

Module 1: Basics of Watershed Management**General****Chapter 1.1.3: Objectives, Concept and Principles of Watershed Management****A. Objectives**

The overall objective (or goal) of watershed management is to maintain the social, economic and ecological watershed functions¹ in a balanced manner, and thereby to contribute to the sustainable development and the reduction of negative external impacts in a region [12].

This presupposes that appropriate policies, legislation and institutions are in place [4]. The goal provides the framework for the following major objectives of watershed management ([2], [8], [11]):

- To ensure that beneficial uses of water resources and other related resources are sustained
- To achieve specified and agreed management targets for water and related resources
- To ensure the avoidance of negative off-site impacts (externalities) on water and related resources
- To ensure that negative impacts of human activities on watershed functions are recognised and avoided as much as possible
- To appropriately manage other resources that impact on water, such as land
- To promote social and economic development
- To conserve, minimise the degradation of, or rehabilitate resources and the environment
- To decrease local vulnerability to climatic extremes
- To ensure maintenance of biodiversity

Objectives for watershed management depend on country-specific conditions and often on the priorities of higher ranking development policies and socio-economic development plans². These vary considerably among the different countries, but as one country-specific example, we have listed the watershed management objectives that were adopted by the Lao PDR in the box below.

¹ See also: [Chapter 1.1.2: Watersheds and their Functions](#)

² See also: [Chapter 2.2: National Policies](#)

Box 1: Objectives of Watershed Management, the Lao PDR [7]

Poverty alleviation and an improved standard of living through the maintenance and enhancement of the existing, and development of new sustainable livelihood opportunities.

Improved conservation and protection of forest areas that are important for the preservation of biodiversity and the protection of water resources.

Improved conservation and management of natural resources to be used for economically productive purposes on a sustainable basis, while maintaining and enhancing their social and environmental service function.

Improved water resource management to meet the needs of different water users within the watershed and down-stream of it, both in terms of the quantity and quality required. Increased protection against floods and sedimentation.

Increased marginal productivity values of natural resources, like land, water and forests.

There is a wide range of potential areas of activity and measures to achieve these objectives, including but not limited to ([2], [14]):

- Developing and enacting appropriate policies and laws and building supporting institutions
- Managing the river flow regime to provide overall benefits such as reducing river bank erosion, decreasing sediment transport and accumulation and improving water quality
- Maintaining an adequate supply of water to meet demands for irrigation, agriculture, as well as domestic and industrial uses at acceptable levels of assurance
- Maintaining water quality criteria that meet government standards and other societal norms
- Reducing vulnerability to natural disasters such as floods, droughts and landslides
- Utilising natural resources effectively to mitigate adverse effects, prevent environmental degradation, enhance water yield and increase biomass production
- Promoting appropriate agricultural and forestry land use practises and associated soil and water conservation measures that allow production levels that provide sufficient income to land users without causing any long term negative impacts on the natural resources of the watershed
- Promoting development of the economic and human resources through employment and income generating activities
- Encouraging simple, easy and affordable technological solutions and institutional arrangements that make use of and build upon local technical knowledge and materials
- Improving the economic and social condition of the disadvantaged and those deficient in resources
- Distributing the benefits of land and water resources development more equally amongst the stakeholders

Most of these activities and measures have in some way or other been planned and implemented in the past under the label of watershed management. This possibly explains why there are so many opinions and definitions of what constitutes watershed management. In the following section we will introduce the current concept of watershed management.

B. The Watershed Management Concept

Watershed management is the people oriented supporting process designed to reach the objectives of watershed management. We will use the following working definition for this process:

Box 2: Watershed management is the process of people guiding and organising water, land and forest resource use on a watershed in order to provide desired goods and services without adversely affecting water, soil and vegetation resources [12].

Embedded in this concept is the recognition of the ecological interrelationships among land use, soil and water, as well as the ecological, social and economic linkages between upland and downstream areas. Watershed management balances the three dimensions of sustainable development – ecological, economic and social – in a watershed context.

The above definition reflects the modern concept of watershed management. *Concepts and the understanding* of watershed management have changed over time. This and the fact that there are numerous definitions and related concepts can be confusing. Amongst these related concepts are integrated water resource management, inter-sectoral water management, environmental management, watershed development and integrated watershed management³. We will now provide a brief overview of the way in which the modern concept evolved.

