

Theme	2. Advancing Human Development and the MDGs
Topic	2.4 Multiple uses of water, e.g. domestic water supply and irrigation
Main Question	How can Multiple Uses of Water Systems which simultaneously address several key livelihood and development needs (water for domestic needs, food security and nutrition, income generation, habitat support, energy generation, transportation, and tourism) be better recognized and further strengthened in their governance and day to day management ?
Related sub-questions	<p>Q1 Types and characteristics of multiples uses of water systems? How to evaluate the value of the benefits of multiple use services with respect to people's livelihoods and MDGs? How do the benefits of such services relate to their costs and compare with single use water system approach?</p> <p>Q2 How can community based multiple use services be developed, supported and scaled up, through different technologies, financing mechanisms, water resources management measures and institutional models? What are the roles of various stakeholders including decentralised authorities in supporting and managing multiple-use approaches to water services?</p> <p>Q3 How to specify and manage the various type of services to users with full consideration on water quality in a Multiple uses system? What are the mechanisms for remunerating the service provider (operator) of the system?</p> <p>Q4 What are the legal, political, financial, institutional barriers faced by multiple-use systems? What kind of institutional reforms or strengthening processes are needed to further facilitate the governance of multiple services? What are the mechanisms towards multi-stakeholders governance for MUS systems?</p>
<u>General introduction</u>	<p><u>introduction</u></p> <p>Multiple uses of water is attracting an increasing attention of decision makers and water professionals from different perspectives, of course domestic water and irrigation, but also power generation, environment and tourism, etc. Many water systems although designed to serve only one use have become de facto a multiple uses system, serving many more uses and users than initially planned, designed and managed for. In this potentially win-win situation, important questions on management remain not answered: How to assess properly the various uses? How to value them? How to govern multiple uses system? How to operate them? How to define, produce, deliver and remunerate the water services? How to ensure water quality matches various needs?</p> <p>The Multi-dimensions of water systems: Uses, functions, roles and purposes</p> <p>It is worth noting the multi-dimensions nature of water systems going often beyond the strict notion of uses (domestic use, irrigation use, hydropower). There are also several functions, roles and purposes associated to water management. For instance the role of water in health (water related diseases), the function of flood protection associated to irrigated paddy cultivation, the multi purposes of a reservoir. Further more one need to look</p>

carefully at positive and negative externalities of the water process. In this introduction paper, the focus is on multiple uses but implicitly we bear in mind a broader concept of multiples uses, purposes and roles of water. In figure 1 we sketch out a typology of situations where the multiple uses or purposes of water systems is explicit. Figure 2 relates to the multi-functions of water systems and productive practices they support. Table 1 lists aspects that are related to this multidimensionality grouped purposes and uses in one category and functions and roles into another.

