

Integrated, Sustainable - Participatory Landscape Management

for Village Tank Cascade Systems

3













Preface.

In sustainable land resource management, this publication expected to present how landscape planning is prepared as an integrated process in collaboration with multilateral institutions, its relevance to Sri Lanka and how this planning is used, especially for village cascade systems. At present, many countries of the world adopt the integrated landscape planning approach and this publication has taken steps to give the reader an understanding of this approach and the principles underlying it.

Since integrated landscape planning is a process that gives priority to public participation, it has been presented in the meeting how the specialized stakeholder institutions at the Divisional Secretariat Division level are oriented towards a common objective. Accordingly, the major stakeholders at the local level in relation to land resource management such as Land, Environment, Wildlife, Forest Resources, Regional Development, Urban Development, Agriculture, Irrigation, Water Resources and Drainage, Livelihood and Economic Development, Poverty Alleviation, and Climate Change and Natural Disasters.

It can also be used as a planning manual as it provides a description of the data and information that may be required in preparing such a plan. It will be much easier to include strategic objectives and activities and implementation structure as well as the follow-up process. I gratefully acknowledge the help given by Dr. W, J. M. Dayarathne, and coordinator of the Ecosystem Conservation and Management Project, H. G. Gunawardena, who helped by providing source information, diagrams and photographs at the drafting stage of this booklet.

Also, I take this opportunity to extend my sincere thanks to Mr. Ajith Silva, The National Project Manager, who provided great support in publishing this booklet. This publication of the Project of the Healthy Landscape Project has been supported by the Global Environmental Facility (GEF) Program under the United Nations Development Program, the South Asian Environmental Cooperation Program (SACEP), the United Nations Environmental Program (UNEP), and the International Center for Biological Diversity (Alliance Biodiversity International & the CIAT) and finally I would also like to express my earnest thanks to the Ministry of Environment for its support in this process.

Editor

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Chapter-01

Introduction

Participatory land use planning is a systematic and iterative process undertaken to create an appropriate environment for sustainable development of land resources that meet the needs and demands of the people.

This assesses the physical, socio-economic, institutional, and legal potential and constraints regarding the optimal and sustainable use of land resources and empowers people to make decisions about how to allocate those resources.

Furthermore, the concept of sustainable land management ensures long-term socioeconomic and environmental functions of the land while also guiding the use of land resources for the future to meet changing human needs (agriculture, forestry).

Integrated Action Plan at tank system level is the conversion of rural land use plans into permanent project activities. Starting with identifying the problems, the committee members are encouraged to analyze the problems faced by their village and reflect on the capabilities of the rural people and address some of the basic issues at the village level (such as insurance, security and livelihood development, poverty alleviation, etc.) with the participation of relevant stakeholders.

Chapter -02

The need for integrated, participatory-sustainable landscape management

Due to the increase in population and the increase in demand for consumption resources, the pressure on the natural resource base is increasing. Some experts have analyzed this trend and stated that in order to meet the expectations of the people, food production growth should be achieved by 60% in 2050 compared to the 2005 basis. Considering the needs of developing countries, experts have pointed out that food production in those countries should be increased by 100%.

"Castner" (Kastner et al -2011) and others have shown that changes in consumption patterns further increase the demand for land resources for food production. In 2009 (Nelman–2009), Nelman pointed out that ecosystem degradation and climate change lead to further declines in agricultural production.

The United Nations Environment Program (UNEP – 2005) and Hoegh – Guldberg and others estimated in 2015 that 54 countries in the world would face water shortages in the near future. Experts (Buck et al, 2007, McNeely and Schery 2003) have shown that production landscapes face habitat threats.

Rural poverty continues to spread around the world. Compared to 2013, 767 million people (10.7% of the world's population) lived in poverty levels, of which 80% live in rural areas, according to World Bank reports (2016).

In view of this situation, land users, land managers and policy planners at all levels are trying to better balance and maintain the growing demand for food products, maintain environmental services and achieve sustainable economic development.

At present, many countries of the world have accepted sustainable landscape management as the best approach to achieve the above situation.

According to traditional policy approaches, it is emphasized that instead of restricting a particular land area to only one major purpose as per the assumption, it should be considered within the same area/landscape zone for several purposes – i.e. the same land caters to a wide range of multiple services.

Thus, "sustainable landscape" is the pursuit of goals that meet current needs and do not interfere with the fulfillment of food needs, ensure future generations meet their needs and create a balance so that economic, social and environmental goals do not conflict (Denier and others- 2015).

