that attempts to restore an area of land back to its natural state after it has been damaged as a result of some sort of disruption. The process involves such things as removing all man-made structures, toxins and other dangerous substances, improving the soil conditions and adding new flora.

Objectives:

To reduce erosion and increase productivity through soil and moisture conservation preferably using vegetative measures

Working Strategy:

The degraded lands will be the working unit and plantation of desired tree seedling along with all the vegetative as well as structural erosion control measures will be applied in a package throughout the working unit. Structural measures will be less emphasized.

Implementation will be carried out with maximum people's participation. Participation will be sought right from planning to implementation, maintenance and benefit sharing. Emphasis will be given on implementation of the activity through user groups.

Scope:

Generally, the activity includes:

- ❖ Tree, shrub and grass planting with necessary conservation techniques such as contour terracing, contour trenching, contour bunding
- ❖ Erosion control measures such as micro-gully plugging, contour wattling and structures such as check dam, retaining wall as needed
- ❖ Seedling production and distribution to the groups
- ❖ Purchasing seedlings and distribution to the groups
- ❖ Protection of the area (including fencing and watchmen)

Unit: Area in hectare/ number of seedlings planted

Mapping Symbol:



4.2.2 Diversion Channel Construction (Bhal Tarkaune Naalaa Nirmaan)

Definition:

Diversion channel is an excavation for diverting overland flow away from exposed slopes, conveying the water to where it can be safely discharged through a stabilized outlet or to a sediment basin. Diversion channels or floodways are man-made channels built to offer a different route for excess water to flow further mitigating the effects of flooding and restoring rivers to their natural water level. Typically, diversion channel is built around communities or economic centre to prevent extensive flood damage; it mitigates the impacts of a flood by offering an alternative route for excess water.

Diversion Channel Management:

Embankment Diversions: When constructing diversions using earthen berms or swales, minimize erosion and sediment discharges by stabilizing the banks of the

diversion channel with an appropriate liner. Consider fluctuations in water depth due to storms or tides. Rip rap may also be useful to hold the liner in place and to dissipate outfall velocity.

Culvert Diversions: When using culverts to divert drainages or streams, ensure that culverts are constructed as per the applicable standard and specification for the type of pipe being used. To minimize water loss along the diversion, ensure that the watertight joints that meet the requirements of a positive joint.

Objectives:

- ❖ To collect and divert runoff by making diversion channels at the top of slopes, at the bottom of slopes or embankments, in material sources, and at waste sites;
- ❖ To reduce the length of an uninterrupted slope face by using temporary diversion channels on the lower side of cleared areas that are awaiting excavation or along the benches on large slope faces, and
- ❖ To discharge concentrated flows by a diversion channel and dike using chutes, flumes, or slope drains and using a diversion channel in conjugation with a dike.

Scope:

Once water is diverted from the water course, ensure that the following scopes are followed:

- ❖ River /channel flow will be diverted to the desired directions and downstream will be safe by the over land flow.
- ❖ Stream bank cutting will be reduced in downstream due to diversion of discharge to the safe direction.
- ❖ The diverted water will be utilized as irrigation facility of the locality and quality and quantity of crop production will be increased.
- ❖ The velocity of diverted water in the channel will be reduced and river bed scouring will also decrease either in main channel or diversion.

Unit: Number / length in meter

Mapping Symbol:



4.2.3 On-farm Conservation (*Khetbaari Samrakshan*)

Definition:

On-farm conservation is the sustainable maintenance of landscape and replaces the traditional cultivation system by growing them in conformity with sustainable and environment friendly cultivation using modern, scientific and conservation technologies close to the conditions under which these production had originated and developed.

On-farm Conservation:

On farm conservation implies management of the farm resource to conserve soil and water and improve production through various measures. The activities conducted by DSCWM include vegetative, structural measures and land surface treatment activities applied in the farmland, which includes leveling of terrace if necessary.

Objectives:

To reduce erosion and increase productivity on the farmland

Working Strategy:

Farmland of one or more farmers will be considered as the working unit and all necessary vegetative as well as structural erosion control measures and land surface treatment activities will be applied in a package throughout the working unit. Implementation will be carried out with maximum people's participation. Participation will be sought from initial planning through implementation. Individual farmers will be dealt with for participation.

Scope:

Generally, the activity includes:

- ❖ Planting of trees, herbs, or grass on marginal lands or unused lands in between and/or within farmlands.
- ❖ Planting of grass, trees and leguminous shrubs on the risers
- ❖ Slope correction/modification of the terrace
- ❖ Stabilization of riser
- ❖ Construction of the safe drainage and disposal of water
- ❖ Construction of conservation ponds for water management
- ❖ Distribution of vegetable and grass seeds and grass and tree seedlings and other types of vegetation as appropriate
- ❖ Erosion control measures such as micro-gully plugging, contour wattling, strip planting along the contour and structures such as check dam, retaining wall as needed
- ❖ Drainage and irrigation system improvement
- ❖ Terrace improvement
- ❖ Bamboo rhizomes distribution

Unit: Hectare/no. of households

Mapping Symbol:



4.2.4 Fruit / Tree Plantation (Falful Ropan)

Definition:

It refers to the plantation area of fruit / seedlings with the purpose of soil conservation and watershed management in the marginal lands where agricultural practice is susceptible.

Fruit Tree Plantation:

It refers to the fruit / tree planting along with vegetative and structural erosion control measures applied on the agriculture land which is not suitable for ploughing each year or communal land under some local institution such as school and non-governmental organization.

Objectives:

- ❖ To reduce erosion and increase productivity of overused private agriculture land and communal land by introducing fruit / trees.
- ❖ To reduce pressure on forest areas by fulfilling the local people's demand of fodder, fuel wood and timber.

Working Strategy:

The overused agriculture land of one or more farmers or communal land will be considered as working unit and planting of desired tree seedling along with all the necessary vegetative as well as structural erosion control measures will be applied in a package throughout the working unit. Implementation will be carried out with maximum people's participation. Participation will be sought right from planning to implementation, maintenance and benefit sharing. Emphasis will be given on implementation of the activity through user groups in case of communal lands and individual farmer in case of private farmlands.

Scope:

Generally, the activity includes:

- ❖ Distribution of fruit / tree seedlings
- ❖ Fruit tree planting with necessary conservation techniques such as contour terracing, contour trenching, contour bunding
- ❖ Erosion control measures such as micro-gully plugging, contour wattling and structures such as check dam, retaining wall as needed
- ❖ Grass planting, construction of diversion channel and safe drainage
- ❖ Seedling production or procurement
- ❖ Protection of the area (including fencing and watchmen)
- ❖ Technical back stopping required for the maintenance
- ❖ Purchasing the seedlings and distribution to the groups

Unit: Hectare/no. of fruit trees

Mapping Symbol:



4.2.5 Fodder/grass Plantation (Daale Ghaans/Bhuin Ghaans Ropan)

Definition:

Fodder/grass plantation refers to the plantation area of grass and fodder species to increase the availability with minimization of soil erosion from the cultivated lands

Fodder /Grass Plantation:

It refers to fodder tree and grass planting along with other vegetative and structural measures applied on the grass/shrub lands and fodder orchards

Objectives:

To reduce erosion and increases the availability of grass and fodder from the individual's overused agriculture land and communal land by the plantation of grass and fodder species

Working Strategy:

To reduce erosion of grassland, shrub land and private non cultivated areas will be considered as working unit and plantation of desired fodder tree, grass and leguminous seedlings along with other vegetative as well as structural erosion control measures will be applied in a package throughout the working unit. Implementation will be carried out with maximum people's participation. Participation will be sought right from planning to implementation, maintenance and benefit sharing. Emphasis will be given on implementation of the activity through user group.

Scope:

Generally, the activity includes:

- ❖ Seed acquisition and storage
- ❖ Construction of nursery beds (seed, seedling and transplant beds)
- ❖ Production of planting stock of trees (fuel wood, fodder, fruit trees), hedge, shrubs, legumes, herbs and grasses
- ❖ Water management
- ❖ Maintenance and protection of nursery
- ❖ Distribution of planting stocks
- ❖ Maintenance of nursery records
- ❖ Purchasing of seedlings and distribution to the groups

Unit: Number/area in hectare

Mapping Symbol:



4.2.6 Nursery /Seedling Production (Nursery/Biruwaa Utpaadan)

Definition:

Nursery refers to an area where plants are raised for planting and has both seedling and transplant beds. Nursery is either permanent or temporary.

Nursery /Seedling Production:

It refers to the area of seedling production for the purpose of plantation either in cultivated private land or community and inclusion area for the soil conservation and watershed management. Specially, it refers to all activities required to produce planting stocks.

Objectives:

To produce required planting stocks of trees (fuel wood, fodder, fruit and timber), hedge, shrub, legumes, herbs and grass.

Working Strategy:

All the activities required for raising planting stocks will be included. Raising of planting stocks will be carried out with maximum people's participation. Participation will be sought right from planning (such as species selection). Emphasis will be given on raising the planting stock through individuals and user group as well.

Scope:

Generally, the activity includes:

- ❖ Seed acquisition and storage
- ❖ Construction of nursery beds (seed, seedling and transplant beds)
- ❖ Production of planting stock of trees (fuelwood, fodder, fruit trees), hedge, shrubs, legumes, herbs and grasses
- ❖ Water management
- ❖ Maintenance and protection of nursery
- ❖ Distribution of planting stocks
- ❖ Maintenance of nursery records
- ❖ Nursery construction
- ❖ Nursery maintenance works
- ❖ Nursery *Naike* placement

Unit: Number of seedling /area of nursery

Mapping Symbol:



4.2.7 SALT Plot Establishment and Management (SALT Plot Sthaapanaa Tathaa Byabasthapaan)

Definition:

Sloping Agriculture Land Technology (SALT) plot is the plot established for the purpose of demonstration and wider dissemination of the conservation technologies used for sloppy land management. It includes the management of sloppy lands.

Objectives:

- ❖ To widely disseminate the conservation technologies at strategic locations
- ❖ To utilize marginal and unused land
- ❖ To organize the communities for income generation through SALT
- ❖ To produce diversified products food security

Working Strategy:

The marginal/unused land of one or more farmers or communal land will be considered as working unit and planting of desired tree seedlings along with all the necessary vegetative as well as structural erosion control measures will be applied in a package throughout the working unit. Implementation will be carried out with maximum people's participation. Participation will be sought right from planning to implementation, maintenance and benefit sharing. Emphasis will be given on implementation of the activity through user groups in case of communal lands and individual farmers in case of private farmlands.

Scope:

Generally, the activity includes:

- ❖ Site selection with local community consensus
- ❖ Vegetative measures with minor structural measures if required
- ❖ Species selection to be planted
- ❖ Maintenance of the site through community participation
- ❖ Bamboo rhizomes, broom grass plantation

Unit: Number of plots

Mapping Symbol:



4.2.8 Sustainable Soil Management (Digo Maato Byabasthaapan)

Definition:

Sustainable soil management refers to variety of practices and operations with respect to soil, that aid the production of plants; normally they are planned to allow for sustained yield in the future. The soil sustains most living organisms, being the ultimate source of their mineral nutrients. Good management of soils ensures that mineral elements do not become deficient or toxic to plants, and that appropriate mineral elements enter the food chain.

