

# TWENTY THREE

## **Multiple Functions and Institutions: Management Complexity in the Serengeti Ecosystem**

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The global importance of the Serengeti ecosystem for biodiversity conservation, cultural heritage and economic development is recognized by designation of two UNESCO World Heritage Sites and a Biosphere Reserve. Lying at the heart of the ecosystem, the Serengeti National Park (SENAPA) is one of the best known wildlife parks in the world and one of Tanzania's most valuable foreign currency earners whose revenue is invested in Tanzania's other protected areas, with additional benefits flowing to local communities and the regional economy. Other protected areas surrounding the Park provide a buffer zone where wildlife and human use overlap. With roughly 2.3 million people in the seven districts that abut the park and a population growth rate of approximately 3% annually (URT 2002), the potential for conflict between wildlife and park adjacent communities is substantial and growing. Thus, discussions on the management of the Serengeti ecosystem are often framed as a debate on management for livelihoods versus conservation (Prins 1992; Sinclair 2008). However, this oversimplifies the complexity of the goods and services (or functions) provided by the ecosystem, which can be roughly classified as ecological (sustaining key species and habitats), economic (enhancing national economic development, local poverty alleviation and sustainable livelihoods) and socio-cultural (safeguarding traditions and cultural identity). Some of these functions will inevitably be mutually exclusive, creating potential conflicts, but others will be compatible or even mutually

dependent. In this chapter, we use an institutional perspective to illustrate the conflicts and synergies in the management of the Serengeti ecosystem as a result of this multifunctionality.

Institutions can be defined as the formal and informal norms, rules, values and customs that regulate society as well as the corresponding incentives and sanctions used to enforce compliance (North 1990; Brett 2000). Institutions provide the frameworks within which individuals and organizations operate on both a national level (e.g., national law, country-specific customs) and local level (e.g., district-related bye-laws, village-specific norms). We focus in particular on the institutions governing the management of the ecosystem's protected area landscape (i.e. the Serengeti National Park, neighbouring Game Reserves, Loliondo Game Controlled Area, Ngorongoro Conservation Area and the Wildlife Management Areas) as well as national laws and policies concerning wildlife, tourism, and land management. We consider to what degree existing institutions and management approaches recognize and reconcile the ecological, economic and socio-cultural functions of the Serengeti ecosystem. We outline some of the challenges to date and make recommendations towards more sustainable management, emphasising in particular the need for governance approaches that address the multifunctionality and institutional complexity across the ecosystem.

## **MULTIFUNCTIONALITY OF THE SERENGETI ECOSYSTEM**

The Serengeti ecosystem is defined by the annual migration of two million wildebeest, zebra, and gazelle from the short-grass plains of Ngorongoro and Serengeti in Tanzania to the savannah woodlands of the Masai Mara in Kenya (Sinclair 1995; Thirgood et al. 2004). The area of interest is more than 33 000 km<sup>2</sup> (Table 23.1) and in Tanzania alone includes seven districts and conservation areas with varying levels of 'protection' (Fig. 23.1). Given its size and mosaic of protected and unprotected areas with different land uses, resource users and management priorities, the Serengeti ecosystem provides a range of ecological, economic, and socio-cultural functions briefly described below.

### **Ecological Functions**

The grasslands and woodlands of the Serengeti ecosystem support some of the greatest concentrations of large mammals in the world, including one of the world's largest herd of migrating ungulates (Sinclair 1995). The migration alone consists of over 1.3 million wildebeest and 200 000 zebra. There are also important populations of resident ungulates, east African black

rhino (*Diceros biconis michaeli*), 14 species of predators, over 500 species of birds and many other taxa. The ecosystem is composed of a mosaic of habitat types broadly classified as southern grassland plains, northern woodlands, and western mixed woodland-grassland within which there is substantial heterogeneity in floral diversity and vegetation assemblages. Seasonality in rainfall and its effects on nutrient availability is thought to be the driving force behind the migration (Fryxell 1995; Murray 1995) with wildebeest concentrated in the southern grasslands during the wet season (December to May) and, thereafter, moving northwest to spend the dry season (August to November) in the northern woodlands (Thirgood et al. 2004). This seasonality, as well as other biotic and abiotic components and processes (e.g. fire, hydrology, predation) that sustain such tremendous biological diversity, underscore the important ecological functions of the Serengeti ecosystem.

