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Part I

Setting the scene

PROGRESS AND CHALLENGES IN KNOWLEDGE AND CAPACITY DEVELOPMENT

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ABSTRACT

Knowledge and capacity development (KCD) involves something more than the strengthening of individual skills and abilities. Trained individuals need an appropriate environment, and the proper mix of opportunities and incentives to use their acquired knowledge. The article therefore discusses KCD for the water sector at three different levels, from individual to organizational to the institutional level and enabling environment. Secondly, the article describes the current conceptual approaches to KCD. They come from a wide variety of fields of social sciences, as well as from field practice and case studies, and are sometimes contradicting. Ideas about capacity originate from fields including organizational development, political economy, public administration, pedagogy, institutional economics and sociology. The most important views and fields, including some examples from the field that influence our thinking on KCD, are described and discussed. The article will discuss the link between knowledge and capacities, clarify that one of the basic capacities is to learn, and highlight the importance to create, share and manage the knowledge that results from learning, at the three levels. Extensive reference will be provided to the respective other chapters in the volume where more detail and case studies are provided, as well as examples of other approaches.

1.1 INTRODUCTION

It is nowadays generally agreed that capacity enhancement involves more than the strengthening of individual skills and abilities. Trained individuals need an appropriate environment, and the proper mix of opportunities and incentives to apply their acquired knowledge. Understanding capacity development therefore requires a more comprehensive analytical framework that takes into account the individual, the organizational and the institutional levels of analysis (Alaerts, 1999, EuropeAid, 2005, McKinsey, 2007). The water sector is a sector of particular complexity, and therefore highly dependent on strong institutions and individual capacities. This complexity derives from the fact that daily decisions of each and every individual in society impact on water management – regarding water use, water pollution, sanitation, etc. – which is different from, say the roads sector. Also, water is a bulky and fugitive resource that has to be managed continuously in order for it to be available in the right quantities at the right time to sustain life – not too little to avoid drought and not too much to avoid flood – which means that it requires heavy investment and laborious operation and maintenance. The decisions and behaviour of mothers and farmers, thus, matter as much as those of the Minister of Water Resources or of Public Works. Not surprisingly, this sector was one of the first to identify the need for capacity development and introduce focused capacity development programs (Alaerts et al., 1991).

The first UN Conference on Water, in 1977 in Mar del Plata, sounded for the first time the alarm bell over the vulnerable and finite nature of water in light of the rapidly growing demands on the resource. The Mar del Plata Action Plan prioritized the provision of drinking water and sanitation – “drinking water and sanitation for all by 1990” – and the need to save water and protect it from wastage and pollution. The 1981–1990 Drinking Water Supply and Sanitation Decade managed to dramatically increase the coverage for water services but proved on many counts less effective. It was outpaced by the growth in population and demand for water. This led to the recognition that strong institutions and proper social behaviour are as important as the infrastructure itself. Also, it was found that development of this sector would require a higher level of pro-activity and effective strategies to deal with future challenges. The UN Conference on Environment and Development in Rio in 1992, and the 2002 UN Millennium Development Goals re-iterated the same priorities. The 2006 World Water Forum in Mexico City again highlighted the role of strong local capacity. After three decades of major investment efforts the world has much achievement to show for, yet serious challenges remain, both old and new.

The exponential growth in demand for water, the strong urbanization, and the persistent poverty have kept the coverage rates for *drinking water supply and sanitation* at modest levels in some regions, though other regions are well on their way to close the gap. Still, major challenges remain: the water use efficiency and service reliability are often unacceptably low; many water supplies are precariously vulnerable; and pollution taints water quality much

faster than pollution control measures can be put in place. Weak performance of the institutions and of the users remains the bottleneck, especially in sanitation and in general *water service delivery*. Yet, it could be argued that the main future concern will be on *water resources sustainability*, as the large-scale and steady transformation of the earth's surface by human interventions as well as by climate variability is rapidly adding new stresses on the natural eco-hydrological systems that will have to support the continual generation of water resources to meet the demand for water—for food production, for drinking, for hydropower and navigation, flood management, etc. Competition for access to water will rise.

Part of the knowledge to address these challenges is available. However, gaps still do exist in our knowledge, for example regarding how the global changes are going to affect us and what the responses should be, and how the water service delivery and the resource should be managed more effectively. This represents a first key challenge. Equally important, one often observes that even when available, this knowledge does not get readily translated into proper planning or effective action. Weak institutions, especially at local levels of government, and in many communities, form a second key challenge, in particular in developing nations. This lagging or constraining effect is especially visible in countries that are developing into modern economies, but it is a challenge for all societies as they continuously must adjust their sector to new outside changes or to new internal demands.

1.2 KNOWLEDGE AND CAPACITY

1.2.1 CAPACITY CONSTRAINTS TO APPLY KNOWLEDGE – THE CASE OF DEVELOPING ECONOMIES

Many countries – that is, their governments as well as their civil society – are observed to have a weak “capacity”: limited knowledge bases; small numbers of professionals with the right education and skills; and, in general, administrative and managerial arrangements, and laws and regulations (the “enabling environment”) that eventually fail to facilitate the swift and effective actions that in their aggregate can deliver the desired outcomes and results on the ground. First, knowledge is required that can identify and describe the issue, challenge or problem that one desires to be addressed. A different knowledge is required to then articulate how to address this. Thereafter, this knowledge needs to be communicated, shared, refined and confirmed among experts, peers and decision-makers as prerequisite for action, after which implementation of the action necessitates a functional and capable organization and an enabling policy and administrative environment to do so and mobilize the matching financial and other resources. The implementation capacity, thus, also depends on the knowledge and skills of the implementing agency, and the incentives it responds to. This creates the potential to act. However, this

potential will materialize only in presence of positive incentives (such as, financial or political incentives, personal motives to further one's career, etc.) which outweigh negative ones (such as, vested interests of an elite, lack of reward, opportunities to extract rents, etc.).

The action, therefore, comes as the aggregate of a series of sequential causal steps and decisions. The eventual outcome or impact from that action can be observed only much later, at substantial distance from the original knowledge. Hence, it is often tenuous to correlate the outcome with that knowledge, or with the capacity of the administration and the quality of the enabling environment. In addition, these processes take place in a dynamic and changing environment, and political contexts are continuously shifting. This difficulty to define unequivocal causalities is further compounded by the fact that similar outcomes can also be generated by several other sets of knowledge, capabilities and circumstances.

1.2.2 DEFINING CAPACITY

The concept of capacity refers to development in general, and several definitions have been proposed that reflect the theoretical (or political) frameworks from which the subject is approached (see Box 1.1).