Therefore, sustainable landscape management in the future is a security measure that protects global economic and environmental systems and livelihoods. Accordingly, the following requirements are met through sustainable landscape management.

- ↓ Nutritious and profitable crop and animal products for food
- Meeting water requirements (drinking water, household consumption, farm, business)
- The existence of ecosystems
- **4** Pollination for crop production
- Tourism Activities
- 4 A wide range of livelihood development and employment opportunities

In addition, landscape management is responsible for controlling and absorbing climate change and reducing the release of greenhouse gases into the atmosphere from a variety of sources.

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Chapter -03

Why does Sri Lanka need integrated, sustainable-landscape planning?

The qualitative as well as quantitative degradation of Sri Lanka's major natural and environmental resources has been observed over the past few decades. Due to the contamination of water resources and the shrinking of many water sources, it has often been observed that the water level of the rivers and streams and significant variations in the drainage pattern have often been observed.



Figure: - 01 Drought, Misuse of Land intensifies its consequences.

Most of the agricultural land has been damaged due to soil erosion, which has resulted in a decline in agricultural production and the destruction of some farmlands. Soil and water resources are being further damaged due to excessive use of chemical fertilizers to increase agricultural productivity in such lands.



Figure: - 02 Destruction of forests and conversion of them into cropland shows the urgent need for a sustainable land use pattern.

Forests are being destroyed in many sensitive areas of the country's total forest cover. Water sources, especially in the central highlands, are being eroded and polluted due to various threats.



Figure: - 03

Unauthorized logging in water reserves including rivers is a common misuse of land in the country.

 $P_{age}C$



.Figure: -04 Sensitive ecological areas as well as lands that are easily vulnerable to natural disasters should be kept free, but these areas provide shelter to different social strata.

Damage to crops caused by natural disasters, loss of property and people's lives has become common today. As a result of improper land management activities, the damage caused by natural hazards has increased in this way.



Figure: -05 Although the selection of inappropriate plots for various constructions, including houses, is a common occurrence today, the loss of human life and property is huge.

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Complications of spatial distribution and dispersal patterns of different land use types have blocked the habitats of wild animals and threatened human habitats and farmlands. Elephant-human conflict, which is common in Sri Lanka's dry zone landscapes, has now become a major social issue.



Figure: -06th Elephant - Human conflict has become an eternal struggle today.

Since recent years, several inappropriate and irregular trends in land-based resource extraction have been observed in different parts of the island. In the meantime, removing the surface soil of valuable agricultural lands and extracting the sand, obtaining the soil required for construction, removing stones is a rapid process. Such uncontrolled activities not only degrade the land, but also leave such lands used to remove sand, soil and rocks without rehabilitation. Substandard gem industry and other mineral exploration activities as well as removal of sand from rivers for construction industry without limits have had similar adverse consequences.



Figure: -07 The use of valuable agricultural land to extract sand has created several crises.

Such uncontrolled activities not only degrade the land, but also leave such lands used to remove sand, soil, and rocks without rehabilitation. Inappropriate gem industry and other mineral exploration activities as well as removal of sand from rivers for construction industry without limits have had similar adverse consequences.

Such uncontrolled activities not only degrade the land, but also leave such lands used to remove sand, soil and rocks without rehabilitation. Substandard gem industry and other mineral exploration activities as well as removal of sand from rivers for construction industry without limits have had similar adverse consequences.

Apart from this, research and publications have shown that climate change is likely to cause different levels of adverse environmental conditions in many areas of Sri Lanka.

Several factors have mainly influenced the development of the above-mentioned natural disasters in Sri Lanka. Meanwhile.

I. Sri Lanka does not yet have a multi-layer comprehensive plan that extends from the national level to the field level related to environmental protection in economic development activities.

- II. Lack of integration between those engaged in development activities and conservation workers in land resource planning.
- III. Due to the rigid nature of sectoral plans, they cannot be easily integrated into other strategic plans.
- IV. Weak interconnection among stakeholder institutions.
- V. The inability to integrate conservation and development activities due to the influence and interference of policy makers in the implementation of development plans.
- VI. Lack of consideration of the main components to be taken into consideration in development planning, including natural resource management, environmental conservation, protection and promotion of environmental services, biodiversity conservation, archaeological factors, natural beauty, and values as well as the impact of climate change and natural disasters.
- VII. Ignoring long-term environmental benefits and paying more attention to short-term economic, social and political benefits.
- VIII. People's needs at the grassroots level should not be taken into consideration in development planning and policy planning.
 - IX. Inadequate understanding of national policies and strategies at provincial, district and regional levels.