### **Economic Functions**

Poverty is prevalent in the Serengeti ecosystem with the per capita income below that for the country as a whole (Borge 2003) and approximately 75% of households below the basic needs poverty line for Tanzania of USD \$0.76/day (Schmitt 2010). As in the rest of rural Tanzania, subsistence agriculture in the form of farming and livestock keeping is the predominant livelihood activity (Schmitt 2010) and the majority of households own livestock as a form of household savings. Thus, the ecosystem provides an important economic function by providing land and ecosystem services that sustain local livelihoods. For instance, to the west of the park the ecosystem protects the Simiyu and Duma watersheds which are critical for agriculture and livestock, and it is estimated that the Mara River alone supports agricultural yields worth USD \$12 million (Gereta et al. 2003). Furthermore, opportunities for wage labour or other forms of paid employment are limited and bushmeat hunting is an important source of cash income for many households (Schmitt 2010). Other forms of natural resource extraction and use (e.g. charcoal making, beekeeping, fuelwood collection) also contribute to household needs and income.

On a wider scale, the economic potential of the Serengeti ecosystem and its ability to generate revenue, primarily through wildlife tourism, is substantial. Serengeti National Park is the second highest earning National Park in Tanzania (behind Kilimanjaro NP) with revenues of USD \$21 million in 2006 (URT 2006) and the Ngorongoro Conservation Area makes approximately USD \$30 million primarily from visitor and concession fees (UNESCO/IUCN 2007). Other areas in the ecosystem retain their own revenue from tourism (e.g. villages in

Loliondo collected over USD \$300,000 in 2007 from private tourism enterprises, TNRF 2008). The potential for wildlife to contribute to poverty alleviation and rural development in the Serengeti ecosystem through employment in the tourism sector and sustainable natural resource use is enormous, and local communities on both sides of the international border derive some benefits from tourism revenue. Nationally, wildlife underpins the tourism industry in Tanzania which generated an estimated USD \$1.3 billion in 2008 (UNWTO 2008). Tanzania's tourist hunting industry contributed an estimated USD \$30 million to the Wildlife Division with an additional USD \$9 million going to the leasing companies (Baldus and Cauldwell 2004). As one of the most visited areas in Tanzania, wildlife based tourism in the Serengeti ecosystem is a key driver of macro-economic growth in Tanzania and, if managed effectively, will contribute significantly towards Tanzania meeting its national goals for poverty reduction as laid out in the National Strategy for Growth and Reduction of Poverty (developed in 2005 and more widely known by its Swahili acronym MKUKUTA).

### **Socio-Cultural Functions**

The Serengeti ecosystem is comprised of a diverse mix of people, including more traditional pastoralists (primarily Masai and Sonjo) to the east and south-east and agro-pastoralist hunters (primarily Sukuma, Kuryia, Ikizu, Taturu, Natta, Issenye, Ikoma) to the west and south-west (Kaltenborn et al. 2008; Schmitt 2010). Each of these groups use (or aspire to use) the wider Serengeti in their own ways. The Masai are thought to have inhabited the area since the 17<sup>th</sup> Century and there are a number of rock paintings, other artefacts of Masai culture and traditional worship sites scattered across the ecosystem (TANAPA 2006). Interwoven with this cultural diversity and history is a wealth of traditional knowledge (cultural and ecological) acquired in some cases over hundreds of years. Paleontological and archaeological records are found in four major sites (Olduvai Gorge, Laetoli, Lake Ndutu and Nasera rock shelter in the Gol Mountains). The discovery of fossil remains of early hominids, such as *Homo habilis*, 3.5 million year old human footprints, and other artefacts, make it one of the world's most important research sites on human evolution (Leakey and Hay 1979; Johanson et al. 1987). Natural resources also constitute a part of the local culture; e.g. wildlife products are used for traditional medicine, clothing and decorations, and traditional ceremonies and marriages (Kaltenborn et al. 2005). There are also social and cultural functions associated with trophy hunting as a means of recreation for resident and tourist hunters.