- 1 Firstly, because of the original concern with effective government, the public administration science was one of the first disciplines to define "capacity" referring to the organizational structures and operational procedures of administrations. In this perspective, the public administration receives its capacity from the education and training of the civil servants, from proper administrative procedures, and appropriate incentives (e.g. Shafritz, 1985).
- 2 However, drawing experience and insight from the only modestly successful efforts in developing countries with the International Drinking Water Supply and Sanitation Decade spanning the 1980s, the water sector was early to devise a practical definition expressing its strong interest in making overall development programs more effective and sustainable, and to articulate in a coherent fashion the need for *knowledge and capacity development* (KCD) (Alaerts et al., 1991, 1999). This experience also highlighted the critical function of the "enabling environment" of the broader policy, legal and regulatory frameworks in which the public administration, and the investment projects funded by the international donor community, have to operate. For example, many regulations and procedures in other sectors one way or another were found to restrict the effectiveness of policies in the water sector: regulations on urban settlements, for example, make it often impossible to extend water services to "irregular" city quarters; human resource procedures in the civil service often preclude that incentives can be provided; and centralized administrations often have no

Box 1.1 What is capacity?

Shafritz (1985) approached capacity from the perspective of public administration sciences: "... any system, effort, or process ... which includes among its major objectives strengthening of elected chief executive officers, chief administrative officers, department and agency heads, and program managers in general purpose government to plan, implement, manage or evaluate policies, strategies, or programs designed to impact on social conditions in the community". The 1991 *Delft Declaration* (Alaerts et al., 1991) suggested "Capacity comprises well-developed institutions, their managerial systems, and their human resources, which in turn require favorable policy environments, so as to make the [water] sector effective and sustainable". UNDP states that "Capacity is the ability of individuals, groups, institutions and organizations to identify and solve problems over time" (Morgan, 1993, UNDP, 1993). Hildebrand and Grindle (1994) emphasize the dynamic nature of capacity: "Capacity is the ability to perform appropriate tasks effectively, efficiently, and sustainably. This implies that capacity is not a passive state – the extent of human resources development, for example – but part of an active process." More recently, the complexity or systems nature of capacity has been emphasized: "Capacity is ... the emergent combination of attributes that enables a human system to create developmental value" and "... the overall ability of a system to perform and to sustain itself: the coherent combination of competencies and capabilities" (Zinke, 2006). And: "Emergent properties, such as capacity, come from the dynamism of the interrelationships in the system. The challenge is not so much to build or enhance them as it is to unleash them or find ways to encourage their emergence" (Morgan, 2005).

- place for a role by local water users. It became recognized that the water users, the consumer, the electorate and other distinct stakeholders in civil society have to play equally important roles in making things work at the local operational level of the household, the irrigation plot or the water catchment, and in providing the political foundation for decisions. This holds especially true in developing countries where the national government has often a very limited reach and capacity, and, thus, much depends on whether local users and communities are willing to take initiative, co-operate and contribute. This approach, in addition, also for the first time linked capacity with knowledge – as generated and disseminated by educational institutions and knowledge centres locally and at a global level. The water sector is increasingly considered a knowledge-intensive sector.
- 3 Thirdly, UNDP, and later OECD, the World Bank and EuropeAid took this definition to a higher level, relating capacity to the overarching goal of national development across the board. That definition, however, tends to dissociate the capacity and the knowledge components.

- 4 Further recent work emphasizes the complex and systems nature of capacity in development efforts, as described below. This approach argues that the capacity of an organization is both a distinct entity by itself and the resultant of the capacities of the individuals in that organization. It is also the resultant of a wide variety of inputs (types of knowledge that have been transferred, structure and procedures, leadership and managerial capabilities of the individuals, etc.). All these attributes tend to change over time and mutually influence each other. This complexity tends to blur the relationship between the capacity development input, and its outcome. This school of thought rejects any normative or deterministic approach and posits the pivotal role of process in which all stakeholders are involved in determining the objectives that are consistent with the capacity (e.g. Pahl-Wostl, 2002).
- 5 Finally, the behavioural and business management sciences have extensively researched behaviour of humans and of organizations. Sveiby (1997) for instance draws from this body of knowledge and also builds on Polanyi's dynamic concept of knowledge (see section 1.3.2). This approach helps to make the concepts more practical for the purposes of managing knowledge organizations, and for budgeting and results assessment, in contrast with the complexity approach which tends to dispute the notion that capacity can be managed.

Based on the above and for our purposes here, capacity can be defined as the capability of a society or a community to *identify* and *understand* its development issues, to *act* to address these, and to *learn* from experience and accumulate knowledge for the future. A country, then, has its “government” and public administration system as its formal tools to make this possible. Other less formal systems do exist as well. This definition emphasizes the linkage of capacity with a verifiable impact on-the-ground after the “act” as well as with the generation of fresh knowledge. It also points out that critical “extra” capacity is required to allocate the resources and incentive for continual learning and improvement that characterize the “learning organization”. Few governments or sector agencies, or non-governmental organizations for that matter, have provisions to allow for this learning.

This definition pertains equally to *individuals* – from technicians and community members up to ministers and politicians – and to the *institutions* in which they work and operate together and carry out their work. Overall performance thus depends on the simultaneous effect of capacity of the individuals as well as of the institutions. Developing countries currently tend to possess weak institutional and human capacity, with administrative systems that tend to be static and bureaucratic, and pre-occupied with technical aspects and standardized solutions. Especially local governments and local communities are at risk and may have little capacity to anticipate, and adapt

to the changing demands and environment effectively. Notwithstanding, many of these local communities have generated over generations a body of traditional knowledge regarding the local conditions and how to cope with them. Tribal communities in the Andaman Islands in the Gulf of Bengal appeared better prepared to deal with erratic devastating events like the December 2003 tsunami than the urbanized and wealthier communities in west Indonesia and east India.

This weak capacity and knowledge impede the proper targeting and absorption of development funds and the sustainable operation and management of “feasible” investments. Feasible proposals are those that have been designed properly based on sound analysis and with respect to realistic outcomes, and that are embedded in a policy and administrative structure that is able to ensure sustained use and maintenance. Different from the situation up to the 1990s, the current experience in most developing countries suggests that it is the shortage of such “feasible” investment proposals that is impeding development, not any longer the shortage of funds *per se*.

1.3 SCHOOLS OF THOUGHT ON KNOWLEDGE AND CAPACITY

1.3.1 UNDERSTANDING KCD

KCD, and in a more general sense, the generation and dissemination of knowledge, take place through formal education, training, and institutional development. The KCD activity always implies a status change, and indeed, the capacity development in organizations and in the administrative and regulatory frameworks are irrevocably linked to change processes and reform (Alaerts et al., 1999, EuropeAid, 2005). The generation and dissemination of the knowledge can be carried out via different vehicles or modes, such as secondary education, tertiary education, learning-by-doing, learning from peers (mimicking), learning through formal and through social networks, purchase of patents, and the physical acquisition or import of individual specialists (and, in reverse, brain drain). However, these vehicles only concern the action of knowledge transfer itself, whereas in a policy or development context one should be equally concerned about the “indirect instruments” that help retain and improve knowledge and capacity. For example, financial and other career-related incentives in the Human Resources policy strongly influence the retainment and commitment of specialists and qualified staff, and make or break the organization’s capacity. The appropriate definition of the objectives of a KCD initiative and the choice of the KCD process and instruments depend highly on the context, as the institutions they focus on are the exponents of a particular set of economic, social and cultural factors.

