ORIGINAL ARTICLE

Learning Alliances for the broad implementation of an integrated approach to multiple sources, multiple uses and multiple users of water

Frits W. T. Penning de Vries*

Abstract 'Multiple use systems' are systems that allow efficient and effective supply of water from different sources to communities for their domestic and for their productive purposes and that allow interaction with providers of water related services. Such systems are probably highly desirable from the perspective of using scare water efficiently and also from the perspectives of gender equity and improving livelihoods. It is therefore useful to carry out scientific research to validate this statement about a water-innovation. The mode of research must be 'action research'.

The specific form and management of multiple use systems depends on local biophysical and socio-economic factors, as well as on local institutions and legislation. Eleven 'corner-stones' need to be in place to realize a full multiple use system. Since a blue print cannot be made and many parties are involved, 'learning alliances' are to be set up in specific geographic areas and at national level to identify how much of these cornerstones of multiple use systems are still lacking, and to work together to create or implement these. Guidelines for setting up Learning Alliances and for actually implementing systems of multiple water use are needed.

Keywords Learning alliance · Action research · Integrated water resource management · Upscaling · Domestic water · Productive water · Implementation · Multiple use systems · Innovation

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Introduction

Why does 'integration' need special attention?

Communities at the scale of villages or settlements in catchments use water for multiple purposes: 'domestic' water for drinking, cooking, cleaning, sanitation, and 'productive' water to earn an income such as by gardening, rearing livestock, brick making, growing of field crops (Yoder, 1983; Van der Hoek *et al.*, 2001). They source water from wells, canals, rivers, reservoirs, and so on (Meinzen-Dick and Van der Hoek, 2001). In small traditional communities integration around water is obtained through informal insight, experience and discussion. Achieving equity among gender and wealth groups in the communities is often not a local priority (Van Koppen, 2001). In larger communities, groups of stakeholders can have representatives in water user associations (Faysse, 2004).

As communities increase in size and wealth and demand more and/or better water, government organizations respond. Since governments are usually structured such that domestic water and productive water are dealt with by different departments, their single-target responses tend to be uncoordinated. Such interventions achieve sub-optimal efficiency and, more importantly, are often not sustainable (Moriarty *et al.*, 2004). Hence, we do need to give particular attention to integration, or perhaps better: to re-integration.

What should be integrated?

Water is crucial for a wide range of activities of every person and in every ecosystem and environment. It is available in limited quantities, and can be used, wasted, lost, polluted, stored, transported, re-used and recycled. Optimum use by an individual user or a single process can be achieved by focussing at a single objective. Optimum use for societies and ecosystems, however, means meeting multiple objectives, and integrated approaches to water use and supply are required. Biswas (2004) argues that while integrated water resource management is a good principle, there is no guideline to operationalize it. We believe that operationalization is feasible by following a gradual, multipartner joint learning approach. That will allow the handling three dimensions of 'integrated approaches to water': (i) *spatial* dimension: across what area to integrate? (note that water catchments are logical units for integration of water management, but communities integrate also social and financial needs that are generally not constraint by catchment boundaries); (ii) *temporal* dimension: over how much time to integrate and find the optimum solution?, and (iii) the *social* dimension: recognize the water sources and needs from different stakeholder groups and aim at acceptable compromises in water usage.

How to integrate users and users?

There are no blueprints for multiple water use systems for at least four reasons: (1) 'optimal' is judged by end users and not by planners, (2) user's criteria and perspectives for 'optimal' change over time and with development, (3) water sources may change (climate change), and (4) reality is too complex for general solutions. Multiple processes of optimization proceed in parallel, continuously and locally. Capacity building of people and organizations is necessary to allow them to identify their own multiple use optimum solutions.