It should be emphasized that many countries of the world, which have faced the above resistances, have now focused on the integrated landscape planning process, and achieved many successful results.

Countries such as India, Ethiopia, Kenya, Niger, Costa Rica have applied the principles of integrated landscape management for sustainable land management, forest landscape restoration, food security programs and biodiversity conservation processes.

Instead of the top-down approach implemented in the watershed development programs in India, the recently introduced Participatory Development Planning Scheme, Bottomup Approach etc. have achieved successful results on the integrated planning method.

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Page 1



What is a landscape?

A landscape has been described in many ways by scholars. But it has many common features, and simply put, a landscape means an area that can be identified as a separate region consisting of human activity as well as natural processes or areas.

Eco-agriculture Partners – (2013) noted that "a landscape is an ecosystem created by natural as well as human intervention and is the result of a set of ecological, historical, economic, and cultural processes represented by the topography, vegetation, land use, settlement pattern of the area." (Landscape for people" Food and Nature initiative – Eco-Agriculture Partners – 2013).

A landscape region consists of multiple processes, within which there are several multiple institutions or groups. The objectives and expectations of these different stakeholders are also diverse. These stakeholders are responsible for a wide range of services such as agriculture, livelihood development, infrastructure, conservation, roads and transport, banking, and finance. Landscape zones are also spatially diverse.

These geographical boundaries are determined by a small watershed or sub-river basin or a large river basin, as well as a lake system, a forest zone, a large tea estate, etc.

Sri Lanka's landscape management plans are currently in two areas. They are shown below.

- Geographical zone within the boundaries of Hurulu Lake, Kantale Lake and Kavudulla Lake (Hurulu" Kanthale & Kavudulla Landscape). The area is 272.557 hectares and is spread over several Divisional Secretariat Divisions in 03 administrative districts.
- II. Geographical zone comprising Sinharaja Forest Range Landscape including Sinharaja Forest Zone and surrounding areas. The size is 92,222 hectares and

this zone includes parts of 16 Divisional Secretariat Divisions in 06 administrative districts.



Figure: -08 A computer-based reconstruction showing a well-designed integrated landscape region

Such a landscape zone is a specialized sustainable development strategic area that ensures not only social, economic but also environmental services and biodiversity. Therefore, many scholars who have studied this have pointed out that it fully serves a wide range of environmental services. Dr. P.B. Dharmasena, in a paper titled "Essential Components of Traditional Village Tank Systems" in the year 2010 under the theme "Cascade Irrigation Systems for Rural Sustainability", has clarified the following quotes.

- Ground water resources were preserved for water security and were not used for agriculture.
- They were accustomed to the risks posed by agriculture.
- They used to use many things without destroying the forest.



- They were accustomed to simple living as well as relying on minimum needs.
- They collected rainwater and used it in an efficient and cost-effective manner.
- They worked collectively to protect themselves from wild animals and to cope with drought and famine.
- Store food for the future.
- They acted independently in the face of external threats. Protected
- Used the lessons learned and the experience gained to resolve crises and brought that knowledge to safety as an asset.
- Mental health as well as a healthy environment were the basic foundations of social existence.

In addition, the following diagram, taken from the Internet, describes the four-types of services provided by the environment to the community.



Figure: -09 Four-Types of Environmental Services (Extracted from - Internet)

Chapter -05

Special features found in integrated landscape management.

There are several special features in integrated landscape management. These are arranged below.

i. To replace the "Sectoral Approach" with the "Integrated Approach".

In development planning, working within one scope is considered as a "sectoral approach" and the "integrated approach" is the opposite i.e. planning through a common approach by integrating multiple institutions and several disciplines.

This enables resources to be utilized efficiently and effectively and provides an opportunity to achieve a wide range of people's goals in one planning area. This provides an opportunity for "multiple benefits" for the target population as well as the environment.

It will also reduce conflicts that may exist in the development process.

- ii. Concern for environmental balance in meeting human needs.
 In the utilization of environmental resources for human needs, a balance should be maintained for its sustainable survival. Otherwise, it is considered that in a short period of time, the balance related to the loss of resources and its existence will be broken.
- iii. Involvement of multiple institutions and equipping multiple objectives.
 Landscape management is a collective effort and planning process of several organizations and works with multiple objectives and aspirations.
- iv. To reach consensus to integrate multiple objectives on the basis of consensus.

