Mobilising knowledge for climate change adaptation in Africa: reflecting on the adaptive management of knowledge networks

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Knowledge sharing networks are increasingly recognised as means of mobilising the knowledge and capacities needed to respond to complex and changing realities, such as the challenges posed by climate change. AfricaAdapt is one such network, aimed at facilitating the flow of climate change adaptation knowledge between researchers, policy makers, civil society organisations and communities across Africa. This paper takes a 'behind the scenes' look at the first phase of the AfricaAdapt Network and the partnerships on which it was based, focusing on its design and implementation processes from the perspective of the network's lead institution at that time. Building on past research which identified components critical to the successful management of communities of practice (CoPs), these reflections focus on the people and roles played within the core group of partners; the structures and processes which facilitate or complicate the delivery of network functions; and the contribution of information and communication technologies (ICTs) to these processes. Evidence from AfricaAdapt points to the importance of exposing the role of power, encouraging the input of divergent perspectives, and embedding learning and reflection into practice.

Keywords   knowledge networks, climate change, management, partnerships, Africa

Introduction

The complex or 'wicked' nature of climate change poses important challenges to the way that we mobilise, reflect upon and apply knowledge in planning current and future actions. The knowledge required to address different scales and dimensions of the challenges presented at the nexus of climate change and development often sits in quite disparate locations; embedded in the traditional adaptive practices of farmers, disaster risk management strategies, national and local development plans, regional climate prediction centres, and elsewhere. The same can be said for the wide range of spaces and stakeholder groups whose action is required if actions aimed at adapting to climate

change are to be meaningful and sustainable. This has raised attention to the value of boundary work that can help to foster dialogue and knowledge exchange across this wide range of actors and settings (Cash et al. 2006; Clark et al 2011).

In many African countries, this challenge is exacerbated by deficits in infrastructure, governance, financing and technology, making those who are often most exposed to the impacts of climate change face the greatest hurdles in adapting. Given the widespread recognition of a need for urgent action to support local-level adaptation for the most vulnerable, researchers and practitioners are paying increasing attention to the ways that knowledge sharing, exchange, and brokerage can link holders of knowledge across different scales to support planning and action on climate change (Cash et al. 2006, Hammill et al 2013, Dilling & Lemos 2011). These concerns, arising from within countries most impacted by climate change, also coincide with a growing focus in the international development community on *research utilisation*, or ensuring that research findings being produced find their way into use to secure better development outcomes for poor people (Research into Results 2013). Much of the recent work on research utilisation shares the above-mentioned focus on engagement and exchange between different actors, and also acknowledges the importance of boundary-spanning intermediaries in these processes (see Datta 2012).

While there is growing focus in the literature on the interface between different types of knowledge holders and decision makers on climate change, less has been written about how networked knowledge sharing on climate change is best undertaken by those who endeavour to manage such activities, the so-called core or managing groups.[1] With the recent explosion of formal knowledge sharing networks on climate change being initiated by funding agencies to address the challenges highlighted above, a better understanding is needed of how these can best be established and sustained from the perspective of their managers and secretariats. Given that this is the level at which strategies for funding and outreach are often developed, activities planned, and more, we argue it is important to understand how knowledge sharing on climate change is 'managed' at this scale, what challenges are relevant to North-South partnerships (particularly in Africa), and what lessons there are to be shared from recent experience.

The very existence of networks is seen to be contingent on their ability to consistently 'perform' relations, meaning that strategies to keep members engaged and relationships strong must be continuously monitored and updated, an important role for this core group (Clappison et al 2011). The strategies and rules they deploy will ultimately shape the form of network that emerges, the roles that members can play, and the outcomes that can be achieved (Clappison et al 2011). At the same time, some authors would question the extent to which knowledge sharing networks aiming to operate as communities of practice (CoPs) can be closely managed while retaining their characteristic modes of self-organisation and voluntary contribution (see Murillo 2011). This presents important opportunities for reflection and analysis.

This paper seeks to contribute to that understanding by taking a 'behind the scenes' look at the first phase of the AfricaAdapt Network (2008-2011), a knowledge sharing network focussed on adaptation to climate change in Africa. It focuses on the design and implementation processes of a knowledge sharing network in a distributed partnership from the perspective of the network's 'host' (or lead) institution at the time, the Institute of Development Studies, UK where the authors were based at time of writing. The paper does not look at the outcomes of AfricaAdapt's work, or at the specific network activities undertaken. Discussion of these can be found in other literature about the network (AfricaAdapt 2011; Harvey et al 2009). Rather, this paper focuses on the way in which the core group of partners developed the relationships and ways of working that underpinned the network. Although all knowledge networks are different, we have tried to identify insights and principles from this specific example that can be adapted and applied in other contexts. We hope that these insights will provide a useful contribution to the broader body of experience around networks and knowledge sharing. We conclude with reflections on the particular challenges and opportunities that managing knowledge sharing networks on climate change present, especially in the context of development.