In the 1990's, participatory approaches were introduced to involve rural stakeholders in formal management of resources through participatory approaches and with a view to facilitate and accelerate uptake of innovations (Engel, 1995). These involve NARES as sources of

information and targets of capacity building, and later also farmers and farmer organizations (Penning de Vries *et al.*, 2000). Other categories of stakeholders, however, need to be involved for an effective and speedy adaptation and adoption process. The project TRANSCOL (Technology Transfer program on Water Supply Treatment) in Bolivia successfully promoted Inter-Institutional Regional Working Groups (IRWG's) to bring stakeholders together and learn how best to adopt the innovation of multi-stage filtration (Visscher *et al.*, 2005). CIAT (Centre for International Tropical Agriculture) and CARE started in S. America a 'Learning Alliance' on agro-enterprises, and after that with the Catholic Relief Services (CRS) in Africa. In their words: a Learning Alliance is 'a process undertaken jointly by research and development agencies through which research outputs are shared, adapted, used and innovated upon to strengthen and create local capacities, improve the research outputs, generate and document development outcomes and identify future research needs and potential areas of collaboration.' (Lundy, 2002). We expand the definition to include the end users of the innovation and define a Learning Alliance as 'a group of organizations and individuals in a particular area with a shared interest in an innovation and the scaling-up of that innovation'. A Learning Alliance follows a flexible but structured, re-iterative path to progress.

Multiple water use systems are little researched as such. How people tap 'productive water' (often from irrigation supplies) for household use, or 'domestic water' (generally piped) for small productive purposes (e.g. gardens) has been well documented. This literature confirms the demand for holistic views. But studies that address multiple use systems from the outset, analyze practices how these are achieved, with a view of recommending improved planning method are rare (judged by our global literature collection of the subject (MUS, 2005)). Hence, positive results obtained in some countries are difficult to access and to repeat in other places.

This paper describes briefly how the MUS-project is adopting Action Research to evaluate multiple use systems and learn lessons to do that effectively, and starts using the a Learning Alliance approach for significantly outscaling and upscaling of integrated systems for multiple use of water. We have no new facts yet, but process documentation to acquire them has been initiated in five river basins. A first update to this paper is already being prepared (Van Koppen *et al.*, 2005).

The MUS project

The project Multiple-Use Systems (MUS) was created in response to a call for research proposals by the CGIAR-Challenge Program for Water and Food (CPWF, 2005). Its first phase is funded by the CPWF from 2004 till 2008, and new partners and donors are joining. The CPWF aims at stimulating innovative ways of doing water-research, at broad partnerships, and particularly at impact.

In most countries, the water sector is fragmented into sub-sectors, the most important ones from a the point of view of resource management and multiple use services being those dealing with domestic water supply, sewerage and waste-water, irrigation, and other productive uses of water in small and medium enterprises. Other relevant water sectors include local government, rural development, social welfare and health, livestock, fisheries, forestry and environment. In the past, centralised planning has made it difficult to achieve the flexibility needed to bring these, typically, governmental stakeholders together to work effectively at the local level. In other cases, it is the inadequate capacity of local planners that promotes

ENTRY POINTS IN PRIORITIZING WATER USES

ENTRY POINTS FOR ENGINEERS

		1	2		3
		DOMESTIC USES	AGRICULTURE		LIVESTOCK
FOR LIFE	1	DRINKING-COOKING	IRRIGATION		DRINKING
FOR BETTER WELFARE	2	HYGIENE			HYGIENE
	3	COMPLEMENTARY USES			COMPLEMENTARY USES

ENTRY POINTS FOR PEOPLE

Fig. 1 Entry points into multiple use systems from different angles (source: CINARA)

fragmentation. The problem is illustrated in Figure 1. The current trends towards increased decentralization and capacity building provide an opportunity to bring back flexibility.

The ultimate objective of MUS-project is to '*enhance land and water productivity, improve rural livelihoods and promote gender equity*' (see http://www.musproject.net/index.php/ intranet). MUS does this through promotion of multiple-use systems, in particular by designing, testing and promoting models, guidelines and tools for the upgrading of existing systems to systems where sources, users and users are effectively integrated. We also formulated two objectives:

Capacity building: To engage, inform, prepare and strengthen the capacity of project partners and of other participants of Learning Alliances, including professionals and policy makers from the domestic and productive water sectors in NGOs, government, financing institutions, private sector, and development organizations, to jointly promote a 100-fold wider implementation of multiple-use water supply systems after this project.

New knowledge: To generate new knowledge and synthesize existing knowledge into innovative models, guidelines, and tools that can be used to produce quantifiable positive impacts on the food security, income, work load, health and well-being of the poor, particularly of women and children, HIV/AIDS victims and child headed households.