In landscape management, stakeholders with multiple objectives are directed to a unified common objective to achieve those goals. This has been referred to as the "Common Concern Entry Point" in landscape management by Soyer and others (2013).

v. Public participation as stakeholders in the planning area or management process should be considered an integral part.

It is accepted that the views and expectations of stakeholders, including the general public, are taken into account for decision-making and it is also considered as the stage of identifying the real needs of the people.

vi. Agreement to make use of resources on an optimal basis and protection of resources on behalf of institutions.

The principles of resource utilization should be maintained in a standardized, systematic and optimal manner and the protection of resources for the future is recognized as an essential element.

vii. Building coexistence conditions instead of conflict situations in the landscape zone.

There may be conflicts between stakeholders as well as processes in the utilization of resources. Therefore, it is generally accepted that in joint planning, there should be a harmonious attitude among all stakeholders by supporting integration, mutual understanding and other processes.

viii. To work within the bottom-up planning approach instead of the planning concept of top down.

In today's development planning, instead of the top-to-bottom approach, the bottom-up approach is considered as an opportunity to better represent people's expectations. Thus, real – and realistic needs will be better incorporated into development processes.

ix. Integration of development and conservation.

Most planning processes focus only on development, and conservation themes have moved away. For this reason, there are short-term consequences such as wastage of resources, cost overruns and low yields, as well as long-term adverse conditions. Integration of development and conservation is therefore a key aspect of the integrated landscape planning process.

x. Building economic, social and financial benefits and livelihood development opportunities for the people for conservation.

This means that the communities should be given direct and indirect benefits in order to convince the people that conservation and protection of resources is a pre-requisite of a development process as well as for the people to work within it. This is a way to keep those stakeholders in conservation activities and can also be considered as incentives for their service and various commitments.

CHAPTER - 0<mark>6</mark>

Preparation of Integrated Sustainable Landscape Management Plan

5.1. Global and Sri Lankan Approaches to Landscape Planning

Landscape based planning strategy is the management of multiple land use patterns under an integrated plan and strategy with a focus on natural resources and human activities (මහවැලි සංවර්ධන හා පරිසර අමාතාහංශය- 2022). The planning process began in 1965. At present, the integrated landscape planning strategy is widely used in Asian and African countries as well as in European countries. This planning process became more widespread and popular in 2015, and Ghana, Rwanda, Mexico, Korea, China, Japan, the Netherlands, the United States, Indonesia, and Thailand have achieved very successful results by using joint landscape planning strategies for the conservation of natural resources.

At the Asia-Pacific Forest Summit held in Colombo in September 2017, 36 participating countries agreed to adopt the Integrated Landscape Planning Strategy in Forest Management. Accordingly, Sri Lanka has also prepared integrated landscape management plans for 02 major landscape zones through the Ecosystem Conservation and Management Project implemented under the Ministry of Mahaweli Development and Environment with the financial assistance of the World Bank.



Figure: -10 Landscape Zone comprising Sinharaja Forest and surrounding zone selected for Integrated Landscape Planning ((d- (Source: ESCAMP Project, 2022)

Plans were prepared for 256,267 hectares of land including other lands and villages, agricultural and private lands. Parts of Anuradhapura, Polonnaruwa and Trincomalee districts were also included in the scheme. The second is a zone of 58,250 hectares of land including Sinharaja Forest Reserve, Morapitiya-Ranakanda Forest Reserve, Kalugala Proposed Forest Reserve and Diyadawa Forest Reserve and 92,222 hectares of land including private land, gardens, paddy fields, rubber plantation land, and plantation crops such as tea (Ministry of Mahaweli Development and Environment - ESCAMP - Project Reports). **5.2 Identification of landscape areas and marking boundaries.** When marking the boundaries of a landscape area, the plan area should be determined in accordance with the objectives and expectations of the plan. Considering both pioneering landscapes above in general, it appears that ensuring the protection and conservation of forests is not limited to those objectives alone, but also

considering the surrounding/affected region as well as "identifying entire landscape zones. Accordingly, it is possible to identify different landscape zones based on specific objectives. Thus, in the case of Sri Lanka, it is possible to use different landscape management zones for planning as follows:

- ↓ A small tank cascade system
- ↓ Micro-watersheds consist of starting water sources.
- 4 A river basin that includes the catchment area of a river
- A sensitive zone vulnerable to impacts from biodiversity, environmental services, and human activities.

This is further illustrated by the examples given for the above areas.