Background

Knowledge sharing for climate change adaptation in Africa

The growing pace and uncertainty of change that climate change has introduced to development is contributing to a major shift in the way that individuals and organizations approach their practice at all scales. There is increasing acceptance that historical trends and norms no longer provide an adequate indicator for informing plans for the future, and that the "right" pathway for responding to this uncertainty is itself frequently unclear. This prompts the need for approaches to problem solving that are innovative, holistic, and which reach across boundaries to bring in the knowledge and perspectives of a wide range of stakeholders (Lonsdale *et al* 2010). Cash *et al* (2006) suggest that co-management structures and 'boundary management' through knowledge co-production, mediation, translation, and negotiation across scales (geographical, jurisdictional, temporal and others) may facilitate solutions to complex problems that decision makers have historically been unable to solve.

The shift in focus from simply generating *more* or *better* knowledge to finding new approaches to bringing together different sources of existing knowledge and collaborative meaning-making is being noted at a variety of interfaces, including the intersection of science and development-policy (Jones *et al* 2009; Dilling & Lemos 2011, Michaels 2009), the community-research interface (Harvey *et al.* 2012) and the community-policy interface (Datta 2012). Many of these studies point to the importance of intermediary and brokering organizations that can help to catalyse or strengthen these forms of exchange, particularly where groups may have high degrees of mistrust, power disparities, or indifference to one another.

Knowledge sharing networks are increasingly recognised as a one such means of supporting people to respond to complex challenges with a breadth of knowledge and collaboration (Michaels 2009; Dilling & Lemos 2011). These networks, understood here as systems of actors who interact (virtually, face-to-face, via intermediaries, or otherwise) with the aim of sharing ideas and experiences around a shared set of challenges, can take on a wide range of forms depending upon their contexts, their membership and management, the technologies they rely upon, and many other factors. Given the wide range of contexts in which they operate, the diversity of approaches, and the breadth of knowledge types they address, our understanding of what factors shape the success or failure of knowledge sharing networks on climate change remains incomplete. This is not a unique challenge to climate change. Recent research from the health sciences has underscored the lack of clear evidence on how knowledge brokering activities work and what factors makes them effective (Ward *et al.* 2009) while research on the private sector highlights the challenge of sharing 'soft' knowledge and questions whether virtual communities for knowledge sharing can be effective without additional face-to-face engagement (Hildreth, Kimble & Wright 2000). Addressing these gaps in our understanding, we argue, requires expanding the body of empirical evidence and lesson-sharing on knowledge networks from across this wide range of contexts, to which this volume is an important contribution. This need is particularly pertinent given the ever-growing interest on the part of institutions and actors working on climate change to establish new networks or draw existing ones into new forms of collaboration.

As we have suggested above, the challenge of knowledge sharing cannot be separated from the wide range of political, epistemological, cultural and social realities within which it must take place (Michaels 2009). The intimate link between knowledge and power may create incentives as well as disincentives, and opportunities or barriers for sharing. Looking more specifically at the realities of facilitating knowledge sharing on climate change in Africa, Harvey et al (2009) raise a number of related challenges, including barriers imposed by technological access, divergent cultural norms, poor coordination between parallel systems for information and knowledge sharing, dismissive attitudes toward the knowledge of many actors (particularly holders of local or so called traditional knowledge), and the lack of adequate resources to allow people to act on new knowledge. Given these wide-ranging challenges, establishing systems and practices that create spaces for an open and inclusive exchange of knowledge and experience in responding to climate change is no small task.

Managing networked knowledge sharing partnerships
As noted at the outset of the paper, the management and organizational models adopted by networks fundamentally shape their potential for facilitating learning and sharing, and for achieving the longer-term outcomes for members and the development objectives they target. While the complexity of working across networks of differently-situated stakeholders means that not all of these outcomes can be 'engineered' through the use of particular approaches to organizing, our experience and recent studies point to an

important role for these models in creating an enabling environment.

In this regard, core network members play an important role in relation to the other segments of a community's membership. The interaction between core, active and peripheral members promotes learning within a networked community of practice (see Figure 1 below). Peripheral members provide access to ideas and information not currently prevalent in the core group, thereby catalysing innovation and deep learning, while the core helps other members to act on those ideas and information (Wenger 2000, Paas and Parry 2012). This dynamic seems contingent, we would argue, on the establishment or emergence of modes of interaction that encourage exchange across these levels, adaptive management approaches that allow new innovations to be integrated into practice, and conditions – such as trust – that allow for open dialogue and exchange. To this end, Paas and Parry (2012) highlight the need for networked CoPs to effectively bring together three interrelated components critical to their success: *people* (ensuring the right mix of members, and levels of trust and belonging), *structure and process* (evolving forms of interaction within and between core, active and peripheral members), and *technology* (accessible tools for interaction which ensure the security and privacy of members).

The challenges of bringing together the components of effective networked CoPs for knowledge sharing can be considerable, especially in highly distributed networks such as the AfricaAdapt network. Jackson (2010) highlights a number of these, including logistical constraints (time, distance, etc.), multiple (and sometimes conflicting) lines of accountability and loyalty, and the difficulty of generating shared understandings across divergent contexts. Wenger notes that organisations can foster, participate in, and leverage social learning systems such as knowledge sharing networks, but cannot fully own or control them – a reality which sits in tension with traditional models of management practice (2000: 243).This may pose real challenges for many of the formal networks on climate change, which have been funded by external agencies on the basis of specific pre-determined outcomes. People may also expect that online knowledge exchange will offer the same types of outcomes as face to face engagement; however, many researchers question whether these communities can effectively replicate the levels of trust and mutual commitment that maximise learning and innovation in face to face environments (Paas & Parry 2012).