The first objective has platforms of stakeholders in its focus and the Learning Alliance is its key approach. The second objective supports the first; it focuses at end users of water and uses Action Research as it main approach. But the two are interwoven: doing effective action research has its own elements of a learning alliance, and the alliances cannot perform well without some action research.

In MUS, Action Research and Learning Alliance will be carried out at various locations in five CPWF-basins: Indus-Ganges (India), Limpopo (Southern Africa), Mekong (S.E. Asia), Nile (NE Africa), and the virtual Andes (S. America) basin. Sites have been selected with local partners. There are quite different experiences with m.u.s. in each of these basins that

Table 1 Lead partners in the MUS-project

Name	Key expertise	Key geographic area
International Development Enterprises (IDE), USA	Implementation small scale water technologies	S. Asia
International Water and Sanitation Centre (IRC), Netherlands	Domestic water policies and dissemination	W. Asia, L. America
International Water Management Institute (IWMI), S. Africa, Ethiopia, India, Thailand	Management agricultural water, policies	Asia, Africa
Khon Kaen University (KKU), Thailand	Land and water management	Thailand
Mekelle University, (MKU), Ethiopia	Land and water management	Ethiopia
CEMAGREF, Unité Mixte Recherche Eau, France	Water pricing	Europe

Table 2 Associate partners for implementation at the basin level (and the list is growing)

Name	Key expertise	Key geographic area
Association for Water and Rural Development	Community mobilization and development	S. Africa
Catholic Relief Services	Community development, micro-finance, sanitation	Africa
Centro-Agua	Participatory water research	Bolivia
CINARA	Participatory water research	Colombia
IDE-Nepal and the Smallholder Irrigation and Marketing Initiative (SIMI)	Community development, marketing	Nepal
Local Wisdom farmer organization	Community mobilization and development, policy advocacy	Thailand
Population and Community Development Centre (PDA)	Community development	Thailand
Mvula Trust	Community mobilization and development, water	S. Africa
Population and community Development Association (PDA)	community development; self financing	S.E. Asia
World Vision S. Africa	Child care and welfare, community development	S. Africa

can be relevant for the other basins. The project started to gather data, analyze these, compare experiences and produce an integrated overview.

MUS has a wide range of expertise, skills and contacts in science and in rural development. At the moment, it has six lead partners (Table 1) that complement each other and has a growing list of associated partners (Table 2).

To operationalize the concept of 'multiple use systems', partners must share a conceptual framework. We conceived the framework based on experiences and insights of all partners (Boelee *et al.*, 2004) using the LearningWheel method (Hagmann, 2005) and defined its 'cornerstones': elements that must be in place in order to have a full multiple use system, be it at the end user, the district or the national level. We identified eleven cornerstones (Figure 2, Box 1). We use these to focus attention, to see in what areas international exchange to be promoted, and to measure our progress in research and capacity building. For each cornerstone, MUS will establish the base line information. Research and implementation actions are derived from these cornerstones, some of which do apply and can be realized for all sites. The framework also allows integration of the results into the bigger picture. The framework will guide the iterative process of action, reflection and joint re-planning, and help to integrate conceptual development, planning and knowledge management (Van Koppen *et al.*, 2005).
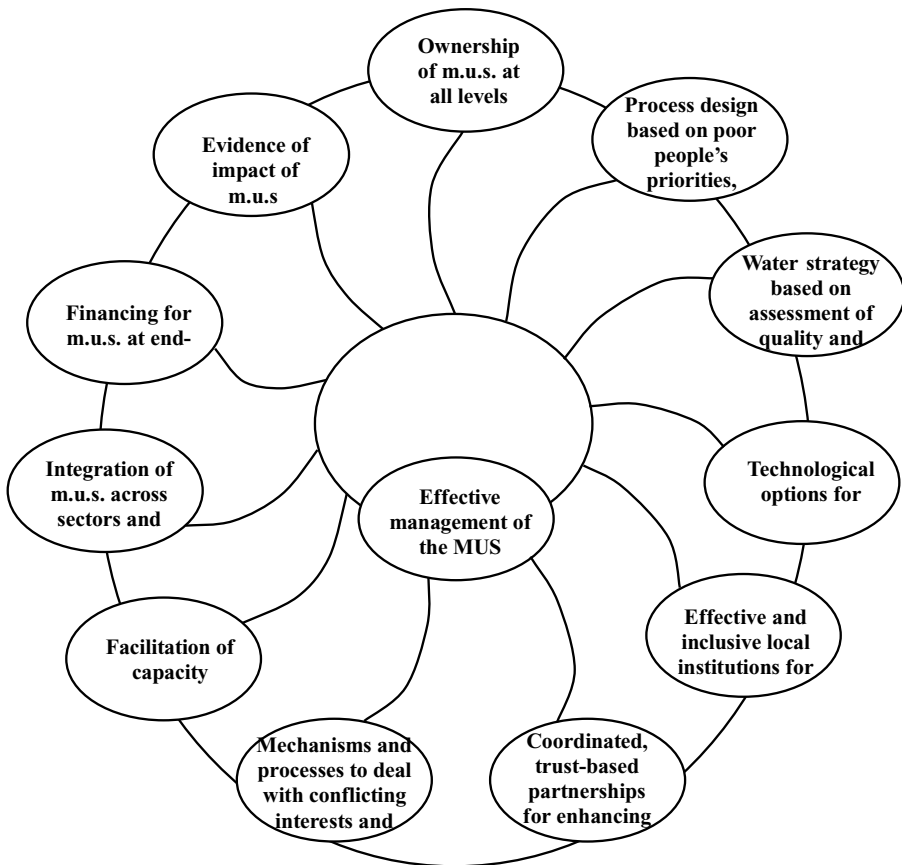