Previously, most water management practices sought to solve single, localised problems without taking account of the wider impacts of such actions on the biophysical, economic and social elements of the larger watershed system. Watershed management was generally understood to be synonymous with technical interventions related to soil and water conservation. The usual objective was to optimise production rather than to maximise the benefits [6]. The following definition, which was first used only about a decade ago, still reflects that: “*Watershed management, or protection, implies the wise use of soil and water resources within a given geographical area so as to enable sustainable production and to minimise floods. The objectives of watershed management programmes are: to increase infiltration into soil, to control damaging excess runoff and to manage and utilise runoff for useful purposes*” [10].

Over the last 20 years a strong global consensus has developed around the notion that the watershed is in fact the logical unit for the management of water resources. Now, countries try to place water management actions in the context of the natural and human systems. Since the 1980’s concepts began to emerge that gave more emphasis to all users of water systems and how their activities affect water availability and quality. Analytical systems (models) were developed that are capable of revealing the range of intervention impacts within the context of the hydrological cycle as a whole. Management policies began to be based on criteria for assessing alternatives in an objective way with the active participation of all relevant regulatory agencies and civil society [6].

Watershed management nowadays provides a comprehensive bio-physical and institutional framework for addressing and solving complex natural resource management problems [1]. There is a continuous effort to optimise the provision of a watershed’s goods and services as an integrated whole and to avoid a sector-specific approach. This effort incorporates the principles of sustainable development and balances its ecological, economic and social dimensions in a watershed context through a people-centred process. This is achieved through the coordinated multi-stakeholder management of land, water and other resources in a region and through a multi-sectoral governance process in which the differ-

³ For more information related to these definitions refer to: [Glossary](#)

ent interests and viewpoints of stakeholders at all levels (government, private sector and civil society) are negotiated ([3], [11], [12]).

The following table provides an overview of the major changes that the concept of watershed management has undergone during the last few decades.

Table 1: The “Changed Understanding of WSM”

	Past	Current
Focus	Single medium: water	Balancing social, ecological and economic aspects
Approach	Sector driven	System approach, cross- and multi-sectoral
Understanding of Participation	Top-down, participation very limited	Bring together top-down and bottom-up, involvement of all stakeholders and the public
Primary Focus	Technical interventions and their implementation	Support negotiation / dialogue process

C. Principles and Conceptual Elements

The current understanding of watershed management, which is based on the lessons from the past, implies that effective watershed management needs to be holistic and interdisciplinary. It has to consider natural as well as human resources, co-ordinate development needs and potentials and include mechanisms of conflict resolution [11]. Modern watershed management has the following principles and conceptual elements:

Holistic and flexible: Neither the natural watershed ecosystem nor the human social and economic systems that exist and operate within it are static. Both are complex and dynamic systems comprising various elements⁴, which interact and influence each other. Therefore it is necessary for watershed management to address identified problems in a holistic way and remain flexible to be able to respond to changes over time.

People-centred and participatory: The degree to which people and civil society actively participate in conservation and resource management is one of the most critical factors that determines the success or failure of the process [9]. Participation enables stakeholders to formulate their interests and concerns and integrate them into decision making, planning and policy development. Participation can take on a more passive form with a relatively low level of involvement as in the ‘top-down’ consultative model. Alternatively, the ‘bottom up’ approach promotes much higher levels of public and institutional involvement and can lead towards civil empowerment and self-mobilisation. Modern watershed management attempts to combine both the ‘bottom up’ and ‘top down’ approaches through negotiation and dialogue⁵.

Negotiation and dialogue processes: Watershed management facilitates the multi-sectoral and multi-stakeholder negotiation processes by providing the necessary platform to examine the interests of the different parties from the overall watershed perspective. This results in the formulation of guidelines or plans for the maintenance of watershed functions, as shown in the following figure.