In the section that follows, we consider many of these challenges for strategy and coordination in greater depth by looking at the specific case of the AfricaAdapt knowledge sharing network and reflecting on the process of designing and establishing the network's partnership in its first phase. We reflect critically on our own role as core group members from IDS where we played a central role in the initial stages of the network's development. We have clustered lessons and observations from this phase of network activities in line with the three essential components of networked CoPs highlighted by Paas and Parry (*people*, *structure and process*, and *technology)* given the central role that core partners in more formal networks like AfricaAdapt have on shaping

the approach taken to addressing them. There are obvious overlaps between these components, and this poses some challenges to the clustering, but we feel it may nonetheless facilitate comparison with experiences from other initiatives.
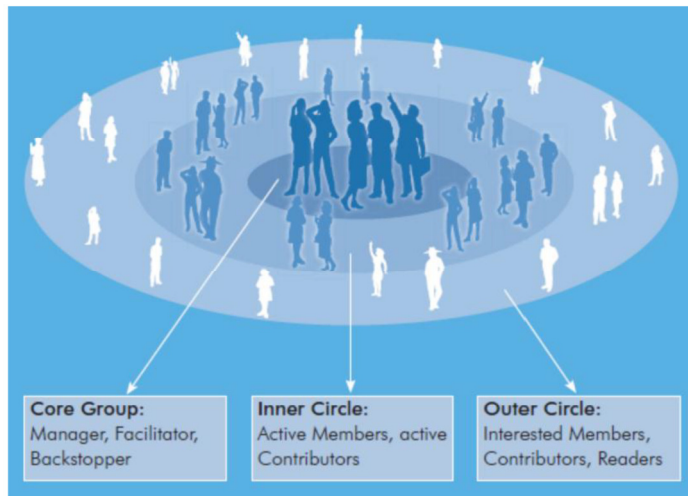
Source: SDC (2007).

Figure 1: Overview of membership of knowledge networks

The case of AfricaAdapt

Background

AfricaAdapt is a knowledge sharing network on climate change adaptation in Africa which was established in 2008 and hosted by four partner organisations until 2011: Environment and Development in the Third World (ENDA-TM), based in Dakar, Senegal; the Forum for Agricultural Research in Africa (FARA) in Accra, Ghana; Intergovernmental Authority on Development (IGAD) Climate Prediction and Applications Centre (ICPAC) in Nairobi, Kenya; and IDS in Brighton, UK. These partners reflect the wide range of disciplines (spanning climate science, social science, and agriculture) and institutions active on climate change adaptation. They also closely reflect the stakeholder groups with whom it hopes to facilitate sharing.

The network describes its aim as 'facilitating the flow of climate change adaptation knowledge for sustainable livelihoods between researchers, policy makers, civil society organisations and communities who are vulnerable to climate variability and change across the continent' (AfricaAdapt undated). Since its launch, it has grown to over 1300 members (over 80% of whom are Africa-based), consisting primarily of researchers, practitioners and students working on climate change and development in Africa. The network intends to offer a space for its members to profile the work they are doing, access information and findings from African research in a range of formats and languages, and establish new connections (both online and face-to-face) with others who are working on adaptation in Africa.

AfricaAdapt is an example of a formal network that has been initiated and funded by
bilateral donors as a development intervention in response to a perceived need. Thus, it
has at its heart a formalised agreement between the four core AfricaAdapt partners who,
as members of the partnership, receive dedicated funds to undertake sets of activities for
which they are held accountable. This is in contrast to informal networks that
spontaneously emerge, do not have such formalised implementation structures, and may
or may not have external funding. In AfricaAdapt's case, this distinction between formal
and informal is blurred because, as a knowledge sharing network, it aims to enable the
emergence of informal networks. However, this distinction is important for this paper
because many of the lessons of the AfricaAdapt Network shared here are of particular
relevance to formal networks and may be less relevant to those involved in informal
networks.

