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How institutions elude design: river basin management and sustainable livelihoods

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This paper challenges ideas that it is possible to ‘get the institutions right’ in the management of natural resources and the construction of sustainable livelihoods.. It engages with the literature and policy specifying ‘design principles of robust institutions’ and uses data from a catchment management project in the Usangu Basin, Tanzania, to illustrate the complexity of institutional evolution. The paper argues that the deep embeddedness of institutions in dynamic and fluid livelihoods renders external crafting problematic.

1. Getting institutions right.

Much theorising of collective action for natural resource management has focused on the importance of institutions as constraining and enabling structures in people’s livelihoods. Institutions provide the incentives to shape individual economic maximising behaviour in socially preferred directions, and the sanctions to punish those who cheat or free ride on the public good of collective action. Institutions can be shaped or crafted by external intervention and, providing due attention is paid to the structures (rules and roles) and norms (relations of trust and co-operation) contained within them then collectively beneficial outcomes may be achieved (Uphoff 2000). These include optimising the output of the resource, sustainable use and management, and the generation of social capital. This model has largely been adopted in Sustainable Livelihoods literature where institutions are seen as critical channels through which people’s livelihood strategies are shaped and mediated.

The idea of institutional crafting is epitomised in the work of Elinor Ostrom whose specification of Design Principles for robust and long-standing institutions has spawned a vast amount of subsequent work empirically supporting the design principles through case studies. Common prescriptions emerging from the Design Principles literature emphasise the desirability of transparency, the codification of rules and regulations and the need for clear authority structures. The following points collate common design principles derived from the literature (Uphoff 1992, 2000, Ostrom 1990, Bromley and Cernea 1989 Wade 1988):

- Transparency – decision making should take place in public.
- Clearly defined boundaries of jurisdiction over the resource.
- Clearly defined user group or community to manage the resource.
- Locally appropriate rules must be devised.
- Clear identification of rights to resources and rules about them.
- Those involved in resource use take part in decision making about the resources.

- Accountable monitoring and effective authority structures are required.
- Graduated sanctions for con-compliance with collective rules, applied impersonally.
- Conflict resolution mechanisms should be clear, accessible and rapid.
- The ‘nesting’ of institutions with other levels of decision-making.

The practical appeal of this approach has been enormous and we see design principles directly translated into policy and project documents, as blueprints of action. However, the approach has also been criticised for not offering a coherent theory of collective action, not explaining the causal processes underlying the design principles, for failing to account for the variability and dynamism of contexts in which DP’s must be applied, and poorly explaining socially constructed values that shape people’s collective action (Ruttan 2000).

In this paper we question the design principles approach by drawing on an example of catchment management, to illustrate how the complexity of social relations, the dynamic nature of livelihoods and the rather fluid nature of institutional evolution, renders Design Principles of questionable validity. We select key design principles to interrogate in the light of the Usangu data, relating to:

- the need to clear boundaries of the resource and the community,
- the nature of monitoring, authority structures and sanctions,
- the need for public fora for decision-making and conflict resolution to which all resource users have access,
- the organisation of institutional arrangements into nested systems for the local to the wider scale.

2. Design Principles in Policy and Practice: the case of river basin management

Institutional approaches to the management of water resources provide a lively example of the practical application of the design principles to a particular sector. Current thinking in the water sector focuses on river basin management as the most appropriate approach for water resources. The approach is based on certain key ideas, the most important of which is:

- managing water on the basis of natural hydrological boundaries (the river basin)

The idea that water should be managed on the basis of its “natural” boundaries has a long history. Some sources such as Newsom (1997) trace this back to the great hydraulic civilisations of early times (China, Egypt and the Fertile Crescent), which owed their pre-eminence to irrigation. In the early part of the twentieth century, river basin management received further impetus with the establishment of the Tennessee

Valley Authority in 1934, and a focus in India on river basins as the natural unit of planning following independence (the first of these, the Damodar Valley Corporation, was set up in 1948). In all of these cases, however, the focus was on a single major water function, generally irrigation except in the case of the TVA which became primarily an energy producer.