Figure: -11 Village Tank Cascade System (Ellanga) landscape





Figure: -12 Satellite Image Showing Tank Cascade System in Anuradhapura District (Source: Google Images)





Figure: -13 Dankanda Micro Catchment Area consisting of initial water sources, Rattota Divisional Secretariat Division, Matale District

CHAPTER -07

Preparation of integrated, participatory-sustainable landscape management plans for Village Tank Cascade System (VTCS)

7.1 Objectives of an integrated landscape management plan.

- I. To establish a ground level planning process for a rural tank system area as it is a unique landscape area.
- II. Active participation of the rural community as stakeholders in the ground level planning process.
- III. Focus on the planning process with equal importance and integration of the three main concepts of development, conservation, and protection.
- IV. To reach an agreement among the stakeholders that the utilization of land resources should be maintained in an optimal and sustainable manner.
- V. Establishing an information system for a village level tank cascade system landscape, maintaining and using it as a decision-making tool.

7.2 Goals of the Planning

There are four (04) main goals.

- I. Efficient, optimal and effective use of human, physical, and other resources.
- II. Building and developing self-confidence in the rural community
- III. Covering target groups
- **IV.** Planning and implementation and ensuring its sustainability.

7.3 Integrated Sustainable-Participatory Landscape Planning

for Rural Tank Systems

The proposed rural tank system landscape plan consists primarily of 07 phases. It's also an ongoing process. The objectives of a plan may vary at different levels depending on the different objectives and expectations that occur both timely and socially, as well as according to public policies. That recurring form is more practical in terms of land use and should be used to integrate people's aspirations into plans.

A planning committee will be established first and the committee will carry out technical as well as administrative and coordinating functions. This group is also responsible for multiple subjects. Therefore, this team expects a wide range of perspectives in decision-making.

As well as the contributions made as multiple subjects, equality and impartiality are also examined here, and this should be more represented in terms of age ranges, gender, income level, employment, and livelihoods.

Figure-14 outlines the planning process and the seven stages shown here are then described in detail.



Figure-14 Setting the stages of the participatory planning process.

Phase 01 - Appointment of a Tank System Level Planning Committee

Objective: The primary objective of appointing such a committee is to clearly identify the main areas to be applied for planning. (Examples: agriculture, food production, adaptation plans for drought, mitigation of conflicts between wildlife – agriculture, etc.).

The committee should also identify the boundaries and administrative area of the planning area.

Since the basic technical task of preparing tank system planning is also a major task of the Planning Committee, it should include an officer/ delegation consisting of the following subjects:

Land, irrigation, water resources, agrarian development, forestry, wildlife, export agricultural crops, major plantation crops, livestock, economic

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development, environment and planning are the main subject areas. It should also include a representative of a community-based organization/ public organization to represent the people of the lake system landscape area. The team should consist of two team leaders and a facilitator for reporting.

Phase 02 - Identification of Specific Objectives

This is one of the most important aspects of planning. What are the specific objectives of lake system planning should be identified and documented. There may be the following specific objectives in a task related to landscape management.

- i. What are the main issues related to land resource management in rural tank system landscape zone (Major Issues)
- ii. Drivers or factors that cause such problems.
- iii. Information required to formulate gross strategies that can be applied to solve them.
- iv. Goals or results that are expected to be achieved by implementing it after planning.

The development of these objectives should be carried out under the guidance of the Planning Committee with the participation of all stakeholders in accordance with a brainstorming session or several similar programs.

In such a situation, the following are some examples of issues that can affect the sustainability of a rural tank system in Sri Lanka.

i. Damage caused by elephants and other wild animals to farmlands.

ii. Unexpected decline in the expected yield of agricultural crops.

iii. Problems in reducing soil erosion or other land degradation conditions.

iv. Crop losses and drinking water shortages during short drought periods.

v. Lack of adequate food production in relation to the population.

The above specific objectives should be categorized into 03 categories. That is, short-term goals, medium-term goals, and long-term goals.

Short-term objectives: Most such objectives are based on activities ranging from 01 to 02 years.

For example, repairing damaged tanks sluice is an urgent as well as a quick task.

Medium Term Objectives: This includes programs for 02 to 03 years. Consider, for example, the elephant fence. Considering the time taken to estimate such a work and complete the production work, it is assumed that such a time will take.

Long Term Objectives: This applies to programs consisting of several sub-activities that take more than 03 years.

Examples:

1. Preparation of a long-term food production plan to maintain selfsufficiency in food for the future by utilizing cultivable land within the rural tank system.