As argued in section 1.2, KCD has a broad remit, and several disciplines are studying parts of the subject, each highlighting an essential aspect and offering complementary and sometimes conflicting analysis and advice (Alaerts, 2009). One can distinguish a number of “schools of thought”. For our case, with the aim of developing a well-performing water sector and extending advice to, amongst others, government, the insights of public administration sciences are of central importance. The formal water “sector” is largely embedded in, and is a part of the public administration (Figure 1.1). Still, as each individual in society must take decisions on water in his vicinity – from the mother in the household to the farmer – and elect his government, the achievement of any water sector policy depends highly on the individuals and communities in society, their representatives, the press, etc. Thus, many of the KCD processes equally pertain to the formal and informal organizations and processes in society. The way the organizations are functioning and are to be managed, is the subject of management and business administration sciences, and what has come to be known as knowledge management in the corporate sector. Several concepts are derived from political and institutional economics and sociology. Other contributing disciplines are educational sciences, pedagogy and didaxology. On a more fundamental level, the epistemology (the philosophy of knowledge and knowing) and the complex-systems analysis provide better understanding of the nature of KCD. These disciplines should be acknowledged by KCD practitioners as important sources of knowledge. Often, policy papers and working documents on KCD are not based on solid and disciplinary research but rather on *prima facie* observation and intuitive analysis.

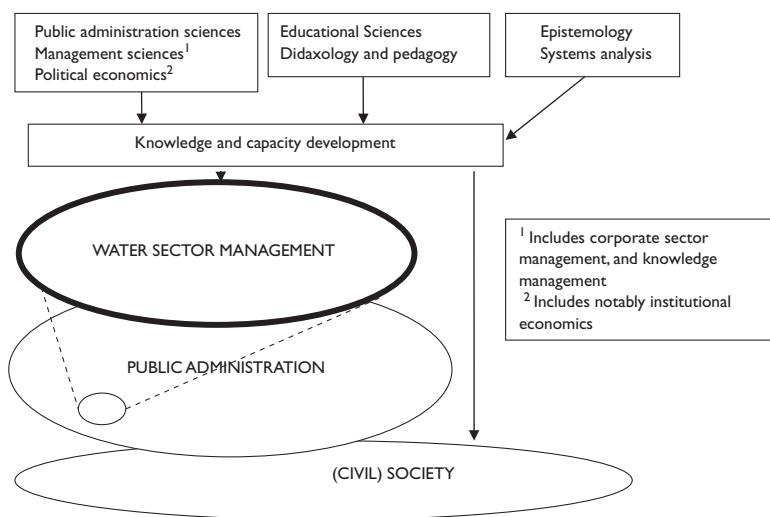


Figure 1.1 Disciplines that contribute to understanding of KCD in the water sector (Alaerts, 2009).

1.3.2 LINEAR APPROACH VS. COMPLEX SYSTEMS APPROACH TO KCD

A first important development in the understanding of KCD is the distinction that is made between a linear approach and a dynamic systems or complexity approach. In approaching complex dynamics in our daily life, and certainly for those complex societal processes, we generally tend to apply a reductionist approach. Complex problems become more easily understandable when they are cut up in isolated events that stand in “linear” cause-effect relationships to each other. However, the process of capacity development is very complex, and full of interconnections. The study of the nature of the parts does not necessarily lead to a correct understanding of the whole as the whole is more than the summation of the parts, since the parts interact. Furthermore, the relationships within the parts and among the parts may be causal under certain conditions but not under others. Some of the parts may have a strong influence on the internal relations within other parts. In addition, these interactions do not take place in a static environment and usually play out over time in sequences. With all interconnections between the components of the system, trying to obtain an overview of the system as a whole might be impossible because of the complexity but also because of increasing uncertainties associated with the interconnections. Complex systems are far more difficult to engineer successfully since potential outcomes can be difficult to identify, let alone measure (Parker and Stacey, 1995). Figure 1.2 illustrates the complexity of cause and effect for three individuals or organizations X, Y and Z. X as central actor discovers the actions and preferences of Y and Z, chooses how to respond appropriately and then acts. That action would have in turn consequences which Y and Z discover. This would lead each of them to choose a position or response which may differ from their original one, which, of course, has again consequences that X then needs to discover and respond to, and so on. This mutual interaction creates non-linear systems. X could be for example Water Users Organizations, and Y and Z a Ministry of Water Resources and local governments, that all are competing for authority and budgetary power. In the context of achieving a reform process of decentralization of management authority over water, it is in principle quite possible for the Organizations to predict what kind of knowledge and capacity development they will require. However, the Ministry and the local governments may have different perspectives and be subject to national policies, regulations and informal vested interests that may or may not preclude, obstruct or re-direct the reform. It is not difficult to imagine that in such non-linear system, it will be difficult to predict, and measure, what the outcome will be of capacity development interventions. In complex systems feedback can be used to monitor how incremental change takes place or what influence a certain measure is having. It can be described as an influence or message that conveys information about the outcome of a process or activity back to its source. Whereas prediction of outcomes in

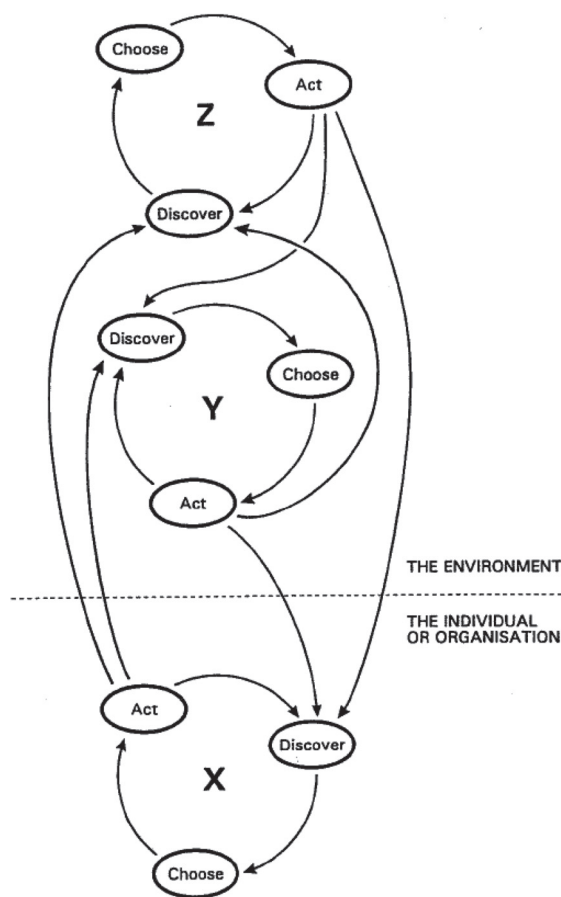


Figure 1.2 Feedback loops in complex systems
(Parker and Stacey, 1995).