Fig. 2 The eleven cornerstones that must be in place in order to realize a full multiple use system and services (Boelee *et al.*, 2004). The connections between the cornerstones indicate that all interdependent but not that there is any particular sequence to be followed. The central element in the diagram is about management of the MUS-project and does refer to the concept of multiple use system

Box 1. Eleven cornerstones for multiple use systems with some key words to characterize them (Boelee *et al.*, 2004):

  1. Ownership of 'multiple use systems' at all levels
        understanding of the concept at local, district and national levels.
  2. Process design based on poor people's priorities, problems, perspectives.
        interventions should fit livelihood strategies.
        participation in decision making.
        involve local wisdom.
  3. Water strategy based on assessment of quality and quantity
        relate quality to purpose of use.
        consider upstream and downstream uses.
  4. Technological options
        appropriate and affordable technologies.
        tariff structures that reflect diverse users to promote equity and empowerment.
  5. Effective and inclusive local institutions to manage multiple use systems
        need for champions, leaders.
        gender sensitive.
        promote social capital.
  6. Coordinated partnerships for enhancing multiple use systems
        trust based partnerships.
        facilitation, coordination, learning alliance.
        influence policy levels.
  7. Mechanisms for conflict resolution.
        with willing pasrtners
        with unwilling partners
  8. Facilitation for upscaling of multiple use systems
        aim for practical results, not academic.
        often limited capacity for implementation.
  9. Integration across sectors and levels
        break down horizontal and vertical barriers.
        local government may have narrow mandates, incentives, capacity.
        cooperation 'moves mountains'.
        institutionalize new knowledge.
 10. Financing for multiple use systems at end user level
        resources from public and from private sectors are used.
 11. Evidence of superiority of multiple use systems
        proof is more convincing than theory.
        better basis for upscaling.

The Learning Alliance approach for multiple water use systems and services

The first objective of MUS is to build capacity to achieve a 100-fold wider implementation of multiple-use water systems than what the project itself can do (3000 households). With this ambitious aim we hope to contribute to achieving the Millennium Development Goals (World Bank Group, 2002). To have a realistic chance of achieving this, we start with it from the beginning. But how?

Researchers typically come into a community, do their research (participatory or otherwise), produce a report and academic papers, do a 'dissemination workshop' and, urged by the sponsor, move on to the next project. Often, there is no consolidation of lessons learned, no true sharing of results, and no development of local ownership. Uptake and scaling-up is left to ill-defined processes of 'dissemination' and 'advocacy'. In addition, many research projects do not allow for building the capacity of staff working in the relevant institutions such as local government, private sector, NGOs or extension services. This approach clearly does not prepare for major upscaling.

