Watershed Management

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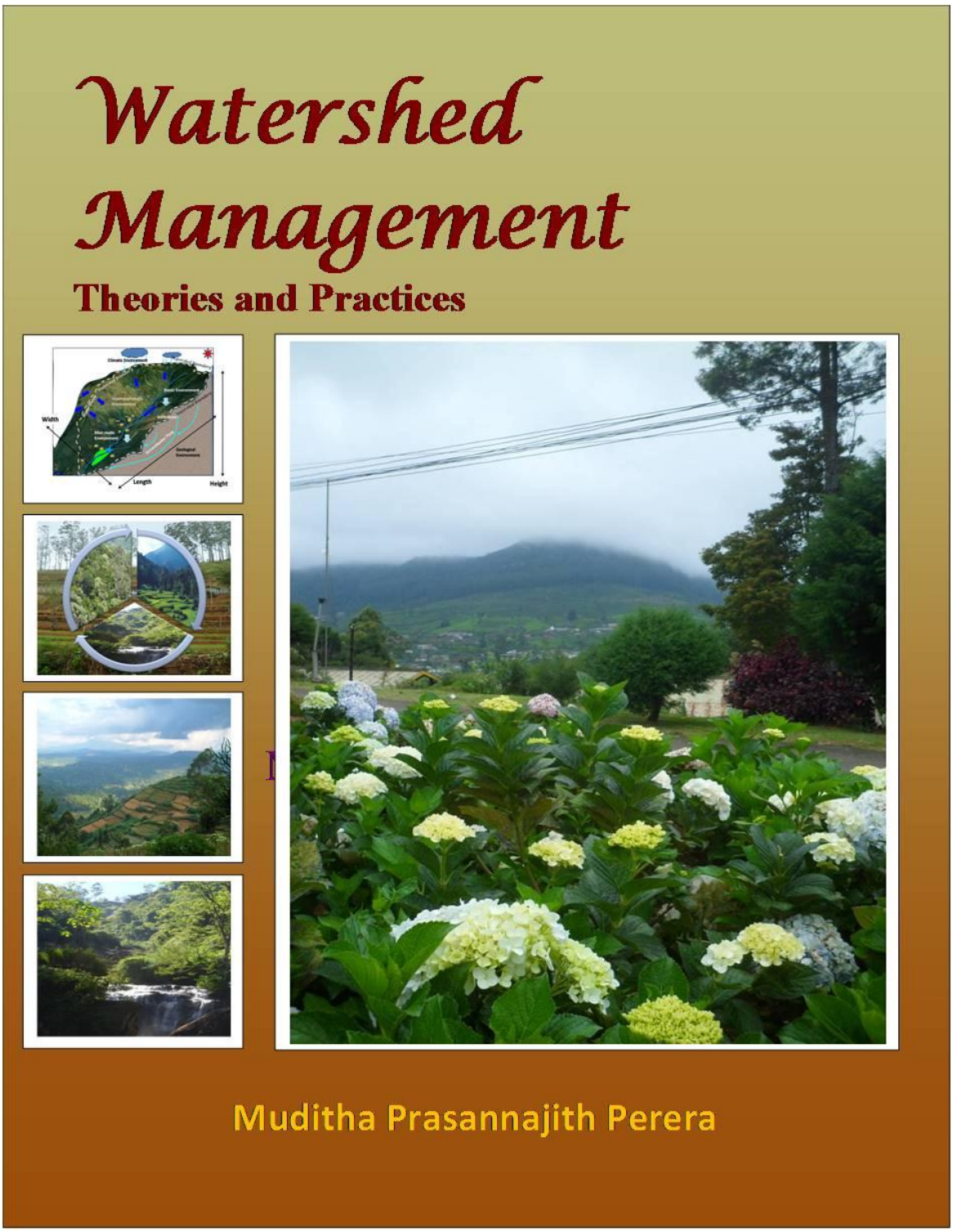


Perera, Muditha Prasannajith (2019),
Watershed Management: *Theories and Practices*,
Colombo; Godage International Publishers Pvt. Ltd.

Chapter 7

The Concept of Watershed Management

"Managing land resources, water resources, forest resources and social system of specifically identified geo-hydrologic area (watershed) can be identified as watershed management".

7. The Concept of Watershed Management

Although there are some records regarding ancient watershed management techniques in some countries, the current watershed management concept has emerged as a "latest approach of managing natural resource base with human interaction within a watershed area".

7.1 Introduction

Watershed is a geo-hydrologic area consisting land, water, forests and man made environment, which absorbs, stores and discharges water through a common drainage point. Further it is a resources unit, identified accurately according to the drainage pattern. The entire system is closely related to the socio economic situation of the area and a number of watershed areas especially in the tropical countries suffer from an unhealthy situation due to various issues related to the watershed degradation (Perera, 2011). That's the reason for implementing a lot of watershed management programmes, by minimizing land degradation and to increase the river base flow as well as the productivity.