## **INSTITUTIONS – THE NATIONAL CONTEXT**

The principles of wildlife conservation in Tanzania were first laid out in President Nyerere's famous Arusha Declaration in 1967. Now, the contribution of wildlife and other natural resources to poverty reduction and economic growth are recognized in Tanzania's National Strategy for Growth and Reduction of Poverty (MKUKUTA), which is also in line with the Millennium Development Goals of addressing poverty, hunger, disease, illiteracy, environmental degradation, and discrimination against women. In addition to these international and national development goals, Tanzania's formal institutions that relate to the functions and management of the Serengeti ecosystem include a number of policies and laws related to wildlife and protected area management, natural resource management, tourism and land use (see also Polasky et al. 2008). We overview these institutions and evaluate whether they promote resilient local livelihoods and contribute to economic development without threatening wildlife populations, ecosystem health or cultural integrity.

### **Wildlife**

The 1974 Wildlife Conservation Act No. 12, revised most recently in 2009, lays out the national system of state protected areas comprised of National Parks, Game Reserves and Game Controlled Areas, and regulates all consumptive use of wildlife through allocation of hunting permits. The Wildlife Policy (1998, revised in 2007) defines the vision for the protected areas network in Tanzania, and clearly sets out to integrate conservation with rural development and broader socio-economic development in Tanzania (as per the National Development Vision 2025). It emphasizes the contribution of protected areas to the local and national economy through tourism (photographic and hunting) and resident hunting in Game Controlled Areas or areas outside but adjacent to protected areas. And whereas previously wildlife management was entirely controlled by the government, the 1998 Wildlife Policy embraced community-based conservation while recognising community user rights and the importance of traditional knowledge and practices for the management of wildlife in Tanzania. In doing so, it called for the legislation that would enable the establishment of a new type of protected area where communities would have legal rights to manage and benefit from wildlife on village land. The 2002 WMA Regulations (revised in 2005) under the Wildlife Conservation Act provide for the creation of Wildlife Management Areas (WMAs) as areas set aside by Village Councils for

wildlife conservation and sustainable use on village land. The Wildlife Policy also promotes: (i) the delivery of extension services and ‘good neighbourliness’ by protected areas; (ii) communication, public education and awareness building; (iii) equitable distribution of costs and benefits; (iv) gender issues, and (v) international collaboration and cooperation with neighbouring countries with regard to trans-boundary issues as well as other government sectors and management authorities.

In one way or another, wildlife conservation falls under the jurisdiction of the Wildlife Division (WD) of the Ministry of Natural Resources and Tourism (MNRT) or two parastatal organisations: the Tanzania National Parks Authority (TANAPA) and the Ngorongoro Conservation Area Authority (NCAA). WD has oversight of game reserves, game controlled areas, wildlife management areas, and open areas while the management, conservation and use of all national parks in Tanzania falls under TANAPA. NCAA oversees wildlife conservation in the Ngorongoro Conservation Area. WMAs are managed by legally recognized community-based Authorized Associations (AAs) under the jurisdiction of the WD. Although WMAs delegate wildlife use and management rights to the village, the WD regulates gazettement of areas, safari and hunting quotas, and prosecution of offenders under the Wildlife Act. WMAs obtain a certain number of wildlife hunting permits according to the WD quota system, which they can either use or sell to a private tourist hunting company.