Objectives:

- ❖ To get improved production technologies adopted by small holders and disadvantaged groups
- ❖ To help small holders and disadvantaged groups understand the benefits of sustainable soil management practices and have access to inputs and other relevant proven technologies
- ❖ To ensure that they are linked with market opportunities and program benefits reach the most disadvantaged

Working Strategy

Sustainable soil management is important to crop productivity, environmental sustainability, and human health. Because of the projected increase in world population and the consequent necessity for the intensification of food production, the management of soils will become increasingly important in the coming years. To achieve future food security, the management of soils in a sustainable manner will be the challenge, through proper nutrient management and appropriate soil conservation practices. There are great scope and potentiality of sustainable soil management in Nepal due to adequacy of biodiversity, climatic variation, topography and others. Nepal's economy largely depends on its agriculture sector. Priority strategies, both technical and legislative, have been put in place to achieve sustainable agricultural productivity.

Scope:

Generally, the activity includes:

- ❖ Promotion of the improved use of local resources
- ❖ Establishing linkages, collaborations and synergies
- ❖ Sharing of experiences through knowledge management
- ❖ Management of soil moisture and conservation/cover crops
- ❖ Inclusion of green manuring system and legumes in crop rotation
- ❖ Focus on organic products and commercialization in crop production
- ❖ Improving biological processes through sustainable management of the soil
- ❖ Minimizing chemical fertilizer and maximize the use of compost in cultivation
- ❖ Capacity building of farmers on sustainable crop production through soil management, etc.

Unit: Hectare

Mapping Symbol:



4.2.9 Conservation Plantation (Samrakshan Brikshyaaropan)

Definition:

Conservation Plantation refers to the vegetative measures as well as structural measures applied on the degraded lands including forests, barren lands, and graveled and sandy river beds.

Objectives:

- ❖ To reduce erosion and increase productivity of degraded lands through soil and moisture conservation
- ❖ To enhance life of structural measures through combination of vegetative structures

Working Strategy:

The degraded lands will be the working unit and plantation of desired tree seedlings along with all the vegetative and structural erosion control measures will be applied in a package throughout the working unit. Structural measures will be less emphasized.

Implementation will be carried out with maximum people's participation. Participation will be sought right from planning to implementation, maintenance and benefit sharing. Emphasis will be given on implementation of the activity through user groups.

Scope:

Generally, the activity includes:

- ❖ Tree, shrub and grass planting with necessary conservation techniques such as contour terracing in moisture stress sites, contour trenching in nutrient and moisture constraint areas, contour bunding in waterlogged areas, basin pit planting in dry and harsh soil condition
- ❖ Erosion control measures such as micro-gully plugging, contour wattling and structures such as check dam, retaining wall as needed
- ❖ Construction of diversion channel and safe drainage
- ❖ Seedling production, purchasing, and distribution to the groups
- ❖ Protection of the area (including fencing and watchmen)
- ❖ Combination of vegetative structures along with structural measures

Unit: Hectare/no. of structures treated

Mapping Symbol:



4.2.10 Silvi-Pasture Improvement (Charan Sudhaar)

Definition:

Silvi-Pasture improvement refers to fodder tree and grass planting along with other vegetative and structural measures applied on the grass and shrub lands

Objectives:

To reduce erosion of grassland and shrub land and increase forage and fodder production

Working Strategy:

The overused grazing and shrub lands will be considered as working unit and plantation of desired fodder tree, grass and leguminous seedlings along with other vegetative as well as structural erosion control measures will be applied in a package throughout the working unit.

Implementation will be carried out with maximum people's participation. Participation will be sought right from planning to implementation, maintenance and benefit sharing. Emphasis will be given on implementation of the activity through user groups.

Scope:

Generally, the activity includes:

- ❖ Fodder tree, grass and legumes planting with necessary conservation techniques such as contour terracing, contour trenching, contour bunding
- ❖ Erosion control measures such as micro-gully plugging, contour wattling and structures such as checkdam, retaining wall as needed
- ❖ Introduction of rotational grazing, application of fertilizer, irrigation, grass cutting, with distribution to user group
- ❖ Construction of diversion channel and safe drainage
- ❖ Seedling production
- ❖ Protection of the area (including fencing and watchmen)

Unit: Hectare

Mapping Symbol:



4.2.11 Conservation Trenching (Samrachhan Khaadal)

Definition:

Conservation trenches are ditches dug along a hillside in such a way that they follow a contour and run perpendicular to the flow of water. Water flowing down the hill is retained by the trench, and is infiltrating the soil below.

Conservation Trenching:

It relates to retaining each unit of water on land for a long time through constructing ditches particularly in slope area of Chure region

Objectives:

- ❖ To retain rainwater on land for agriculture, livestock and domestic use
- ❖ To retard soil erosion by checking rainwater run off
- ❖ To control rainwater volume/velocity and enhance evaporation
- ❖ To enhance water balance
- ❖ To conserve fertile soil particles and enhance agriculture production
- ❖ To help create micro climates in the area.

Working Strategy

The trenches will be dug in sandy soil and slope areas of Chure region for multipurpose use of water. Upside of the trench should be protected against erosion by means of grass, shrubs and other vegetative structures. Depending on the slope of the hill, more than one parallel trenches will be constructed closer or farther from one another. The dimensions and the format of the trench will be based on climate and soil conditions.

Implementation will be carried out with maximum people's participation. Participation will be sought right from planning to implementation, maintenance and benefit sharing. Emphasis will be given on implementation of the activity through user groups.

Scope:

Generally, the activity includes:

- ❖ Digging ditches in contour
- ❖ Mulching to enhance evaporation and control rainwater volume/velocity
- ❖ SALT implementation
- ❖ Vegetative structures construction for dug soil stabilization

Unit: length in meter

Mapping Symbol:



4.3 Water and Sediment Management (*Paani Tathaa Gegraan Byabasthaapan*)

Water is the fundamental resource of the watershed area to be managed for better output and outcome. Sediment is the product associated with water and it creates problems in both upstream and downstream dwellers, settlements, infrastructures, livestock, agriculture, etc. Water, if managed properly, gives positive result; otherwise it creates havoc. Hence, water and sediment need proper attention to make watershed management effective and fruitful. Rainwater harvesting, runoff harvesting, ground water recharge, and siltation management are some of the measures of Water and Sediment Management. These measures usually require more investment and a higher degree of technology to design and maintain. Most of these activities would be related with the daily life of the people; therefore, while implementing these activities people's participation should be expected more.

4.3.1 Rain Water Harvesting System (*Barshaako Paani Sankalan Paddhati*)

Definition:

Rain water harvesting (RWH) is the accumulation and deposition of rainwater for reuse on site, rather than allowing it to run off. Its uses include water for garden, water for livestock, water for irrigation, water for domestic use with proper treatment, and indoor heating for houses etc. In many places the water collected is just redirected to a deep pit with percolation. Commonly used systems are constructed of three principal components; namely, i) catchment area, ii) collection device, and iii) conveyance system.

Rain Water Harvesting System:

RWH systems can be installed with minimal skills. The system should be sized to meet the water demand throughout the dry season since it must be big enough to support daily water consumption. Specifically, the rainfall capturing from the natural area or catchment such as a building roof, sunken areas and established sites must be large enough to maintain adequate flow. The water storage tank size should be large enough to contain the captured water.

Objectives:

The main objectives of rain water harvesting are:

- ❖ To meet the increasing demand of water
- ❖ To reduce the run off which chokes the drains
- ❖ To avoid the flooding of roads
- ❖ To raise the underground water table
- ❖ To reduce soil erosion
- ❖ To reduce ground water pollution, and
- ❖ To supplement domestic water needs.

Working Strategy

Rain water harvesting is a technique of increasing the recharge of ground water by storing rainwater locally, through roof water harvesting, refilling of dug wells, recharging of hand pumps, construction of percolation pits, trenches around fields and bunds or dams on small rivulets. The working strategies for the rainwater harvest are:

- ❖ Educate and train the local people
- ❖ Develop the state, regional and district chapters throughout the country to focus on Rain water harvest in their respective areas
- ❖ Demonstration facilities and legislature support
- ❖ State agency assistance
- ❖ Local government support
- ❖ RWH equipment sourcing
- ❖ Cost competitiveness

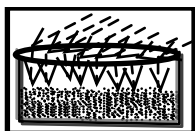
Scope:

Generally, the activity includes:

- ❖ Data collection, overview, and background of building-scale rain water harvesting relative to other available water supply strategies
- ❖ Regulatory review of state and local government
- ❖ Stakeholder consultations to obtain information, inputs and insights
- ❖ Review of backup water supply strategy to drought-proof the building-scale of rain water harvest system
- ❖ Examination of impacts of the rain water harvest strategy on local hydrologic environment
- ❖ Cost analysis and comparison with conventional water supply
- ❖ Evaluation of impacts on rain water harvest water supply
- ❖ Review and analysis of sustainability issues
- ❖ Outreach activities to disseminate the findings and the results
- ❖ Construction of Ferro-cement jar, masonry jar, or use polythene jar to store collected rainwater
- ❖ Livelihood improvement activities like horticulture, floriculture etc to maximize the harvested rainwater use.

Unit : Number

Mapping Symbol:



4.3.2 Siltation Management (*Baaluwaako thigro Byabasthaapan*)

Definition:

Siltation is the pollution of water by fine particulate terrestrial clastic material, with a particle size dominated by silt or clay. It refers both to the increased concentration of suspended sediments, and to the increased accumulation (temporary or permanent) of fine sediments on bottoms where they are undesirable. Siltation is most often caused by soil erosion or sediment spill. Siltation is the preferred term for being unambiguous, even if not entirely stringent since it also includes other particle sizes than silt.

Siltation Management:

In rural areas the first line of defense is to maintain land cover and prevent soil erosion in the first place. The second line of defense is to trap the material before it reaches the stream network (known as sediment control). In urban areas the defense is to keep land uncovered for as short a time as possible during construction, and to use silt screens to prevent the sediment from getting released in water bodies. During dredging the spill can be minimized but not eliminated completely through the way the dredger is designed and operated. If the material is deposited on land, efficient sedimentation basins can be constructed. If it is dumped in relatively deep water there will be a significant spill during dumping, but not thereafter, and the spill that does arise will have minimal impact if there are only fine-sediment bottoms nearby.

It is desirable to minimize the siltation of irrigation channels by hydrologic design, the objective being not to create zones with falling sediment transport capacity as that is conducive to sedimentation. Once sedimentation has occurred, in irrigation or navigation channels, dredging is often the only remedy.

Objectives:

The general and long-term objectives of the siltation management are to protect the natural resources of the basin and to conserve its hydrological potential in order to foster development, decrease food insecurity and poverty and preserve local ecosystems. Specific objectives are as follows:

- ❖ To strengthen the institutional capacity in collaborative management of basin shared resources
- ❖ To alleviate the effects of desertification and to slow down the silting process
- ❖ To assist in developing programs against hydraulic erosion and in raising funds
- ❖ To promote participation and involvement of affected local populations and communities.