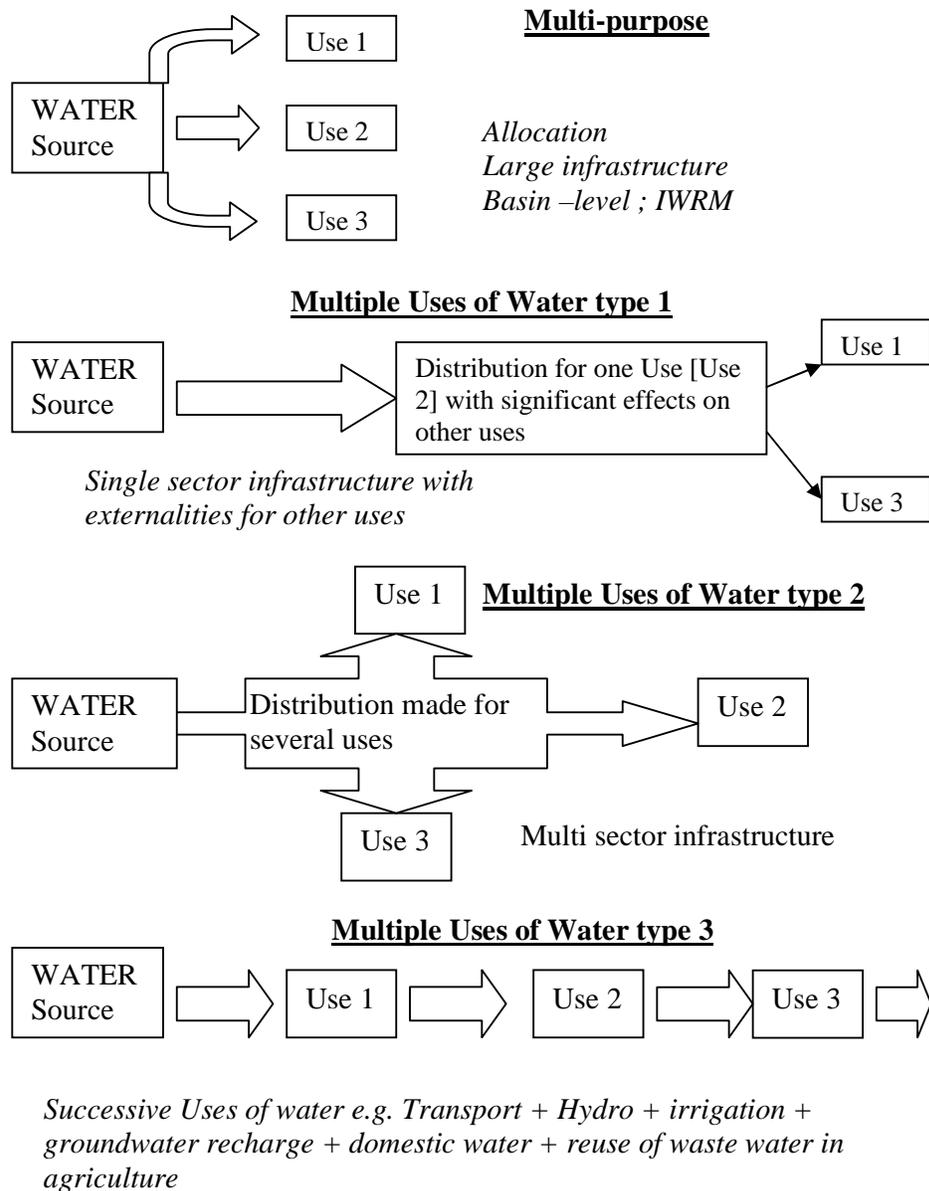
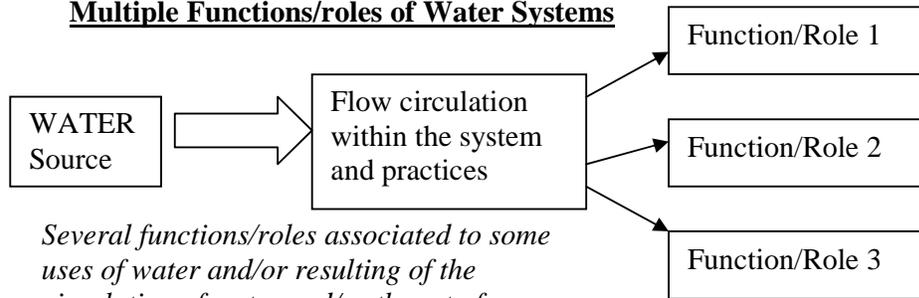


Figure 1. Typology of Multiple Uses/Purposes systems

Multiple Functions/roles of Water Systems



Several functions/roles associated to some uses of water and/or resulting of the circulation of water and/or the set of practices associated with water management

Figure 2. Multiple Functions/Roles linked to water systems

Table 1. Classification of functions, uses, purposes and roles

Purposes and Uses	Functions and Roles
<ul style="list-style-type: none"> • Domestic water • Hygiene and sanitation • Irrigation • Transportation • Hydropower • Environmental flows • Flood protection 	<ul style="list-style-type: none"> • Flood protection • Groundwater recharge • Support to fishing • Tourism • Support to natural ecosystems (biodiversity) • Health: water related diseases, support to medicinal trees. • Social functions linked to the infrastructure and management • Recreation • Soil conservation • Habitat improvements (raw materials for construction, shade, cooling effect,...)

Some functions are rooted in the social and cultural aspects of water management; others are related to the hydrological processes, others to the biological and ecological processes. Some of these functions are indirectly linked to water but direct effects of agriculture practices supported by water management.

The increasing pressure on resources and uses

The notion of multiple uses of water is not something really new in practice, one needs simply to look at the many traditional community based water systems (tanks, spring, small scale canal, etc..) which have been used for centuries in domestic water as well as in irrigation, and to a less degree to the multi-purposes water infrastructures constructed in the XXst century [multi-purposes reservoir].