"Process of utilization, conservation and development of land, water and forest resources of given watershed, for continuously improved live hood and human development"

-P.N. Sharma, 1997

"Watershed Management is a ecosystem based holistic, integrated and effective action"

- Florida Watershed Management Programm

"Watershed Management embraces all human activities and natural events in a stream basin, oriented towards optimizing the productive use of its resources holistically"

-C.M .Madduma Bandara, 2011

Soil and water conservation practices are the primary step of the watershed management program. Land and water conservation practices, those made within agricultural leads like construction of contour bunds, graded bunds, terraces building, broad bed and furrow practice and other soil-moisture conservation practices, that are known as in-situ management. These practices protect land degradation, improve soil health, and increase soil-moisture availability and groundwater recharge. Moreover, construction of the check dam, farm pond, gully control structures, pits excavation across the stream channel is known as ex-situ management. Ex-situ watershed management practices reduce peak discharge in order to reclaim gully formation and harvest substantial amount of runoff which increases groundwater recharge and irrigation potential in watersheds (Wani and Garg, 2009).

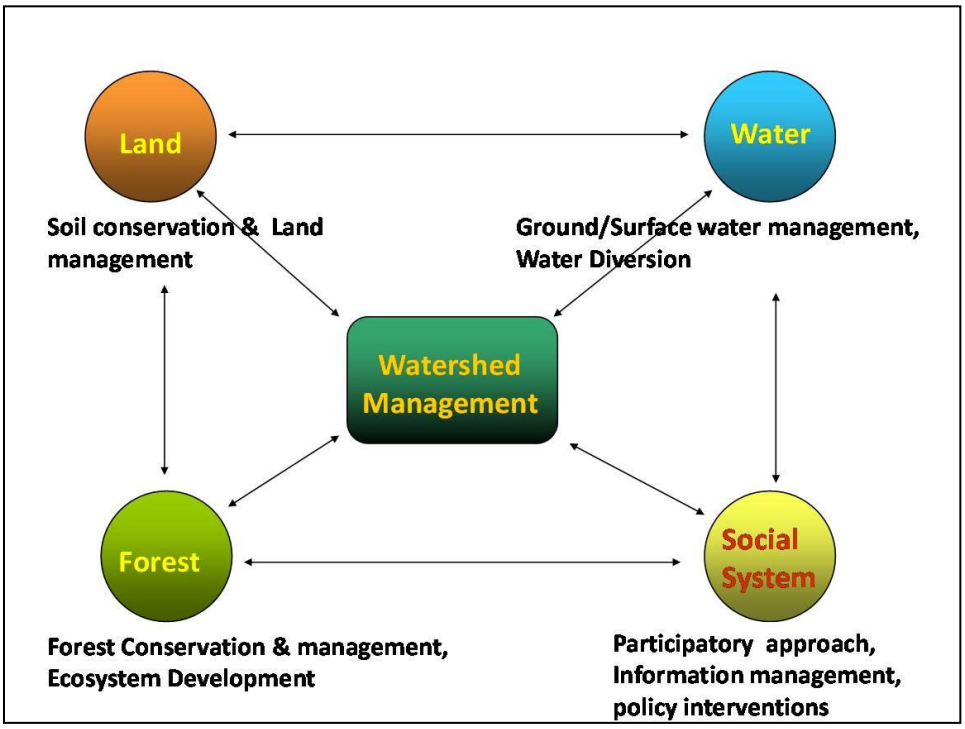


Figure 7.1: Scope of the watershed management

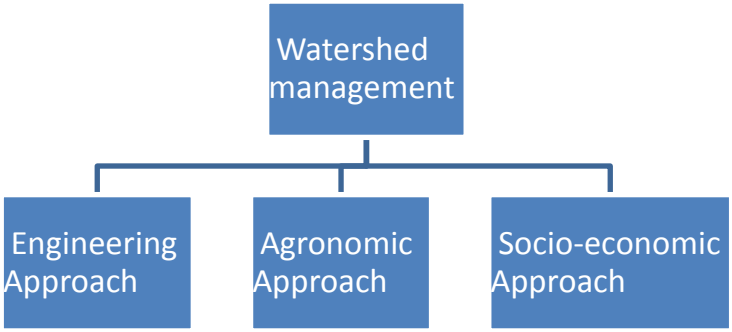
On the other hand, watershed management is an adaptive, comprehensive, integrated multi-resource management planning process that seeks to balance healthy ecological, economic, and cultural/social conditions within a watershed. Watershed management serves to integrate planning for land and water; it 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 (http://www.rdrwa.ca/node/27).