Working Strategy:

- ❖ Developing emergency plans of sediment management of the river system

- ❖ Making information available to the public about civil protection matters
- ❖ Maintaining arrangements to warn, inform and advise the public in the event of an emergency
- ❖ Sharing information with other local responders to enable greater co-ordination
- ❖ Co-operating with other local responders to enhance co-ordination and efficiency
- ❖ Providing advice and assistance to businesses and voluntary organizations about business continuity management
- ❖ Work collaboration and improve resilience
- ❖ Improving understanding and awareness
- ❖ Enhancing the natural and historic environment
- ❖ Encouraging suitable development and use resources effectively
- ❖ Promoting riparian responsibilities

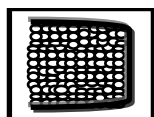
Scope:

Generally, the activity includes:

- ❖ Siltation dam construction to trap deposits
- ❖ Check dam construction
- ❖ Protection of infrastructures from siltation
- ❖ Siltation extraction and utilization
- ❖ Structures construction associated with siltation management

Unit: Hectare/place

Mapping Symbol:



4.3.3 Ground Water Recharges Structure Construction (*Bhumigat Jalsechan Samrachanaa Nirmaan*)

Definition:

Groundwater recharge or deep drainage or deep percolation is a hydrologic process where water moves downward from surface water to groundwater. This process usually occurs in the vamoose zone below plant roots and is often expressed as a flux to the water table surface. Recharge occurs both naturally (through the water cycle) and through anthropogenic processes (i.e. “artificial groundwater recharge”), where rainwater and/or reclaimed water is routed to the subsurface.

Groundwater is recharged naturally by rain and snow melt and to a smaller extent by surface water (rivers and lakes).

Objectives:

The objectives of constructing recharge structures on roadsides and open spaces are:

- ❖ To harvest the run-off rainwater falling on in the country
- ❖ To utilize the rain water to recharge the underground aquifers
- ❖ To prevent water stagnation
- ❖ To prevent flooding
- ❖ To improve the quality of underground water in the country

Working Strategy:

- ❖ Demand side management interventions related to communities
- ❖ Supply side engineering structures belonging to the project and government
- ❖ Implementation of concept of real water savings
- ❖ Rainwater harvesting, aquifer recharge enhancement and urban waste water rescue.

Scope:

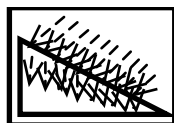
Recharge may be impeded somewhat by human activities including paving, development, or logging. These activities can result in loss of topsoil resulting in reduced water infiltration, enhanced surface runoff and reduction in recharge. Use of groundwater, especially for irrigation, may also lower the water tables. Groundwater recharge is an important process for sustainable groundwater management, since the volume-rate abstracted from an aquifer in the long term should be less than or equal to the volume-rate that is recharged. Recharge can help move excess salts that accumulate in the root zone to deeper soil layers, or into the groundwater system. Tree roots increase water saturation into ground water reducing water runoff.

Generally, the activity includes:

- ❖ Greenery promotion such as conservation plantation
- ❖ Conservation pond construction
- ❖ Contour trench/ditch construction
- ❖ Diversion channel construction to retain and percolate water to the ground

Unit: Number

Mapping Symbol:



4.4 Development Infrastructure Protection (*Bikaas Kaa Purbaadhaar Samrakshan*)

Development infrastructure protection measures are those which protect and stabilize the basic development infrastructures such as reservoir, irrigation, road and others to improve economic status of the people. These measures usually require more investment and a higher degree of technology to design and maintain.

Irrigation channel protection, trail protection, road slope stabilization, water source conservation, shelter belt and buffer strip come under infrastructure protection measures. Under these activities various engineering and vegetative measures may be required. Check dams, retaining walls, diversion channels, grass sowing, tree planting, are the main types of works under these activities. Most of these activities would be related with the daily life of the people; therefore, while implementing these activities people's higher participation should be expected.

4.4.1 Irrigation Channel Protection (*Sichaa Kulo Samrakshan*)

Definition:

Irrigation channel protection relates to the existing irrigation channel which is susceptible to damage by erosion up slope and down slope in want of properly constructed distribution system.

Irrigation Channel Improvement:

It refers to the vegetative and structural measures applied to manage and improve water use and to reduce sedimentation in the irrigation channel and reduce erosion in the adjoining area.

Objectives:

To reduce erosion (including gully and landslide formation) caused by irrigation channel to protect channel from the erosion and sedimentation and to manage water use.

Working Strategy:

The irrigation channel, up slope and down slope of the channel affecting its stability and the catchment area at close vicinity of the intake will be taken as working unit and all the necessary vegetative as well as structural measures will be applied in a package throughout the working unit. Implementation will be carried out with maximum people's participation. Participation will be sought right from planning to implementation, maintenance and benefit sharing. Emphasis will be given on implementation of the activity through user groups.

Scope:

Generally, the activity includes:

- ❖ Improvement and construction of irrigation channels

- ❖ Vegetative and structural erosion control measures required up slope and down slope of the irrigation channel
- ❖ Re-grade and/or reroute irrigation channel
- ❖ Construction and improvement of intake, distribution and sediment trap system
- ❖ Erosion control measures of the catchment in the close vicinity
- ❖ Use of pipes instead of channelizing in case of difficult areas such as continuous landslide areas

Unit: Number/length of irrigation channel/hectares of command area

Mapping Symbol:



4.4.2 Trail Improvement (Goreto Sudhaar)

Definition:

Trail Improvement relates to the existing trail, which has potential for gully formation, susceptible to damage by erosion up slope and down slope, causing erosion up slope and or down slope and not convenient for the general human and livestock traffic.

Trail Improvement:

It refers to the vegetative and structural measures applied to protect trail from erosion and to improve the trail for general human and livestock traffic

Objectives:

To reduce erosion from un-managed trails, protect trails from erosion and to improve the trail for general human and livestock traffic

Working Strategy:

The trail and up slope and down slope of the trail affecting its stability will be taken as working unit and all the necessary vegetative as well as structural measures will be applied in a package throughout the working unit. Implementation will be carried out with maximum people's participation. Participation will be sought right from planning to implementation, maintenance and benefit sharing. Emphasis will be given on implementation of the activity through user group.

Scope:

Generally, the activity includes:

- ❖ Improvement and construction of trail
- ❖ Provision of diversion channel and safe drainage along the trail
- ❖ Re-grading and or rerouting the trails where erosion is advanced
- ❖ Re-vegetating abandoned trails, while rerouting

- ❖ Constructing stone steps on steep trail segments
- ❖ Vegetative and structural erosion control measures required up slope and/or down slope of the trail
- ❖ Construction and protection of small bridges and other minor structures wherever needed (within the trail segment)
- ❖ Construction of resting place (Chautara)

Unit: Length of the trail in meter

Mapping Symbol:



4.4.3 Road Slope Stabilization (Sadak Paakho Samrakshan)

Definition:

Road Slope Stabilization refers to the slope up and/or down of the road, where it is susceptible to erosion or degradation affecting stability of the road.

Road Slope Stabilization:

It refers to the vegetative and structural measures applied in the road slope to maintain stability of road from erosion.

Objectives:

To reduce erosion in the road slopes and protect road from erosion and to improve the road for general traffic

Working Strategy:

The road slope affecting the roads stability will be taken as working unit and all necessary vegetative and structural measures will be applied in a package throughout the working unit.

Implementation will be carried out with maximum people's participation. Participation will be sought right from planning to implementation, maintenance and benefit sharing. Emphasis will be given on implementation of the activity through user groups will be emphasized.

Scope:

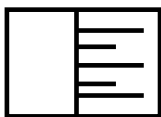
Generally, the activity includes:

- ❖ Tree and grass planting with necessary conservation measures such as contour terracing, contour trenching, contour bunding
- ❖ Erosion control measures such as micro-gully plugging, contour wattling and structures such as check dam, retaining wall as needed
- ❖ Improvement of roadside drainage system
- ❖ Protection of cross drainage system

- ❖ Silvi-pasture management
- ❖ Fencing of road slope for livestock control

Unit: Kilometers of Road Protected/Hectare of Road Slope Stabilization/Number of sites

Mapping Symbol:



4.4.4 Shelterbelt Development (Samrakshan Peti Bikaas)

Definition:

Shelterbelt Establishment refers to a belt of trees, shrubs and grass maintained to protect soil resources from wind erosion and conserve moisture to increase productivity of the agriculture lands.

Shelterbelt Establishment:

It refers to the planting of trees, shrubs and grass vegetation in rows mostly across the general wind direction of locality.

Objectives:

To reduce wind erosion and conserve the soil and moisture for better production of crops.

Working Strategy:

Strip of land required for protection will be considered as working unit and all the necessary vegetative and structural erosion control measures will be applied in a package throughout the working unit. Implementation will be carried out with maximum people's participation. Participation will be sought right from planning to implementation, maintenance and benefit sharing. Emphasis will be given on implementation of the activity through user groups or individual landowners.

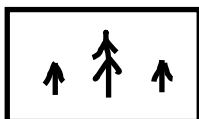
Scope:

Generally, the activity includes:

- ❖ Surveying and preparing location/orientation of strip
- ❖ Planting of trees, shrubs, hedge and grass in the shelter belt in pre-designed pattern of spacing and height
- ❖ Protection of vegetation in the shelter belt
- ❖ Seedling production
- ❖ Erosion control measures in the case of erosion prone area

Unit: Length in meters/area in hectare

Mapping Symbol:



4.4.5 Buffer Strip Development (Avarodh Peti Bikaas)

Definition:

Buffer Strip refers to a strip of grass and or other erosion resisting vegetation (trees, shrubs and hedge)

Buffer Strip:

It refers to the planting of grass and other vegetation (tree, shrub and hedge) in rows mostly along the contour and all structural erosion control measures applied in a package throughout the buffer belt.

Objectives:

To reduce erosion of up slope and sedimentation of down slope areas by increasing surface friction component

Working Strategy:

Strip of land required for protection will be considered as working unit and all the necessary vegetative and structural erosion control measures will be applied in a package throughout the working unit.

Implementation will be carried out with maximum people's participation. Participation will be sought right from planning to implementation, maintenance and benefit sharing. Emphasis will be given on implementation of the activity through user groups and individual land owners.

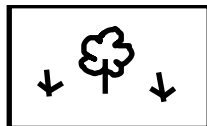
Scope:

Generally, the activity includes:

- ❖ Planting of trees, shrubs, hedge and grass in the buffer strip
- ❖ Erosion control measures such as micro-gully plugging, contour wattling and structures such as check dam, retaining wall as needed
- ❖ Protection of vegetation in the buffer strip Seedling production

Unit: Length in meters/area in hectare

Mapping Symbol:



4.5 Climate Change Adaptation / Resilience Development (*Jalabaayu Paribartan Anukulan/Samaanukulan Bikaas*)

Climate change is one of many challenges of developing countries that must be recognized and responded to in planning for the future. By increasing risks to human health, welfare, natural resources and ecosystems, climate impacts can threaten development goals such as reducing poverty, increasing access to education, improving human health, combating disease, or managing natural resources sustainably. Climate-resilient development ensures that people, communities, businesses, and other organizations are able to cope with current climate variability as well as to adapt to future climate change, preserving development gains, and minimizing damages. Climate-resilient development is about adding consideration of climate impacts and opportunities to development decision-making in order to improve development outcomes, rather than implementing development activities in a completely new way. Climate risks cannot be eliminated, but negative impacts on people and economies can be reduced or managed. Climate-resilient development helps minimize the costs and consequences of climate impacts so they do not hinder progress toward conservation and development of the country. The major activities under this section are as follows.

4.5.1 Water Source Protection and Development (*Paani Muhaan Samrakshan ra Bikaas*)

Definition:

Water is the major natural resources of landscape. The water source protection refers to implementation of the various structural and vegetative activities for sustainability and proper utilization of the rural water source, such as springs, *kuwas*, irrigation and ponds.

Water Source Protection:

It refers to vegetative and structural erosion control measures applied in the source and its catchment of the water source and also distribution system.

Objectives:

To improve the quality and regime of water through soil conservation and watershed management.

Working Strategy

The water source, its catchment and distribution system will be considered as working unit and all the necessary vegetative as well as structural erosion control measures including distribution will be applied in a package throughout the working unit. Implementation will be carried out with maximum people's participation. Participation will be sought right from planning to implementation, maintenance and benefit sharing. Emphasis will be given on implementation of the activity through user group.