a complex and fuzzy system such as capacity development, thus, is difficult, “managed learning” as a way to improve systems capacity in an iterative way may be a more modest and realistic option. However, this “process approach” assumes continuous flexibility which conflicts with the desire for outcomes that are agreed upon up-front. For example, governments, and donors will be unwilling to allocate substantial funds in annual budgets for ventures where the outcomes cannot be defined well, and, by implication, where the efficiency and feasibility of the investment cannot be confirmed ex ante. This outcome-focus requires a certain amount of planning in the development processes. It is suggested that for government and accountability purposes a predefined goal and direction are needed, as well as a strategy to achieve this goal. This strategy should, however, be a flexible plan that can cope to a certain extent with unexpected influences and developments.

1.3.3 PUBLIC ADMINISTRATION

Water sector management is part of a nation's public administration. Proper understanding of this field is therefore a requirement to understand capacity development in the water sector. The field covers among others governance, public choice theory, management and human resources management. Farazmand (2004) describes what human resources management should consider in public sector organizations:

- Motivating people at work is of prime importance. Employees must see real purpose in public service, and have a sense of belonging to the organization.
- Compensation must be equitable to treat every citizen equally, offer equal opportunity and avoid any semblance of preferential treatment. The organization must be seen as impartial and objective. This objective is essential but in practice often hard to maintain. It also tends to become very inflexible and bureaucratic because the decision is determined by "the rule" rather than by considerations of overall effectiveness. The compensation should, however, also be efficient in order to prevent organizational brain drain and to attract the most competent talents to the public service.
- Organizational mobility and rotation are designed for strategic personnel to move periodically to new positions, to learn and apply their knowledge and experience. At the same time continuity in the organization should be guaranteed and skills mixes maintained.
- Personnel should have the chance to periodically refresh their knowledge and skills they need to manage, and function in, the organizations in this information age. This can be done by in-service training programs, seminars, conferences, and workshops.

The above objectives are laudable and appropriate, but implementation remains a major challenge in developing countries facing on one hand a dearth of qualified staff and budget constraints limiting the number of civil servants, and on the other hand a weak support in society for an impartial and meritocratic civil service that can be held accountable. Good governance implies transparency and accountability. Transparency of, say, budgets, plans and staffing arrangements, eliminates opportunities for corruption and closes the door to secrecy and abuse. Pro-active accountability mechanisms help serve as a strategic instrument in pursuit of excellence and trust, and hence legitimacy. The comparatively low compensation for employees in public sector organizations, and opaque structures and regulations in many developing nations are often an incentive to engage in corruptive practices.

1.3.4 KNOWLEDGE MANAGEMENT

A large proportion of the literature on "knowledge management" and "learning organizations" is geared at corporate businesses and firms. For the

public sector the rationale for knowledge management is just as important, however, instead of the maximization of profit under conditions of competition there is a need for maximizing public service delivery at minimal cost, under pressure from society that demands a healthy public sector at low fiscal requirement.

For the water sector this would mean investing in the capacities that are needed for a well-performing sector, and working towards better governance, transparency and accountability. Knowledge management tools can be utilized drawn from human resources management and personnel management, and putting in place the objective and the administrative procedures that create a climate where people are encouraged to learn about their field and share their knowledge. A learning organization will have incentive systems that encourage knowledge, and internal procedures that facilitate, and require, open discussion, “peer reviews” and the valuation of knowledge. Information and Communication Systems (ICS – comprising both the technologies proper, and the interfaces and educated users who are able to utilize and work with these systems) are essential for example to develop databases and make information broadly available, and to facilitate communication and exchange of information. In reality, many water sector agencies notably in the developing world do not actively promote critical reviews and discussion, and staff careers are often based on performance in contract management for works and political relationships.

Drawing on epistemological analysis, knowledge can be both explicit (that what can be articulated in written form, for example, and formally taught) and tacit (such as the capability to ride a bike). Recognizing the value of the tacit knowledge, and figuring out how to use it, are the key challenges in a knowledge-creating company; they require extended communication, intensive and critical personal interactions among peers, and an knowledge enabling environment (Krogh et al., 2000). The enabling environment for bringing out tacit knowledge is a shared space that fosters emerging relationships. Tacit knowledge is to be considered more crucial and needs to be recreated from scratch by any new apprentice who is mimicking what the mentor demonstrates (Sveiby, 1997). As Tsoukas (2002) mentions, tacit knowledge can only be manifested and valued in what we do, and “that new knowledge comes about when our skilled performance is punctuated in new ways through social interaction”.

What makes knowledge creation a fragile process is the fact that it requires individuals to share their personal beliefs with others about a particular situation. There is need for justification, explanation, persuasion and human connectedness. In organizations with a poor transparency or a culture of fear, knowledge creation will be difficult. Likewise, treating staff as conscripts or just implementers, and applying unnecessary bureaucratic burdens, significantly impede effective knowledge sharing (Schenk et al., 2006). For the water sector in different countries, a useful indicator for the knowledge

facilitation is the presence of informal and formal networks among sector specialists and peers. In many countries, in particular developing ones, the absence or limited size and relevance of these networks is a barrier to knowledge generation and sharing. These networks are of great importance in the exchange of knowledge between government and other actors in the sector. Through formal and informal networks educational institutes are connected to the government and society to provide part of the “answers” through appropriate curricula and research. They also can have the overview of the human resources needs both in terms of quantity and skills mixes. Similarly, the informal and formal debates between the water sector and the civil society and its representatives and the press are critical to identify pressing issues in the sector and foster consensus on the action to be taken. In strongly hierarchic societies that tend to wield large bureaucracies and where the government basically takes all key decisions, knowledge creation and sharing is much less intensive.

1.3.5 EDUCATION AND TRAINING

Education and training is an obviously important aspect of knowledge and capacity development, especially at the level of individuals (see also Chapter 18 in this volume). Capacity development relies on the strengthening of individual capacity through training and learning, in order to raise the domestic stock of human capital, or the “social capital”. Although some of the necessary skills would typically be acquired on-the-job or through learning-by-doing, developing countries characterized by less efficient organizations of work or by obsolete technologies might need to rely more on formal vocational education and training (Vincent-Lancrin, 2007).

There are four different types or levels of knowledge for which different methods of learning are appropriate:

- Factual knowledge (“water is boiling at 100°C”).
- Understanding (“where does rain come from?”).
- Skills (proficiency in a language, ability to work in a team).
- Attitudes (problem solving attitude, capability to approach a complex challenge, ambition, “gut feeling”, and the drive to keep learning).