Saha in India had argued in 1938 that “river basins, because of their intrinsic ecological integrity, were ideally suited territorial units for undertaking comprehensive programmes of socio-economic development” (Saha and Barrow, 1982). However, it was not really until the latter part of the 21st century that a broader view emerged of the need for holistic planning and management of water within its natural boundaries, based on the river basin as a drainage unit. This view is summarised in the key principle:

- water management integrated across all sectors and stakeholders

Industrialised countries such as the UK and France formalised this integrationist approach through different types of river basin authorities in the 1960s and 1970s. In France, these have continued to occupy a central place in the economic life of the state, although their importance has been somewhat diminished in the UK, following stronger moves towards free market economics. Nevertheless the basic concepts of integrated water management at the basin level have remained and have been taken up across a whole range of contexts, so that it is now a globally accepted approach to water management. It was, for example, a central tenet of the Dublin and Rio conferences in the early 90s, and formed an important element of the reassessment of water resources management policy carried out both by the World Bank and the Asian Development Bank in the mid 90s. In all these cases the emphasis has been on integrated development:

“the effective management of water resources demands a holistic approach linking in social and economic development with protection of natural ecosystems” (World Bank, 1993),

with the implicit assumption that the developmental concerns can be tied in with the natural boundaries, in line with the Ostrom design principles. More recently the EU is leading the way with the Water Framework Directive (2000), which states its aim “to ensure protection and sustainable use within the framework of the river basin” (clause 13). Whilst the focus on river basins remains, it is noteworthy that the emphasis for the EU is on protection and sustainable use of water resources, rather than on their development.

River basin management is also commonly taken to comprise certain other principles, which have borrowed from broader perspectives of democracy and accountability. Two such principles are:

- water resource management should be developed to the lowest appropriate level
- water resource management processes should be open and transparent

Similarities between these and certain of the Ostrom design principles are immediately apparent, for example the need to devise locally appropriate rules, and the need for transparency (decision-making should take place in public). There is, however, one further cardinal principle often associated with river basin management which appears to contradict the institutional design principles.

- Water resource management functions should be separated from water use functions.

The need to separate management from use has grown up in industrialised countries because of the perception that issues of scarcity and quality require regulation (management), and the belief that those involved in regulation should not also be involved in operation (use) because of potential conflicts of interest. By contrast, the design principles are based on the assumption that those most closely connected with the exploitation of a resource are also like to be its best stewards.

Managing water at the basin level based on the five principles outlined has now become accepted wisdom in the water sector. The close relationship between the river basin management principles and the institutional design principles (except in the case of separating water management from water use functions) has been noted, although they appear to have developed independently of one another. Nevertheless this close relationship is not without problems and contradictions, as will be evidenced by the case of the Usangu Catchment in Tanzania.

3. Usangu – a challenging environment

The Usangu catchment is an extensive catchment in the upper reaches of the Rufiji river (Tanzania's main river) in SW Tanzania, covering an area of about 22,000 km². It is defined in geographical terms by its hydrological boundaries, comprising all the land which drains into the Great Ruaha River from the Usangu wetland, at the downstream end of the catchment. It is diverse in landform and land use, consisting of an upper steeply wooded part with a high rainfall, and then an extensive plain supporting settlements and agriculture in the higher reaches and seasonally flooded grassland in the lower reaches. The wetland comprises both the seasonally flooded grassland and a smaller area of permanent swamp.

Around 200 000 people live in the catchment, deriving their livelihoods in a variety of ways mainly from its natural resources. Key occupations include rainfed agriculture and some forestry in the higher regions, irrigated and rainfed agriculture in the upper part of the plain, and pastoralism and a small fishing industry centred on the wetland. The catchment is characterised by an increasing demand for resources of all kind. In particular water resources are becoming increasingly stressed, with the result that the Great Ruaha river downstream of the catchment began to dry up during the dry season in the mid 90s, and the period of no-flow is becoming increasingly prolonged. Although this is the most visible manifestation of recent changes in the catchment, it was quickly realised that it was impossible to look for causes for these changes in the water regime alone, and that it was necessary to study the complex linkages between land, water and other resources to come to a comprehensive view of the catchment and appropriate responses to the situation. A project was therefore initiated for the Government of Tanzania, with financial assistance from the UK's DFID. The purposes of this project, the Sustainable Management of the Usangu Wetland and its Catchment (SMUWC) was to develop local capacity to manage the wetland and its catchment sustainably, which was to be achieved through knowledge-generation and capacity-building. The capacity-building initiatives, in particular, lead to a whole range of institutional issues which provide many of the examples illustrating the points of this article (www.usangu.org).