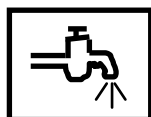
Scope:

Generally, the activity includes:

- ❖ Tree and grass planting with necessary conservation techniques such as contour terracing, contour trenching, contour bunding
- ❖ Erosion control measures such as micro-gully plugging, contour wattling and structures such as check dam, retaining wall as needed
- ❖ Construction of water storage tanks and water distribution system
- ❖ Construction of diversion channel and safe drainage
- ❖ Seedling production
- ❖ Construction of water conservation ponds to manage water
- ❖ Protection of the area (including fencing and watchmen)
- ❖ Appropriate land use treatment in the catchment
- ❖ Control of contamination by surface flow of water e.g. fertilizer, disease/ pathogens from animal and human waste

Unit: Number/catchment area in hectare/no. of household

Mapping Symbol:



4.5.2 Catchment Restoration (Jalaadhaar Punarsthaapanaa)

Definition:

Catchment Restoration refers to the vegetative and structural measures applied on the catchment area of water sources including forests, barren lands and graveled and sandy riverbeds.

Catchment restoration:

Catchment restoration is a process in which the value of the biophysical environment is affected by the combination of human-induced processes acting upon land.

Objectives:

To reduce erosion and increase the productivity of catchment areas with the preference of vegetative conservation measures of soil and moisture conservation.

Working Strategy:

The catchment restoration will be working unit and plantation of desired tree seedling along with all the vegetative as well as structural erosion control measures will be applied in a package throughout the working unit based on the requirement of the sites.

Scope:

Generally, the activity includes:

- ❖ Tree, shrub and grass planting with necessary conservation techniques such as contour terracing, contour trenching, contour bunding
- ❖ Erosion control measures such as micro-gully plugging, contour wattling and structures such as check dam, retaining wall as needed
- ❖ Seedling production and plantation
- ❖ Protection of the area (including fencing and watchmen)

Unit: Hectare

Mapping Symbol:



4.5.3 Conservation Pond (Samrakshan Pokhari)

Definition:

Conservation Pond refers to a runoff water collection/perennial water collection area which is constructed with the purpose of reducing the soil erosion and storing water for the drinking of cattle and irrigation.

Conservation Pond:

It refers to the pond (new or old) used for storage of run-off water during excess rain to reduce erosion and for later use. The activity refers to all the necessary vegetative and structural measures applied in the pond and its catchment.

Objectives:

To manage water for erosion control and multiple purpose use.

Working Strategy:

The pond and its catchment will be considered as working unit. All the necessary vegetative as well as structural erosion control measures including construction of the pond will be applied in a package throughout the working unit. If such a pond is used for irrigation purpose (though, this will be in small scale only), the distribution also will be considered as a part of working unit.

Implementation will be carried out with maximum people's participation. Participation will be sought right from planning to implementation, maintenance and benefit sharing. Emphasis will be given on implementation of the activity through user group.

Scope:

Generally, the activity includes:

- ❖ Construction of new pond or improvement of old ponds
- ❖ Water harvesting
- ❖ Tree and grass planting with necessary conservation techniques such as contour terracing, contour trenching, contour bonding
- ❖ Erosion control measures such as micro-gully plugging, contour wattling and structures such as check dam, retaining wall as needed
- ❖ Construction of inlets and outlets
- ❖ Construction of diversion channel and safe drainage
- ❖ Protection of the pond
- ❖ Seedling production
- ❖ Appropriate land use treatment in the catchment

Unit: Number

Mapping Symbol:



4.5.4 River bed Farming (Naditatiya Kheti)

Definition:

The farming done on the beds or banks of a river is called river bed farming. Riverbed farming can be used to increase household income and to improve the food security of landless and land-poor households. Riverbed farming provides landless and land-poor households with the possibility to earn an income from on-farm activities close to home.

River bed Farming:

The approach described here allows the farmers to make the most of the large areas of fallow land near riverbeds which are normally unclaimed and not cultivated. Since the lands near riverbeds have alluvial soils and sufficient moisture, they are suitable for seasonal vegetable cultivation during the dry season. In order for these landless and land-poor households to be able to farm these riverbed areas, they need to have access to suitable plots and the necessary agricultural inputs and training.

Objectives:

- ❖ To uplift the socio-economic status of landless people living on the banks of nearby rivers
- ❖ To facilitate the landless people in riverbank farming for sustaining their livelihoods;
- ❖ To promote market linkage for the agriculture products focusing on fruits and vegetables

- ❖ To create opportunities of self-employment at the local level by utilizing locally available resources
- ❖ To utilize the marginal land of the locality for the improvement of economic status and technical knowledge of local people

Working Strategy:

The riverbed land along the river bank will be taken as working unit. All the necessary vegetative as well as structural erosion control measures will be applied in a package throughout the working unit. This land will be used to promote income, to adapt to climate change and to promote food security.

Implementation will be carried out with maximum people's participation. Participation will be sought right from planning to implementation, maintenance and benefit sharing. Emphasis will be given on implementation of the activity through user groups.

Scope:

Generally, the activity includes:

- ❖ Reclaiming riverbed using vegetative as well as structural measures
- ❖ Organizing poor people into groups and encouraging them to cultivate the riverbed area for income generation
- ❖ Using the land for river side forest development
- ❖ Growing off-season vegetable

Unit: Hectare/number of plot

Mapping Symbol:



4.5.5 Wetland Conservation (Simsaar Samrakshan)

Definition:

Wetlands are perennial water bodies that originate from underground sources of water or rains. It means swampy areas with flowing or stagnant fresh or salt water that are natural or man-made, or permanent or temporary. Wetlands also mean marshy lands, riverine floodplains, lakes, ponds, water storage areas and agricultural lands (National Wetland Policy, 2003).

Wetlands are fertile lands for agriculture and rich from the point of view of biological diversity. The Nepali term for wetlands is “*simsar*”, which means lands with perennial source of water. Swampy rice fields, water logged areas and ponds.

Wetland Conservation:

Wetland Conservation refers to protecting and preserving areas where water exists at or near the Earth's surface, such as swamps, marshes and bogs.

Objectives:

- ❖ To conserve biodiversity and improve human well being
- ❖ To support water supply, fisheries, agriculture, forestry, tourism to enhance local economy

Working Strategy:

- ❖ The wetland required to be protected will be taken as working unit. All the necessary vegetative as well as structural measures will be applied in a package. Structural measure alone without supportive vegetative measures will not be used.
- ❖ Implementation will be carried out with maximum people's participation. Participation will be sought right from planning to implementation, maintenance and benefit sharing. Emphasis will be given on implementation of the activity through user groups.

Scope:

Generally, the activity includes:

- ❖ Cleaning catchment area of the wetland
- ❖ Planting trees
- ❖ Lining of inlet/outlet for waterways management
- ❖ Fencing the area
- ❖ Constructing contour bund in slope area
- ❖ Using bio-engineering techniques.

Unit: Number/hectare

Mapping Symbol:



4.5.6 Rain-fed farming (Barshaa maa Aadhaarit Khetipaati)

Definition:

Growing of crops on natural precipitation without irrigation is Rain-fed Farming (agriinfo.in). In the area where water supply is the major factor limiting crop yield, management options can change the amount, pattern and efficiency of crop water use in order to increase or stabilize yield. While the availability of water through rainfall and soil storage influences the farming system, the design, operation and management of the whole system and its parts will affect subsequent water availability and efficiency of use.

Objectives:

The structure, operation and management of rain-fed farming systems focus on increasing four primary components of their water economy:

- ❖ Delivery of water
- ❖ Capture of rainwater
- ❖ Proportion of water available for crop production; and
- ❖ Efficiency of conversion of water to a usable product (www.springer.com).

Working Strategy:

The farming area and its catchment will be considered as working unit. All the necessary vegetative as well as structural measures including construction of the pond, ditch, bunds, water collection tank etc. will be applied in a package throughout the working unit.

Implementation will be carried out with maximum people's participation. Participation will be sought right from planning to implementation, maintenance and benefit sharing. Emphasis will be given on implementation of the activity through user groups.

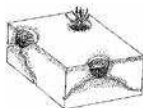
Scope:

Generally, the activity includes:

- ❖ Run-off management structures construction
- ❖ Water harvesting structures construction
- ❖ Drainage construction and management
- ❖ Placement of pipe to divert the irrigation water if required
- ❖ Construction of water collection structures to irrigate the farmland
- ❖ Bunding, mulching, irrigation techniques will be used
- ❖ Ferro cement jar construction
- ❖ Income generation activities along with the farming system to enhance livelihood of the local people

Unit : Hectare

Symbol :



4.5.7 Run-off Harvesting Dam Construction (Bhal-Paani Sankalan Pokhari Nirmaan):

Definition:

It is the dam constructed (mostly single) for harvesting the run-off across the rivulet or gullies of large along the Terai, Bhabar and Churia region. It is also called as “*Ek Dhara Pokhari*” in Nepali in local language. Catchment Pond is very often considered

as synonym of Run-off harvesting dam. But in reality, they are different in construction, scope and objectives (DSCWM, 2061/62).

Small earthen dams, cement stone masonry dams with earthen cover, and reinforced cement concrete core walls with earthen outer layers are constructed based on site requirement across the gullies, deep valleys, ephemeral stream rivulets, and water channel to store excess runoff water during peak monsoon from the catchments for various use.

Every run off harvesting system has run-off area (i.e. catchment) and run-on area (i.e. storage area).

There are two types of run-off harvesting methods:

1. **Reservoir system:** The run-off is stored in a pond or a storage reservoir in gullies, seasonal stream, and rivulets by providing dam across it.
2. **Soil moisture storage system:** The run-off is stored directly seeped into the soil or sand.

Run-off Harvesting Dam Construction:

It refers to pond construction scaling up of existing pond, and regulating rivulets/ small and medium rivers through damming (partial/full) using structural as well as vegetative measures.

Objectives:

- ❖ To hold run-off water to recharge ground water through underground seepage enhancement
- ❖ To trap the debris flow or slit coming from upstream areas and minimize flood problems at downstream areas
- ❖ To impound water for irrigation purpose to downstream areas
- ❖ To provide water to wild and domestic animals and in forest area it works as waterhole
- ❖ To raise moisture regime in and around the region especially downstream areas.
- ❖ To support to increase and maintain bio-diversity
- ❖ To work as a recreation site purpose such as picnic, fishing and eco-tourism.
- ❖ To addresses the dilemma of too much water in rainy season and too little water in dry season

Working Strategy:

The influencing run-off (upstream area) and run-on (downstream area) area will be taken as working unit and all the necessary vegetative as well as structural control measures will be applied as package throughout the working area. Use of earthen material, stone, cement, concrete and iron rod will be decided to construct the dam depending on site. It will be linked with rural livelihood improvement by supplying water for cattle feeding, irrigation and so on. Simple and cheap technology by integrating scientific techniques

and indigenous knowledge for its replication by the communities will be practiced. Bio-engineering techniques will be used for environment friendly structures.

Implementation will be carried out with maximum people's participation. Participation will be sought right from planning to implementation, maintenance and benefit sharing. Emphasis will be given on implementation of the activity through user group.