The Ngorongoro Conservation Area Ordinance 413 (1959) set up the earliest nationally recognised form of community-based conservation in Tanzania by designating the Ngorongoro Conservation Area (NCA) as a multiple land use area for the integration of human development and conservation. The Ngorongoro Conservation Area Authority (NCAA) was established under a separate ordinance to manage NCA for indigenous Masai residents, including regulating cultivation, grazing, tourism and natural resource use.

## **Tourism**

Like the Wildlife Policy, the Tourism Policy (1991, revised in 1999) also sets out to enhance ecological, economic and socio-cultural functions by promoting “the development of sustainable and quality tourism that is culturally and socially acceptable, ecologically friendly, environmentally sustainable and economically viable”. Involvement of and benefit-sharing with communities within and adjacent to protected areas is specifically highlighted in the policy, as is adherence to wildlife conservation and sustainable use strategies. Implementation of the Tourism Master Plan (1996), the implementation strategy for the Tourism Policy, is the responsibility of

the Tourism Division of the MNRT in coordination with other government ministries. The Tanzania Tourism Board (TTB) was established under the MNRT to promote Tanzania as a tourist destination.

### **Land, Settlement and Local Governance**

Recognizing and securing traditional rights to land is one of the main objectives of the National Land Policy (1997), which also recognizes the linkages between conservation, development and sustainable use by promoting a land tenure system “to encourage optimal use of land resources and to facilitate broad-based social and economic development without upsetting or endangering the ecological balance of the environment”. The 1999 Land Act (No. 4) categorized public land into three categories – general land, village land and reserved land. Reserved land includes all land set aside for special purposes to be managed by the government, including those protected areas established under the Wildlife Conservation Act of 1974. Management of village land was made the responsibility of the Village Council under the 1999 Village Land Act (No. 5).

Conflicts do arise, for instance where Game Controlled Areas (GCAs) and the Ngorongoro Conservation Area (NCA) demarcated as Reserved Land under the Land Act have been established on areas traditionally occupied by communities and, thus, considered village land where customary rights over tenure and management prevail (TNRF 2008). In addition, the 1999 revision of the 1982 Local Government Act (No. 6) stated that “the Minister shall endeavour to ensure that the local government authorities are strong and effective institutions that are more and more autonomous in managing their own affairs and they operate in a more transparent and democratic manner”. Theoretically, the policy and legal framework serves to strengthen decentralisation of decision-making to local institutions while recognizing community rights to manage their own land and resources and, thus, derive financial benefits from wildlife resources; these being key economic and socio-cultural functions of the Serengeti ecosystem.

### **INSTITUTIONS – THE SERENGETI CONTEXT**

Policies and regulations set at the national level determine permissible land uses and other activities in different land categories, including protected and unprotected areas. The Tanzanian sector of the Serengeti ecosystem includes five types of protected areas (Fig. 23.1). In addition, the Masai Mara National Reserve on the Kenyan side of the ecosystem has its own set of institutions which are covered only briefly in this chapter.

The Serengeti National Park (SENAPA) is managed for conservation and tourism and, in recognition of its outstanding biodiversity value, was inscribed as a Natural World Heritage Site in 1981. As a National Park it has the highest level of protection and, thus, all forms of consumptive use are prohibited (including settlement, grazing, hunting and resource extraction) other than that needed for park, tourism or research staff. The SENAPA management plan (2006-2016), which lays out the vision and activities for the management of the park, was developed by a series of working groups and interdisciplinary planning teams representing a range of stakeholders involved in the planning process (TANAPA 2006). The plan is divided into four programmes: Ecological Management, Tourism Management, Park Outreach and Park Operations. In this sense, the GMP broadly recognizes the multifunctionality of the ecosystem and lays out a number of Objectives and Actions outlining the Park's role in enhancing these functions.