The catchment is typical of rural Tanzania in that it is the setting for many development interventions, varying in size from local initiatives affecting a few hundred people, to regional and national programmes operating across the whole catchment or in certain parts of it. Many development interventions are based around the existing local government system, focussing on the district, but extending in theory or practice to the village, or its lowest level, the hamlet. Other institutions of importance in the management of water resources are the Rufiji Basin Water Office, which is advised by the Rufiji Basin Water Board. The Water Office has the duty to protect and manage the basin's water resources (which are a national, rather than a district) asset, and in particular it has the power to license abstractions and collect water fees.

The population of the catchment is characterised by ethnic diversity and a history of change and uncertainty. Key features have been migration, in particular immigration of pastoralists from the north in period 1960 to 1980, and more recently, economic and environmental changes. Population and population growth remains the major driving force, others being economic liberalisation with accompanying changes in agricultural policy, and the remoteness of the basin from Tanzania's main centres of economic activity.

4. Boundaries; clear and closed or overlapping and permeable?

Ostrom suggests that resources should be managed within clearly defined boundaries; the boundaries of the resource and the user community with rights over it would be clearly specified. This is intended to enhance the jurisdictional integrity of collective use arrangements (Ostrom 1990).

Current theories of river basin management are likewise based on the fundamental idea that water is best managed within the natural boundaries formed by drainage lines. The basin provides a natural focus since all the water within it will eventually end up in the single channel (in the case of Usangu, the Great Ruaha River at its downstream end), and moreover the boundaries of the basin are, at least in theory, easy to map and define. This geographical approach has received impetus in modern times from the creation of the Tennessee Valley authority onwards. This development is well traced by Barrow (1998) but is also worth noting that there has been a rapid increase of interest in river basin management in the late 90s.

Whilst managing water within basin boundaries may seem a logical approach to water planners and other professionals, in practice matters are not so simple. The boundaries of both the resource and the community, and their relationship to managerial structures, prove elusive to rigid specification. Resource boundaries frequently overlap or overlay administrative boundaries (for example with different villages sharing the same water supply). People may wish to combine the use of water with other resources (such as grazing land) that has different boundaries, and the organisation of people's lives is partly shaped and constructed through multiple cultural and social networks rather than simply through resource or jurisdictional boundaries. So, for example people may seek to access resources in an area other than their own community, but where they can secure access through kinship arrangements.

Example 1: Seasonality of boundaries

The idea of clear boundaries of a resource and a user group cannot adequately account for the seasonality of rural livelihoods and the differing needs for access to resources over the year. Seasonal uncertainty of resource availability may mean that people outside the regular user community seek access to a resource – for example if a water source dries up or breaks down in the dry season people may seek alternative supplies in adjacent villages. (*examples to add*)

Pastoralists use the grazing lands (far from the villages in which they reside) seasonally. They pay taxes and are nominally eligible to participate in public decision making in their ‘home’ villages and yet their use of grass and water and their temporary residence in the grazing lands directly impacts upon resource availability in nearby villages. Officials in adjacent villages tried to deal with this by requiring pastoralists to register their presence locally, but they were reluctant to do this for fear of being taxed twice.

Example 2: Livelihood networks

In deploying risk management and diversification strategies people with adequate labour or cash resources may expand their livelihood activities outside their home areas. Examples include the renting of land (including irrigated land) in other villages (often those where they have kin), establishing businesses (such as selling beer or food) in villages where kin reside, undertaking commercial exploitation of natural resources, such as burning wood for charcoal which takes place in forest areas often distant from the home village (*examples to add*).

In cases where land and water interactions are critical, defining hydrological boundaries not necessarily meaningful to local resource users. We can see that where boundaries exist they are permeable and often fluctuating and that they are overlaid with the multiple social networks through which people access resources and manage their livelihoods (Berry 1993 and Peters 1994). Imposing rigid resource management boundaries on these existing structures runs the risk of ignoring the social realities of resource use.

In summary, both the institutional design principles and the river basin management literature would suggest that Usangu’s water resources should be managed on the basis of the catchment (the river basin), and indeed there was a water agency and board set up to support this. In practice, however, the situation was not that straightforward. Both the existing institutional structures and the livelihood strategies and understandings of the local people were established along different lines, and it was therefore necessary that other approaches and institutional frameworks would evolve.