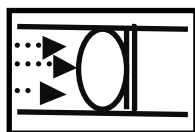
Scope:

Generally, the activity includes

- ❖ Construction of earthen dams built of rock, gravel, sand, silt or clay in various combinations by placing, rolling and tamping or hydraulic pudding; cement masonry dam; or RCC dam
- ❖ Appropriate land use improvement measures in upstream area.
- ❖ Conservation pond construction or enhancement to store run-off
- ❖ Soil moisture enhancement through in-situ and ex-situ run-off harvesting system such as on-farm conservation, water irrigation system.

Unit: Numbers/meter/hectare

Mapping Symbol:



4.6 Community Mobilization, Capacity Development and Livelihood Improvement (*Saamudaayik Prichaalan, Kshyamataa Bikaas Tathaa Jibikoparjan Sudhaar*)

Effective natural resource management requires interrelated technical practices and social arrangements that are appropriate to a region's biophysical characteristics and that address protection and sustainable management of resources. In general, despite large investments of time and funding, conventional reforestation efforts had little impact. To address interrelated technical and social issues in resource management, it includes the marginalized groups and implements monitoring and enforcement systems enabling communities to manage land and regenerate income through the management of natural resources. The technical solutions advised should be build on local knowledge and skills and use previously undervalued indigenous management system. Food security and community resilience to conservation related issues can be markedly enhanced and local incomes can be increased. The experience provides important lessons for approaches to addressing environmental degradation and poverty in the remote areas and facilitating the spread and adoption of conservation systems.

4.6.1 Conservation Income Generation Program (*Samrakshan Aayamulak Kaaryakram*)

Definition:

Any activity that generates extra income of an individual or family or group on top of his/her current income is considered to be an income generating activity (IGA). The activities that provide quick income within a period of one to five years and support in reduction of soil erosion can fulfill the purpose of soil conservation and watershed management.

Objectives:

- ❖ To sustain soil conservation and watershed management works
- ❖ To improve livelihood of pro-poor, women, and marginalized people

Working Strategy:

The conservation IGA will be focused on quick income generating activities that give output in one to five year span of time. Regarding the IGA, the guidelines on IGA for soil conservation and watershed management-2062 will be taken as a reference. Implementation will be carried out with maximum people's participation. Participation will be sought right from planning to implementation and maintenance. Emphasis will be given on implementation of the activity through user group.

Scope:

Generally, the activity includes:

- ❖ Income generating activities supporting soil conservation in group
- ❖ Vegetable farming

- ❖ Livestock rearing
- ❖ Fruit tree plants purchasing and distribution
- ❖ Bamboos rhizomes purchasing and distribution
- ❖ Broom grass plantation

Unit: Numbers /groups

Symbol: 

4.6.2 Community Mobilization/Empowerment (Saamudaayik Parichalan/ Sashaktikaran)

Definition:

Community mobilization (CM), defined as a broad-scale movement to engage a community in achieving a specific development through self-reliant efforts—those that depend on their own resources and strengths. It involves all relevant segments of society: policymakers and other decision-makers, opinion leaders, the media, bureaucrats and technical experts, professional associations, religious groups, the private sector, NGOs, community members, and individuals.

Objectives:

- ❖ To enable networking
- ❖ To enhance conference participation and learning opportunities
- ❖ To encourage more participation among a broader constituency
- ❖ To empower community members
- ❖ To develop community leadership
- ❖ To achieve community goals

Working Strategy:

It is a planned decentralized process that seeks to facilitate change through a range of players engaged in interrelated and complementary efforts. It takes into account the felt needs of the people, embraces the critical principle of community involvement, and seeks to empower individuals and groups for action. Mobilizing the necessary resources, disseminating information tailored to varying audiences, generating inter sectoral support, and fostering cross-professional alliances are part of the process.

Scope:

Generally, the activity includes:

- ❖ Different types of training organization
- ❖ Gender and social inclusion training
- ❖ Meeting, workshop, interaction

- ❖ Good governance training
- ❖ Fund and accounting training
- ❖ Skill development trainings
- ❖ Technical trainings such as watershed concept
- ❖ Low cost soil conservation technology trainings

Unit: Numbers /groups



4.6.3 Conservation Farmers Network Establishment(Samrakshan Krishak Sanjaal Nirmaan)

Definition:

Joining different community user groups into one platform is called networking. The development of networks of farmers for the purpose of conservation of various aspects is called conservation farmers networks.

Objectives:

- ❖ To organize farmers into grass root level viable institutions for exploring their potentiality in conservation initiatives
- ❖ To enhance collaboration of farmers for meeting the common goals
- ❖ To share groups experience and learn from one another
- ❖ To help enhance good governance in soil conservation and watershed management

Working Strategy

- ❖ The committees of respective groups will select two members both male and female for the representation in the network established at VDC level. The network will be chaired periodically under special advisory of VDC chairperson
- ❖ Organization of conservation based farmer groups,
- ❖ Transformation of such groups into networks.

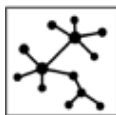
Scope:

Generally activities include:

- ❖ Workshop and meeting organization at ward level
- ❖ Workshop and meeting at VDC level
- ❖ Interaction at different levels
- ❖ Focus group discussion

Unit: Numbers/groups

Symbol:



4.6.4 Agro-forestry Development (*Krishiban Bikaas*)

Definition:

Agro-forestry is a unique land management approach that intentionally blends agriculture and forestry to enhance productivity, profitability, and environmental stewardship. Agro-forestry can be a key tool for farmers, ranchers, woodland owners, communities, and others who want to use sustainable strategies that enhance agricultural practices and protect natural resources. The word agro-forestry or “*krishiban*” in Nepali is a new word in the farmers’ vocabulary but the practice has been in their farming systems for many generations.

Objectives:

- ❖ To manage land efficiently so that its productivity is increased and restored.
- ❖ To use available resources efficiently and economically
- ❖ To generate employment opportunities for rural peoples
- ❖ To provide raw material for small cottage industries in rural areas
- ❖ To raise the supply of fuel in the rural areas at convenient distance for consumer
- ❖ To raise the supply for small timber used by villagers for agricultural implements, house construction and other domestic purposes
- ❖ To raise the production of food crops, legumes and tuber to meet the rapidly growing food requirements
- ❖ To promote production of vegetables, pulses, milk and meat
- ❖ To help in obtaining an ecological balance in rural areas and thus it may be considered as a matter of great significance for a country
- ❖ To preserve the humidity in cultivable lands and check soil erosion and increase productivity of land.
- ❖ To reduce insecurity of the agriculture (in such areas the dual system of production of tree and grasses ensures stability with productivity of land in drought prone areas.)
- ❖ To supply of fodder for vast population for proper feeding to livestock (large supply of milk and meat will be achieved from livestock when fodder and feeding is proper.)

Working Strategy:

- ❖ **Develop Partnerships:** Sharing information through new agro-forestry

partnerships and networks will address emerging needs and continue to encourage wider participation by underserved and minority audiences.

- ❖ **Educate Professionals:** Natural resource professionals will gain the education and training necessary to provide technical, educational, financial, and marketing assistance to help landowners consider agro-forestry as an opportunity.
- ❖ **Engage Globally:** Nepal and the international agro-forestry community will exchange information about agro-forestry's role in supporting sustainable food, and fiber production in light of global issues such as climate change and population growth.

Scope:

Agro-forestry system in Nepal is diversified and integrated with livestock, trees and crops. Any change in any component of the whole system will have effects on the other components. Hence, generally the activities include:

- ❖ Fruit tree plantation
- ❖ Fodder/grass plantation
- ❖ Land productivity enhancement activities such as composting, green manuring, mulching, etc.
- ❖ Fruit tree plantation

Unit: Hectare/place

Symbol:



4.6.5 Partnership soil conservation(Saajhedaari Bhu Samrakshan)

Definition:

Partnership soil conservation is an approach of implementing SCWM programs/ activities in collaboration with other stakeholders such as local government i.e. VDC, Municipality, line agencies, local community and individuals to maximize the input through synergy development.

Objectives:

- ❖ To make best use of given resources
- ❖ To get collaboration of other stakeholders
- ❖ To take the services to larger communities

Working Strategy:

- ❖ Priority in SCWM programs/activities implementation will be in collaboration with other stakeholders. The concerned groups will be sensitized to collaborate with other stakeholder organization/s for support
- ❖ Local community resources will be utilized
- ❖ The conservation activities will be carried out with maximum people's participation

Scope:

Generally, the activity includes:

- ❖ Collaboration with other organizations for financial support
- ❖ Local bodies, i.e. VDCs, Municipalities' support for conservation activities' completion
- ❖ SCWM related programs/activities implementation in collaboration with other stakeholders
- ❖ Collaboration with individual, organization, and community

Unit: Number

Symbol:

**4.6.6 Small enterprise development(Saana Udhyog Bikaas)****Definition:**

Access to decent work is an antidote to social exclusion right across our social economy. Sustained enterprise growth is essential to employment creation, small and group-based enterprises, and the upgrading of micro-enterprises in the informal sector, an area which generates most new jobs.

Objectives:

- ❖ To create employment
- ❖ To get marginalized communities united
- ❖ To mobilize the local resources

Working Strategy:

- ❖ The IGA guideline-2062 will be taken as reference for enterprise development
- ❖ Poor women will be given more emphasis
- ❖ Conservation based enterprise with community participation will be supported
- ❖ The individual will be organized into group or already existing group will be utilized for support

Scope:

Generally, the activity includes:

- ❖ Ginger and turmeric cultivation
- ❖ Vegetable farming
- ❖ Fruit tree plantation
- ❖ Bamboo rhizomes distribution
- ❖ Livestock rearing

Unit: Number

Symbol:



4.6.7 Study Tour and Trainings (Adhyayan Bhraman/Taalim)

Definition:

A study tour is an award for a development cooperation activity, commonly given to an individual or group of individuals to visit pre-arranged sites and institutions in one or more selected locations. The main purposes are to observe developments, gather information and exchange experiences with counterparts in fields pertaining to specific location. Similarly, training is a flexible arrangement made to meet the requirements of stakeholder working in a project or program. They receive practical training within the district or country designed to upgrade skills, or attend specially designed, practical training courses, seminars, symposia, workshops or technical meetings.

Objectives:

- ❖ To expose the trainees in the relevant subject matters
- ❖ To share knowledge, skills and the experiences
- ❖ To enhance the capacity of the trainees

Working Strategy:

- ❖ Organize study tours for the exposure of the trainees.
- ❖ To capacitate the relevant stakeholders on appropriate conservation and management practices through the organization of series and numbers of trainings.

Scope:

Study tours and training are organized for the farmers (men and women), including user groups, teachers, and extension workers in the field of soil conservation and watershed management. Preference is given to male and female progressive farmers, user group and teachers so that they can act as extension workers to create awareness

among the rural population regarding soil conservation and watershed management activities.

Unit: Events/groups

Mapping Symbol :



4.6.8 Conservation Education Campaign (Samrakshan Shikshyaa Abhiyaan)

Definition:

It refers to an informal education system which is used in schools for students by focusing on the conservation and management of natural resources. The rural people have low level of awareness on the issues of conservation and management. Conservation Education and Extension Program (CEEP) should form the core of every conservation endeavor so that it can lead to a successful community-based integrated conservation and development programs.

Objectives:

- ❖ To spread the conservation awareness message to the students and teachers
- ❖ To deliver the message of conservation and development through formal school education with special curriculum
- ❖ To organize talk, exhibition, film show, land use judgment contests for conservation awards and others in the premises of the school to create awareness among school children and teachers

Working Strategy:

- ❖ Coordinate school and other educational institutions for wider dissemination of the conservation messages
- ❖ Undertake massive awareness campaigns at school levels
- ❖ Incorporate conservation education based courses in school level curricula
- ❖ Mobilize school students and teachers as conservation based change agents.