In its first phase the network structure was based on a Core Group, comprising two
representatives from each of the four partners. This group was effectively responsible for
both governance and management of the network. The host organisation, IDS, was
represented on this group by a Core Group member and the Project Manager. Another
key part of the AfricaAdapt structure is made up of knowledge sharing officers (KSOs),
one in each partner organisation. These KSOs work almost full time on AfricaAdapt and
are responsible for the implementation of AfricaAdapt activities, from designing network
infrastructure to liaising with members. KSOs are line managed by one of their
organisation's Core Group members and work with their peers to co-ordinate Core Group
activities. In the lead-up to the network's second phase, a network co-ordinator position
was created to interface between the Core Group's management roles and the KSOs'
implementing role and to provide more hands-on management of the network (see Figure
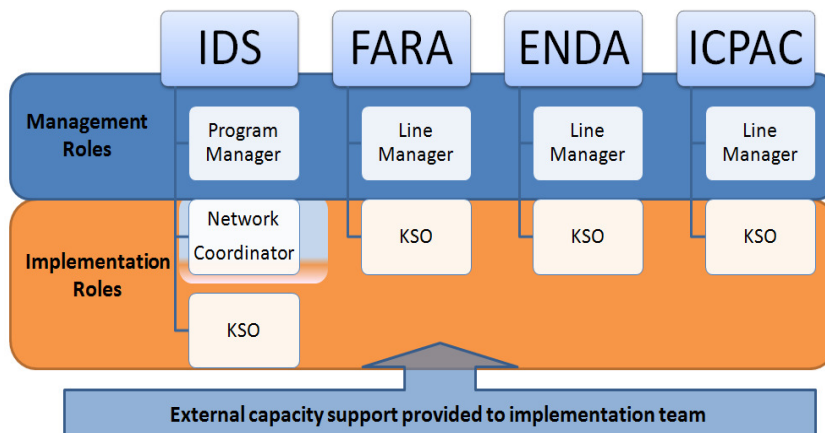2).

Figure 2: Overview of the network

In 2011 AfricaAdapt entered its second phase in which the network is entirely African-
led and operated. The role of lead organisation for AfricaAdapt has moved from IDS to

ENDA-TM which leads the Network in Phase Two. This paper was written from the perspective of IDS as the outgoing lead organisation and shares insights that emerged from this first phase of network development.

A key characteristic of AfricaAdapt is the strong emphasis that has been placed on learning (see Figure 3). The network drew heavily on relevant network theory and on the experiential learning of core group partners in its design and establishment. In spite of its strong theoretical foundations, it needed to evolve and respond to the realities of implementation. On-going learning has enabled lessons to be identified and responded to by the AfricaAdapt partnership even within the relatively short time the network has been in existence. So far the approach of prioritising and embedding learning has allowed the Network itself to be highly adaptive to the challenges it faces and has proven to be one of its great strengths.

People: establishing a core group of partners
The challenges of working in decentralized partnerships which are noted in the previous section are a daily reality for the AfricaAdapt core group. Added to this are the difficulties of working in a heterogeneous partnership operating at different thematic and institutional intersections with climate and development. This mix of partners offers the opportunity to draw on comparative strengths, diverse networks of stakeholders, and a wide range of capacities and knowledge bases. However, it presents challenges in creating spaces and modes of interaction that are equally accessible and responsive to the institutional cultures and ways of working of each partner, and capable of addressing power relations – particularly between the lead organisation and its partners.
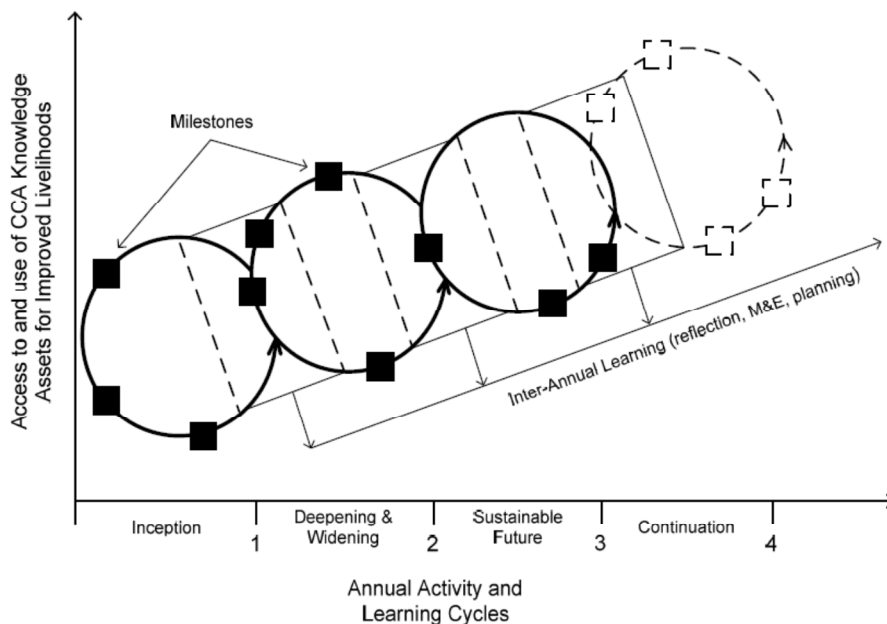

Figure 3: The AfricaAdapt Learning Cycle approach (Source: AfricaAdapt 2007)

Insights on being the lead partner: reflecting on power

One of the realities of formal networks in development is that there is usually the need for a lead institution which serves as the liaison with funding partners and leads reporting and financial management processes. This can create tensions between the clear lines of accountability sought by many funders and more horizontal forms of collective ownership considered desirable for knowledge sharing within a community of practice. Leadership and hosting responsibilities meant that IDS was home to a small secretariat comprising the Project Manager and a Core Group member who was resourced to put more time into the network than Core Group members in other organisations, as well as a KSO with leadership responsibilities vis-à-vis other KSOs. IDS also mobilised staff members from outside of this main management group to provide advice and input in areas such as capacity development, communications, marketing, and monitoring and evaluation. During the handover period at the end of Phase 1 activities, these responsibilities were devolved to ENDA-TM in an extended process. In reflecting on this role, it becomes clear that being aware of power and accountability at multiple levels is a key challenge for lead partners.