5. Low cost decision public decision-making

The design principles literature strongly emphasises the desirability of public, transparent decision making and conflict resolution arrangements at the lowest possible level. Thus, Ostrom suggests it is desirable that:

‘Most individuals affected by the operational rules can participate in modifying the operational rules.’

and that

‘Appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials’ (Ostrom 1990:90).

Such an emphasis is based on rather romantic notions of the homogeneity of the community and the possibilities of participatory processes. It little recognises the ways in which power relations are played out in public fora and the possibility of institutions reproducing existing inequitable relations in society. Nor does it recognise that there may be social preferences for a convenient opacity in collective arrangements, for non-confrontational and socially supported forms of decision making and conflict resolution. These points are elaborated in the following examples:

Example 1. Access and articulation

Despite the nominal specification of rights to participate in local decision making in Tanzania, social relations and imbalances of power ensure that people with particular social identities may find such participation difficult. Examples include:

Pastoralists who have very low levels of representation on decision making bodies in Usangu, and probably even lower influence on the decisions made. Pastoralists are often perceived by the politically and numerically dominant agriculturalists to be itinerant (even when they are settled) and therefore ineligible for full participation in decision making. Prejudicial attitudes against pastoralists who may be perceived as intransigently backward also militate against their full incorporation into decision making. Examples of their inability to significantly influence local decision making include an occasion when Mabadaga village re-demarcated grazing land to an area unsuitable for cattle, in order to remove cattle from grazing on growing crops. Despite the nominal membership of pastoralists of the village assembly, their views were not taken into account.

Women and children often have little or no direct representation on decision making bodies despite being the managers in use of many natural resources. Where women are represented in public decision making they often claim that they go just to listen, and that they don’t ‘have the words’ to articulate their concerns in these fora. Previous research in Tanzania has also highlighted gender differentiated preferred norms of participation in public fora with men preferring individual articulation of interest and opinions, women relying on key representatives to present their views. (Cleaver and Kaare 1998)

Poor people are perhaps the most disadvantaged by public decision making arrangements. The opportunity cost of attending meetings is often too high for labour stressed households who secure their basic needs on a daily basis. They too experience severe problems of articulation in public fora – that most extreme examples being the poor families who don’t even speak the common language Swahili, because they have

never been to school. Their limited social networks also militate against their ability to influence the decisions made in public fora.

Example 2. Socially costly conflict resolution

Research in Usangu has demonstrated a deeply held preference for conflict avoidance and for reconciliatory conflict resolution systems. The preferred channels for resolving disputes over resource use are existing social and cultural structures, only if these fail do people resort to more formalised and transparent conflict resolution. Social forms of conflict resolution (often conducted through village elders) emphasise the generous interpretation of compliance with the rules (a blind eye is turned to a limited amount of free riding), the negotiation of compliance over time, rather than at a single event, and the desire for reconciliatory rather than adversarial solutions (fines and punishments imposed only in the last resort). (*Add examples*). Moreover, punishment may often safely be left in the hands of god or the ancestors, so relieving individuals of the troublesome obligation of imposing sanctions on close neighbours, even kin.

Such conflict resolution through socially embedded mechanisms is neither rapid nor low cost but people may be willing to incur transaction costs if the outcomes are socially preferable; more reconciliatory and less adversarial, so preserving the possibility of maintaining livelihood interactions with the offender.

But preferences for forms of conflict resolution vary – different fora will favour different groups and it is significant that in research about conflicts in the Usangu basin, Maganga found that women preferred to take marital disputes to formal arbitration bodies, presumably because the socially embedded institutions largely operated by male elders were unsympathetic to their requests for divorce (SMUWC 2001).

We need to ask critical questions about participation in local public decision making, to ascertain the level of inclusiveness and representation involved. Whose views and interest are actually articulated in such fora, which underlying social values reproduced? An understanding of the limits imposed upon participation by livelihood dynamics, particularly the constricting effects of poverty should lead us to be sceptical about easily claiming local representation in decision making processes.