Skills generally can be acquired by training, whereas for the other three types of knowledge, education is more appropriate, partly through formal schooling. Training can be accomplished through apprenticeships and mentoring, seminars, workshops, classes, or through self-study. With training, a task analysis will yield a complete “step-by-step” list of what needs to be done to accomplish the skill being learned (Fabri, 2008). Training has therefore pre-defined content and is a closed system. Usually training needs a fixed amount of time – weeks or months.

Box 1.2 Effective training and education.

The World Bank evaluation on WBI training for capacity building (World Bank 2008) suggests a number of simple but essential success factors for *training*, namely:

- appropriate pedagogical tools and frameworks, classroom teaching, self-study, group work, etc.;
- support for the transfer of learning to the workplace, to consolidate what was learned by embedding it through on-the-job support; and
- targeting of training to organizational needs, anchored in a diagnosis of institutional and/or organizational capacity gaps, and formal assessment of participant training.

The early preparation to facilitate the application of what was learned in the workplace through action learning and practical exercises is of utmost importance.

Success factors for *education* include, to get the right people to become teachers and develop them into effective instructors (Fullan, 2007), (McKinsey, 2007). With regards to capacity needs for teachers, Fullan (2007) further states that a high level of success in the classroom requires personalization, precision and professional learning by teachers:

- Personalization is the capacity of a teacher to acknowledge what each individual student needs.
- Precision refers to the capacity to address these learning needs.
- Finally, learning by doing and mentoring by experienced colleagues are very effective educational and training methods.

Instructors require continuous learning and development, not only during their education, but especially during their working life. In general for training to be effective, it should be taken to the work floor, be integrated in operational practices and there should be room for learning-by-doing and for coaching by experienced colleagues.

1.3.6 INSTITUTIONAL CAPACITY BUILDING

The weak institutional capacity at the levels of the organizations and the enabling environment, are an equally important impediment to assimilate modern approaches in science, technology and management, essential to deal with the complex challenges in the water sector. The term institution is described by North (1990) as “the rules of the game in a society, the humanly devised constraints that shape human interaction”. Institutions can take the forms of policies and objectives, laws, regulations, administrative rules, organizations,

and norms and traditions. They determine how we think and what we do (North, 1990, 2005).

It is now conventional wisdom to say that strong institutions are the critical variable in development, not only in the sense of their quality, but also in their very capacity – for example as defined as their quantity of civil servants – to absorb initiatives and funds and prepare for future action. In the recent past several seminal studies have provided empirical documentation on the critical role of institutions (Fukuyama, 2004). Incremental change comes from the perceptions of the entrepreneurs in political and corporate organizations that they could do better by altering the existing institutional framework at some margin. But the perceptions crucially depend on both the information that the entrepreneurs receive and the way they process that information (North, 1990). One aspect of capacity development is to make sure the information received is as comprehensive as possible and to equip the entrepreneur with the right skills and mental constructs to process the information for the benefit of the organization and society. This will determine the transaction costs. Transactions costs are the costs of measuring the value of attributes of what is being exchanged and the costs of protecting rights and of policing and enforcing agreements. When the costs associated with an exchange are higher than the perceived benefits, there will likely be no transaction, meaning, things stay the way they are. Incomplete information, limited mental or institutional capacity by which to process the information and the risk of failure associated with this, determine the cost of transacting.

1.3.7 A SCHEMATIC OF KNOWLEDGE AND CAPACITY DEVELOPMENT

Figure 1.3 brings together the different elements of KCD. The diagram specifies in broad terms, for each of the three levels of action – the individual, the organization and the enabling environment – the sequence of what knowledge and capacity imply, by what means the knowledge and capacity development can take place, what the outcomes are and how these could be potentially assessed. These levels are “nested”, that is, the individual operates embedded within his organizational context, and the organization operates within its broader context. The enabling environment itself is divided in that part that typically falls in the realm of the formal institutional frameworks, and in a second part referring to the broader context provided by society. (Civil) society itself is both part of this enabling framework and at the same time an actor in its own right, as within society numerous formal and informal non-governmental networks, associations and organizations take part in the broader game of water management.

The sector’s performance derives from the effective action of individuals with the proper knowledge and capacity, who function in larger (sector)

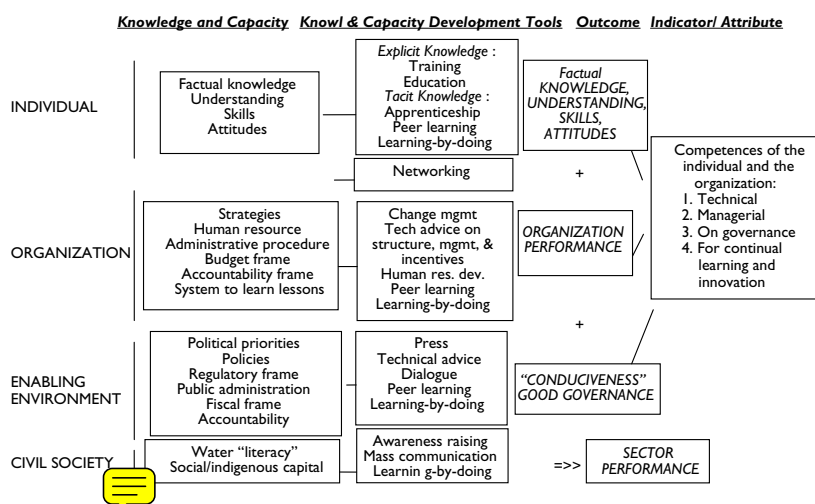


Figure 1.3 Schematic of KCD at different levels, indicating inputs and outcomes, and means for measurement (after Alarerts, 2009).

organizations (such as ministries, local governments, water user associations, civil society organizations, etc.). The effectiveness of these organizations depends both on the effectiveness of those individuals and on the typical features that shape the capacity of the organization itself through its skills mix, its internal operational and administrative procedures, etc. In turn, organizations with the right capacity and procedures still need an enabling environment to put in place the facilitating factors including an enabling legal and regulatory framework, financing and fiscal rules that stimulate proper action, and a broadly supportive political inclination in parliaments and among the voters and consumers. As mentioned above, KCD is essential to support and implement improvement of institutions or change in institutional arrangements. Often it is difficult to distinguish KCD proper from institutional development, and, indeed, KCD is embedded in and in effect helps shape, any institutional development and reform effort. KCD is part and parcel of change management.