⁴ See also: [Chapter 1.2.1: Watershed Elements](#)

⁵ See also: [Chapter 1.3.5: Participation](#) | [CS: Watershed Management Arrangements in Australia's Murray Darling Basin](#) [3.1]

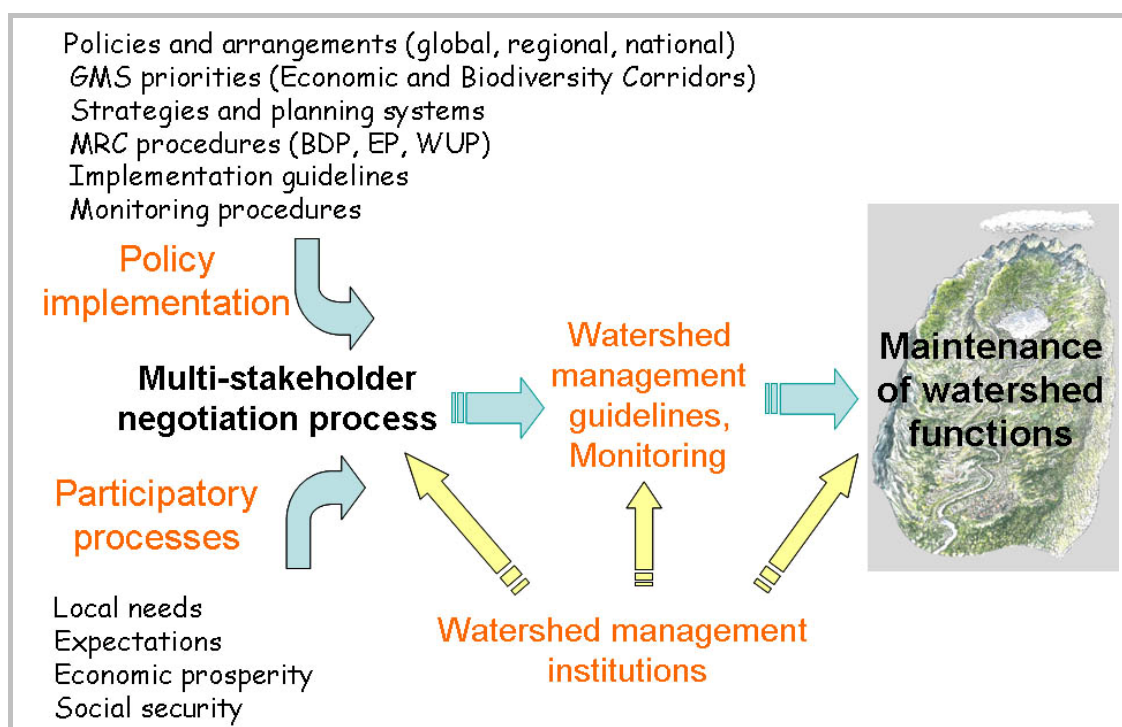


Figure 1: Watershed Management – A Negotiation and Dialogue Process [13]

It is important that dialogue and negotiation take place at all levels between government, non-governmental organisations, the private sector, community organisations and throughout civil society. Government here includes the national (ministries and line agencies), provincial, district and community levels. Dialogue and negotiation should aim to cover policy formulation, institutional support, planning, implementation, monitoring and capacity building. The general aim is to ensure that the negative impacts of individual activities on the watershed functions are recognised and as much as possible avoided and that beneficial policies and practices are identified and promoted [11].

Integration – multi-disciplinary and multi-sectoral: Watershed management is not a sector itself and could instead be perceived as a dialogue process, which draws in all of the relevant sectors – water resources, agriculture, forestry, environment, transport, energy, interior, land management, rural development – and pursues effective collaboration and coordination [15]. The requirement is for ***vertical consistency*** to be achieved between the various “watershed” institutions in the hierarchy of drainage units (river basin, watershed and catchment); ***institutional consistency*** to be achieved between the “watershed” institutions and the territorial administrative hierarchy and; ***horizontal consistency*** to be achieved between the line agencies involved, as shown in the following figure.