6. Monitoring, authority and sanctions

The Design Principles literature stresses the importance of effective monitoring of resource use and of compliance with collective rules. Thus Ostrom suggests that:

‘Monitors, who actively audit CPR conditions and appropriator behaviour, are accountable to the appropriators or are the appropriators’

and

‘Appropriators who violate operational rules are likely to be assessed graduated sanctions (depending on the seriousness and the context of the offence) by other appropriators, by officials accountable to these appropriators, or by both.’ (Ostrom 1990:90)

In terms of institutional crafting these principles translate into the need to establish clear monitoring systems based on indicators and transparent processes. Such monitoring systems, as well as providing information about potential depletion and degradation of resources, help to determine where people are cheating or free riding on the collective good. Authority systems built into the institutional structure are then used to exercise prompt and impartial exercise of sanctions are seen as critical in determining the effectiveness collective resource management.

Considerable work has been done on the definition of indicators, both in the water sector and in other development sectors more generally. Much of the current interest centres round participatory monitoring, in which the indicators are defined by the users themselves to reflect their interest and pre-occupations. This approach has obvious points of reference to the institutional design principles. There is likewise a general consensus on the desirable features of monitoring systems (transparent, accountable, systematic, quick, responsive) which is applied not only to the water sector, but also to other sectors more generally.

In practice, the apparent simplicity of the design principles is not matched by simplicity in application. For example, it is difficult to define indicators for the management of water and other resources in Usangu because of the multiplicity of resources and the way they are linked to one another and utilised. Irrigators, for example, differ from pastoralists in the aspects of water availability which are of interest to them. It is also difficult to define monitoring systems and processes because there is no clear responsibility for resource management within the catchment. Local government have a pivotal role to play, and from an important point of contact for many local resources users. However, local government is often ill-equipped, in terms of structure and resources, to perform effectively in this role (Larson, 2002, discusses this problem in the very different context of Nicaragua). Likewise the water agencies in Usangu have in theory a key responsibility, but are also ill-equipped to discharge it effectively. As with many other institutions in such circumstances, both local government and the water agencies are being reassessed for their suitability for their contribution to the management of water and other natural resources. There was indeed a major project operating in Tanzania in the late 90s, studying the institutional and legal framework for environmental management (ILFEMP) of local government. It is instructive that this project failed to come up with recommendations that were widely acceptable, and it was eventually disbanded without having achieved its objectives.

In common with other aspects of collective action, monitoring is not a cost free activity for participants. Research suggests that where people establish their own arrangements they incorporate monitoring into existing livelihood activities, so ensuring that the effort and the opportunity costs involved are minimal. For example at a new handpump provided through the project and managed by the community, a system of locking the pump was introduced. By opening the pump only at certain hours the committee could ensure that everyone in the community had to take water at roughly the same time so avoiding the necessity of constant monitoring of the pump. Observations made by committee members during pump opening hours (when they or their household members were collecting water) provided the basis for charging households differentially for water use (Ukwaheri pump case study).

Sanctions

The emphasis in institutional design literature on the prompt and impersonal exercise of sanctions against non-compliers has been criticised for its adversarial emphasis on public confrontation rather than negotiated reconciliation (Cousins, Maganga). It also idealises a form of bureaucratic regulation which may be impossible to implement in the highly socialised context of community based resource management. Recommendations to adopt such bureaucratic approaches to water management are commonly found in the literature:

“water resources managers should enforce strict compliance with the regulations governing the behaviour of water users and the impacts of water utilisation on the natural environment” (Koudstall et al, 1992)

However, people are not perceived by others simply as anonymous ‘resource appropriators’ or users but as very real individuals with a social identity as neighbours and kinsfolk. Evidence from Usangu and elsewhere (Cleaver 2000, Maseruli 2000, Mnzava 2000 etc) suggests that the social circumstances of individuals (and importantly their households) are taken into account in assessing whether to exercise sanctions against them for non-compliance with the collective rules. Approximate compliance with rules is usually sufficient to avoid incurring penalties as rigid adherence to punishing all misdemeanours against the common good is considered too costly in terms of time, effort and social capital. Where fines are levied as a sanction against anti-social acts, they are often determined according to the ability to pay; household goods such as pots and pans or stools and small livestock being taken as substitutes for cash. Finally when such fines are levied they are frequently used to fund a celebration (a beer drink or feast) the purpose of which is to ‘celebrate forgiveness’.