Knowledge, understanding and skills are generally developed through typical knowledge transfer instruments such as education and training, however, whether the desired knowledge (or capacity) is explicit or tacit does make a difference in the choice of instrument. As Polanyi and Sveiby argued from their respective epistemological and practical management insights, tacit knowledge is eventually far more important as it shapes the skills and deeper attitudes. Tacit knowledge can best be transferred through one-on-one interaction between junior and senior, apprentice and teacher. Organizational capacity development is achieved by educating/ training the (staff) members and

by helping the organization as such learn from the experiences from others. Technical assistance, management advice, learning experiences, comparison with peers and benchmarking, are important instruments. Both for individuals and for organizations, networks are playing an increasingly important role for generating, sharing, corroborating and improving knowledge and capacity. Networks – both formal and informal associations and “communities of practice” – are becoming the main mechanisms for professional improvement for many water professionals. ICS are powerful tools to support and intensify communication and open up new avenues for the dissemination of knowledge including best-practices.

At the level of the enabling environment, governments and other actors also “learn” and acquire capability to, in turn, become more enabling. Policy makers, governmental departments, and politicians, also increase their understanding about new challenges and solutions by, for example, drawing lessons from international “good practice”. Technical advice, communication platforms and peer-learning are useful instruments for exchanges of information. In civil society, capacity already exists in the form of what is often called social capital or indigenous knowledge that resides in communities, and in water literacy. This can be further developed through comparison activities and peer-learning with other communities. The press and mass communication – such as Discovery Channel – are powerful vehicles to disseminate knowledge and develop attitudes, and reach many communities that otherwise receive little opportunity to communicate with the government. Non-governmental organizations and networks are important and often effective actors in this capacity development. Finally, the role of society is of course critically important as it shapes the nation’s consensus about the priorities for the future (and the budget allocations) through electing its political representatives and holding its government accountable.

Eventually, “capable” individuals and organizations possess aggregate competences to act. Four types of aggregate competences can be distinguished. Firstly, technical competence is required to analyze and solve the problems that have a technical nature. For instance, all sector agencies need to regularly acquire new technical knowledge on an array of subjects from piling and construction techniques to climate change mitigation and adaptation. Second, organizations need to have an adequate pool of management competences embodied in their senior staff. In many developing countries sector agencies may score well on technical and civil engineering aspects, but often the competence to manage personnel and organizations, as well as the water resource itself, is modest. Third, an effective and performing water sector requires organizations that possess skills to foster and apply principles of good governance, such as dialogue and communication with stakeholders, resource allocation within policy frameworks that aim for equity and poverty alleviation, transparency and accountability. Finally, as mentioned before, capable individuals and organizations are those that manage, by deliberate

decision, to keep learning and innovate. Learning and innovation do not come automatically but require financial resources and personal and managerial procedures to foster knowledge generation and sharing. This learning can emerge from an acquired attitude or natural inquisitiveness, but institutions may become interested in and coaxed into learning only after being held accountable for poor performance. Table 1.1 provides an overview of features and attributes related to these four competences.

Table 1.1 Examples of competences for each level.

	<i>Individual level</i>	<i>Organizational level</i>	<i>Institutional level</i>
<i>Technical competence</i>	Regularly updated knowledge and skills. Understanding of the broader technical context.	Appropriate knowledge and skills mixes for the services that are delivered, such as engineering, legal, financial, institutional knowledge. Knowledge on procurement and investment procedures.	Technical expertises and available skills mixes in a broader setting. Procedures for critical review and corroboration of knowledge and information.
<i>Management competence</i>	Project mgt skills. Financial mgt skills. Personnel and team mgt skills. Mentoring skills. Understanding of political consensus building. Ability to 'deliver'. Leadership.	Leaders able to operate with goals and objectives as agreed with supervisory entities and main stakeholders. Ability to set goals, strategy. Financial management. People management. appropriate staff rotation; talent spotting, incentive systems, etc: Project management. Ability to 'deliver' timely.	Sound and workable task assignments of sector agencies. Minimal overlap between agencies, and size and task of agencies facilitate proper management and task execution. Sound financial, fiscal and budgeting systems. Facilitating proper management by organizations.
<i>Governance competence</i>	Understanding of procedures. Ability to engage with and listen to stakeholders. Ability to apply inclusiveness. Focus on results.	Transparent decision making processes. Procedures to consult with stakeholders, and provide empowerment to others. Procedures to be held accountable, including transparency in budgets and plans.	Distinction between 'operator' and 'regulator'. Procedures to ensure inclusiveness in particular regarding objectives, priorities and strategies. Procedures to ensure transparency and accountability.

(Continued)

Table 1.1 (Continued)

	<i>Individual level</i>	<i>Organizational level</i>	<i>Institutional level</i>
<i>Learning competence</i>	Desire to 'keep learning', readiness to critically reflect on own's performance. Availability for training and education in new skills and knowledge.	Readiness, and procedures, to critically review own's performance on a continuous basis, and revise if necessary. Goal, procedures and resources to support learning by staff, organization and if necessary other stakeholders. Support of 'communities of practice', and rewards for staff learning.	Procedures to promote open working atmosphere and critical reflection on performance. Openness to review sector performance on a continuous basis, and revise policies and arrangements if necessary. Foster inclusiveness.

1.4 TOOLS AND INSTRUMENTS FOR KCD

1.4.1 A STRONGER CASE

If sustainable development is our prime objective, then KCD should have the priority attention in developing and industrialized countries alike. Governments – for having legal authority and responsibility over the sector – can devise appropriate policies and take the main initiatives. Notwithstanding, an equally important role is to be played by civil society organizations and NGOs, and through the awareness and political vote of the electorate. The discussion below does not claim to be comprehensive, and focuses on the government role.

Investing in knowledge and capacity development pays off. Recent evaluations have demonstrated that development programs in the water sector are now more effective and sustainable than, say, before the mid-nineties. Many local communities have become less vulnerable to external upheaval or natural disaster. This higher effectiveness can be attributed for a large part to stronger institutions, better governance and more technical and managerial competence in the developing countries whose capacity has been strengthened. Several studies on irrigation, for example, have shown that nowadays the best return on the investment in canal improvement is achieved when a substantial effort is also placed in capacity enhancement, including empowerment, of irrigators and local-government officials. Of course, at a higher level of aggregation, the impact of education of the young generation and of communities on sector development and sustainability is without doubt. These impacts are being recognized. Although accurate figures are lacking, the amount of funds allocated to capacity development by donors seems to have increased about

tenfold in the period 1995–2004 over the preceding decade. For instance, the World Bank provided for Sub-Saharan Africa between 1995 and 2004 about US\$9 billion in lending and US\$900 million in grants for the broader goal of capacity enhancement and education (World Bank, 2005). Across the globe, the Bank financed about \$720 million annually over the past years for training activities for all sectors (World Bank, 2008).

1.4.2 STRATEGIES AND NEXT STEPS

But governments and other decision-makers have still a long way to go to align their administrative systems and sector policies to international best-practices, and put in place a knowledge-management system stimulating structured learning. The coordination between institutions must be deepened, and more structural capacity developed. Communication with the stakeholder groups from local communities to politicians is to become a priority, partly for awareness raising and education, but also to listen in and forge cooperation.