Clappison *et al.* note that power relations have 'a significant bearing on the spread of authority and responsibility across networks, and therefore also about the architecture of decision-making' (2011: 3). The lead organisation is in a powerful position, both explicitly through its control of budgets and relationship with donors, and implicitly through the way in which it is able to construct the terms on which the network partners operate and through the relatively greater amount of time it has to dedicate to the network, so enabling it to shape on-going decisions. This was certainly true for IDS who at times ended up making decisions about strategic priorities (e.g. decisions about strategic partnerships) in somewhat unilateral ways when other partners did not engage due to their absence or their focus on other work. As holder of the budget, IDS was able to move to implement those decisions in ways that other partners could not.

One of the risks that this carries is having partners feel that ownership of the network lies elsewhere and is beyond their control. It can also threaten the trust between partners if there are doubts about the degree to which one partner is acting in the best interests of the others, and of the network as a whole. The lead organisation therefore needs to take measures to address power inequalities not consolidate them. Useful approaches include being open about power within the partnership (tools such as power mapping exercises could help here), encouraging the development of multilateral relationships between partners through direct communication and exchanges, being reflective and inviting feedback on performance from partners and stakeholders, and avoiding consolidating roles within the lead organisation.

Constructing meaning

As lead partner, IDS was also involved in the conceptualisation of the network. This meant that it played a central role in defining key concepts such as 'knowledge sharing'

and 'network' that would be adopted by members from the outset. Although there was a long and participatory conception period for the network, it was not deliberately used to counterbalance this initial dominance in meaning-making. IDS was subsequently, if often inadvertently, able to enforce these meanings directly through the creation of plans and project documentation, and indirectly through its leadership of areas such as capacity development. In the interests of creating more equitable partnerships, it is important for lead organisations to be aware of this invisible power and to take steps to make it more visible and therefore contestable. This can create a space and a network culture where difference and dissonance are valued and explored between implementing partners and with the broader membership. This seems especially important in knowledge sharing on climate change, where the meaning of concepts like 'vulnerability' or debates over what forms of knowledge are valid often sit at the intersection of the social and natural sciences and can therefore be interpreted in quite different ways.

Balancing multiple accountabilities
A key challenge for the core group is balancing the need for the implementation team to deliver to a high standard and meet commitments made to funders with the need allow the network to grow and evolve naturally. As the main contact point with the network funder, IDS felt greater pressure to show that work was 'getting done'. Issues of timing and quality of activities are likely to be particularly prevalent at the beginning of the partnership when partners may be familiarising themselves with the range of new tasks and approaches involved in a knowledge sharing network and there is a need to be creating the building blocks needed to launch the network. Centralised project management approaches that emphasise task lists and deadlines are a tempting route but can compromise ownership and are not a sustainable way of managing an on-going knowledge sharing network. Another temptation may be for the lead partner to backstop, taking back activities which have not been completed or are not of satisfactory quality, which is also unsustainable and can affect collective ownership of the network. Indeed the very notion of what defines 'quality' may not be understood in heterogeneous partnerships at the intersection of science and policy (see Turnhout et al 2013). In the early days of the network when the membership does not itself have an established voice, the lead organisation also needs to be the champion of future members, a role which may put it at odds with other partners and donors. It must also maintain a balance between upholding an agreed standard of quality for delivery of products and activities while recognising the need for partners (and the broader network partnership) to gradually strengthen their capacities.

Working with dedicated network staff in different organisations
A key feature of the AfricaAdapt model is its decentralised implementation team. Unlike many other networks, the AfricaAdapt core group partners each recruited a dedicated staff member, the KSO. The presence of dedicated AfricaAdapt staff within partner organisations helped the core members to be genuinely involved in the network's implementation and is key to its operation. This was particularly important given the

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network's desire to focus on local-level actions to adapt to climate change in Africa; actions which often go undocumented and must therefore be explored first hand or via local intermediaries. Unsurprisingly, there were challenges in working in this distributed way and the implementation system evolved over time to respond to these challenges. The expectations placed on KSOs were high as they represented a substantial investment in the network. However it is important to be realistic about what they can achieve and the support they need. KSOs have had to manage a number of tensions including their dual identity as working for both the network and the partner organisation. They faced challenges because the kinds of activities they were expected to undertake in facilitating the network were sometimes unfamiliar to their host organisation. For example they required using new technologies, working in new ways and on different terms (e.g. convening rather than communicating, a focus on outcomes rather than outputs, and a trans-disciplinary focus that some were not accustomed to). Their institutional line managers were busy and sometimes unfamiliar with the nature of the network tasks, activities and priorities. This meant KSOs were sometimes unable to leverage the support and guidance that most new recruits require from their organisation. This may be true for many distributed or networked initiatives but seems particularly pertinent for knowledge sharing networks.