However recently it has gained much more attention recently as the result of:

- emergence of conflicts among different water users (e.g. between hydropower and fishing activities or irrigation)
- increasing needs to improve management efficiency and to introduce

water accounting mechanisms

- introduction of IWRM
- introduction of water pricing mechanisms
- increasing concerns on water quality
- consideration of natural ecosystem services (including aquatic ecosystems such as wetlands)
- increasing pressure to deal with pollution and preserve the environment from untreated water waste.
- pressure to internalise the externalities (water quality and pollution, water born disease and health, ...)
- basin management approach and the closing of basin
- need to reduce the unit costs (investment and running) of water services to allow serving more people.

all these aspects of water management have contributed to a large extent to illustrate the intricacy of uses and functions with water trickling down throughout the landscape following complex pathways from the source to various users and beneficiaries.

Defining the system for Multiple Uses

The notion of multiple uses of water is somehow associated to the system in which water circulates and we understand here the concept of multiples use to that of sharing the same infrastructure system (network). Of course one can argue that the entire basin is a multiple use of water system where drops are used many times for the same or several uses before reaching the sea or the atmosphere, but in that case the concept of IWRM is the right one. Thus to remain practical and to embrace the dimension of management and operation we consider here the multiple uses water at the scale of the system however this domain under consideration includes very often surface and groundwater as both are affected by water management. This system approach may also sometimes include water reuse from urban areas for various beneficial uses, when safety concerns are adequately addressed.

We will further consider two types of system:

- community based small scale MUS system
- medium to large irrigation based MUS systems

By system here we consider the surface area covered by the distribution network, for instance the command area in irrigation, and the below subsurface system which encompasses groundwater. In irrigation multiple uses of water are often misunderstood as conjunctive of surface and groundwater.

Multiple Uses as a multi-dimension cost-effective answer for the poor and the disadvantage groups

The multiple uses of water is for the poor communities an opportunity to have several water services with the same infrastructure, therefore diminishing drastically the cost of each service taken separately. It also increases the diversity of outputs they can get from their natural environment, for instance mixing agriculture with fishing activities has strong impacts on the nutrition of many poor communities. As the livelihood approach is central to developing multiple use water systems, they tend to address concerns of poor women and man better than single use irrigation projects.

	<p>In this regard management must take into consideration constraints and risks associated to water quality of surface and ground water if used for domestic/drinking.</p> <p>Quantification of multiple uses and services is critical</p> <p>The recognition of multiples uses has made progresses during the last decade in particular through extensive water accounting procedures that have revealed the magnitude of this practice. Managers of many irrigation systems have then discovered that the water they were considering as losses were in fact serving many other valuable uses. For instance in many rice paddy systems of Asia, but also in old surface irrigation systems of France, it is not rare to record that crop water use is only $\frac{1}{4}$ or $\frac{1}{3}$ only of what is withdrawn from the natural streams. The remaining part being used for other purposes such as recharge, support to perennial vegetation and/or returned to the natural streams.</p> <p>The issue of efficiency in MUS systems</p> <p>In a multiple use system the concept of efficiency must be holistic: improving the efficiency in only one sector might be achieved at the expense of other uses. Water resource allocation strategies are being developed for a more economically efficient and sustainable water utilization with special regard to reuse of poor quality waters in agriculture. The beneficial impacts resulting from reuse water in agriculture or for groundwater recharge, with regard to conserving quality water for domestic consumption, economic aspects in cost-benefit analyses of a more rational water use have come to play a central role in developing cost-efficient strategies and effective water pricing.</p> <p>The questions ahead</p> <p>Although in many places the establishment of the basic facts are still to be made through water balance procedures in many others the multiple use of water is to a certain extent well established at least as far as the water uses/consumption is concerned.</p> <p>There are still big questions left for both systems, community based or large professionally operated systems :</p> <ul style="list-style-type: none"> • how to value the different functions and uses of water • How to define the best decision mechanisms for X-Uses • How to define the water services • How to remunerate the water services • How to estimate the cost associated to these services • How to best design institutional arrangements and mechanisms to remunerate the service providers by the users and beneficiaries whoever they are.
<p>(Types of) Organizations to be involved in topic consultations</p>	<p>Water User Associations, Federations of WUAs</p> <p>Local civil society: NGOs engaged in community development</p> <p>Irrigation agencies/corporates:</p> <p>Power producers:</p> <p>Tourism actors:</p>

	<p>International Agencies: FAO, IUCN, WEC, National Governments: Association(s) of agricultural producers: IFAP International Associations: ICID, GWP Associations and networks: MUS Network, INWEPF Research Institutions: IRC, IWMI, Winrock Multilateral donors: World Bank, AFDB, ADB,IFAD Environmental agencies / NGOs: WWF, Wetlands International,</p>
<p>Process of paper and session development:</p>	<ol style="list-style-type: none"> 1. Draft 1 of topic scoping paper to be sent to key institutions for comments 2. Improved draft to be placed on website 3. Improved draft with comments received to be discussed at the February coordinators meeting to: <ol style="list-style-type: none"> a. Agree on key questions b. Agree on the topic document so that it can be placed on the Forum web- site c. Agree on key stakeholders to take part in the development of the topic d. Agree on consultation process: relevant meetings with key stakeholders e. Agree on the process and actors to develop the forum session.

