DEVELOPING CAPACITY FOR AGRICULTURAL WATER MANAGEMENT: CURRENT PRACTICE AND FUTURE DIRECTIONS

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Abstract

This paper defines concepts of capacity and capacity development for agricultural water management, and particularly the contributions made by ICID in this area in the recent past. Working from a theoretical framework of overlapping domains of capacity development – the enabling environment, the organisational and the individual domains, with knowledge management as a cross-cutting theme – the paper reviews previous work in the field and then summarises a range of case studies from the sector which illuminate key aspects of these different domains.

The paper notes the need to accommodate a rapidly-changing context for agricultural water management to take account of the increasing demand for water resources in all sectors, and the consequent requirement for support of new approaches to capacity development. These new approaches emphasise the growing importance of authentic knowledge, internally-generated learning and self-development, whether at the level of the organisation or the individual. The paper also recognises the need for continuing and long-term support of capacity development, particularly in processes of organisational and institutional change, where there is no single set of guidelines or practices which will fit every situation. Specific directions for future work are suggested, including increased attention to monitoring and evaluation of capacity development, and closer links to emerging work on water governance.

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1. The context

1.1 Challenges facing the sector

The final decades of the 20th Century and the first years of the new millennium have been characterized by ever increasing competition among sectors for water resources. The importance given to issues related to climate change and its impact on the environment - with water at the forefront - has changed priorities and perceptions among governments across the world. Currently, agriculture accounts for 70 percent of the total water withdrawals of the globe, an amount that sectors like domestic water supply, industry, manufacturing and maintenance of ecosystems have begun to question and dispute. More than ever the international community is keeping track of water use allocations and demanding higher water use efficiencies across the board. Monitoring and evaluation of water consumption patterns is now an integral component of any agricultural development effort. A corresponding capacity development thrust related to agricultural water management that can assure high utilization standards of water (and other) resources has accordingly gained importance and priority.

Coupled with this is the fact that liberalisation of economies in the developing world is now more the rule than the exception. Open markets, diminished trade barriers, reduction of subsidies and other policy changes have led to a decreasing role of the state. An enhanced and enlarged participatory approach in decision making and renewed efforts to improve governance and accountability has changed the equation and “business as usual” is no longer a valid alternative. As a response, the agricultural water sector has been engaged in a profound reform process, of which irrigation management transfer (IMT) is a leading example. The devolution of responsibility of the management of the irrigation systems from government control to private organizations (like water users associations and others) is now a worldwide phenomena, with more than 60 countries engaged or planning to do so (FAO, 2007). Within this IMT process, capacity development for agricultural water management has emerged as a necessary - albeit not sufficient - component.

Under these new institutional arrangements, where farmers no longer play a passive role in handling their affairs but rather have gained importance, both as individuals and as part of newly established groups, their needs to lead and make decisions has brought to the forefront an emphasis for developing capacity for agricultural water management at various levels: individually, organisationally and in the policy environment.

1.2 Definitions of capacity development

The need for individual and organisational capacity to support development initiatives has long been important. Even during the decades of the 60s and 70s when the emphasis of development assistance was on physical infrastructure, the need for local capacity to manage the infrastructure was apparent and efforts were made to develop appropriate capacity through training and support programmes. This trend increased during the 80s and 90s with the change in emphasis from physical infrastructure to social and human development. This brought in turn an enhanced focus on institutions and human resources which lead to an increasing interest in notions of capacity development and questions about how best to increase capacity, both of individuals and of the organisations in which they work.

As a result, a number of agencies and organisations began to work very actively in the field, in an attempt to define the concepts and to document best practice. This intensive phase of work lead to a range of definitions, both of capacity and capacity development. One of the simplest and most effective definitions of capacity comes from the UNDP:

> "Capacity is the ability of individuals and organisations … to perform functions effectively, efficiently and sustainably" (UNDP 1998)

Capacity is thus seen as the ability to do the right things in the right way and for the long-term. The focus is not just on capacity to perform day-to-day tasks (the core functions) but also to look to the future, taking a strategic view of goals and overall objectives, and how these might change over time.

Whilst many people and organisations may have inherent capacity to deliver their core functions, for others there is a need to support and develop their capacity, particularly as they take up new roles and responsibilities. Originally termed capacity building, the preferred term for this process has now changed to capacity development. 'Development' emerged as a more appropriate term than 'building' because it reflects a change in approach from external actions and physical activities to internal processes of growing and evolving, which is more in keeping with contemporary trends and approaches. In addition, an emphasis on development implies a focus on means rather than ends, and highlights the need for capacity to be continually responding and changing to meet new long-term challenges. A considerable amount of work has now been completed around the twin concepts of capacity and capacity development (Pres 2008). The experiences reported here reflect the contribution made by the International Commission on Irrigation and Drainage (ICID) and its partners to this work.