The Ngorongoro Conservation Area (NCA) is a multiple-use area that, in theory, recognizes and accommodates ecological, economic and socio-cultural functions. Management objectives aim to promote natural resource conservation in conjunction with pastoralism and permanent settlement by indigenous Masai. Hunting is not permitted but substantial revenue is earned from photographic tourism. The area was inscribed as a Natural World Heritage Site in 1979 in recognition of its global importance for biodiversity conservation. In recognition of the area's archaeological importance, it was also inscribed as a Cultural World Heritage Site in 2010. A 10-year General Management Plan for the area was approved in 2006.

Maswa, Grumeti, and Ikorongo Game Reserves (GR) are managed primarily for conservation through the consumptive use of wildlife through tourist hunting (Maswa GR) and non-consumptive photographic tourism (Ikorongo NR and Grumeti GR). Maswa GR has three hunting blocks operated by different companies (Big Game Safaris, Tanzania Game Tracker Safaris, and Robin Hurt Safaris) on five year leases, while Grumeti and Ikorongo GRs each have one hunting block operated by Singita Grumeti Reserves for photographic tourism. Settlement, pastoralism, cultivation and other forms of resource extraction are prohibited within the GRs.

Loliondo Game Controlled Hunting Area (GCA) is a multiple-use area where settlement, pastoralism and cultivation by Masai are allowed, as are consumptive use of wildlife through tourist hunting and non-consumptive wildlife or cultural tourism. Tourism is run by a handful of top end private operators (largely photographic) who have entered into local contracts with individual Masai villages for lease and exclusive use of land in exchange for fixed payments.

Three Wildlife Management Areas (WMAs) were initiated in the Serengeti ecosystem: Loliondo to the east, Ikona to the west, and Makao to the south. WMAs are multiple-use areas that can be managed for consumptive and non-consumptive use of wildlife with associated revenue shared between the communities and government. Following the gazettelement of Ikona WMA in Serengeti District and Makao WMA in Meatu District, user rights were given to the Authorized Association (AA) by the Ministry of Natural Resources and Tourism (MNRT) which enabled by-law and constitution formation in both areas. Management plans have been prepared for Ikona and Makao WMAs, and Ikona WMA has steady revenue from private tourism investors and appears to be capable of maintaining its operational and management costs through this revenue. Makao WMA is still in the process of setting up contracts with investors (primarily hunting companies) to earn revenue from wildlife. The WMA process has not proceeded in Loliondo but villages in the area are earning revenue from tourism by entering into legal agreements with private investors in ways that are, arguably, less complex or costly than undergoing WMA gazettelement (TNRF 2008).

In Kenya, management of the Masai Mara National Reserve (MMNR) is mandated to the Narok County Council (east of the Mara river) and the Trans Mara County Council (west of the Mara river). Day-to-day management of the Trans-Mara part of the MMNR is contracted to the Mara Conservancy (a local non-profit organisation representing the Masai). Grazing and other forms of consumptive use are not allowed inside the Reserve but revenue generated from tourism aims to benefit both local and national economies. A draft management plan (2009-2019) was developed, involving a range of stakeholders, to address threats to the Reserve and guide ecological management, tourism, community outreach, and protected area operations. At the time of writing it was undergoing revision before approval.

Informal institutions also exist including the customs and traditions related to bushmeat hunting, livestock herding, and other forms of land and resource use. There is a considerable amount of knowledge on traditional institutions of land tenure and access to land in areas inhabited by the Masai (Pander 1995; Seno and Shaw 2002; Fratkin and Mearns 2003). However, there is comparatively little information about the informal institutions that regulate bushmeat hunting, trophy hunting or wildlife tourism (for a historical perspective see Steinhard 1989) or their interaction with national policies and legislation. Bushmeat hunting is not believed to be a strong part of the Masai's pastoral culture, although this may not be the case today in the face of changing livelihoods and modernisation. Initial qualitative research suggests that while bushmeat hunting on the western side of the Serengeti National Park does not seem to have