- i The fact that KCD is a formidable agenda by itself does not mean that meaningful KCD should always be carried out with such comprehensive ambition. KCD usually is more manageable and better targeted when carried out on a smaller working area or on a confined issue. Still, governments should at the same time start analyze their sector's knowledge and capacity weaknesses and outline a longer-time strategy comprising a series of steps.
- ii As a first initiative to inform the policy and the next steps, the institutional and human capacities of the country's sector, or part thereof, should be assessed to define their strengths and weaknesses, and how robust the capacities are to deliver more effective services and prepare for future uncertainties. The assessment can cover a larger or smaller part of the sector (e.g. the management of river basins, basic sanitation, vulnerable communities, youth, etc.), or focus on a part of the overall institutional architecture and capacity (e.g. the education system, community management, or the legal framework). The SWOT analysis technique (Strengths-Weaknesses-Opportunities-Threats), results frameworks, risk analysis, stakeholder analysis, and similar techniques can be very useful to conduct the assessment (see Box 1.1–1.3). Such analysis always needs to be conducted together with all key stakeholders, including also non-governmental entities, and educational and training outfits besides academia. UNDP (2007) has reviewed and compiled the experience with capacity assessments and offers a rational framework for capacity assessment. It suggests that *core issues* to be assessed cover institutional development, leadership, knowledge, and mutual accountability. Critical *functional capacities* include, e.g., capacity to engage in multi-stakeholder dialogue, situational analysis, vision creation, policy and strategy formulation, budgeting, and monitoring and evaluation. It should be borne in mind that proper analysis requires

substantial time and funds, as the assessment is specialistic and interactive and presumes adequate meeting and communication opportunities. Other best-practices are offered in a World Bank review of experiences in Africa (World Bank, 2005).

**Box 1.3 A check-list to assess the capacities at the sector level
(Lopes and Theisohn, 2003).**

Human resources: Refers to the process of changing attitudes and behaviours—imparting knowledge and developing skills while maximizing the benefits of participation, knowledge exchange and ownership.

Job requirements and skill levels	Are jobs correctly defined and are the skills available?
Training/retraining	Is the appropriate learning taking place?
Career progression	Are individuals able to advance and develop professionally?
Accountability/ethics	Is responsibility effectively delegated and are individuals held accountable?
Access to information	Is there adequate access to needed information?
Personal/professional networking	Are individuals exchanging knowledge with peers?
Performance/conduct	Is performance effectively measured?
Incentives/security	Are these sufficient to promote excellence?
Values, integrity and attitudes	Are these in place and maintained?
Morale and motivation	Are these adequately maintained?
Work redeployment and job sharing	Are there alternatives to the existing arrangements?
Inter-relationships and teamwork	Do individuals interact and form functional teams?
Communication skills	Are these effective?

Organizational capacity: Focuses on the overall organizational performance and functioning capabilities as well as the ability of an organization to adapt to change.

Mission and strategy	Do the organizations have clearly defined mandates?
Culture/structure/competencies	Are organizations effectively structured and managed?
Process	Do institutional processes such as planning, quality management, monitoring and evaluation work effectively?

Human resources	Are the human resources adequate, skilled and developed?
Financial resources	Are financial resources managed effectively and allocated appropriately to enable effective operation?
Information resources	Is required information available and effectively distributed?
Infrastructure	Are offices, vehicles and computers managed effectively?
The enabling environment: Focuses on the overall policy framework in which individuals and organizations operate and interact with the external environment.	
Policy framework	What are the strengths, weaknesses, opportunities and threats operating at the societal level?
Legal/regulatory framework	Is the appropriate legislation in place, and are these laws effectively enforced?
Management/accountability framework	Are institutional responsibilities clearly defined, and are responsible institutions held accountable?
Economic framework	Do markets function effectively and efficiently?
Systems-level framework	Are the required human, financial and information resources available?
Process and relationships	Do the different institutions and processes interact and work together effectively?

Lopes and Theisohn (2003) offer a useful check-list to help assess a sector's capacity by analyzing the three levels of individual (or human resources) capacity, organizations (or institutional) capacity and the capacity of the enabling environment (Box 1.1–1.3).

From this assessment, a strategy and action plan can be derived. The strategy should be shaped contextually through dialogue and stakeholder involvement. Because the environmental, social-economic and cultural contexts differ between countries and sub-sectors, there is no “one size fits all” strategy. Such process cannot be imposed from the outside, and requires a home-grown demand and political commitment. However, often the capacity assessment and its development help to make the case and demonstrate the benefits, and at the same time help develop capacity. The process often turns out to be slow, incremental and patchy. Addressing weak institutional environments is not a straightforward or “linear” process but often works best through “strategic

incrementalism”, i.e., pragmatic incremental reform steps that may not fully address all the current institutional performance problems but can alleviate some acute problems while at the same time creating the conditions for deeper and more favourable change in the longer run (World Bank, 2008). In other words, one should continually adapt the approach as specific new opportunities arise along the way.

- iii The water sector is knowledge intensive. This calls for much investment in the creation of new knowledge, through research and innovation. On the other hand, a lot of knowledge to guide local action resides within the traditional knowledge of local communities, and is often untapped or dismissed. Knowledge on water tends to be available in fragmented form among a growing number of actors who each hold part of the solution. Communication, therefore, is becoming increasingly important in building the knowledge base and the institutional and human capacities; to disseminate and acquire knowledge from across the sector; and to forge political consensus in society. Precisely because of this complexity and the distributed nature of sector knowledge, a judicious balance needs to be sought between centralized sector management and collaborative arrangements among decentralized entities.

ICS is a powerful tool to support and intensify communication and open up new avenues for the dissemination of knowledge including best-practices. ICS is also becoming the key instrument to forecast with greater precision the future consequences of current decisions and policies in development scenarios, and to reduce the uncertainty related to climatic variability. The access to relevant data facilitates decision-making and in general increases transparency and governance. Thorkilsen (2001) and Abbott (2007) describe how ICS has been at the core of the broad knowledge-sharing effort that was necessary to create the political and societal support for one of Europe’s largest and controversial infrastructure projects, namely the rail and road bridge and tunnel across the Øresund strait connecting Denmark and Sweden.

Decision-makers have nowadays an array of tools and “knowledge pools” such as data bases, research and educational centres, consultants, etc., at their disposal to develop or enhance capacity and facilitate knowledge generation in those areas and with those actors whose low capacity is considered a key constraint.