1.3 ICID's conceptual framework

Over the past few years, ICID has played its part in investigating the needs and opportunities for capacity building for agricultural water management to meet the challenges facing the sector. After a period of preparatory work, ICID, along with partners in FAO and the International Programme for Technology and Research in Irrigation and Drainage (IPTRID), began a process of intensive work and study on capacity development. This commenced with a workshop held in Montpellier in 2003 and the preparation of Water Report no. 26, resulting from the proceedings of the workshop (FAO-ICID, 2004).

Water Report no. 26 confirmed a simple conceptual framework for capacity development, the origins of which can be discerned from a range of earlier work. This framework suggests that capacity development needs to be addressed in three domains or levels:

- enabling environment

- organisation
- individual

Recent work has suggested the addition of the cross-cutting theme of knowledge to these three domains (Figure 1).

Figure 1 goes here

In the domain of the enabling environment, there is a need for a supportive and enabling policy framework, which provides organisations with the appropriate administrative and legal context in which they can operate effectively and efficiently. The policy framework also sets the overall strategic goals and directions for organisations, and establishes mechanisms and incentives for achieving those goals. Whilst it is unusual for capacity development programmes to include policy-making initiatives explicitly, policy-making needs to take explicit account of capacity development and to be clear how policy initiatives are to be implemented. Problems of implementing irrigation management transfer in some countries (see, for example, the paper by Huamanchumo et al in this collection) provide very clear examples of the need to take account of capacity shortfalls before implementing such policies.

Next is the organisational domain of capacity development, the ability of organisations to perform their functions efficiently, effectively and sustainably. Sometimes referred to as the 'institutional' level, 'organisation' is the preferred term, since it relates specifically to the allocation and co-ordination of responsibilities within groups of people to deliver services. Capacity development therefore requires giving attention to how organisations are structured and how individuals relate to these organisational structures so that they can deliver services effectively and efficiently. Institutions can also refer to the rules and principles by which people and organisations interact. Whilst these, too, are important in the way that organisations function, they are often informal and uncodified, so they are less susceptible to development initiatives. In practical terms, few capacity development programmes can set out to develop institutions, in the sense of the (often informal) rules and norms by

which people operate. However some writers such as Ostrom explicitly address these issues (Ostrom, 2005) and the paper by Leathes et al in this collection explores how some of Ostrom's ideas work out in a practical setting.

The third domain at which capacity development operates is that of the individual. In the past this has been the primary focus of capacity development initiatives, since this has been the most obvious and easiest point at which to try to make changes, principally through various forms of training. The capacities of individuals continue to be important, and this element of capacity development is concerned with developing the knowledge, understanding, skills and abilities of individuals to perform their roles within their given organisational structure. Training retains a significant role in this respect but current ideas go beyond traditional approaches to training and propose new ways of changing and enhancing knowledge, skills and understanding such as networks and social learning (Mati's paper in this collection looks at some of the issues involved). Human resource management and development issues such as recruitment, development, and appraisal are also important aspects of capacity development at the individual level.

Increasing knowledge is an important feature in the capacity development of individuals, and is often the primary objective of training programmes. Knowledge is also an essential resource for organisations, underpinning their ability to deliver their core services and grow to meet new challenges and opportunities. For these reasons, knowledge management is becoming an increasing pre-occupation for organisations in a wide range of contexts and it is indeed an important pre-requisite for capacity development at all levels. Previous work, including that carried out by ICID in this programme, has perhaps not emphasised the importance of knowledge sufficiently in capacity development for agricultural water management. The papers by Keuls and Ritzema et al in this collection go some way towards redressing the balance.

1.4 Previous work

In developing its framework for capacity development, ICID has built on a range of work by other agencies. For example UNDP has worked extensively on capacity development, and in particular has been responsible for formulating new approaches to capacity development which take account of the changing context of development in general (UNDP, 1998). The policy branch of the Canadian International Development Agency (CIDA) has also been active in the field and has been responsible for a range of analyses setting out the basic concepts of capacity development at the present time (Morgan, 1998)

In the water sector, UNESCO/IHE has been leading the way since the 1990s, particularly with a series of major workshops. In these workshops, the three-part framework for capacity development (policy/organisations/individuals) was first articulated. The outcomes of these workshops were described by Alaerts (1997)

ICID's specific experiences in capacity development have been documented in a series of workshops which followed the Montpellier workshop referred to above, and the publication of Water Paper no. 26. A workshop in 2004 investigated the practices and processes of capacity needs assessment. The process starts by reviewing existing capacity, assessing future capacity needs, and mapping the capacity gaps between present capacity and future needs. Capacity gaps provide the basis for identifying opportunities for capacity development, leading to the definition of objectives and targets as the basis for the formulation of a strategic plan of action (IPTRID-ICID, 2005)

In the next workshop in this series, in 2005, attention turned to implementation of capacity development initiatives. It drew together ideas in this and the preceding workshop to present capacity development as a series of logical steps and stages (Figure 2). Both the conceptual paper and the case studies presented in this workshop highlighted the importance of such practical actions as an action-oriented approach, the establishment of a co-ordinating body, the importance of strategic partnerships and the need for long-term funding (IPTRID-ICID 2006).