strong cultural functions, it is clearly organised through informal rules and associated incentives and hunting is currently gaining in social status due to the increasing need for cash in the market economy (Lowassa et al. in press). Until recently, clans and tribes tended to have taboos relating to specific species (for example, elephants or zebra) or hunting methods – for example, the use of pitfall traps could potentially cause misfortune, as could bushmeat hunting in general for cattle owners. We can only speculate about the ecological impact of these taboos and social norms – most likely, they provided migrating wildlife populations with a quasi-closed season during the cycle migration, and a mosaic of ‘safe’ areas for non-migrating species. In recent times, many of these informal rules may be decreasing in importance. In addition, institutions that seem, at first sight, rather unrelated to the ecological functions of Serengeti ecosystem, draw on the economic functions of wildlife populations. For example, the need for cash or cattle – governed by formal (tax, school fees) and informal (e.g., customs related to dowry) institutions – are strong drivers of hunting as livelihood activity. There may be other informal institutions that, although unwritten, are socially embedded in local society and, thus, sustaining shared norms and prevalent practices.

## **INTERACTIONS BETWEEN FUNCTIONS AND INSTITUTIONS**

Although the protected area landscape is designed to reflect the multiple land uses and users in the ecosystem, this multifunctionality is not easily divisible geographically or institutionally. Where overlap occurs, interactions are inevitable and, more often than not, lead to conflict. For example, wildebeest spend about a third of their time in less-protected (e.g. GRs, GCA, WMAs) or unprotected open areas of the ecosystem (Thirgood et al. 2004) where they are exposed to agricultural intensification (Homewood et al. 2001) and high levels of (illegal) hunting (Arcese et al. 1995; Campbell and Hofer 1995; Mduma 1996). Historically wildlife hunting was not a major conservation concern in Tanzania, but increasing rural populations, expanding agriculture, food insecurity, and the demand for increased household income pose ever greater threats to wildlife inside and outside protected areas. Previous studies suggest that poverty and lack of alternative sources of protein are the primary drivers of local bushmeat consumption in the Serengeti ecosystem (Loibooki et al. 2002), making bushmeat hunting a major component of rural livelihoods (socio-cultural and economic function) and, at the same time, a serious threat to the viability of migratory and resident wildlife populations (ecological function) and thus potentially also to the attractiveness of the Serengeti for tourists (economic function). This leads to mounting conflict between economic functions for different groups (e.g. local communities

and national economy) as well as between institutions that aim to protect ecological functions and communities with few alternative livelihood options. Other conflicts ensue from the interactions between functions, including:

- Agricultural intensification, deforestation and unsustainable water use in the headwaters and catchment on the Kenyan side are causing decreased water levels and increasing seasonality of flow in the ecosystem's only perennial river, the Mara River (Gereta et al. 2003). This has the potential to seriously affect the stability of the entire ecosystem and all its functions.
- Disturbance to habitat and wildlife from tourist vehicles are evident, particularly in the NCA and on the Mara side where severe overcrowding and overuse are widespread (UNESCO/IUCN 2007, 2008; MMNR, 2009). Other negative impacts from tourism are degradation of local culture and traditional sites as well as unsustainable water extraction and poor waste management at lodges and other tourist facilities.
- Wildlife are negatively impacted by diseases from livestock (Dobson 1995) and domestic dogs (Roelke-Parker et al. 1996; Lembo et al. 2008) and vice versa (Kaarea et al. 2007).

While management debates tend to focus on the conflicts and alleged trade-offs between land uses and users, the ecological, economic and socio-cultural functions of the ecosystem are, for the most part, highly interdependent. Thus, activities that aim to promote one function to the detriment of another are unsustainable in the long run. For example, biodiversity loss and natural resource degradation disproportionately affect the poorest of society who greatly depend on natural resources for their livelihoods (MEA 2005). Even where poverty is a major driver of illegal activities such as bushmeat hunting, community development can increase wellbeing in ways that are counterproductive to sustainable development if increased wealth leads to consequent degradation of the resources on which people intimately depend (Walpole 2006). Sustainable development ultimately depends on the mutual enhancement of ecological, economic and social goals (WCED 1987) and this, in turn, depends on institutions that reflect the Serengeti's multifunctionality and promote good governance.