Implementers have also innovated: rope pumps, community gardens, family ponds and community small-dams are well-known innovations coming from the field. Many of such innovations are well integrated into the local water use system, but still have often failed to go to scale. One of the reasons for the failure is that scaling up is not carried out within an institutional, organisational, economic, physical and/or environmental setting that is realistic to that country or region. Examples of practices that are handicaps for uptake include: input subsidy for farmers, paying for people's participation, the use of subsidized facilitators to overcome bottlenecks, creation of parallel structures to bypass 'failing' government, use of highly motivated project teams that cannot be replicated, unrealistic levels of resources for base line studies, demonstrations, vehicles etc.

Connectivity to the local situation, continuity and learning must all be ensured to take innovations to scale. What is needed is 'a group of individuals or organisations with a shared interest in innovation and the scaling-up of innovation', or for short: a Learning Alliance. A Learning Alliance is a structured platform of a range of partners in a particular geographic area with different concerns (those of the various end users) and capabilities (implementation, regulation, policy and legislation, research, learning, documentation and dissemination). It breaks down barriers to sharing of information and creates a means for negotiation, and thus to speed up the process of identification, adaptation, and uptake of new innovation. Working together in implementation and research within an alliance of practitioners, researchers, policy makers and activists will lead to greater impact and more potential to go to scale through development of (i) capacity of Learning Alliance members, (ii) ownership of the concepts and process, and (iii) locally appropriate innovations.

Good results with a Learning Alliance approach for natural resources management by communities have already been registered in ten Asian countries with respect to adoption and impact (Gonsalves and Mendoza, 2003); the term they used to describe the movement is 'learning by doing' and 'learning spiral'. The gradual process builds capacity and implements solutions to jointly felt problems. Visscher *et al.* (2005) report that the TRANSCOL project with a learning alliance approach 'avant la lettre' resulted in significant outscaling (repetitions) and upscaling (adoption by authorities) and appeared sustainable (in as far as this shows in one decade).

Probably the most important element of a successful Learning Alliance is a shared understanding of the problem to be solved and a set of common objectives. All organisations participating in a Learning Alliance should have a vested interested in dealing with a specific issue and in the innovation to overcome it. The first step of establishing a Learning Alliance is therefore scoping and defining the area of intervention, and identifying the stakeholders to be involved in it. The MUS-basin core team will begin the process with a 'vision' in mind. In the early steps of setting up the Learning Alliance they will work in 'advocacy' mode: selling the idea to potential partners. But relatively quickly it must shift into a 'facilitator' mode: helping the new partners to understand, adapt, and own their own vision and objectives that will undoubtedly diverge from the starting point!

Learning Alliances are always context specific. Hard rules about who should be involved and in what manner cannot be formulated. It may depend on the specific topic of work, organisations available and interested, resources available, etc. The key points are to have a common vision as to what the objectives of the alliance are, and to include stakeholders from implementation, policy, regulation, learning and dissemination backgrounds. Deciding who is to be involved in a Learning Alliance is critical to the immediate success of sharing the results of action research, and to the likelihood of successful scaling-up. The choice should be based on a thorough process of stakeholder analysis and a clear view of the role that partners will take in further uptake and scaling-up. Table 3 provides an example of the result of stakeholder mapping; Box 2 shows factors to consider in partner selection.

Box 2. Factors to take into account in the selection of participants for a Learning Alliance:
   ongoing work that is relevant to the issue or innovation;
   personal interest;
   ability to commit and take decisions;
   ability to provide resources (financial, human);
   potential to take up findings (become a champion);
   ability to block or impede the project (local politicians).

Effective communication between members of the Learning Alliance is crucial. Elements include: identifying and understanding different perspectives, constant checking that there is still common understanding, sharing results and experiences horizontally and vertically, shared experimentation and learning within the boundaries of existing or realistically attainable institutions and policies. The methods used for communication draw on approaches from a range of disciplines: adult education and capacity building, action research, process documentation, dissemination and sharing, and process facilitation.

When there are two or even three levels of Learning Alliances involved, information flows in all directions are critical to ensure that ownership of (and responsibility for working with) the findings of pilot activities is achieved. The flow of appropriate information between different levels is enhanced by having an alliance, but it may also need professional facilitation.