Scope:

Conservation education in school is adopted not only as a program for diffusing ideas and conservation messages in the community but also as a means to bring about positive changes in the prevailing attitudes regarding the sustainable use and management of natural and cultural resources. It places emphasis both on formal

(school) and informal (out of school) conservation education in school programs to reach to a wider range of community. Use of media to disseminate the message is also adopted. Collaboration with other stakeholders is also emphasized.

Unit: Numbers/schools

Mapping Symbol:



4.6.9 Training/ Workshop/ Exposure Visit (*Taalim/Gosthi/ Sthalgat Bhraman*)

Definition:

The training workshop/study tour is organized for the conservation practices. The training given to users of certain programs is called user groups' training. The workshop organized for certain users groups is called user groups' workshop and visits arranged for such groups are called exposure visits.

Objectives:

- ❖ To capacitate the users groups by introducing new knowledge and technology
- ❖ To enhance the existing knowledge, skills and capacities of users groups

Working Strategy:

Work in group approaches for harnessing common efforts for the collaborative actions.

Scope:

Generally, the activity includes

- ❖ Onsite visit
- ❖ Exposure tour
- ❖ Experience sharing
- ❖ Area potential workshop

Unit: Number of events/groups

Mapping Symbol:



4.6.10 Conservation Women Training/ Workshop/ Exposure Visit (Samrakshan Mahilaa Taalim/Gosthi/Sthalgat Bhraman)

Definition:

Conservation Women Training/ Workshop/ Exposure Visit refer to the training given to, workshops organized and exposure visits arranged for women regarding conservation.

Objectives:

- ❖ To capacitate the women and women groups in conservation efforts.
- ❖ To enhance the existing knowledge, skills and capacities of women in conservation initiatives and endeavors.

Working Strategy

The women groups will be selected for training, study tour, exposure visit, etc. The groups will be asked to select their members to participate along with group decision.

Scope:

Generally, the activity includes:

- ❖ Orientation to the members about tours, visits
- ❖ Organization of the training, tour, visits
- ❖ Taking different conservation groups into account

Unit: Events/groups

Mapping Symbol:



4.7 Research, Technology Development and Extension ***(Anusandhaan, Prabidhi Bikaas Tathaa Prachaarprasaar)***

Research and technical (technological) development (RTD) is a general term for an activity related to the enterprise of corporate or governmental innovation. The activities that are classified as R&D differ from organization to organization, but there are two primary models, with an R&D department being either staffed by engineers and tasked with directly developing new products, or staffed with industrial scientists and tasked with applied research in scientific or technological fields which may facilitate future product development. In either case, R&D differs from the vast majority of corporate activities in that it is not often intended to yield immediate profit, and generally carries greater risk and an uncertain return on implementation and investment.

These types of activities are intended to create community awareness of the erosion problems of the watershed and to show how to undertake conservation measures through field demonstration and use of films, slide show, flip chart, calendars, slogans, newsletter, poster, study tours, training, and user group. The rationale is that the people lack awareness of the problems, and knowledge of how to solve the problem when it is recognized. Although the approach is gradual, the effect will be long lasting. Because education alone will not solve the problem, it must be coupled with extension work through demonstrations on farmer's lands, motivation, and financial and technical support.

A conservation education and extension program will be successful only when it considers the activities that will be beneficial to the people involved. Therefore, it is very essential to recognize such activities and to demonstrate their beneficial effects. Conservation education and extension activities may be broadly categorized into demonstration, conservation education and extension materials production, study tours and training, audiovisual show, and exhibition.

4.7.1 Natural System Monitoring *(Praakritik Paddhati Anugaman)*

Definition:

The natural phenomena of hydrological and erosion processes are continuously in action with respect to geo-ecological and land use practices. Soil conservation and watershed management interventions have been continuous inputs for the better land use practices and erosion control which bring changes in the hydrological and erosion processes. Run-off plot studies, paired catchment studies and sedimentation survey in the lake and reservoirs are the main activities in consideration under natural system monitoring.

Objectives:

- ❖ To record the changes in the hydrological and erosion processes caused by the soil conservation and watershed management interventions.

Working Strategy:

Natural system monitoring will be done on private land, community land, and public land. Run-off plot study, paired catchment studies, sedimentation survey, siltation rate analysis will be done with community people' involvement.

Scope:

Generally, the activity includes:

- ❖ Soil erosion rate analysis
- ❖ Water quality test
- ❖ Soil pH test
- ❖ Gully erosion rate analysis
- ❖ Run-off plots establishment and study
- ❖ Preparation of findings and dissemination of report

Unit: Numbers/plots

Symbol:



4.7.2 Action Research on Conservation (Samrakshan Kaaryamulak Anusandhaan)

Definition:

The research into action is called action research. The research into action about conservation is called conservation action research.

Objectives:

To undertake research simultaneously with action about conservation

Working Strategy:

All the conservation measures will be followed by action research while implementing in the field. Soil conservation measures and technologies will be taken as an action research to enhance their effectiveness.

Scope:

Generally, the activity includes:

- ❖ Action research along with activities implementation
- ❖ Documentation of the efforts
- ❖ Publication of the results
- ❖ Dissemination of the result
- ❖ Continue research

Unit: Numbers/plots

Symbol:



4.7.3 Bio-engineering Plots Establishment and Management (Bio-engineering Plot Sthapanaa Tathaa Byabasthaapan)

Definition:

Bio-engineering plot is the plot established for the purpose of demonstration and wider dissemination of the conservation technologies along the road sides or in landslide prone areas for the conservation of the roads and the lands.

Objectives:

To widely disseminate the conservation technologies at strategic locations

Working Strategy:

To promote low cost indigenous technology, demonstration sites will be developed with all implemented activities on bio-engineering as far as possible. Apart from this, demonstration centre will be developed showing bio-engineering techniques, methods, sites, etc.

Scope:

Generally, the activity includes:

- ❖ Bio-engineering site selection
- ❖ Discussion with local communities
- ❖ Bio-engineering nursery establishment and seedlings production
- ❖ Site survey for Bio-engineering Centre establishment

Unit: Numbers/plots

Symbol:



4.7.4 Conservation Demonstration (Samrakshan Pradarsan)

Definition:

‘Seeing is believing.’ So, conservation demonstrations are established/developed to disseminate or transfer the information to the visitors or local peoples.

Conservation Demonstration:

Demonstration is a basic extension tool to create awareness; therefore, demonstration is to be emphasized. Demonstration site refers to the place where implementation, output, effects and/or impact of the activities are illustrated.

Objectives:

To illustrate the SCWM activities to disseminate the technology

Working Strategy:

Demonstration may be categorized into two broad categories:

1) Demonstration Sites:

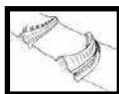
- ❖ One or more activities are illustrated. Aggregates of demonstration sites along a trail may serve as demonstration site.

2) Demonstration Centre:

- ❖ Several activities are illustrated in a composite area and demonstration can be carried-out on the farmer’s land and on the community lands or small watershed. Demonstration of activities such as: conservation farming, compost making, stall feeding, fodder storage, improved stoves, treatment of thatching materials, sanitation program, bio-gas, solar energy, water energy, etc.
- ❖ Demonstrations of biogas, solar energy, water energy are to be carried out on community basis. Demonstration of different soil conservation and watershed management measures may be carried on a small watershed without distinguishing private, communal and or government lands.

Unit: Numbers /area hectare

Mapping Symbol:



4.7.5 Conservation Farming (Samrakshan khetipaati)

Definition:

Conservation Farming refers to the farming system, which minimizes soil loss and conserves moisture, and thus, sustains and increases production. This activity is separated from on –farm conservation to emphasize that it is to be applied as demonstration only with emphasis on tillage, cropping and manuring.

Objectives:

To minimize soil loss and conserve moisture through conservation farming

Working Strategy:

Farmland of an individual farmer will be considered as working unit and farming system will be applied along with some vegetative erosion control measures and land treatment activities throughout the working unit. Implementation will be carried out with maximum people's participation. Participation will be sought right from planning to implementation. Respective individual farmer will be dealt with for participation.

Scope:

Generally, the activity includes:

- ❖ Adoption of contour farming (contour furrow, contour ploughing, contour bounding)
- ❖ Adoption of inter-cropping, multi-cropping, strip cropping, alley cropping, cover cropping, mulching, conservation tillage
- ❖ Conservation of diversion channel and safe drainage
- ❖ Grass and tree planting as needed
- ❖ Green manuring and mulching
- ❖ Composting, green manuring

Units: Numbers

Mapping symbol:



4.7.6 Conservation Exhibition/Extension (Samrakshan Pradarshan/ Prachaarprasar)

Definition:

Conservation exhibition/extension is an event for farmers, user groups, professionals to sell their productions, where the conservation professionals will organize a mass

gathering to disseminates the conservation education to the people. However, conservation extension is the expanding of information and services for conservation of the watersheds, environment, flora and fauna or biodiversity.

Objectives:

- ❖ To make stakeholders and beneficiary communities aware of the conservation initiatives
- ❖ To capacitate them for the promotion of the conservation
- ❖ To make the stakeholders more responsive towards the conservation initiatives

Working Strategy

Most exhibitions about conservation highlight successful and dramatic treatments which have led to a significant discovery about a work of art. From paintings to sculpture, manuscripts to furniture, this exhibition explores conservation across the breadth of world-class collections. It considers issues that face the conservator and curator daily when deciding the best treatment for works of art in order to preserve them for the benefit and enjoyment of future generations whilst making them accessible to today's visitors.

Audio-visual show is organized and conservation education materials will be distributed during that event. The exhibition will also be an event for other district offices and non-governmental organizations to convey their extension message directly to the local population as well.

Unit : Numbers/days/places

Mapping Symbol:



4.7.7 Conservation Day Celebration (Samrakshan Dibas Samaaroha)

Definition:

The remarkable event especially soil conservation day to be organized for celebration regarding conservation is called conservation day celebration.

Objectives:

- ❖ To make stakeholders and communities aware of the conservation initiatives.
- ❖ To capacitate them for the promotion of conservation.
- ❖ To make the stakeholders more responsive to the conservation initiatives.

Working Strategy

Conservation day is an event for farmers, user groups, conservation professionals and concerned stakeholders for the celebration of a professional ceremony. In this ceremony the group of conservation related professionals will organize mass gathering, speech, pamphlet, quiz contest, audio-visual show, conservation education materials distribution, etc for the public awareness on SCWM. It is also an event for district offices and non-governmental organizations to convey their extension message directly to the local population as well.

Scope:

- ❖ Soil conservation day celebration
- ❖ Environment day celebration
- ❖ Different conservation related ceremony celebration
- ❖ Collaboration with other stakeholders for celebration
- ❖ Media use for conservation message dissemination
- ❖ Award presentation to the conservation groups, personnel

Unit: Numbers/days

Mapping Symbol:



4.7.8 Conservation Extension Material Production (*Samrakshan Prachaarprasaar Saamagri Utpaadan*)

Definition:

Conservation education materials are the basic tools for awareness building. Conservation education material production includes the production of extension materials like brochures, posters, pamphlets, booklets, leaflets, calendar, newsletter, slogan, publications, models and audio-visual documentaries, which are the major materials used in conservation education.

Objectives:

- ❖ To sensitize the general population and relevant stakeholders for the promotion of conservation initiatives
- ❖ To produce and widely disseminate the extension materials about the conservation.