A key question then is do existing institutions recognize and reconcile the multifunctionality of the Serengeti ecosystem? For the most part the multiple functions of the Serengeti ecosystem and their linkages are enshrined in Tanzania's policies, and broadly speaking, these put forth strategies for sustainable wildlife utilisation that have the potential to contribute to poverty alleviation and rural economic development (World Bank 2005). They are also in line with broader development strategies such as Tanzania's National Strategy for Growth and Reduction of Poverty (or MKUKUTA) which call for greater revenue generation from

tourism and wildlife for local and national economies. Nevertheless, there are at times contradictions between institutions, leading to conflicts that are made worse by inadequate adherence to and poor implementation of policies and laws that should otherwise promote sustainability. We use examples from community-based wildlife management and tourism to highlight this.

Community-based wildlife management has become the political mantra for integrating rural development with conservation (Hulme and Murphree 1999), the underlying rationale being that if wildlife provides sufficient economic value to communities, then community-based conservation can compete with agriculture, pastoralism and hunting. This not only provides a basis for resilient livelihoods by alleviating poverty but also reduces illegal poaching. Thus, in theory, community-based conservation and Wildlife Management Areas (WMAs) should go some way towards reconciling wildlife conservation and local livelihoods, particularly for communities that incur most of the costs but receive few of the benefits of living adjacent to wildlife and protected areas. Unfortunately, progress to date in the development of the WMAs has been mixed and challenges remain. For one thing, the formation of Authorized Associations constitutes the creation of a new local institution distinct from the village council and other pre-existing, elected governing bodies at the local level thus complicating governance (Nelson 2007). Tanzania's policies and laws have also been criticized for not enabling suitable levels of community ownership and empowerment to adequately ensure the dual goals of wildlife conservation and rural development (TNRF 2008). For example, the Village Land Act No. 5 (1999) and the Local Government Act No. 7 and 8 (1982) allow for responsibility for the conservation, management and development of wildlife to be devolved to the village level, but the state retains ownership of wildlife and other regulatory functions (e.g. authority for granting hunting block concessions in the WMA, approval of investment agreements with private operators and determining how revenue from WMAs will be shared between the community and government) that limit the economic benefits that communities can actually accrue from wildlife management in WMAs (Nelson 2007). The apparent reluctance on the part of the Wildlife Division (and private sector) to grant full mandate for wildlife management as per the Wildlife Policy means that the benefits that actually go to rural communities are minimal (World Bank 2005). Contrast this with Namibian conservancies which are given exclusive user rights and retain all revenue earned from wildlife, making Namibia's model one of the most successful for community-wildlife management in east and southern Africa (Nelson 2007).

Tanzania's Tourism Master Plan calls for 'low volume, high yield' tourism as a means of promoting sustainable development. Yet high tourist numbers and vehicles in the NCA, one of Tanzania's most popular destinations, is leading to overcrowding of wildlife, degradation of roads and other infrastructure, soil erosion and runoff in some areas and unsustainable extraction of water from the crater for lodges on the crater rim (UNESCO/IUCN 2007, 2008).

Environmental degradation as a result of tourism is also occurring on the Kenyan side of the ecosystem as a result of high tourist numbers (MMNR 2009). This growing conflict between economic and ecological functions undermines conservation goals as well as livelihoods that depend on wildlife and other natural resources. Furthermore, while MKUKUTA calls for greater revenue generation from tourism and wildlife, a World Bank report (2005) suggested that the Wildlife Division is not adequately capturing the market value of Tanzania's wildlife resources (e.g. trophy fees are low compared to other African countries, Baldus and Cauldwell 2004). This reflects a lack of implementation of the Policy and Management Plan for Tourist Hunting developed in 1995. Lastly, expanding cultural tourism is a main objective of Tanzania's Tourism Policy, but restrictions imposed by the NCAA on land and natural resources use are adversely affecting Masai cultural identity (DeLuca 2002) as more households turn to agriculture as a means of supplementing traditional pastoral livelihoods (UNESCO/IUCN 2007).