Figure 2 goes here

In 2006, the focus shifted again, to monitoring and evaluation (M&E) processes for capacity development. In this case the workshop highlighted the fact that, whilst the importance of M&E is widely understood, in practice it is often not carried out effectively. The logical framework approach provides a mechanism for incorporating M&E into capacity development processes, but it was acknowledged that the indicators defined are often simplistic and unrepresentative of real capacity development (for example, measuring the volume of training without paying due attention to its quality or impact on organisational effectiveness). The outcomes of this workshop re-enforced the need for more work in this important aspect (IPTRID-ICID, 2007).

2. Learning lessons from current practice

2.1 The papers in this collection

The papers in this edition are drawn from contributors to the workshops described above, and others working in the agricultural water management sector who have specific insights or experiences. The coverage of the papers ranges across all the domains at which capacity development operates (figure 3). Dreschel and colleagues write about actions in the enabling environment to enhance and support capacity for peri-urban agriculture. Hundertmark analyses capacity development in the regional context of the Mekong River Commission. At the organisational level, Facon et al describes an intensive programme to build capacity in system managers, whilst we have three papers (Huamanchumo et al, Johnson and Stoutjesdijk and Leathes et al) on capacity development of water user groups, reflecting the importance of this topic at the present time. In the individual domain, Mati describes how smallholder farmers in Kenya develop their capacity to take advantage of commercial opportunities opening up in irrigated agriculture. The final two papers look at different aspects of knowledge generation and management for capacity development. Keuls assesses the knowledge network of water resource institutions in Indonesia,

while Ritzema et al analyses capacity development for drainage through a number of long-lasting and extensive international programmes.
Figure 3 goes here

2.2 The enabling environment

We turn first to two papers which present experiences of capacity development in the domain of the enabling environment. In the paper by Drechsel et al the point is made, albeit within the context of peri-urban irrigation, that in most Sub-Saharan African countries clear policies in relation to the irrigation sector are lacking. By extension, it is inferred that specific policies concerning the role that capacity development can play are seldom explicitly manifested and therefore the enabling environment for the articulation of a solid capacity development effort at lower levels is simply non-existent. Without policies or legal framework, the large numbers of actors that in one way or another are responsible for shaping interventions related to peri-urban agriculture work in isolation at best or are unable to articulate a reasonable program in response to real needs concerning capacity development. The results are conflicting priorities and regulations and worse, low levels of efficiency and fuzzy ownership or follow-up on policies formulated.

This paper emphasises the importance of multi-stakeholders processes for action planning and more importantly in policy formulations. Various types of interventions such as training needs assessment, monitoring and evaluation of trainees' receptivity, moods and behavioural changes, and specific training events directed towards policy awareness and development were part of the activities to fill the missing links in the enabling environment, with encouraging results. The multi-stakeholder dialogues offered an opportunity to identify policy needs that go beyond just one particular group and managed to strengthen the advocacy or lobbying for specific policies at the highest levels of decision making. Capacity development on policy formulation and implementation was facilitated and provided the opportunity to intervene in the agricultural policy of several participating countries.

The paper by Dreschel et al looks at capacity development in the enabling environment in a specific sub-sector (peri-urban agriculture). By contrast, the paper by Hundertmark looks at the role of regional and international co-ordination in supporting capacity development, focussing on drought management capacity in the Mekong River basin. The question of the need of an enabling environment is tackled through the design, promotion and implementation of a multi-level planning and stakeholder consultation process, this time at a regional level since efforts revolve around four riparian countries of the river. Responsibility lies in the hands of the Mekong River Commission, an inter-governmental organization established precisely to deal with trans-boundary issues where capacity development necessarily constitutes a primary development strategy.

Not unexpectedly, capacity development needs varied from country to country, with Thailand and Vietnam relatively advanced and Cambodia and Laos falling relatively behind. The discrepancy showed the need of capacity for drought management policy harmonization and strategic alignment. A four component drought-related programme, each with a corresponding capacity development thrust, was designed and implemented. These components were: forecasting, impact assessment, preparedness and mitigation measures, and management policy. The general conclusions of the intervention indicate that building capacity at a regional scale requires good planning and preparation within the framework of an established network of stakeholders and institutional arrangements and that the components of the regional enabling environment need to be linked across the region to facilitate and expedite a successful and participatory effort.

2.3 The organisational domain – managers and water user associations

2.3.1 System Managers

The important role of system managers in coping with the current demand for service-oriented management is highlighted in the paper by Facon et al. It describes MASSCOTE (MApping System and Services for Canal Operation

Techniques) as an approach to capacity development at the system level. This is a process that comprises a sequence of rapid appraisal followed by mapping at various levels of the system, proposals for improvement options and a plan for M&E, set out through a series of training workshops. The aim of the process is for operators and managers to actively address the real issues in a system, rather than to be on the receiving end of standard modernization packages determined by outsiders.