Considering all the ideologies, the term Watershed Management can be defined as **"managing land, water and forest resources with the social system within a specifically identified geo-hydrologic area (watershed) in order to minimize the land degradation, maintain the river base flow and increase the productivity"**.

7.2. Different approaches of watershed management

Managing process of the above resource base can launched by using three approaches. There are three main approaches for watershed Management as, engineering, agronomic and socio-economic approaches.



Engineering Approach: In this approach engineering techniques and methods are being used for watershed management and conservation.

Ex:-Terraces, Contour drains, Contour earth bunds, Small dams

Agronomic Approach: Managing watershed by using forest management or crop science techniques.

Ex:- Changing forest cover, Changing the perennial tree species, Changing crop patterns and agricultural intervention

Socio Economic Approach: Managing watershed by changing or developing socio - economic intervention pattern and attitudes, Institutional development and integration

Ex:- Changing attitudes towards sustainability and development, Participatory approach, Changing the economic activities of the area, institutional integrity and efficiency

7.3 Different aspects of watershed management

The all activities related to watershed management in a geo-hydrologic area can be concentrated into a few aspects. If some of stakeholder group wants, they can manage a watershed by applying more irrigation and water management techniques, or applying soil conservation and land management techniques or applying ecological and forest management techniques or applying institutional and socio-economic techniques.

Most probably, selected aspects can be used by a recognized institutional body. As an example Agricultural ministry of a country may use soil conservation and land management techniques for managing a selected watershed. Then we call that the watershed management programme launched through soil conservation and land management aspect. However, if somebody or institutional body is going to mange a watershed through all these four aspects, it becomes an integrated aspect or holistic approach (Figure 7.2). Generally most suitable way is concentrating all these aspects for a watershed management project.

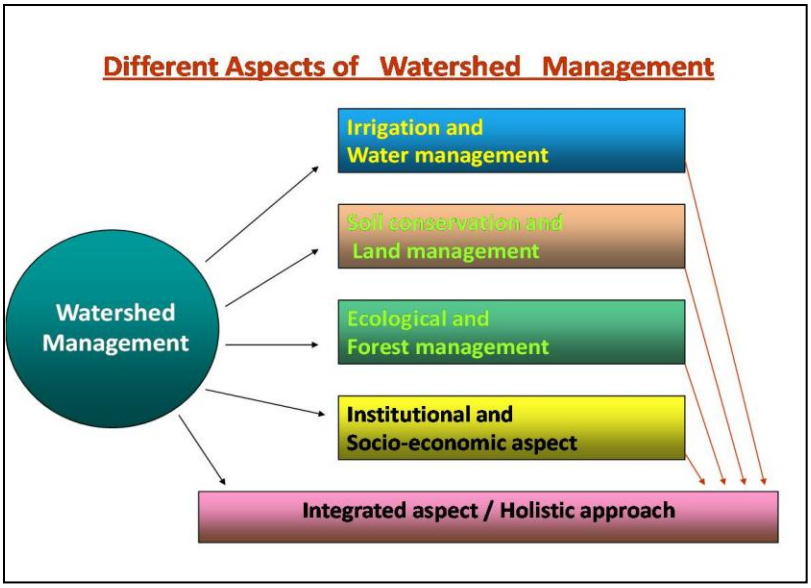


Figure 7.2: Different aspects of watershed management

One of these aspects or all can use for studies in a particular educational body, representing the relevant study aspect.

7.4 The scope and objectives of watershed management

When implementing watershed management activities, all the implementation lay out through a wide range. It may differ simple to complex and large scale activities with number of stake holders. The relevant watershed management strategies may apply, from home garden development to river basin based integrated programme level (Figure 7.3).

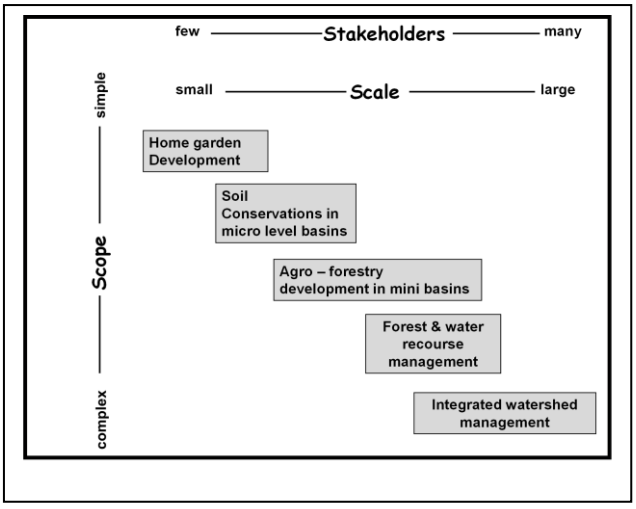


Figure 7.3: Scope and the scale of the watershed management

The activities spread out in a wide range including forest cover development, chena stabilizing, conservation farming, tank and stream ecosystem development, irrigation water management, groundwater management, and participatory planning and development (Figure 7.4). However the entire watershed management activities will fulfill the anticipated three generalized objectives as follows.