Towards a guideline for Learning Alliances

A Learning Alliance follows a structured yet flexible and re-iterative path to progress. Tables 4 and 5 present a draft of the main and generic 'steps' needed in the process of establishing and working with a Learning Alliance at the National level and at the District level. They guide our processes of establishing Learning Alliances at different levels, but clearly should not be followed mechanistically. The processes to promote Learning Alliances needs to be dynamic, flexible, and fuzzy (as in 'fuzzy logic': i.e. not very precise, responsive to the actual situation, gradually improving). The 'steps' in the tables are like markers or waypoints on a journey that may start from several different points and follow several different routes, but in which most of these markers will have to be visited at least once. For example, in the beginning the activities may be initiated at the national level and then go to the local level. But it is equally valid to start at the district or at community level if, for example, an implementing partner is already involved in work there. What is important is that, wherever we start, we end up with a proper alliance that carries within it the necessary elements to allow for fast scaling-up.

Table 3 Example of matrix for mapping stakeholders for a multiple use systems Learning Alliance

Category	Stakeholder	Role in Learning Alliance	Strength	Weakness
Regulation/policy making	Ministry of Water	Review norms and standards	Capacity to scale up	Politicised
	Ministry of agric.	Create enabling policies	Capacity to scale up	Politicised
Innovation	National/local University	Research on new methodology	Strong in content	Often isolated; academic
	Government Research	Research on adoption, impact	Access to sites	Under resourced
Planning	Local government	Adopt MUS approach in planning	Capacity to adopt and support uptake	Politicised, under-staffed
Implementation	Dept. for Domestic Water	Scale up through implementation	Big reach; continuous presence	Politicised, under-staffed
	Private sector actors	Scale up through implementation	Sustainable, flexibility	Unaccountable; profit oriented
	International NGO	Scale up through implementation	Strong capacity	No long term continuity
	Dept. of irrigation	Investments and extension support	Strong extension officers	Sectoral bias; lack of flexibility
Dissemination/advocacy	Association of Municipalities	Mobilise other district councils	Big reach; credibility	Little content expertise
	National resource centre (NGO)	Document and disseminate lessons learned	Strong capacity	Isolated, under-resourced
	Local University	Research and documentation	Formulate messages	Isolated; under-resourced
Service provider	Community based organizations with district council	Manage the m.u.s. after project completion	Local level, relatively well skilled	Lack of empowered communities
	Local private sector	Day to day operations and maintenance; spare parts	Local level; flexible	Lack of skills, profit driven

Table 4 Creating a Learning Alliance (LA) at the National level; the process is iterative particularly in steps 4 and 5

Step	Objective	Activities	Tools	Outputs	Remarks
Step 1: Scoping	Come to an agreement as to the boundaries of the issue	Discussion within partnership	Discussion	Short (1–2 page) description of issue for use with stakeholders in steps 2 and 3	• Discussions at district level normally start from innovative work that people may want to scale up. • At national level: identify the 'innovation' to be introduced.
Step 2: Mapping stakeholders	Know who is somehow engaged with the issue defined earlier	Initial stakeholder mapping exercise (likely to be repeated in next step)	• Functional matrix • RAAKS tools (Rapid Appraisal Agricultural Knowledge Systems)	An initial list of likely stakeholders who may be approached to join the national LA	• Different types of functions are to be represented • Normally, one targets the line ministries and national organisations from whom the district organisations depend.
Step 3: Creating interest in a national LA, and formalizing it.	• Reach agreement on the common objective • Consolidate commitments • Review the m.u.s. cornerstones • Identify roles	• Stakeholder workshop • Institutional SWOT • Meetings with key stakeholders • Make TOR LA explicit	• Strength weakness, opportunities, threat analysis • Sector scan of tools	• Terms of reference for the LA • Determine the degree to which cornerstones are in place and which ones are missing or need work.	• Initial contacts can take place before the workshop. • Good facilitation will be essential, particularly when there are blockages or good opportunities to take innovations forward. • It may be necessary to create a National Steering Committee with its own secretariat.