Outputs from training workshops, as needed, can be used as inputs to: a modernization plan with the stakeholders; the preparation of an investment project proposal; and as support to an agency's strategic planning and policy revision. The aim of MASSCOTE is to address the weak learning culture in irrigation systems, and to develop strong leadership for change at agency and system management level. The authors stress that it needs long-term and active implementation and continual support, for example by linking the approach to future requirements for funding.

2.3.2 Water User Associations

Whilst the focus of Facon et al is on system managers, the remaining papers in this section look at the vitally important challenge of developing the capacity of farmers to manage systems and resources themselves. From Peru the paper by Huamanchumo *et al* describes how, after 10 years of a *de facto* irrigation systems management transfer from the government to water users associations, farmers realized that their chances for success would be slim, unless they took matters into their own hands in improving their capacities to administer, operate and maintain the systems.

Recognizing that, for political and security reasons, the Government of Peru had few, if any, choices on the devolution decision, this paper is perhaps a text-book case on how not to develop capacity for water users associations. The systems were handed over without any previous consultation with farmers, no training was anticipated or provided, existing rules and regulations were applied throughout the country whether they fitted the socio-cultural environment of

individual systems or not, and furthermore no incentives were put in place to motivate farmers in accepting their “forced” irrigation system ownership conditions.

On the other hand, the paper describes how farmers, when relying on their own capacity and without major outside help from the government or others, managed to turn around a bad situation and are now able to generate enough momentum and goodwill among the reorganized water users associations in order to embark on a wide reaching capacity development programme that builds from the bottom up and stresses the utilisation of local resources, both in human and financial terms.

It may well be reasonable to suggest that Peru’s present experience in developing capacity in agricultural water management for water users associations can be seen as a model to imitate worldwide. The wealth of information derived from their particular experience based on a “hands-on” and “in-service” capacity development approach and clear M&E systems is worth imitating. The Government of Peru has recognized this and is now trying to complement farmers’ efforts. At least in the Latin American context, their experience puts them at the forefront.

The paper by Huananmancho et al describes responses by farmers in a situation where actions by government were unhelpful, at least initially. In Kyrgyzstan, on the other hand, Johnson and Stoutjesdick describe a project in which the government was actively supporting the establishment of new water users associations (WUAs) to take over from existing organisations set up in Soviet times. These existing organisations blurred the lines between governance and management and an important element of the new organisational structures was to separate out management by hired staff from oversight responsibility by members. A new law was promulgated to support the establishment of water users associations because it was noted that attempts to form new associations without a supporting legal framework generally end up with associations that are controlled by a few powerful individuals. In Kyrgyzstan, considerable effort went into supporting the fledgling associations

through a variety of training approaches and a further important factor in the overall success of this programme was the encouragement of the new organisational arrangements by Government and the Department of Water Resources. As the associations grew in size and gained experience, they began to link together through federations, and the paper goes on to identify the increasingly complex capacity development needs of the federations. An encouraging aspect of the work in Kyrgyzstan is the direct evidence of the success of the capacity development programme in the form of increased fees paid by farmers for irrigation services.

In contrast to the efforts to establish water user associations in relatively poor countries such as Peru and Kyrgyizstan, Leathes et al describe the process of establishing abstractor groups in UK. These abstractor groups have emerged as irrigated farmers begin to experience a range of pressures arising from increasing demand and competition over water resources, coupled with a more intensive regulatory regime. As a result, the farmers feel that formation into groups might give them a better chance to defend their rights. Abstractor groups are also welcomed by the regulators because they provide a means for building stronger lines of communication with a large number of individual farmers. The paper analyses the process of group formation against the institutional design principles put forward by Ostrom (1991) arising from collective choice theory. It suggests that these processes do indeed conform in a general way to the institutional design principles, albeit with contextual differences which take into account local conditions and different drivers of change. These findings are of interest because practitioners of capacity development in agricultural water management generally find themselves without a set of consistent theories to guide their actions, particularly at the organisational level. The Ostrom design questions provide a conceptual framework within which to approach issues of organisational design and structure.

2.4 The individual domain - farmers

Whilst the strength of farmer groups at the organisational level is an important element of capacity development, so too is the development of the individual

farmer. The paper by Mati describes evolution of farmer capacity on a number of small-scale systems in Kenya. The systems studied covered a wide range of contexts, from schemes started by individuals to out-grower systems on large commercial farms. Commercial drivers were important in all these cases: market opportunities meant that farmers understood the potential for financial benefit and were prepared to take the necessary steps to achieve it.