Such a socially embedded system of exercising sanctions tends to reproduce existing social structures and therefore may disadvantage those already marginalized, who are given less room for manoeuvre in terms of adherence to the rules and payment of fines. However, this may be balanced against the positive effect in terms of maintaining social capital, relations of co-operation and reciprocity. For people closely tied to their neighbours in kin through trade, labour exchange, marriage and reciprocal coping strategies, non-confrontational, reconciliatory and processual ways of maintaining compliance with effective rules make sense. We can see the outcome as a compromise between social acceptability and appropriateness and resource management effectiveness.

7. The nesting of institutions: moving from the local to the large-scale

Those working in institutional design, and indeed those concerned with the management of common pool resources generally, have been much exercised with issues of scale. Much of the research work on which current approaches is based has been carried out on small-scale systems where linkages and interactions on the personal scale can be investigated and documented. Translating this to the large-scale has been problematic, but has generally been covered in the concept of nested systems or enterprises, in which small local systems covering perhaps a few hundred people form the building blocks which gradually create the larger institution.

Thus the design principles suggest that ‘Appropriation, provision, monitoring, enforcement, conflict resolution and governance activities are organised in multiple layers of nested enterprises’ (Ostrom 1990:90).

Similar ideas can be found in actor-network theory. ‘ANT considers natural resource managers, common property regimes, the economy and technology to be ordered networks of heterogeneous materials that are constantly being shaped and reshaped as new human and non-human entities enter the arena. Such ordered networks of heterogeneous materials are referred to as nested collectifs’. (Steins, 2001)

In practice, nesting institutions (enterprises, collectives) in Usangu faces a range of constraints. Firstly, the physical scale and size of the catchment mean that local-level institutions dealing with local issues find it difficult to engage with the issues facing others in the catchment who are perhaps over 100 km away, and for whom indeed the key issues may be very different. Thus, water user groups in the upper part of the plain are primarily engaged in allocating water for irrigation and establishing mechanisms for sharing, particularly in times of scarcity, whilst pastoralists are concerned with access to grazing resources and drinking water for their animals. Both are concerned with the issue of water, but in somewhat different ways, and the institutions that involve in each case do not easily nest together within a larger system. Scale indeed leads to general problems of “access”, in both physical and conceptual terms. Actors in one part of the system may be physically unable to reach other parts of the system in order to interact with it, and this may lead to problems of conceptualising the other components of the system. The final downstream user of Usangu’s water is the main hydro-electric system in Tanzania, but many of the local people living within the catchment have no conception of what a hydro-electric dam looks like, or how it functions.

Problems of scale and access lead to problems of inclusion – how to take account of the needs of “others”. In the case of Usangu, this particularly relates to downstream users outside the catchment. The importance of water for the hydro-electric system has already been mentioned, but there is also a national park taking water from the Great Ruaha river immediately downstream of the wetland, and mechanisms for including the needs of these two systems within the overall institutions for allocating Usangu’s water do not naturally arise from the idea of “nesting” institutions which arise from a set of broadly-similar circumstances and thus lock into one another. Indeed, even within the catchment, problems arise because of its diversity. Experience in one of the sub-catchments in trying to bring together the various resource user groups (domestic water, irrigation water, pastoralist groups) alongside the local government structure and other existing local institutions met with only limited success. In this case, it was envisaged that these various institutions would “nest” inside an “apex body” which would provide an overarching resource management institution for the sub-catchment. In practice, local people were not convinced of the need for the apex body, seeing it as simply one more institution which would require support and contributions from them, and whose function and value was by no means clear (Ref).

8. The challenges facing Usangu

The challenges facing the application of the design principles to the resource management issues in Usangu are linked through constraints such as scale, diversity and complexity. The response by the SMUWC project was focused on the twin aims of developing knowledge and building capacity amongst the stakeholders, as the basis of a long-term process of negotiating and implementing a sustainable management plan for the whole catchment.

Developing knowledge is a valid response, as a basis for increasing communication and understanding amongst all the stakeholders. There is good evidence that earlier attempts to develop management plans in Usangu had been based on erroneous or incomplete analysis of the situation and that this had in fact lead to counter-productive actions by various stakeholders, particularly in relation to the role of pastoralism. The importance of the process of developing and using knowledge, and of balancing perceptions held by different stakeholders has been the subject of significant discussion, (for example, Dwivedi (ref) and others) and this continues to be a point of interest and significance in the evolving situation in Usangu.