KSOs were supported through peer network and one-to-one mentoring to help them overcome and manage uncertainties. As well as support, hands-on co-ordination and oversight of a distributed team is required. In AfricaAdapt's second Phase this role is being provided by a Network Co-ordinator. While dedicated team members in partner organisations are a huge factor in enabling this kind of network to realise its ambitions, network stakeholders such as donors, line managers, and programme managers need to acknowledge that dedicated network staff cannot deliver on programme objectives alone and require a supportive and enabling environment in which to work. This environment may differ substantially from existing institutional cultures and therefore takes time and political commitment to develop through capacity strengthening, reviewing institutional policies and practices, and encouraging flexibility in management practices.

Working with network members
A final insight which links the issue of *people* to our discussion of systems and processes below relates to the interaction between the core group and other members. A key success of AfricaAdapt's first Phase was its Innovation Fund, through which small amounts of funding were made available for members and potential members of the network to document examples of adaptation practice and initiate local knowledge sharing activities on adaptation. This served to attract people who were keen to share their experience and generated some valuable content from regions where team members were not necessarily present. It also served to establish strong and lasting relationships with grant recipients, many of whom continued to be active members beyond the duration of their funding and provided regular (solicited and unsolicited) feedback to the core group on ways that the network could be more responsive to its membership and issues

that needed to be addressed. This principle of providing small amounts of funding for network members to undertake knowledge sharing activities has been extended in the second Phase. The principle of catalysing and supporting action by others is an important one for knowledge sharing networks and can create important avenues for exchange between the core group and the emerging 'inner circle' of active members.

Structure and process: creating spaces for sharing
As noted at the outset of the paper, the dynamics between core, active, and more peripheral network members are a key factor in determining the shape networks will take and the outcomes that can be achieved. Given this paper's emphasis on the role and functioning of the core group, we focus here on the structures and processes that were used within AfricaAdapt's core group and the lessons learned in their establishment. Here there was an attempt to establish adaptive structures and processes which were informed by relevant theory and the collective reflection and learning which underpins an iterative approach to networked practice.

Adaptive management of the network: phases and forms of governance
The AfricaAdapt inception period (when the core partnership was established, KSOs were recruited, and the network was launched) was important for exploring the potential for the network, laying the foundations for the network and the partnership that would support it, and establishing the network infrastructure – such as its website. It was valuable but could have gone even further in exploring meaning around key issues and encouraging differences of opinion or positions to be identified. At times the set-up period relied on a project management style and deadline oriented mode of operating which may have been useful for a stage where there were very clear deliverables (hiring staff, building an online platform, etc.) and there was not yet a broader set of members to engage. However, this was not a good precedent for an on-going programme and caused tensions within the partnership. This approach contrasts with more flexible outcome-based approaches to working, which are especially important to adopt as networks move into active implementation. Thus, it seems that there is a need to be clear about what stage of development a network is in and the kinds of governance and management approaches are required for each.

Later in Phase One, a governance review was undertaken which sought to distinguish between governance, management, and implementation processes in the core group, whereby governance is where high level strategic decisions are made, management is the process whereby those decisions are turned into plans and activities and progress is monitored, and implementation is actually undertaking the work to achieve the goals. As a result of this review a number of changes were made including changing the composition and mandate of the Core Group, introducing the role of a Network Coordinator, and moving to a more horizontal model of outreach to other network members. Engaging in these forms of adaptive management requires establishing a sufficient degree of flexibility and ensuring spaces exist for collective review of lessons

learned. This suggests potential parallels between the capacities required for management of networked knowledge sharing and the characteristics of well-adapting institutions or systems for responding to climate change (see Lonsdale et al 2010). We return to these in the conclusions to this paper.

The role of theory in structuring implementation
The early design of AfricaAdapt was strongly grounded in relevant theory, evidence and experience, for example about knowledge sharing, network implementation, capacity development, and monitoring and evaluation. However this did not always inform practice once the network was up and running. This may be because those designing the network were not always the people implementing on a day to day basis, and the network development and funding model meant that implementation staff were recruited only after the proposal was funded. It may also reflect the common 'know-do' gap where it is simply not possible to put into practice everything you know is advisable in theory. That said, the theoretical underpinnings have strengthened the network and it is worth ensuring that all those involved – even the 'doers' – have an awareness and understanding of relevant theory to guide their action. This highlights the value of creating a culture of engagement with relevant theory and practice in the inception period, in inductions for new staff and through on-going professional development of those involved. It does not, however, preclude the need to reflect on processes specific to the network, given the unique contexts and dynamics of any given network.

Insights on capacity development, learning and change
AfricaAdapt places great emphasis on capacity development within the core partners in relation to knowledge sharing (see Jackson 2010). Its approach to capacity strengthening recognises that capacity goes beyond individual skills. Rather, it views capacity as being made up of five interrelated capabilities that are not just about be being able to act, but being able to achieve coherence, to relate to others and to innovate (Morgan 2006). It also recognises that capacity exists at individual, organisational, sectoral and societal levels which impact on each other. As a result, activities undertaken through the capacity development programme went beyond typical training packages that focus on build individual hard skills. They also aimed to build KSOs' capacity to act effectively individually and collectively at the organisational and network level. An equally important investment into the capacity of the network was through the strong emphasis that has been placed on learning. This programme-wide emphasis on learning has engaged more stakeholders than those activities undertaken under the banner of capacity development and has arguably had more impact.