Mati's paper investigates the importance of capacity-development of the farmers, and particularly the need for training in new methods or production, in the success of these schemes. Training was provided in a variety of ways, through government extension services, NGOs, the private sector or by farmer-to-farmer visits. All of these different methods can be successful in the right circumstances, though Mati notes the difficulty of providing formal extension services during a period of institutional change in government. In general, those methods which involve an element of social learning (for example, farmer-to-farmer visits) seemed to be most successful. The paper also stresses that basic infrastructure and human capital (such as good communications and high literacy levels) must be in place if capacity development is to be successful.

2.5 Knowledge management

The last two papers in this collection look at the cross-cutting issue of knowledge management, which contributes to all three domains of capacity development. The paper by Keuls reviews the establishment of Collaborative Knowledge Network in Indonesia (CKNet-Ina). This network brings together a number of Indonesian universities with a speciality in water resources to pool their expertise and increase the range and coverage of their educational services to deliver capacity development services in support of water reform. The network is expected to benefit from the sharing of knowledge and information through a web-based platform, and to deliver service via internet-based learning and education. Its focus is on knowledge generation and management, through providing a flexible basis for continuing development at the professional level.

A number of practical issues have arisen in the management of the knowledge network since its establishment in 2003. The paper explores these issues and also discusses the linked challenge of sustainability. At present, the network is financed by an external source in the form of project support, which means that the network management process is monitored by means of indicators through a logical framework. As with other types of capacity development, the knowledge network needs continuing and long-term effort, and the ability to generate income to cover its costs. This calls for high-quality and timely service delivery that builds on the enhanced possibilities created by advances in information technology.

The paper by Ritzema et al on capacity development in land drainage also highlights the importance of networks, and of reinforcing experiential learning. It describes the knowledge generation process through worldwide cooperation among universities and research centres, and also project partnership with the public and private sectors for the long term mission of improving agricultural drainage worldwide. The paper emphasises the need to combine tacit (experiential) and explicit (formalised) knowledge, and to foster the socialisation of learning that supports the process of the generation of knowledge, through research, education, and advisory services. Like many of the other papers in this collection, Ritzema and his co-authors emphasise the need for long-term and sustained support, and for continuous reinforcement of learning through refreshing courses, networking and social learning.

3. Future directions for capacity development

3.1 The changing context of agricultural water management

Earlier in the paper, it was stated that the role of agricultural development in general, and that of agricultural water management in particular, continues to play centre stage in developing countries. A number of major and recent initiatives in this regard, all within the initial years of the new century, can be cited. For example, the ‘Camdessus Report’ calls for renewed efforts to finance

water infrastructure in order to provide relief from the water stress of communities around the globe. The initiative, while placing water supply and sanitation in the driver's seat, recognises the importance that water for agriculture can have in fulfilling this goal (World Water Council, 2003). The Commission for Africa Report (2005), also known as the 'Blair Report', calls for a wider set of measures to promote agricultural development in this continent and suggest that doubling the current area under irrigation by the year 2015 should be an integral component of those efforts (Commission for Africa, 2005). In 2006 the World Bank launched its strategy 'Re-engaging in agricultural water management', arguing that it is time to increase the levels of investments in agricultural water management as an engine of growth. Thus, the downward investment trends of the past decades are to be reversed, a change already talking place. Finally, the recently completed 'Comprehensive Assessment of Water Management in Agriculture' (IWMI, et al 2007) has identified as two major policy actions the need to "change the way we think about water and agriculture" and to "fight poverty by improving access to agricultural water and its use".

One common element in these efforts happens to be capacity development, in its broadest sense, and there is therefore an urgency to assess needs in the various fronts and more importantly, to create the enabling environment, the organisational frameworks and the individual opportunities that will allow the design of appropriate policies and legal frameworks that can guarantee successful implementation of these measures. Thus, the message seems to be clear: capacity development needs are changing.

3.2 The changing needs of capacity development

The papers in this collection reflect these changes in emphasis in current approaches to capacity development. They arise not only from the change in focus of the sector from formal irrigation towards agricultural water management, but also changing patterns of development assistance which focus on new structures of governance and new patterns of service delivery.

Such changes are being recognised and analysed elsewhere. For example, Levy and Kpundeh for the World Bank (2004) distinguish between the old and new paradigms of capacity development (Table 1).

(Table 1 goes here)

We can see some of the tensions between these old and new paradigms in capacity development for agricultural water management in the table presented by Keuls in his paper in this collection. For example, the decades of physical infrastructure development required a focus on technical issues, which has subsequently been superseded by heightened awareness of the importance of social and political issues, accompanied by an increasing emphasis on the importance of building capacity for governance and oversight (see, for example, the paper by Johnson and Stoutjesdick in this collection). Approaches to capacity development for individuals are changing, too. Whereas the common model was overseas training to observe best practice, there is now increasing realisation of the importance of social learning and an understanding of responses that work in particular situations.