Of more direct relevance to the application of the institutional design principles is the second aim of the SMUWC intervention, capacity-building. This was included as an objective from the very start but it was rightly considered that this process should not commence until it was decided whose capacity was being developed and for what purpose. As the process unfolded, it became clear that these issues would not be easily resolved, and that the evolution of institutions for managing the resources in Usangu would itself be a long and complex process, and that capacity-building would necessarily have to be slow and gradual in response.

At the present time there is still uncertainty about what institution will evolve. It does, however, seem clear that simple notions of “river basin organisations” will not be appropriate and that the future response will be some form of bricolage of existing and evolving institutions linked together in complex and fluid networks, in which institutional design principles are only partly applicable.

References

- Barrow, C. (1998) River basin development planning and management: a critical review. *World Development* **26(1)**, 171-186.
- Berry, S. (1993) *No Condition is Permanent: the social dynamics of Agrarian Change in Sub-Saharan Africa*, University of Wisconsin Press, London.
- Bromley, D. W. and M. M. Cernea, 1989, The Management of Common Property Natural Resources, Some Conceptual and Operational Fallacies, World Bank Discussion Papers No. 57, The World Bank, Washington DC.
- Cleaver, F. (2000) ‘Moral Ecological Rationality, Institutions and the Management of Common Property Resources’, Development and Change, Vol.31, No 2, March, pp 361-383.

- Cleaver, F.D. (2001) Institutional bricolage, conflict and co-operation in Usangu, Tanzania. *IDS Bulletin* **32(4)**, 26-35
- Koudstall R, Rijsberman F.R and Savenjie H (1992) Water and Sustainable Development. *Natural Resources Forum* Vol 16 no. 4 pp277-290
- Larson, A. M. (2002) Natural resources and decentralization in Nicaragua: are local governments up to the job? *World Development* **30(1)**, 17 – 31
- Maganga, F. (1999) Resource Conflicts and Conflict Management: fieldwork findings from Iringa and Mbarali District, SASA, Copenhagen
- Mnzava, D. (2000) How modern water resources management conflicts with traditional/indigenous management; the case of Arusha Water Project, Unpublished paper, University of Bradford, June
- Maseruli, B. (2000) Local Institutions and the Management of Natural Resources, Unpublished Field Notes, College of African Wildlife Management, Mweka, Tanzania
- Newson. M (1997) Land Water and Development. Routledge, London
- Ostrom, E. (1990) Governing the Commons: The Evolution of Institutions for Collective Action, Cambridge University Press, New York
- Ostrom, E. (1992) Crafting Institutions for Self Governing Irrigation Systems, San Francisco, ICS Press
- Peters, P. (1994) Dividing the Commons: Politics, Policy and Culture in Botswana, London, the University Press of Virginia
- Ruttan, L. (2000) ‘Games and the CPR toolkit’ *The Common Property Resource Digest*, no 55, pp 1-3
- Saha S.K and Barrow C.J (1982) *River Basin Planning: Theory and Practice*. John Wiley and Sons. Chichester
- Scoones, I. (1998) Sustainable Rural Livelihoods, A Framework for analysis’ IDS Working Paper No. 72, IDS, Brighton
- Serageldin I (1995) Water Resources Management: A New Policy for a Sustainable Future *Water Resources Development* Vol 11 no. 3 pp221-231
- SMUWC, 20001d, SMUWC Final Report: Conflicts, <http://www.usangu.org/reports/conflicts.pdf>
- Steins, N. A. (2001) New directions in natural resource management: the offer of actor-network theory. *IDS Bulletin* **32(4)**, 18 – 25

Thompson, J. (1995) Participatory approaches in government bureaucracies: facilitating the process of institutional change. *World Development* **23(9)**, 1521 – 1554

Uphoff, N. and Wijayaratna, C. (2000) Demonstrated benefits from social capital: the productivity of farmer organisations in Gal Oya, Sri Lanka. *World Development* **28(11)**, 1875 – 1890

Wade, R. (1988) Village Republics: Economic Conditions for Collective Action in South India, Cambridge, Cambridge University Press

World Bank (1993). Water Resources Management. World Bank, Washington