The AfricaAdapt approach to capacity development recognises that capacity cannot be developed by focussing on the skills of an individual without reference to organisational systems, processes and contexts in which they work. Consequently, the ambitions of the capacity development work included helping KSOs engage with their own institutions about the value and practice of knowledge sharing. This direct engagement led to most of

the changes that have taken place in the partner organizations, rather than specifically emerging from the capacity development activities. Partners reported in the first phase that their involvement in the network and the behaviour modelled by KSO has led to a shift in thinking and greater value placed on knowledge sharing within their organisations, which paves the way for greater change in the future. These findings suggest that supporting institutional change, if it is a strategic aim, requires a more systems-oriented approach to capacity strengthening instead of focusing on helping individuals develop. It also requires active buy-in from stakeholders in those organisations. Institutions which are successful in doing so are better placed to engage in networked knowledge sharing and, we would argue, may be more resilient in dealing with the future uncertainties presented by climate change. However, studies suggest that formal institutions that fit with this model remain an exception (Siebenhuner undated).

The willingness to take time out to reflect and explore issues collectively, then adapt and respond has been a key characteristic of AfricaAdapt so far. At a network level, the most significant capacity changes may have been as a result of the emphasis it has placed on learning throughout the programme, particularly through facilitated learning reviews at the end of each year, strategic reflection in response to emerging issues, and a culture of reflection among KSOs who regularly undertake After Action Reviews of their activities face to face as well as through video recordings and Skype. These activities, both planned and spontaneous, have led to changes in the way the network governs itself, the activities it plans from year to year, and the ways that it engages with network members virtually and face-to-face. This process of "learning to learn" is seen by some as a core component of social-ecological resilience (Fazey *et al* 2007), and a key feature of adaptive institutions (Lonsdale *et al* 2010) making it a process that not only benefits the functioning of the network at the level of the core group, but that should also be propagated through the network.

The role of ICTs
The geographical distances between each of the partner organisations and the continent-wide target area for membership means that ICTs play an important role in facilitating and mediating relationships in AfricaAdapt. Key technologies used in Phase One included Web 2.0 tools such as Skype, wikis, and Delicious, as well as more conventional tools such as email. Use of these tools was also seen as a form of institutional capacity strengthening and, to this end, KSOs were provided with on-going training and mentoring on the identification and use of knowledge sharing tools. In communicating with and facilitating knowledge sharing between AfricaAdapt's other members however, a different range of networking and knowledge sharing tools are employed, including Twitter, YouTube, and a bespoke online platform that allows for the creation of user and project profiles in a style similar to that of Facebook, and other social networking sites. While new ICTs and Web 2.0 tools provide exciting and well-recognised opportunities for collaboration and co-production of knowledge across distances, we note that they are not divorced from existing power relations or institutional cultures.

Technologies as a mediator of relations

AfricaAdapt, like many North-South partnerships, sits both within a context where access to, and mastery of, new technology is limited and variable, and among a range of other ICT-enabled climate change knowledge-sharing initiatives which tend to promote themselves on the basis of their use of sophisticated technologies. As the lead partner, IDS played a significant role in selecting and ultimately enforcing the use of particular ICTs for coordination and sharing within the core group. IDS brought an enthusiasm for new and sometimes unfamiliar tools to the partnership and, due to its influence, saw many of these ideas adopted. However, these were not always smoothly and unanimously appropriated by partners, who each brought different sets of expectations, experience, and constraints that ultimately influenced the informal negotiation of which technologies would be used, and how. These experiences reveal the close link between technologies and power relations in partnerships.

For example, the use of Skype as the primary means of communication was widely accepted by partners and seen as an easy, low-cost alternative to telephone calls or extended email discussions. Due to bandwidth constraints, and for ease of record keeping, group Skype discussions were primarily text-based. These meetings often involved parallel 'behind the scenes' one-to-one discussions using the same technology to negotiate contentious issues, and the use of varying degrees of direction and tone to control the pace of discussions and achieve particular outcomes. While many of these strategies are common within all meeting facilitation, the use of text-based Skype enabled their deployment, potentially subverting the transparency of decision-making processes. Text-based Skype meetings may have also facilitated some disengagement with participants simply not contributing or physically stepping away from their computers while the meetings were in process.

In contrast to the example of Skype, attempts to use wikis within the partnership demonstrate the ways in which partners actively and passively resisted the adoption or principles of use of particular ICTs. An attempt to implement the use of a wiki among managing partners to improve tracking and sharing of documents was rejected by partners who did not see the value of imposing another layer of navigation to access documents or who found it onerous to access another new, unfamiliar tool. Meanwhile, a wiki developed for KSOs to enable sharing of resources for implementing activities and minutes from meetings was used regularly for these purposes, but itself became a source of debate. Disagreement emerged over whether this wiki space should be kept a closed and private space where KSOs could discuss work together, away from the scrutiny of their line managers, or whether creating closed spaces within the partnership was anti-collegial. This debate highlighted the risk of selecting tools that meet the needs of some people within the core group while being seen as inappropriate or insufficient by others, and how the use of particular tools can affect the cohesion of the core group.