Table 4 (*Continued*)

Step	Objective	Activities	Tools	Outputs	Remarks
Step 4: Planning and design	• Scoping of national process finalized • Agreed structure and scope of learning and implementation process	As above	Project cycle management tools.	Work plan for the LA: clear plans for planning, design of interventions, implementation, monitoring and evaluation	• For each step roles and responsibilities need to be defined between the member organisations. • Some activities, especially around policy development, may not have proper project cycles. Interactions with the LA-workplan are still needed
Step 5a: First year: Identify pilots	• Pilot areas agreed • roles and tasks partners defined	In district level discussions with stakeholders ascertain interest, suitability	• Stakeholder mapping • Resource assessment	Reports on • Institutional 'readiness' • Water resource assessment • experiences elsewhere	• Criteria may include: commitment of organisations in district, presence of representatives of national stakeholders in district, ongoing initiatives, etc. • The criteria for institutional linkages are crucial.
Step 5b: Later on: Carrying out activities in pilots	Get a larger part of the missing m.u.s. cornerstones in place	field work, lobby, information campaign, discussion sessions	as relevant to the cornerstone	Progress reports on improving the cornerstones	The actual activities and results may be quite diverse among sites and countries. Communication vertical and horizontal, as well as between MUS project members in other countries, is crucial.

Table 5 Creating a Learning Alliance (LA) at the District level. May features are similar to those of the National level LA. Particularly steps 4 and 5 are re-iterated after one or two years

Step	Objective	Activities	Tools	Outputs	Remarks
Step 1: Scoping	Agree on the boundaries of the issue	Discussion within partnership	Discussion	Short (1–2 page) description of issue for use with stakeholders in steps 2 and 3	Discussions start from innovative work that people may want to scale up.
Step 2: Mapping stakeholders	Know who is somehow engaged	Initial stakeholder mapping exercise	Functional matrix	An initial list of stakeholders who may be approached to join the district LA	Different types of functions (water users, water providers) are to be represented
Step 3: Set up District LA	• Establish a District LA • Reach agreement on objectives • Create commitment • Set up a forum for implementation	• District level stakeholder workshop • District level institutional SWOT	Workshop		The criteria may include: geographical conditions, ongoing initiatives, presence of stakeholders in the village, etc.
Step 4: Planning and Project cycle at district level	Structure the learning and implementation process	Interaction between the District and the National LA (possibly with pilot villages)	Frameworks for planning, design of interventions, implementation, monitoring and evaluation	• Pilot villages can take part, so that Steps 3 and 4 coincide. • For each step roles and responsibilities need to be defined between the member organisations	Ensure that new planning and implementation approaches tailor as closely as possible with existing ones–and that where changes are necessary these are designed and are acceptable at both district and national level.

Table 5 (*Continued*)

Step	Objective	Activities	Tools	Outputs	Remarks
Step 5a: Identify pilot villages	• Identify potential pilot villages/ communities • Have pilots as members of LA			Pilot sites identified with reports on readiness and the five capitals	A 'champion' for m.u.s. in the district or village is very helpful.
Step 5b: Later on: Carrying out activities in pilots	Get a larger part of the missing m.u.s. cornerstones in place	Field work, lobby, information campaigns, discussion sessions	As relevant to the cornerstone	Progress reports on improving the cornerstones	Actual activities and results may be quite diverse among sites and countries. Communication vertical and horizontal is crucial.

In MUS we will further elaborate on these principles and practices to promote Learning Alliances and summarize these in the form of a guideline. What this guideline for upscaling through Learning Alliances may look like by the end of a project? Ideally it will be a sort of 'toolbox', electronic or printed, in which the table provides the framework, and in which the tools, outputs, activities and objectives have been validated and updated. It should be accompanied by case studies from projects (in the different basins, for instance), based on the process documentation; successes, failures, lessons learned etc. An electronic version will allow users to click on, for example, a tool, and then pull up a fact sheet that talks them through how to use that tool, with the fact sheet in turn linked to a case study in which it has been used.

Action research on multiple use systems

The second objective of MUS is to gain new knowledge with respect to multiple use systems and its water services. Research on multiple use systems and services is much needed, since the benefits and cost under various conditions are not fully worked out, and hard scientific proof of the value of the concept is required before donors will be convinced to support major activities in upscaling. Research is also needed to prepare and evaluate guidelines. We envisage that two sets of guidelines are needed: one for implementers of multiple use systems for end users, and one for development of Learning Alliances.

Extensive debates about participatory approaches have shown the importance of involving stakeholders in the analysis of development problems and in the design of possible solutions for communities. This will help to identify the *relevant* aspects of the problems, create *ownership* of these problems and the solution, and build the required *skills and capacities* to tackle similar future problems and manage the solution in a sustainable manner. Research with the stakeholders as active partners is called 'action research'.