2. In addition to the productivity improvement of the forest lands, development of eco-tourism, promotion of other non-agricultural employments to enhance livelihood development and sources of income.

Phase-03 Data Collection

This planning methodology is primarily based on the integrated approach. Therefore, a wide range of data collection should be done through this. It facilitates the decision-making process and covers several areas.

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However, the information collected for this purpose is divided into 02 main categories. They are shown below.

This planning methodology is primarily based on the integrated approach. Therefore, a wide range of data collection should be done through this. It facilitates the decision-making process and covers several areas. However, the information collected for this purpose is divided into 02 main categories. They are shown below.

1). Common Information

- 7.1.1 Name of rural tank cascade system (Name of Ellangaawa)
- 7.1.2 Number of tanks
- 7.1.3 Size/Plot Size
- 7.1.4 Administrative boundaries
- 7.1.5 Grama Niladhari Division/s
- 7.1.6 Size of the Command Area under Cascade
- 7.1.7 Included Settlements or Colonies/ Irrigation Schemes

2). Specific Information

Specific information is divided into several parts, including several types of specific data collected only for this purpose.

Physical EnvironmentMain CategoryMain CategoryI. Topography & DrainageSurface drainage patterns include
elevation, slope of land, slope
zones, streams, rivers, and lakes.
Topography and Main topographic
features such as mountain ranges,
rock outcrops, valleys, wetlands,
etc.



	Water capacity of tanks, water
	surplus or water shortage
II. Climate	Agroclimatic zones, rainfall (annual
	and monthly average)
	Annual rainfall variability and
	drought/flood conditions
	Relationship of tank systems with
	capacity and rainfall patterns
	Water Control in Relation to
	Agricultural Crops
III. Soils	Great soil groups, soil series
	Different soil qualities,
	Soil texture, drainage, soil fertility
	level and status of soil degradation.
iv. Land Use & Land Cover	Major plantation crops,
	Paddy cultivation (paddy
	cultivation with rainfed, irrigated
	paddy, and additional crops)
	Cropping intensity, temporary /field
	crops, crops such as maize,
	Home gardens, urban areas, and
	Settlements.
	whatthe reserves, forests
	(according to unterent
	or marsh forests
	01 111/01/05/05.

		This includes information that can
		be mapped according to various
		other uses and crops.
IV.	IV. Social, Economic,	Population, age structures,
	Cultural and Community	employment pattern, employment
	Scientific	sizes,
		Labour Force/ Labour Shortage,
		Mobility
		Education levels,
		Communication and information
		systems,
		Religious, cultural, and
		archaeological information,
		Tourism Areas and Potential Areas,
		Eco-Tourism and Agro-Eco-
		Tourism Potential
v.	Infrastructure and	Agricultural Extension Services,
	Extension Services	Knowledge, Training and
		Education Programs,
		Use of raw materials and tools,
		modern technology and strategies,
		coverage of subjects and areas of
		extension officers,
		Post harvest, processing and
		storage, packaging and value
		additions,
		Networking of markets and
		supplies.

VI.	VI. Land use pattern and	Issues relating to land tenure and
	environment related	ownership,
	conflicts	Issues relating to the boundaries of
		settlements/ wildlife and forest
		reserves,
		The crisis surrounding the elephant
		corridors and the proposed
		corridors,
		Wildlife - conflicts between
		farmlands and settlements, Issues
		between protection and
		conservation strategies,
		Environmental damage,
		deforestation and land degradation.

Key Tools for Information Processing

In the participatory landscape management process, 03 main strategic tools of information and data collection have been introduced. (Participatory Land Use Planning Training Manual - Nov. 2020, Stockholm International Water Institute – SWEDEN).

They are as follows.

Physical and Environmental Approach/Tools

- Agro-climatic zones/ information-based approaches
- Land Evaluation
- Soil Productivity Index
- Access to maps and information (Satellite images, Land use, Topographic maps. This includes all types of grassroots level participatory mapping activities.

age 3

• Computer assisted land resource planning approach (pl. see Figure 13).

2. Socio-economic and group discussion approach

- (Farming System Approach)
- Gender Representation Approach to Planning
- Household level surveys
- Participatory Tools (PRA Tools)

3.Integrated Approach

The following tools can be used under this approach.

Spatial Planning ApproachRegional Planning / Sustainable Land Management Approach.

Phase-04 Data Analysis

1 Preparation of base maps and analytical maps

- 2 Preparation of maps containing details of issues under community participation
- 3 Configuring Data Tables

Brief details of this are given below.