While some of these paradigm features may seem somewhat theoretical for application in the specific context of agricultural water management, we can indeed detect a change in the focus of capacity development initiatives in the sector in recent years, as these papers demonstrate. The focus in the decades of infrastructure development and new construction (including the construction of new irrigation systems) was on developing the capacity of service organisations and agencies to manage the new systems. Along with that came the process of transferring expert knowledge to farmers through extension agencies. Now the emphasis has shifted towards developing farmer institutions and water user associations (partly in response to the perceived need to reduce the role of the state and public sector organisations in the delivery and management of irrigation services). In relation to knowledge generation and management, the focus has shifted towards supporting internally-generated learning, particularly through processes of social learning, and enabling self development, rather than externally-induced change. We can also note that

capacity development has recently assumed a more significant role than it has in the past, and we can find many examples where capacity development is now a major element of programmes in its own right, and not just as an adjunct of other development initiatives.

3.3 Guidelines for action

Some overall directions for capacity development emerge both from the papers and the preceding workshops, reflecting these changing paradigms. These learnings apply in all three domains of capacity development, and in the generation and management of knowledge.

At the level of the enabling environment, there is a need for policy analysis, implementation and management to provide support and best fit to capacity development initiatives. The paper on the water user associations in Kyrgyzstan, for example, demonstrates the need for an appropriate legal framework to support the establishment of the new associations. Conversely, it is important that water policy reform processes take account of capacity development needs during formulation. In Peru, the policy to turn water management over to local associations took no account of the capacity of the existing farmers' organisations to assume these new responsibilities. Consequently it took several years before the policy could be effectively implemented.

At the level of organisational design and capacity, there is a need to find mechanisms which allow effective organisations to evolve, focussing not just on formal bureaucratic structures but also on existing socially-embedded organisations and institutions. In this area there are comparatively few formal theories and concepts to work from, a factor which explains the enduring popularity of the Ostrom institutional design principles. Whilst there is some discussion round their theoretical basis and application (Cleaver and Franks,

2005) the Ostrom principles do provide a pragmatic and workable approach to the issues of institutional design, as the paper by Leathes et al describes in relation to water abstractor groups in UK. The papers in this collection also emphasise the importance of supporting appropriate new organisational forms as they emerge, such as the federations of water user groups in Kyrgyzstan.

At the level of the individual, modern approaches to capacity development stress the need for social learning to replace or augment traditional education and training approaches. This in turn emphasises the importance of experiential learning, and of approaches to capacity development which reinforce the learning cycle. Ritzema's analysis of capacity development in drainage gives several examples of successful programmes which have done this. Capacity development of individuals also needs to focus on knowledge, skills and abilities relevant to the context. The paper by Mati shows how this can be done in the Kenyan context, and makes the point that facilitation of experiential learning by individuals can be done by a range of agencies, public, private, third sector or community-based. One point which is implied by many of the papers but not made explicitly is the importance of incentives and drivers to change, which provide the internal motivation for individuals to learn new knowledge and skills and develop their capacities to function more efficiently and effectively.

Whilst not originally included in the three-domain framework, the generation, management and dissemination of knowledge are increasingly important features of capacity development. The papers in this collection emphasise the importance of developing authentic knowledge, which is internally consistent, and fits with the user's context. Hundertmark's paper in this collection discusses how capacity building for drought management at the regional scale of the Mekong River Commission nevertheless has to build on the contexts and understanding of the individual countries and agencies. The same processes apply when generating knowledge at the scale of individual farmers and water users. Such knowledge has to fit and be consistent with the individual's frame of reference, a factor which explains why so much overseas training, whilst having identifiable benefits of various kinds, often leads to disappointing outcomes. Knowledge management is of increasing interest and concern across a whole

range of sectors, including modern, industrialised sectors. In some ways the problems are particularly acute in the agricultural water management sector, because of the range and nature of the users and the way they are often dispersed geographically, with poor lines of communication. The paper by Keuls describes how processes of networking, using modern IT facilities, can address some of these issues, though it remains to be seen how these approaches can be translated into farmer-to-farmer interactions.

In general the key lesson that can be taken from all of these papers, and indeed the others presented during the preceding series of workshops, is that it is impossible to be prescriptive about capacity development needs and approaches, and to write guidelines which fit every situation. Each situation is unique, requiring attention to the enabling environment, the organisational structures and individual development needs, based on appropriate knowledge and skills, and suggesting a differing and unique set of responses. It is also clear that it is impossible to write a blueprint for capacity development initiatives: each must evolve through a process approach of consultation, discussion and bargaining, which must be developed over the long-term and with long-term support.

3.4 Future directions

This paper has stressed the changing context and paradigms of capacity development over recent decades. The needs and approaches of capacity development are likely to continue to change in the future, reflecting continuing and perhaps accelerating changes in the context in which it takes place. Investigating and reflecting on the issues will therefore remain a constant need. A number of constraints and difficulties in studying capacity development can be identified, some of which are evidenced by difficulties recounted in the papers in this collection.