For Reference:

Question 1	Types and characteristics of multiples uses of water systems? How to evaluate the value of the benefits of multiple use services with respect to people's livelihoods and MDGs? How do the benefits of such services relate to their costs and compare with single use approach?
	<i>This question focus on the issues related to quantification of uses and services, cost and values.</i>
<u>Statement 1</u>	
<u>Statement 2</u>	
<u>Statement 3</u>	
<u>Statement 4</u>	
(Types of) Organizations to be involved in session consultations	

Question 2	How can community based multiple use services be developed, supported and scaled up, through different technologies, financing mechanisms, water resources management measures and institutional models? What are the roles of various stakeholders including decentralised authorities in supporting and managing multiple-use approaches to water services?
	<i>This question focus on specific issues pertaining to community based multiple uses system.</i>
<u>Statement 1</u>	
<u>Statement 2</u>	
<u>Statement 3</u>	
(Types of) Organizations to be involved in session consultations	

Question 3	How to specify and manage the various types of services to users in a MUS irrigation based system? What are the mechanisms for remunerating the operator of the system?
	<i>This question focus on specific issues pertaining to irrigation based multiple uses system.</i>
<u>Statement 1</u>	
<u>Statement 2</u>	
<u>Statement 3</u>	
Statement 4	
(Types of) Organizations to be involved in session consultations	

Question 4	What are the legal, political, financial, institutional barriers faced by multiple-use systems? What kind of institutional reforms or strengthening processes are needed to further facilitate the governance of multiple services? What are the mechanisms towards multi-stakeholders governance for MUS systems?
	<i>This question focus on issues institutions for MUS.</i>
<u>Statement 1</u>	
<u>Statement 2</u>	
<u>Statement 3</u>	
Statement 4	

(Types of) Organizations to be involved in session consultations	
--	--

Process of session development:	<ol style="list-style-type: none"> 1. Draft 1 of session description to be sent to key institutions for comments 2. Improved draft to be placed on website/included in announcements 3. Call for session participation (March 2008) and selection of candidates 4. Collaborative work to develop sessions, with or without resource base assistance
---------------------------------------	---

References

Barker R. Matsuno Y. and Masumoto T. 2006 Special issue on “Multifunctionality of paddies” Paddy Water Environment Journal Springer.

FAO 2004 Traditional use and availability of aquatic biodiversity in rice-based ecosystems Cambodia (Edrs M. Halwart and D. Bartley)

FAO Water Reports No 30 Stakeholder-oriented valuation to support water resources management processes: confronting concepts with local practice. [Imperial College IUCN IWMI FAO]

JIID JSIDRE 2002 Proceedings of the pre-symposium for WWF3 on “Multi-functional Roles of paddy field irrigation in the Asia Monsoon Region” 300 pages.

IUCN 2004 Emerton L. Bos E. Value: counting ecosystems as water infrastructure. IUCN Gland Switzerland and Cambridge UK 88 pages

IWMI Research Report 98 Barbara van Koppen, Patrick Moriarty, and Eline Boelee “Multiple - Use Water Services to Advance the Millennium Development Goals

IWMI, 2007. Comprehensive assessment, Colombo, Sri Lanka.

JIID Proceedings of the pre-symposium for the WWF3 on Multi-functional roles of paddy field irrigation in the Asia Monsoon Region 20-21 March 2002.

Renault D & M. Montginoul. " Positive externalities and water service Management in Rice Based Irrigation Systems of the Humid Tropics " (Ag. Wat. Mgt. Journal, 59 171-189; April 2003).

Renault D. Hemakumara M Molden D. 2001 Importance of water consumption by perennial vegetation in irrigated areas of the humid tropics evidence from Sri lanka. *Agricultural Water Management. Vol 46 Issue 3, January:201-213.*

Renwick Mary E. 2001 Valuing Water in Irrigated Agriculture and reservoir Fisheries : a multiple use irrigation system in Sri lanka Research report 51 IWMI.

Stef Smits and Patrick Moriarty 2004 Towards Multiple Use Water Services Background paper for the E-mail conference on Multiple Uses of Water. IRC International Water and Sanitation centre The Netherlands.