1. Preparation of base maps and analytical maps

Examples of base maps

- i. Location
- ii. Administration (District D.S. Division, G.N. Division)
- iii. Geomorphology and Drainage
- iv. Watersheds/ Catchments
- v. Land use pattern.
- vi. Population Distribution / Population Density

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- vii. vii. Soil Distribution
- viii. Land Tenure and ownership.
- ix. Irrigation and Infrastructure

Analytical Maps

Category -01 G.I.S. Assisted Maps

- 1.Land use changes and trends
- 2. Population density
- 3. Under-utilized lands and Misuses lands
- 4. Land suitability maps.
- 5. Land suitability maps for different crops.
- 6. Maps showing protected and conservation areas.
- 7. Eco-tourism, Agro-ecotourism potential areas

Apart from this, the Geographic Information System (GIS) can configure additional maps as follows.

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Sample Maps are given below.



Figure :15 - Geographical analysis methods are a very popular tool for landscape planning.

Category -02 Community Participation Maps prepared under Participatory Approach

These maps are based on the knowledge, experience, and experience/practices of the rural communities such as land use issues, land ownership, areas of human-elephant conflict, encroachments, etc.

During the analytical process these maps will be incorporated to GIS based maps. However, this is important for the exchange of traditional knowledge and experience of land users, and preparation of resource maps, land use issue



maps and proposed land use maps can be prepared based on these information. Figure: 14, 15 and 16).



Figure: -16 Resource map prepared during the participatory mapping Process of Pahalagama Tank Cascade



Figure: -17 Land Use Issue Map prepared during the participatory planning process, Pahalagama Cascade





Figure: -18 Proposed Land Use Issue Map prepared during the participatory planning process, Pahalagama Cascade

2. Preparation of Data Tables

Analytical calculations and information can be tabulated and prepared to be included in the plan as needed. Under this, basic information, administrative details, physical information, demographic and economic information, land use information, calculations related to proposed land uses, and other calculations should all be arranged accordingly.

Phase -05 Drafting Land Use Plan (Report)

It consists of several parts. At least such a plan should consist of the following areas:

What are the basic/main objectives for which this will be done?

What problems are you expected to address?

What are the benefits (short, medium, and long term)?

What geographical area is covered? Needed to be clearly stated.

See the examples below:

Strategic Objective

Address issues related to land use and land cover pattern on participatory approach.

Strategic Objective - 01

Examples: Discouraging the trend of encroachment by 5% per cent per annum.

Actions suggested under Strategic Objectives.

- 1.1.1 (a) To implement production potential and crop promotion programs in existing agricultural lands instead of disclosing forest land to agricultural purposes.
- 1.1.2 (b) To make the public aware of the importance of forest lands for the environment and common needs and the benefits of biodiversity conservation.
- 1.1.3 (c) Taking steps to release vacant land, if any, suitable for agricultural use, on the basis of the relevant procedures.
- 1.1.4 (d) Effective implementation of existing laws against unauthorized acquisition of government land.

Phase -06 Implementation Plan

In this plan, the following points should be shown separately according to the different themes. Examples are given below.

Strategic Objectives: Address issues related to land use and land cover pattern on participatory approach (briefly describe the underlying reasons or issues related to this situation).

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Activities	Main Responsible Agency	Supportive Institutions	Estimated Cost	Annual target	Performance indicators
1					
2					
3					

Strategic target: Reduce the trend of unauthorized land grabbing by 5% per annum.

Phase -07 Implementation Mechanism and Monitoring Process

The action plan for the items related to the activities shown under Phase 06 should be shown under this phase.

It should be classified as follows according to the implementation time frame.

Short Term Activities - Projects or programs expected to be completed within 1 and 2 years.

Activities	Priority	Main Responsible Agency
Repair to damaged sluice	1	Department of
of the tank		Agrarian Development
Reconstruction of	1	Department of Wildlife
damaged electric fence		Conservation



Note:

(1) Priority 1 : High2 : Medium3 : Low

(2) Time Frame -	Short Term 1 to 2 years
	Medium Term 2 to 3 years
	Long Term 3 to 5 years (max. 5 years)

Institutional and Legal Framework for Implementation Mechanism

This plan is simply the result of a grassroot level planning process. Therefore, each of the stakeholders is represented at the level of statutory organizations or institutions within the existing legal framework.

Examples:

(i). Representatives of Agriculture Committees and Officers or Members of Farmer Organizations

(ii). Environmental Committee officers, members or representatives of environmental organizations, voluntary organizations, or institutions.