These examples highlight that ICTs can provide benefits, but also potentially bear great costs on the strength of a partnership depending on how strategically and appropriately they are brought into action. This suggests the need for heterogeneous ICT-enabled partnerships (such as knowledge sharing networks for climate change adaptation) to reflect collectively on how these online interactions impact the desired outcomes of their work. They also underscore the continued value of face-to-face meetings to ensure that partners can address any negative dynamics emerging from ICT-based collaboration (Hildreth, Kimble & Wright 2000).

Considering the suitability and sustainability of technology choices
A further consideration is where the added value of particular technologies is likely to be experienced. For example, heavy investment of partners' time, finances and energy into technologies which are primarily aimed at enhancing transparency and accountability to donors, but have little impact at the level of service delivery to the network's primary stakeholders may be attractive at some levels, but ultimately detracts from the network's activities and the achievement of its goals.

Further, funding for knowledge networks should ensure that sufficient financial resources are available to enable its use of ICTs to evolve in line with the lessons it learns. ICT budgets, in our experience, tend to privilege setup and maintenance costs. Consequently there is enormous pressure on partners to get everything right the first time, which can be unrealistic for new and rapidly evolving fields such as knowledge sharing on climate change adaptation, and particularly given the pace of technological change in Africa. This can lead to networks being 'locked in' to inadequate or inappropriate tools. The AfricaAdapt core group has tended to rely primarily free or low-cost technologies, as noted above, which may be an important means to avoiding these pitfalls.

The link between institutional practices, working cultures and partners' expectations must be considered at the start of the partnership and revisited regularly to review whether use of technologies is creating positive and/or negative shifts in the network's performance. This reflection process can have significant bearing on the how ICT budgets are structured, what kinds of capacity support should be offered to partners, and importantly, on how to balance the adoption of new technologies with reliance on established forms of practice. It may also influence the transfer of practices from within the management process into the broader network membership and ultimately shape the network's objectives.

Putting learning and experimentation at the centre of technological innovation
Experience from the first phase of AfricaAdapt suggests that a key factor in the successful selection and deployment of ICTs within partnerships working on climate change (and other complex and highly uncertain challenges) is the capacity of the partnerships themselves to plan, reflect, and adapt to change as it emerges. ICTs can contribute to this process by facilitating the documentation of learning, maintaining and

contributing to shared stores of knowledge across distances, and by creating spaces for the contribution of a wider range of viewpoints and contributions than might otherwise have been possible. As such, there is potential for a mutually-reinforcing link between the effective deployment of ICTs for knowledge sharing, an on-going commitment to learning in practice, and the strengthening of a partnership's adaptive capacity.

One question this raises, which warrants further investigation, is whether, and under what conditions strengthening the adaptive capacity of the core group positively influences the adaptive practices of the broader network membership. Such an analysis would need to take into consideration the fact that these processes always unfold within a given context which is shaped by institutional and interpersonal norms, hierarchies, power relations, financial and time constraints, competing priorities, etc. and which will ultimately influence what can reasonably be expected and achieved.

Discussion and conclusions

This paper has sought to contribute empirical evidence to our understanding of how core, or managing groups working in distributed knowledge sharing networks can work more effectively together. As knowledge sharing grows in importance for climate change adaptation, the lesson from AfricaAdapt's experience may serve as a building block for others. Building on past research which identified components critical to the successful management of CoPs (Paas and Parry 2012), we have organised these reflections according to: a) the people and roles played within the core group of partners; b) the structures and processes which facilitate or complicate the delivery of network functions; and c) the contribution of ICTs to these processes.

Overall, the experience of AfricaAdapt on knowledge sharing raises a number of questions which are broached elsewhere in this volume. In particular, evidence pointing to the importance of exposing the role of power in meaning-making, encouraging the input of divergent perspectives, and embedding learning and reflection into practice suggests serve as key features of successful management models which can adapt to change as it arises. Similarly, Folke *et al.* (2005) note that learning from change, nurturing diversity and organising and building knowledge across systems and scales are key components for adaptive governance of social-ecological systems. The overlap in features contributing to the effective governance of networks and social-ecological systems is compelling, as it may suggest win-win opportunities for institutions working on climate change which are able to embed these traits in their modes of networked practice. The role of ICTs in supporting (or potentially hindering) the development of these capacities is also an important point of consideration, particularly in resource-constrained initiatives. Further research on the strength and potential of this link between adaptive management *of* networks, and adaptation *to* climate change is needed, but we hope that these reflections provide a valuable point of entry for further debate.

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[1] The Swiss Agency for Development and Cooperation (SDC) (2007) distinguishes between three levels in the structure of a community of practice: the core group, which coordinates activities and acts as a secretariat; the inner circle of active members and contributors; and the outer circle of interested members. A similar structure can be found in many large knowledge sharing networks.