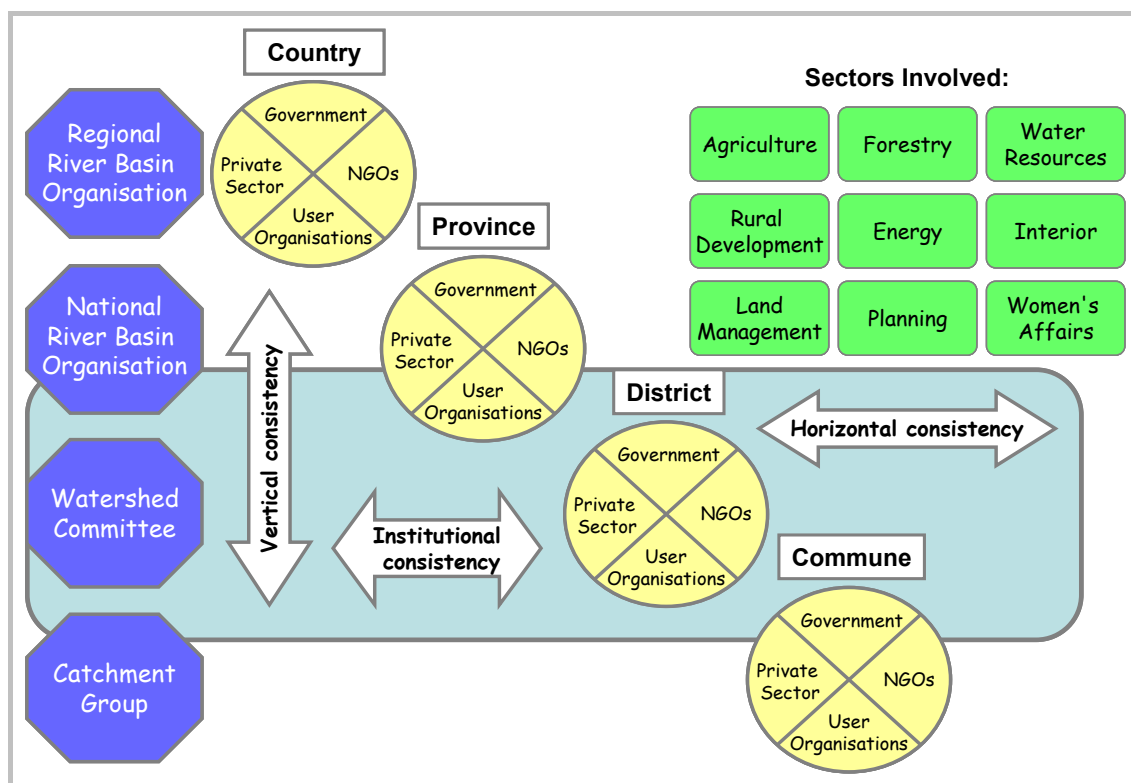


Figure 2: “Watershed” Institutions and Territorial Administrative Hierarchy [4]

Through the involvement of all sectors, watershed management should be based on data, scientific knowledge and factual information provided by the physical, natural and socio-economic sciences, as well as the traditional knowledge of resource users. In this context it is important and necessary to identify an appropriate and context-specific balance between a fully integrated approach and a sectoral approach, which takes into account that both extremes include certain risks⁶ [5].

Considering the above principles the following table provides an overview of what the next generation of watershed management will be characterised by:

Table 2: Characteristics of the Past and Future Generation of Watershed Management [3]

Past Generation	Next Generation
Integration of socio-economic issues within watershed management programmes.	Emphasis on watershed natural resource management as part of local socio-economic development processes.
Focus on the “people” or “community” participation, with an emphasis on bottom-up participatory planning.	Focus on multi-stakeholder participation, linking social, technical and policy concerns in a pluralist collaborative process.
Rigid programme design that overestimates central government’s capacity to enforce policies, and lacks adequate institutional / organisational arrangements at the local level. Short term planning and financing.	Flexible programme design that adjusts to local governance processes. Long-term planning and financing.