(iii). Appointed village level and divisional secretariat level officials.

Representatives from the following levels could be more useful.

Divisional Secretary Level:

Divisional secretary, Assistant Director-Planning, TO- Irrigation Department, Representative from Forest Department (BFO/RFO), Representative from Department of Wildlife Conservation, Land Use Planning Officer,

At the Agrarian Development Division Level, the following representatives are mostly applicable.



Divisional Officer-Agrarian Development Dept., Representative from Export Crops Dept. and Representatives from Mahaweli Authority of Sri Lanka. (however, this will only be applicable to Mahaweli Areas).

Village/GN Level

Grama Niladhari,, Economiv Development Officer, Agrarian Research and Development, Samurdhi Niladhari, Agriculture Instructors.

The team thus formed represents different levels of the plan implementation hierarchy. It is headed by the Divisional Secretary of the Divisional Secretary's Division, which includes the respective Rural Tank System Zone. The note below makes it clearer.

Tank Cascade Level Landscape Management Planning Committee

PRESIDENT

(Divisional Secretary)

LANDSCAPE MANAGEMENT PLANNING COMMITTEE

Land Use Planning Officer (Convener)

Assistant Director/Deputy Director-Planning

Wanajivi Adavi Arakshaka (DWC)

BFO/RFO-Forest Department

Divisional Officer (Agrarian Development)

Agriculture Instructor

Irrigation Engineer/Technical Officer

Extension Officers (Main Crops and Export Crops)

Other relevant representatives

Note: Tank Cascade Level Landscape Management Committee



Implementation Stakeholders

In this regard, all field officers at the divisional level will take the lead and the responsibilities of implementing. Farmer organizations/ environmental organizations and other public organization representatives and concerned stakeholders including farmers should be fully involved.

Village level officers are proposed to play the role of facilitating and coordinating in this work.

In addition, various organizations and institutions that fund such a planning process may be appointed as members or observers of this committee and may be allowed to do so.

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<mark>Chapter -0</mark>8

The current importance of a Tank Cascade Landscape and their proper Management.

8.1 Current importance

In 2017, the Food and Agriculture Organization of the United Nations designated Sri Lanka's Tank Cascade system as a Globally Important Agricultural Heritage System.

It has been the lifeline of Sri Lanka's dry zone water management for centuries and is the core system of sustainable agriculture and economic revival. There are also four types of environmental services, supportive services, regulatory services, cultural services, and provisioning services.

It is best represented by the image shown on the back cover of this booklet, extracted from the Internet.

8.2. Strategic activities and measures taken for the promotion of rural tank systems:

Strategic activities and measures taken for the promotion of rural tank cascade systems:

1. Reservoir Rehabilitation

- This has expanded the capacity of several small tanks to store water by increasing their capacity or increasing the size.
- Efficient water management has also been carried out by removing silt and renovating embankments and other structures.

2. Integrated Water Management

- New approaches have been introduced by managing rivers and groundwater resources together with the tank cascade system.
- This integrated system has further ensured the availability of sustainable water resources for agriculture as well as for drinking needs and environmental services.

3. Rainwater Harvesting

- Rainwater falling on rooftops or rainwater falling on the ground is collected and used.
- This is most important during the periods of drought when lake water is insufficient.

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4. Improved Irrigation Techniques

- Drip irrigation systems water supply, dispersal methods, as well as more sophisticated and efficient water supply methods, have now been popularized.
- This has enabled the use of water in a sustainable manner, reducing water losses and feeding more land.

5. Climate-Resilient Practices

- Climate change has influenced variations in rainfall patterns and temperature fluctuations.
- Adaptation strategies have already been introduced, which have enabled them to reduce risk and increase resilience.

6. Community Participation and Governance

- This has been ensured by allowing the community to participate in water control and management activities and to make decisions at the village level.
- Thus, community-based organizations at the village level play a major role in the management of tank cascade systems.

7. Technology and Data

- Satellite imagery (remote sensing), computer-based geographic information systems (GIS-Geographic Information Systems), and hydrological models have been used in connection with the operation of tank cascade systems.
- Thus, real-time water supply information and quantity information are exchanged, making it easier for more accurate forecasts and optimal water management.



A well-managed tank cascade system maintains extensive coexistence between man and the environment (including wildlife) and is also the primary expectation of integrated sustainable landscape management. (Photo from the Internet)

Publication of Healthy Landscape Project