A key difficulty lies in disentangling capacity development from other issues, and in identifying cause and effect for capacity development initiatives. The biophysical basis of soil moisture and crop production inter-relationships lends

itself to procedures of scientific observation and deduction which are not possible or appropriate in the socio-cultural and economic field of organisational and individual capacity for agricultural water management. Whilst it is important to stress the necessity of including capacity development initiatives as part of wider programmes of support to the sector, it will remain difficult to justify them on the basis of cost-benefit analysis, or even of qualitative outputs and outcomes. There is therefore an on-going need for increased precision in defining inputs to, and outputs from, capacity development programmes.

The discussion in the previous section pointed to the difficulty of drawing out universal lessons from localised experiences. Capacity development by its nature will be specific to the situation in which it is located, and the organisations and individuals who are involved with it. The work of ICID and the papers presented at the workshops illustrate these difficulties. Attempts have been made to draw out some broadly-applicable lessons at a very general level, but at best we can be presented with issues to be addressed, rather than guidelines or blueprints to be followed which can be expected to be appropriate and successful in all circumstances.

Managing the processes of capacity development remains a complex and demanding task, another fact which is illustrated by these papers. The third of the ICID workshops (IPTRID-ICID, 2007) focussed on the specific need for monitoring and evaluation of capacity development initiatives but concluded that there was no simple or clear approach to be followed. In part this difficulty also stems from the complex and indeterminate nature of the outcomes of capacity development, as discussed above. It is problematic to define measurable outputs for capacity development that have meaning, and correspondingly even more problematic to define measurable outcomes and impacts (although the papers by Johnson and Huamanchumo highlight increasing payment of irrigation service fees by farmers as a proxy measure of success).

Finally we should note the increasing importance being given to the concept of water governance in the water sector in general. This concept is less prevalent in agricultural water management, and has hardly entered into the debate about

capacity development. Nevertheless water governance encompasses important ideas about establishing an appropriate 'system of actors, resources, mechanisms and processes to mediate society's access to water' (Franks and Cleaver, 2007). Implicit in this definition is the need to develop capacity in organisations and individuals to perform the functions needed to keep water systems operating and evolving to meet new challenges. The agricultural water management sector will benefit from learning from advances in capacity development elsewhere in the water sector which are designed to improve or enhance water governance.

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Figure 1 – Domains of Capacity Development