Action Research needs also to be designed to reflect the realities of research and support agencies. This implies procedures with of (annual) cycles of problem identification, solution identification, action, reflection, learning lessons, identification/modification of new solutions. Such cycles must also be linked to the planning processes of the partner organisations. The challenge is to realize a workable harmonization without excessive bureaucracy and rigidity. Action Research implies the need to manage the field activities adaptively, in contrast to following strict procedures or logframes, since blueprints to common developmental problems do not exist, and intermediate level actors need to be empowered to be responsive. Hence another challenge for Action Research is to allow for management flexibility without compromising scientific rigor.

The framework of Cornerstones (Figure 2, Box 1) guides Action Research in four ways:

- As a tool for common understanding and vision. It helps to learn together and to recognise the complexity and get a grasp of how to handle it. In particular it leads to a solid research framework that all partners can contribute to without going back to the research leader too often.
- As a frame to design new activities. In setting up new activities, the context can be analysed together with the main stakeholders and the main areas of interventions of the projects can be defined on the basis of the joint analysis.
- As a frame to monitor and evaluate on-going activities in basins in a strategic way. Basin teams can use the frame to reflect on their intervention and analyse the state of the art for each cornerstone. This helps them to reach a common perspective on where they are, what they consider success and what the knowledge and design gaps are in their existing intervention in an iterative way.

- As a knowledge management tool. The lessons and experiences and methodologies/tools used to enhance each of these cornerstones can be collected, synthesized across programmes and put back into the framework. This way, the frame will build up and enhance a rigorous and systematic learning in institutions/networks. Increasing operational knowledge from different actors on how to manage successful m.u.s. can be integrated in the common frame.

The steps in Action Research that follow from the framework are:

- Document the functioning of systems that were designed for multiple use and of systems that were not designed as such (with the eleven m.u.s. cornerstones in mind) and compare them in terms of water use efficiency, contributions to livelihoods, income and gender; for the documentation. MUS has a liaison scientist in each of the basins to collect information with local partners.
- Assemble documents on m.u.s. as well as relevant documents from other sources for internal and external use (MUS, 2005).
- Analyze these documents to determine costs and benefits for both cases (designed as m.u.s. and not-designed as such) to determine impact of effective multiple use systems on the five capitals for development (human, social, financial, physical, natural, see Merrey *et al.*, 2005).
- Draft a guideline for implementation of multiple use systems, and draft a guideline for the creation of learning alliances (Tables 3–5 are preliminary versions).
- Implement at sites in all countries systems that are multiple use by design, usually by up-grading existing systems, and evaluate and improve the draft guidelines; this is particularly the 'action' part in the research and involves much collaboration with NGOs and (other) national partners.
- Document the process of formation of learning alliances and analyze the results from all project sites to test the guidelines and improve them; this involves much 'action' with local partners and end users of water.
- An annual review is made of progress in view of the m.u.s. cornerstones, of understanding of the costs and benefits of the multiple use systems, and the impact they have on livelihoods, income and equity.

While research in MUS will have CPWF-funding until 2008, it is expected that it will require several more years of time to follow developments at pilot sites and to determine the full impact (e.g. Moriarty *et al.*, 2005), and also to improve the contents and functionality of the guidelines (languages, medium, tools, etc). For that, we will seek additional funding, and collaborate with partners among the NGO's and farmer organizations that implement projects that will last 10–15 years.

Discussion

Even though the arguments that integrated multiple use systems are better than un-integrated systems and that learning alliances are a better way forward, proof of these statement cannot yet be provided. Not only because little research has been so far but also because the successful cases have hardly been exposed to sustainability tests with respect to environment and institutions. While time will tell, we do need to improve our insights, research concepts and methods to be able to provide conclusive answers and shorten the time to reach many people in need of better water solutions.

Water users will often not optimize their water use *perse*, or that of other natural resources, but their household income or livelihood. In that optimization, water is only one of the elements and may be even a minor issue (until it runs out). In other words: 'integration' is a process where water and other resources are continuously and interactively optimized by different groups and at different scales. Integrated use of water is an example of fuzziness *par excellence*. But that does not mean that the concept is 'useless' or cannot be made operational. It does imply that in some learning alliances 'water' will not be the centre but has a secondary role.

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