Working Strategy

Development and wider dissemination of the extension materials

Scope:

Generally, the activity includes:

- ❖ Publishing different conservation materials
- ❖ Purchasing conservation materials
- ❖ Distributing conservation materials to the stakeholders
- ❖ Use of audio-visuals for conservation extension
- ❖ Developing web-page for wider dissemination ensuring good governance
- ❖ Preparing activity profile
- ❖ Preparing annual progress report
- ❖ Evaluating activity impact and producing report

Unit: Numbers/plots

Mapping Symbol:



4.8 Monitoring and Evaluation (*Anugaman Tathaa Mulyaankan*)

Monitoring is the routine collection and analysis of information to track progress against set plans and check compliance to established standards. Evaluation is an assessment, as systematic and objective as possible, of an ongoing or completed project, program or policy, its design, implementation and results. Monitoring and evaluation (M&E) is a process that helps improving performance and achieving results. Its goal is to improve current and future management of outputs, outcomes and impact. It is mainly used to assess the performance of projects, institutions and programs set up by governments, international organizations and non-governmental organizations. It establishes links among the past, present and future actions.

4.8.1 Monitoring of Soil Conservation and Watershed Management Program

The monitoring and evaluation of soil conservation and watershed management program gives the information on programs/ activities, input/output indicator, and ongoing results/effects etc. However, the monitoring and evaluation program is most essential to maintain the quality and quantity of any implemented activities of the soil conservation and watershed management programs. The monitoring and evaluation matrix for the soil conservation activities is given in Table-3.

Table-3: Monitoring and Evaluation Matrix for Soil Conservation Activities

SN	Sub-program/operation	Input/output	On-going results/ effects
1.0	Land Use Development		
1.1	Soil Conservation and Watershed Management Plans based on Types and Sizes		
1.1.1	<ul style="list-style-type: none"> • SCWM management plans • Basin management plan • Watershed management Plan 	<ul style="list-style-type: none"> • No of SCWM plans • Area covered by plan • Cost 	<ul style="list-style-type: none"> • Off-farm employment generation • Proper land use development
1.1.2	<ul style="list-style-type: none"> • Operational plans • Sub watershed management plan • Micro watershed management plan 	<ul style="list-style-type: none"> • No. of plans • Area covered • Cost 	<ul style="list-style-type: none"> • Off-farm employment generation • Proper land use development
1.2	Watershed Management Plans based on Contents and Principles		
1.2.1	<ul style="list-style-type: none"> • Objectives, propose and goal 	<ul style="list-style-type: none"> • Proposed numbers • Expected quality 	<ul style="list-style-type: none"> • Achieved numbers • Achieved numbers

1.2.2	<ul style="list-style-type: none"> • Water and sediment yield • land productivity conservation • Infrastructure protection • Institutional development • program management 	<ul style="list-style-type: none"> • Proposed numbers • Expected quality 	<ul style="list-style-type: none"> • Achieved numbers • Achieved numbers
2.0	Land Productivity Conservation		
2.1	<ul style="list-style-type: none"> • On-farm conservation 	<ul style="list-style-type: none"> • Farm area covered • No of household • Area of terrace improvement • Length of waterways • Cost 	<ul style="list-style-type: none"> • Meeting the feed needs • Increase in duration of water availability • Increase in animal and dairy products • Improvement in farm productivity • Change in vegetative cover • Reduction in soil erosion • Income promotion
2.2	<ul style="list-style-type: none"> • Conservation ponds 	<ul style="list-style-type: none"> • No. of pond improved or constructed • Capacity of ponds • Cost 	<ul style="list-style-type: none"> • Reduced soil erosion and sedimentation • Increase land productivity • Increase water availability
2.3	<ul style="list-style-type: none"> • Fodder tree/grass plantation 	<ul style="list-style-type: none"> • Area of grass/ fodder tree planted • Cost 	<ul style="list-style-type: none"> • Increase grass/fodder availability • Increase number of livestock • Increase dairy product and livelihood income
2.4	<ul style="list-style-type: none"> • Fruit tree plantation 	<ul style="list-style-type: none"> • Area of plantation • Cost 	<ul style="list-style-type: none"> • Reduce soil erosion and mass movement • Increase productivity • Increase fruits and livelihood income
2.5	<ul style="list-style-type: none"> • Nursery operation 	<ul style="list-style-type: none"> • No of nursery in operation • No of seedling • No of seedling distributed • Cost 	<ul style="list-style-type: none"> • Promote greenery • Reduce soil erosion and sedimentation • Increase productivity • Increase grass and fodder and livelihood income

3.0 Development Infrastructure Conservation			
3.1	<ul style="list-style-type: none"> Road slope stabilization 	<ul style="list-style-type: none"> Area of sloppy land treated Length of road covered Cost 	<ul style="list-style-type: none"> Improvement of accessibility Stabilize the sloppy land Reduction in maintenance cost
3.2	<ul style="list-style-type: none"> Water source protection 	<ul style="list-style-type: none"> No of source treated Water source area treated Cost 	<ul style="list-style-type: none"> Increase in water yield, water quality and availability during dry season
3.3	<ul style="list-style-type: none"> Irrigation channel protection 	<ul style="list-style-type: none"> No of channel improved Length of channel improved Cost 	<ul style="list-style-type: none"> Reduction soil erosion Increase the productivity and production of lands Increase in economic life of development structures Increase in economic activity
3.4	<ul style="list-style-type: none"> Trail protection 	<ul style="list-style-type: none"> Length of trail improved Cost 	<ul style="list-style-type: none"> Controlled the foot trail erosion Easy to access in locality Enhance the vegetative coverage along the trail
3.5	<ul style="list-style-type: none"> Shelter belt/buffer strip/green belt development 	<ul style="list-style-type: none"> Length of belt Area of plantation Cost 	<ul style="list-style-type: none"> Reduction in wind erosion Increase in economic life of development structures such as road, dams, irrigation system, drinking water system, etc. Increase in economic activity
4.0 Natural hazard prevention			
4.1	<ul style="list-style-type: none"> Gully treatment 	<ul style="list-style-type: none"> No. of gully treated with bio-engineering Area of gully covered Cost 	<ul style="list-style-type: none"> Stabilized the gully Reducing soil erosion Managed drainage system Enhanced vegetative coverage

4.2	<ul style="list-style-type: none"> • Landslide treatment 	<ul style="list-style-type: none"> • No. of landslide treated • Area of landslide treated • Cost 	<ul style="list-style-type: none"> • Stabilized the landslide • Managed drainage system • Reducing soil erosion • Enhanced vegetative coverage
4.3	<ul style="list-style-type: none"> • Torrent control 	<ul style="list-style-type: none"> • No. of torrent controlled • Area protected • Cost 	<ul style="list-style-type: none"> • Controlled the torrent • Managed drainage system • Reducing soil erosion • Enhanced vegetative coverage
4.4	<ul style="list-style-type: none"> • Stream bank protection 	<ul style="list-style-type: none"> • Length of stream bank • Area protected • Cost 	<ul style="list-style-type: none"> • Controlled the stream bank cutting • Decreased productive land loss • Enhanced vegetative coverage • Reduction in flood hazard
4.5	<ul style="list-style-type: none"> • Degraded land rehabilitation 	<ul style="list-style-type: none"> • Area of degraded land treated • Cost 	<ul style="list-style-type: none"> • Rehabilitate the degraded lands • Enhanced vegetative coverage • Increased soil fertility and production
5.0	Community Soil Conservation/Extension		
	<ul style="list-style-type: none"> • Micro-watershed conservation demonstration 	<ul style="list-style-type: none"> • No. of demo micro-watersheds • No. of land type covered • Cost 	<ul style="list-style-type: none"> • Replicated the practices • Adopted conservation practices • Private land • Community land
5.1	<ul style="list-style-type: none"> • Conservation education/study tours/ exhibition and competition 	<ul style="list-style-type: none"> • No. and types • Duration • Cost 	<ul style="list-style-type: none"> • Awareness of school children • Use of conservation technology. • Conserve soil and water

5.2	<ul style="list-style-type: none"> • Training/ Workshop/ Exposure Visit 	<ul style="list-style-type: none"> • No. of training/ visit • Persons participated • Duration • Cost 	<ul style="list-style-type: none"> • Applied skill in community • Development of community skills • Improved watershed condition
5.3	<ul style="list-style-type: none"> • Conservation Women Training/ Workshop/ Exposure Visit 	<ul style="list-style-type: none"> • No. of training/ visit • Persons participated • Duration • Cost 	<ul style="list-style-type: none"> • Applied skill in community • Development of community skills • Improved watershed condition
5.4	<ul style="list-style-type: none"> • Conservation Exhibition/Extension 	<ul style="list-style-type: none"> • No. and types of events • Persons participated • Duration • Cost 	<ul style="list-style-type: none"> • Applied skill in community • Development of community skills • Improved watershed condition
5.5	<ul style="list-style-type: none"> • Conservation Day Celebration 	<ul style="list-style-type: none"> • No. of events • Duration • Cost 	<ul style="list-style-type: none"> • Applied skill in community • Development of community skills • Improved watershed condition
5.6	<ul style="list-style-type: none"> • Conservation Extension Material Production 	<ul style="list-style-type: none"> • No. and types of materials • Cost 	<ul style="list-style-type: none"> • Impact of extension material • Use of extension material • Support on watershed mgt
6.0	Community Mobilization and Livelihood Improvement		
6.1	<ul style="list-style-type: none"> • Conservation Income Generation Program 	<ul style="list-style-type: none"> • No. and types of program • Involved HH • Cost 	<ul style="list-style-type: none"> • Improved local economy • Reduced soil erosion • Improved watershed condition
6.2	<ul style="list-style-type: none"> • Community Mobilization/ Empowerment 	<ul style="list-style-type: none"> • No. of community • HH participated • Cost 	<ul style="list-style-type: none"> • Mobilized community • Improved level • Improved watershed condition
6.3	<ul style="list-style-type: none"> • Conservation Farmers Network Establishment 	<ul style="list-style-type: none"> • No. and types of networks • Cost 	<ul style="list-style-type: none"> • Established networks • Use of networks • Support on watershed Management

6.4	• Agro-forestry Development	• No. of plots • Duration • Cost	• Established demonstration plots and management • Applied learning by doing • Replicated by the local people.
7.0	Research and Technology Development		
7.1	• Natural system monitoring and learning	• No. of program • Duration • Cost	• Finding of monitoring and learning • Applicability of learning • Application of learning
7.2	• Action research on identified issues	• No. of program • Duration • Cost	• Finding of research and issues • Applicabilities of research • Application of findings
7.3	• Establishment of demonstration plots and management	• No. of plots • Duration • Cost	• Established demonstration plots and management • Applied learning by doing • Replicated by the local people.
7.4	• SALT plots establishment and management	• No. of plots • Duration • Cost	• Establishment of SALT plots • Applied learning by doing • Replicated by the local people.
7.5	• Bio-engineering plots establishment and management	• No. of plots • Duration • Cost	• Establishment of Bio-engineering • Applied learning by doing • Replicated by the local people.

Scope:

Generally, the activity includes:

- ❖ Effect/Impact evaluation of the executed activities
- ❖ Preparation of the report
- ❖ Dissemination of the findings
- ❖ Use of different types of M&E formats by the DSCWM

Unit: Number

Symbol:



4.8.2 Coordination Workshop and Meeting (*Samanwaya Gosthi Tathaa Baithak*)

Definition:

The meeting and workshops organized for the coordination purposes are called coordination meeting and workshops. Such coordination meetings/workshops are organized for the coordination among wide ranges of the stakeholders.