- iv The strategy generally is implemented through a combination of education; training; technical advice for institutional strengthening and change; institution of appropriate incentives and procedures that encourage staff to seek innovation and learn; facilitation of research and innovation, and of communication and interaction. Given that much of the sector’s education is actually carried out by the educational establishment – through polytechnics, and a variety of university-level studies – sectoral

decision-makers would do well by engaging in a dialogue with these establishments to ensure that sectoral and educational perspectives are aligned. The generation of professionals is in many developing countries a prime concern. In many countries nominally adequate numbers of graduates are churned out by universities and polytechnics, but their specializations and skills may not be attuned to the modern challenges and the expectations from the societies they are supposed to serve. “Education” should also be understood to go well beyond tertiary education, and society at large and youth in particular need to be educated about water and how it impacts their future. Finally, “education and training” encompasses a wide gamut of instruments spanning from conventional class-room teaching to Objective-Based Learning, hands-on learning and mentoring. Recent comparative studies have shed new light on which approaches are likely to be most effective. In this fields too, ICS has opened up powerful new tools for real-time access to data and teachers across the globe, and communication among peers.

- v Governments can encourage the development of systems to generate and share knowledge among “centres of knowledge”, as well as between those who are in need of knowledge and those who possess it. As highlighted above, with the advent of ICS and globalization, governments can create and actively fund “communities of practice”, networks of professionals and institutions, and databases, on the relevant subjects. In such networks, local governments and communities are not to be left out – they are always the first at risk, but they also often hold a lot of traditional wisdom. Some such networks preferably should also be international, both south-south and south-north.
- vi A special challenge concerns the facilitation of institutional strengthening and KCD in civil society. Although many governments may not find this obvious or against their mandate, civil society needs to receive special attention based on the following considerations.
 - With the large numbers of stakeholders in water management, governments will increasingly depend on informed and “capacitated” actors in civil society to play a growing role in water management, over and beyond the role they are already playing.
 - As the technical agencies at national as well as at local government levels depend on budgets voted by Parliament or Councils, it is essential that their staff is better able to make the case with politicians to secure the budgets. Eventually, this also means that civil society too needs to feel more strongly about the priority for water, and lend its support to water sector initiatives.
 - Climate and other changes need to be better forecasted, and remedial actions identified, agreed upon and taken. Much of this implies non-technical measures as well as some technical measures at local level to strengthen preparedness and resilience of local settlements and their

arrangements for agriculture and for natural resource management. This is of special relevance in light of climate variability and other environmental changes.

- Civil society has the right to hold government accountable for delivery on its policies. To enhance governance, civil society therefore should have suitable capacities, have access to relevant information and be able to engage with (local) government on service delivery.
 - Civil society as “user”, on the other hand, needs to be able to involve itself in some decision making at local, river basin and national level, to help decide on priorities in spending and water management, and in such a way that at the same time it is aware of the costs involved in the options, and agrees to provide for the finance.
- vii Finally, it should be recognized that “learning” is a continual effort. Governments can put in place the procedures, institutions and incentives to ensure that lessons are learned, documented and disseminated. Each time an issue has been addressed, or a particular action carried out more effectively, this information should be fed back to stimulate further improvement.

1.5 MEASURING KCD

1.5.1 INTRODUCTION

Little agreement exists about how to identify and measure KCD. Some sources tend to focus on the measurement of components of KCD only, such as the individual capacity or the organizational capacity. Others prefer to focus on measuring performance as a proxy for capacity, probably because it is more appealing to look at apparent results than to look at the mechanism of KCD itself. Performance however, depends on many other factors beside

Table 1.2 Three types of evaluation (Hospes, 2008).

<i>Evidence-oriented evaluation</i>	<i>Realistic evaluation</i>	<i>Complexity evaluation</i>
Measuring effects	Investigating “black boxes”	Exploring complexity
No use of policy theory	Use of policy or program theories on what happens in “black boxes”	Starting point is that policymaking is dynamic and interactive
Programs stand at the beginning of a results chain	Programs are “black boxes”	Programs are adaptive systems
Input => output => outcome => impact	Mechanism + context => outcome	Outcomes are emerging and quite unpredictable
One-way and single cause-effect relationships	One-way and multiple cause-effect relationships	Two-way and multiple cause-effect relationships

the current capacities of individuals and organizations, and there is no direct causal relation with KCD; one should be cautious.

Many attempts have been undertaken to develop frameworks for the measurement of KCD, and numerous capacity assessment tools exist; UNDP summarizes 20 just for organizational capacity measurement (UNDP, 2005). Several web-sites are specialised in capacity assessment. Mizrahi (Chapter 20) concludes that not one study offers indicators, benchmarks or measurement tools that can be used across regions, or indicators that assess all relevant levels of KCD.

1.5.2 APPROACHES IN MONITORING AND EVALUATION (M&E)

The various ways in which KCD is assessed can usually be categorised in two broad schools. One school advocates approaches based on results-based management; the other favours evaluation based on the complex-systems theory and a participatory approach.

Hospes (2008) has created a comprehensive overview based on three approaches (Table 1.2). The most commonly used evaluation method in development cooperation is evidence-oriented, as is described in the left column. This approach focuses on the impact of a given intervention. It assumes a linear, causal relation from input to impact. This type of evaluation is convenient when working with the short-term project goals and time slots, as donors often do. Realistic evaluation however, believes that the relation between input, output, outcome and impact is not linear. What happens in the process from input to impact, in the so-called “black boxes” should be investigated. The art in realistic evaluation is to map the dynamics in a program: social interaction and institutional influences that determine the relation between input and output.

Critics of realistic evaluation point out that the context should not be perceived as something external, but as part of the process. As a reaction to realistic evaluation, complexity evaluation is evaluating how policymakers themselves respond to complex problems. It wants to capture the dynamics of the context as well. Hospes (2008) states that for the evaluation of complex systems different approaches need to be brought together, based on adaptive systems, institutional dynamics and assigning meaning. The evaluation of complex systems is rooted in various schools of thought, some of which are described earlier in this article, and will receive more elaborate attention elsewhere in this volume.

1.5.3 ADAPTIVE SYSTEM MANAGEMENT

One management approach that is working according to the principles of complexity evaluation and the institutional dynamics in complex systems, is adaptive management (AM). AM is defined as the “integration of design, management, and monitoring to systematically test assumptions in order to adapt and learn” (Salafsky et al., 2002). AM originates from ecosystems

research and has combined this with research on the social and institutional dynamics in a system. The objective of AM is to better manage the impact of an intervention, by investigating what happens in the “black boxes”, and at same time it takes along the social and institutional dynamics of the system. An important component is the involvement of stakeholders in the process from beginning to end, to capture their knowledge and use it to arrive at a set of management options. New knowledge about the connection and interaction between the social and cultural system and the ecological system has to be generated, through extensive consultation and participation of stakeholders. The next step is how to use that knowledge for policy making. An important advantage of AM is that the process consists of step-by-step learning, iteratively allowing to monitor what worked and what not, and to adjust the intervention process. This facilitates easier and early evaluation of mistakes and successes, albeit that this monitoring system would likely involve high expense for the repeated consultations. Chapter 5 will discuss the principles of AM more elaborately.

NOTE

The opinions expressed in this paper are those of the author and do not necessarily reflect those of the World Bank.

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