⁶ See also: [TA: Risks of a Fully Sectoral and Fully Integrated Approach \[1.1.3\]](#)

Implementation responsibility entrusted to “heavy” institutions, such as donor-assisted programs or government watershed authorities.	Implementation responsibility entrusted to “light” institutions such as watershed management fora, consortiums and associations, with programmes and authorities playing a facilitating and subsidiary role.
Focus on on-site, short term effects. Small-scale projects with little watershed or basin-level coordination.	Focus on upstream-downstream linkages and long-term impacts. Local-level processes coordinated at the watershed or basin level.
‘Quick-and-dirty’ participatory assessment and evaluation with little or no linkage to natural and sociological evidence.	Dialogue between local and scientific knowledge in “fairly-quick-fairly-clean” action research processes, involving a variety of stakeholders.
Belief that access, tenure and social conflicts can be solved by sound technical interventions.	Awareness that most access, tenure and social conflicts in watersheds are rooted in society and politics and should be managed through continuous negotiation.

D. Value Added of Watershed Management

The question may be raised as to the value added of watershed management, compared with other approaches to manage water and natural resources. The following table provides an overview:

Table 3: Overview of the Value Added of Watershed Management [13]

Value Added	Related “Products” of Watershed Management
The impact of activities within a watershed on sustainable development within that watershed is recognised and accepted.	<ul style="list-style-type: none"> • Ecological health • Economic prosperity • Social security
The impact of activities within a watershed on sustainable development on downstream areas is recognised and accepted.	<ul style="list-style-type: none"> • Ecological health • Agreed upon upstream downstream relationship
All relevant stakeholders are involved.	<ul style="list-style-type: none"> • Participatory processes • Local ownership • Policy implementation
An established and accepted process is in place.	<ul style="list-style-type: none"> • Functioning institutional framework

References and Sources for Further Reading

- [1] Brooks, K.N., Folliott, P.F., Gregersen, H.M., Easter, K.W. 1994: Policies for Sustainable Development: The Role of Watershed Management. [hardcopy]
- [2] DSE, 2001: Integrated Watershed Management Planning. Training Manual. [unpublished]
- [3] FAO, 2006: Forestry Paper 150 – The new generation of watershed management programmes and projects. [hardcopy]
- [4] Feldkoetter, C. 2006: The Mekong River Commission and the Watershed Management Project. Power Point Presentation. [unpublished]

- [5] Global Water Partnership (GWP), 2006: Global Water Partnership – Toolbox. Creating an Organisational Framework – Forms and Functions.
http://www.gwptoolbox.org/en/listoftoolsFrame_en.html
- [6] Heathcote, I.W. 1998: Integrated Watershed Management – Principles and Practice. John Wiley & Sons, Inc., New York, Chichester, Weinheim, Brisbane, Singapore, Toronto. [hardcopy]
- [7] MAF / DANIDA, 2002: Evolving Concept, Practice and Issues of Integrated Watershed Management in Lao P.D.R.
- [8] MRC 2002: Basin Development Plan. Regional Sector Overview Watershed Management.
- [9] Pacific Regional Agricultural Program, 1997: Participatory Methods: Background Information on Terminology, Approaches and Common Principles for Agricultural Rural Development. PRAP Leaflet No. 11. [hardcopy]
- [10] Tideman, E.M. 1996: Watershed Management – Guidelines for Indian Conditions. Omega Scientific Publishers, New Dehli. [hardcopy]
- [11] Tuyll C. 2004: Brief Introduction to the Agriculture, Irrigation and Forestry – Watershed Management Programme. [unpublished]
- [12] Tuyll C. 2006: What is Watershed Management all about it? [unpublished]
- [13] Tuyll C. 2007: MRC GTZ Watershed Management Programme – Consultative Meeting. Capacity Building Package 1. Power Point Presentation. [unpublished]
- [14] Wiesmann, U. 1999: Integrated Management of Watersheds – Trans-disciplinary Approaches at Multiple Scales. A Summary of Presentations. In: Workshop Proceedings on Concepts and Methods for Institutionalising Watershed Classification and Watershed Management in the Lower Mekong Basin, Vientiane, Laos, 16 - 17 November 1999. [hardcopy]
- [15] WSMP, 2005: Second Policy Dialogue on Watershed Management in the Lower Mekong Basin. Proceedings. MRC / GTZ / InWent.

Additional Visualisation Materials

[VM: Relationships between Watersheds and Administrative Hierarchies \[1.1.3\]](#)

[VM: Watershed Management – A Negotiation Process \[1.1.3\]](#)