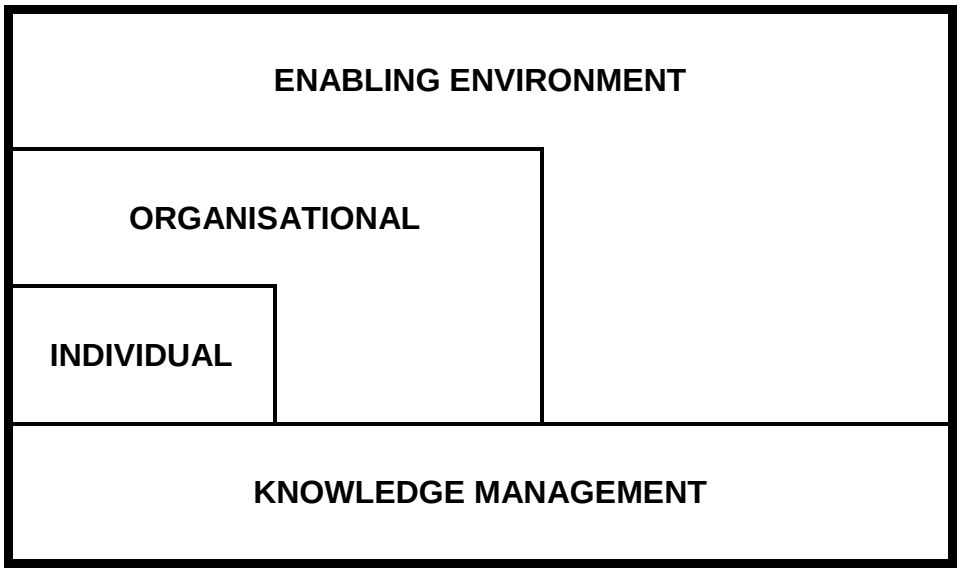

Figure 2 Strategic planning for capacity development

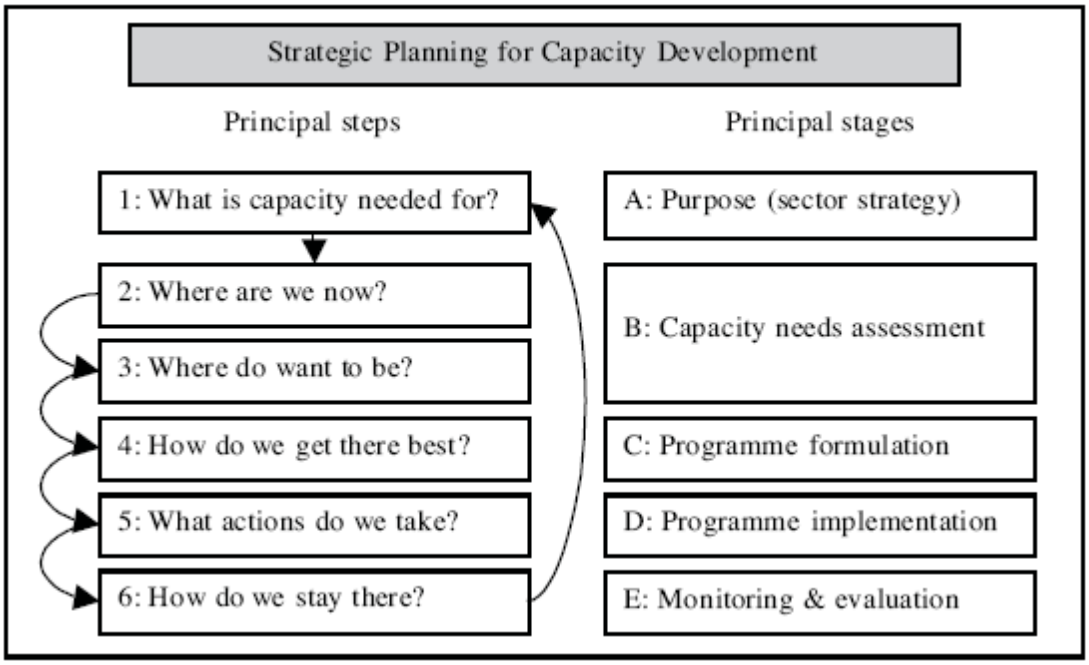

Figure 3 Location of case studies within the conceptual framework for capacity development

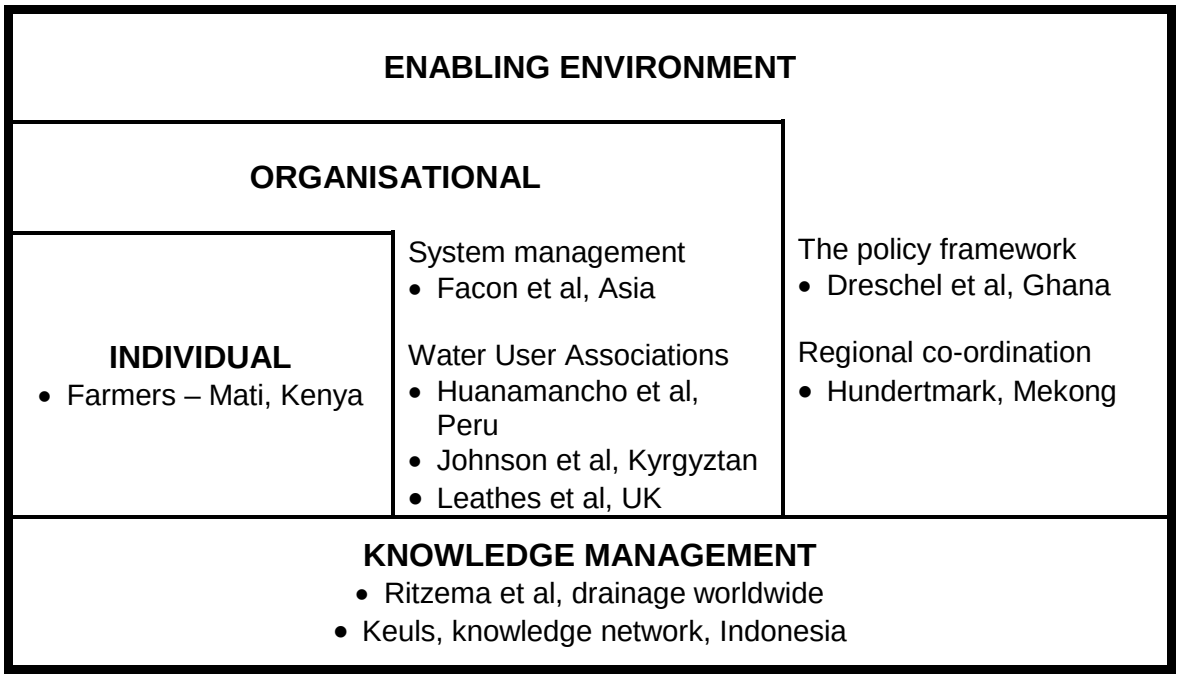

Table 1 Old and New Paradigms of Capacity Development

Old paradigm	**New paradigm**
Focus on technical issues	Focus on social/political issues
Driven by supply considerations	Responding to perceived need or demand
Oriented towards bureaucratic structures	Oriented towards building capacity for governance and oversight
Led from the centre	Evolving through the local context
Transferring 'best practice'	Identifying solutions for 'good fit'
Comprehensive in scope	Selecting key issues for optimum results
Concerned with structure	Concerned with process

Source: from Levy and Kpundeh, 2004