i. Minimizing the land degradation
ii. Maintaining the stream base flow
iii. Ensuring a better sustainable production system

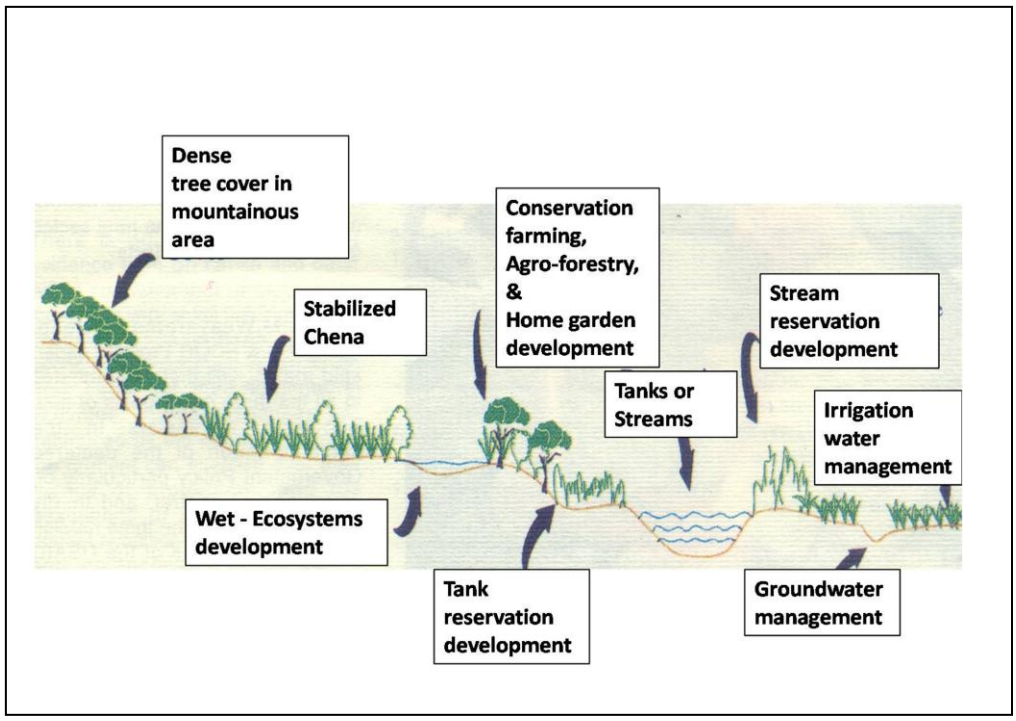


Figure 7.4: Profile of a managed watershed
Source: Author modified from SCOR Monitor, 1994

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http://www.rdrwa.ca/node/27

Watershed Management

Theories and Practices

Muditha Prasannajith Perera

"Dr. Muditha Prasannajith Perera, since beginning of his carrier has shown much interest in the subject of Watershed Management. He has mastered the subject by continued studies and been in association with watershed management professionals and projects related to Watershed management. The author has put his knowledge gained through long experience in working in this discipline into this book. The book very well covers theoretical and practical aspects of the subject. The book will be a comprehensive text book for undergraduate and post graduate students who seek information on theoretical aspects and beyond in watershed management".

Dr. H.B. Nayakakorala,

Former, Deputy Director, UWM Project &
Former, Deputy Director, Natural Resource Management Center, Sri Lanka

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"Watershed Management had been a more recent addition to the western system of knowledge. However, in eastern countries like Sri Lanka, regional divisions as well as some natural resource management techniques were based on river basin or watershed based vision since early periods of history.

This publication ventures into both theory and the practice. It therefore, provides a simple but comprehensive introduction to the subject of watershed management, which has now gained ground as a science itself. Dr. Muditha Perera proceeds this book through an educational approach and a reader friendly style of writing. In addition to the text, it has a sprinkling of large number of descriptive diagrams, tables and photographs. From an overall perspective, the publication would be an ideal reading for the university students, researchers and beginners in the science and profession of Watershed Management".

Emeritus Prof. C.M. Madduma Bandara
Former Vice Chancellor, University of Peradeniya, Sri Lanka.