Objectives:

- ❖ To harness common efforts for the collaborative actions
- ❖ To make common understanding among the various groups
- ❖ To achieve common goals through common understanding

Working Strategy:

Coordination is a very crucial element in efficient and effective service delivery and hence it should be done according to need and circumstances. All the SCWM programs/activities will be implemented through better coordination. Specially, green sector line agencies will be coordinated for synergetic effort of the implemented programs.

Scope:

Generally, the activity includes:

- ❖ Coordination workshop for DSCOs
- ❖ Different seminar organization
- ❖ Different meeting organization

Unit: Number

Symbol:



4.8.3 Joint Monitoring and Learning(*Samyukta Anugaman Tathaa Sikaai*)

Definition:

The monitoring done jointly by all relevant stakeholders and donor agencies is called joint monitoring. It also refers to working collaboratively with other stakeholders/partners. It should be seen as an approach, not a pre-defined system. Joint monitoring must grow organically, based on the particular circumstances. It is not a substitute for more in-depth evaluations.

Objectives:

- ❖ To watch and ensure that activities are going on the right track
- ❖ To support ownership and mutual accountability among stakeholders
- ❖ To support 'alignment' and 'capacity development' objectives
- ❖ To generate information about whether or not development 'results' are being (or likely to be) achieved through a joint investment (to supports results-based management approaches)
- ❖ To enhance good governance

Working Strategy:

Joint monitoring is based on assessments of project progress/performance that involve various levels of joint engagement in: i) deciding and planning what to monitor; ii) conducting field missions/visits; iii) production of monitoring reports; and iv) results-oriented analysis. The SCWM programs/activities will be monitored involving different stakeholders periodically.

Scope:

Generally, the activity includes:

- ❖ Joint monitoring of the SCWM programs/activities with different line agencies
- ❖ Observation of ongoing activities for their effectiveness
- ❖ Collection of information and preparation of report
- ❖ Dissemination of the report

Unit: Number of event

Symbol:



4.8.4 Case Study Documentation and Sharing (Maamila Adhyayan Abhilekhikaran Tathaa Aadaanpradan)

Definition:

A case study is an up-close, in-depth, and detailed examination of a subject (the case), as well as its related contextual conditions. It is a published report about a person, group, or situation that has been studied over time; also a situation in real life that can be looked at or studied to learn about something. It is an evaluation tool. Researchers have used the case study research method for many years across a variety of disciplines. Social scientists, in particular, have made wide use of this qualitative research method to examine contemporary real-life situations and provide the basis for the application of ideas and extension of methods. The documentation and sharing of case study is called case study documentation and sharing.

Objectives:

- ❖ To provide a more thorough analysis of a situation or “case” which will reveal interesting information to the reader
- ❖ To study intensely one set (or unit) of something—programs, cities, counties, working sites as a distinct whole
- ❖ To replicate successful case studies
- ❖ To disseminate the features of particular case
- ❖ To have institutional memory

Working Strategy:

Out of implemented programs/activities, some decent one will be undertaken for a case study. Information collection, analysis, and findings will be disseminated. Local communities' involvement will be sought during case studies.

Unit: Number

Symbol:



4. 8.5 Public Auditing and Self Evaluation (Saarbajanik Lekhaaprikshyan Tathaa Swamulyankan)

Definition:

Public audit is an inspection, correction, and verification of physical and financial status of any community development activities/business conducted by any community development groups/ individuals in a locality.

Public audits of projects (PAP) are very important to ensure transparency of budget with quality, quantity and contribution of stakeholder on development activities. Through these events, the public is aware of the costs of the project and prevents any misuse of the funds, as people can control the fund flows. So it strengthens the relationship and trust between the users' committee, user groups and development line agencies or partners.

Objectives:

- ❖ To initiate improvements in public administration or to provide assurance to management that an activity is being managed effectively, economically and efficiently and in accordance with government policy/ legislation and community norms
- ❖ To enhance good governance
- ❖ To inform the local community about development works
- ❖ To improve individuals as well as institutions based on evaluation

Working Strategy:

The conservation groups/committees will perform public auditing of implemented SCWM activities for final completion and handed over to them eventually. They will perform their evaluation for their betterment.

Scope:

Generally, the activity includes:

- ❖ Public auditing of the SCWM activities implemented by the groups/committees
- ❖ Developing auditing formats
- ❖ Self evaluation based on spider-web analysis
- ❖ Ranking of the groups based on evaluation

Unit : Number of event/number of group

Symbol:

**4.8.6 Revision of the Document (*Abhilekh Punaraabalokan*)**

This document will be monitored regularly and revised as and when required.

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ANNEXES

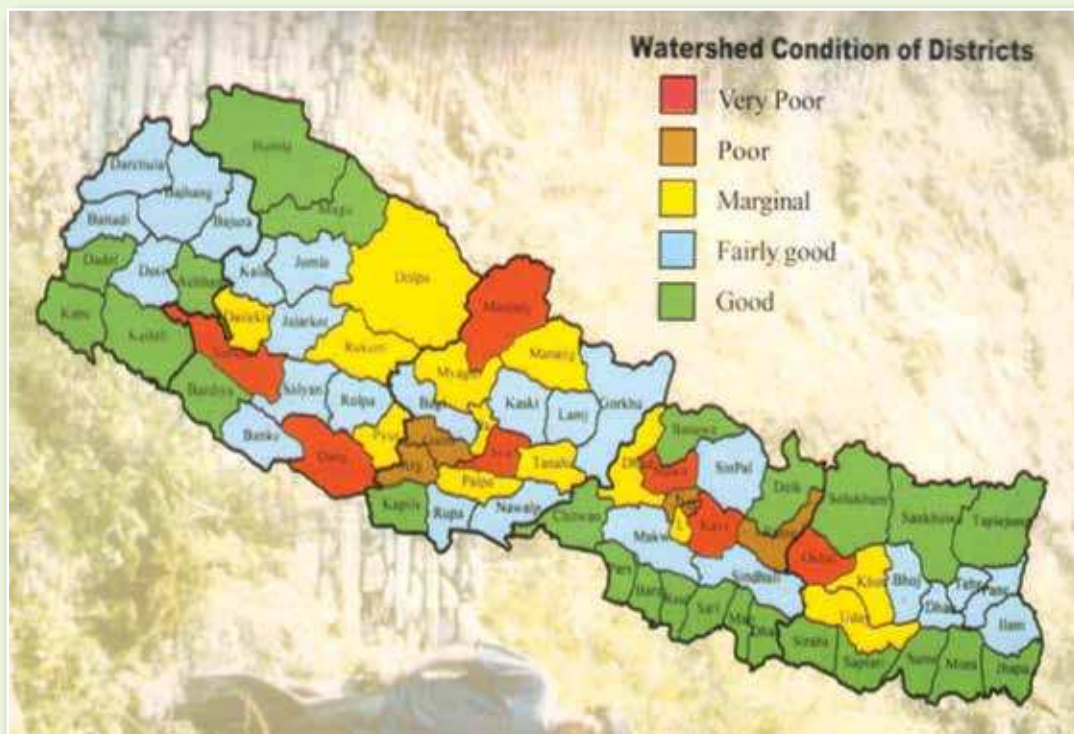
Annex 1: Participants of Inception Workshop for the revision/update of Green and White BookDate: Jul 31st, 2014

S.N	Designation	Name	Organization/Section
1	Director General	Mr. Pem Narayan Kadel	Department of Soil Consecration and Watershed Management
2	Deputy Director General	Mr. Chewan Prakas Guragyan	Department of Soil Consecration and Watershed Management
3	Planning Officer	Mr. Gehendra Keshari Updhaya	Department of Soil Consecration and Watershed Management
4	Soil Conservation Officer	Mr. Arjun Kumar Thapa	Department of Soil Consecration and Watershed Management
5	District Soil Conservation Officer	Mr. Ramananda Bhattarai	District Soil Conservation Office, Parbat
6	Under Secretary (Tec)	Mr. Rajendra Prasad Yadav	Department of Soil Consecration and Watershed Management
7	Assistant Planning Officer	Mr. Dipak Bhardhoj	Department of Soil Consecration and Watershed Management
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9	CDE	Mr. Rakesh Kumar Tripathi	Department of Soil Consecration and Watershed Management
10	Under Secretary (Admin)	Mr. Arjun Gautam	Department of Soil Consecration and Watershed Management
11	Under Secretary (A/C)	Mr. Khila Nath Dahal	Department of Soil Consecration and Watershed Management
12	Under Secretary (Tec)	Mr. Ram Sing Thapa	Department of Soil Consecration and Watershed Management
13	Under Secretary (Tec)	Mr. Dharendra Pradhan	Department of Soil Consecration and Watershed Management
14	CDE	Mr. Dilip Sadaula	Department of Soil Consecration and Watershed Management
15	Computer Officer	Mr. Mukunda Prasad Acharya	Department of Soil Consecration and Watershed Management
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17	Team Leader	Mr. Dev Raj Gautam	Hariyo Ban Program, CARE Nepal, Pokhara
18	Governance Specialist	Mr. Umesh Shrestha	Hariyo Ban Program, CARE Nepal, Pokhara
19	Deputy Chief of Party	Mr. Sandesh Hamal	Hariyo Ban Program, CARE Nepal
20	Personal Assistant	Mr. Basanta KC	Department of Soil Consecration and Watershed Management
21	Team Leader/ED	Dr. Krishna Bdr. Karki	Sustainable Natural Resource Management Pvt. Ltd

Annex 2 : Participants of Sharing and Consultation Meeting

Date: June 7th, 2015

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1	Pem Narayan Kadel	DG	Department of Soil Conservation and Watershed Management
2	Gehendra Kesari Upadhyay	Joint Secretary	Ministry of the Forests and Soil Conservation
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4	Diwakar Maskey	DSCO	DSCO, Lalitpur
5	Shyam Sundar Shrestha	DSCO	DSCO, Nawalparasi
6	Puspa Ram Thapa	DSCO	DSCO, Makawanpur
7	Krishna Prasad Poudel	DSCO	DSCO, Sindhuli
8	Kamal Prasad Gautam	DSCO	DSCO, Syangja
9	Badri Raj Dhungana	DSCO	DSCO, Tanahun
10	Krishna Prasad Ghimire	DSCO	DSCO, Sindupalchowk
11	Shyam Sundar Shrestha	DSCO	DSCO, Nuwakot
12	Uddhaw B. Ghimire	DSCO	DSCO, Kaski
13	Ananda Ram Ghimire	DSCo	DSCO, Rudendehi
14	Jagannath Joshi	Watershed Management officer	Department of Soil Conservation and Watershed Management
15	Meghnath Kafle	DSCO	DSCO, Kathmandu
16	Manohar Shah	DSCO	DSCO, Kavre
17	Dr. Krishna Bdr. Karki	Team Leader/ED	Sustainable Natural Resource Management Pvt. Ltd



(DSCWM, 2015)

Government of Nepal established the Department of Soil and Water Conservation in August, 1974 under the then Ministry of Forests. In 1980, it was renamed as Department of Soil Conservation and Watershed Management (DSCWM) to better represent its roles and responsibilities of watershed management. Since its establishment, various efforts have been continuing to meet the challenges of soil erosion and watershed degradation faced by the country. At present DSCWM is providing soil conservation and watershed management service to 73 out of the 75 districts of Nepal through 61 District Soil Conservation Offices (DSCO). DSCWM has been planning, implementing and monitoring soil conservation and watershed management programs/activities based on the principles of integrated watershed management.

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