## **MANAGEMENT APPROACHES TO MULTIFUNCTIONALITY**

Approaches for managing multifunctionality and institutional interplay in the Serengeti ecosystem have evolved over time. Historically, SENAPA and NCAA have contended with illegal hunting primarily through strong law enforcement consisting of heavily armed anti-poaching patrols and arrests (Arcese et al. 1995). While law enforcement is an effective wildlife protection strategy (Hilborn et al. 2006), it has long been recognized that a combination of incentives (community development) and law enforcement (wildlife protection) may better reconcile the multiple-functions of the Serengeti ecosystem. That said, the trade-offs between incentives and protection in reducing conflicts are tricky to disentangle (Adams et al. 2004).

The Serengeti Regional Conservation Strategy (SRCS), initiated in 1985, was one of the first attempts to enhance community development as a means of reconciling the ecological, economic and socio-cultural functions of the Serengeti ecosystem (Mbano et al. 1995). This was a government project under the Wildlife Sector of the MNRT with funding from Norwegian Agency for Development Corporation (NORAD) and other donors (e.g. Frankfurt Zoological

Society). The SRCS recognized the need for reconciling wildlife conservation and human development and, in doing so, tackling growing resource conflicts associated with poaching and encroachment through an integrated approach that addressed human needs and livelihoods. The project was implemented in three phases: phase one focused on identifying problems and opportunities for community participation in conservation and benefit sharing; phase two focused on building awareness and coordination among stakeholders, and phase three focused on implementation of community natural resource management and benefit sharing (Mbano et al. 1995). The SRCP had some positive results in terms of empowering communities, delivering social services, training game scouts and mitigating poaching to some degree, but the overall sustainability of the programme was called into question (Bryceson et al. 2005).

The Ngorongoro Conservation and Development project set up in 1985 was also a response to growing conflict between the NCAA and Masai communities. Its objectives were to incorporate land use and development needs of resident pastoralists into management strategies (IUCN 1987). Since then the NCAA has also established a Community Development Department and supported the establishment of the Masai Pastoral Council to involve the Masai community in management decisions. Nevertheless, the effectiveness of the Masai Pastoral Council has been criticized for its lack of decision-making power, weak mechanisms for dissemination of information and consultations with the wider Masai population, and the absence of transparency in how it uses its share of the revenue from tourism in the NCA (Odhiambo 2003; UNESCO/IUCN 2007). Subsequently, Ereto was set up as a local NGO to provide services to Masai communities.

Both TANAPA's Community Conservation Services (CCS) and SENAPA's Support to Community Initiated Projects (SCIP) schemes also aims to distribute benefits from conservation to local communities around the Serengeti National Park thereby improving relations with neighbouring stakeholders (Bergin 1996). Since 2000, SENAPA has contributed about USD \$100,000 per year to community development projects (Thirgood et al. 2008). Direct economic benefits are provided to communities through the Revenue Sharing Programme, which provides a percentage of park fees for community development projects largely aimed at improving school, health and road infrastructure in park adjacent villages (TANAPA 2006). Given the size of the target population (c. 2.3 million people in the seven districts that abut the park) and an under-resourced/under-staffed outreach department (four staff and only 7.5% of the park budget according to the SENAPA GMP), the overall impact of the Park outreach programme is questionable. Until recently, there was also no official forum for coordinating activities with or

facilitating communication with communities and other stakeholders in the ecosystem. As a result, the views and needs of communities have typically not been taken into account, marginalised groups have often been excluded and benefits have not been equitably distributed (Schmitt 2010). The SENAPA GMP (2006-2016) identifies three areas for current and future outreach activities: (i) the identification and establishment of conservation friendly income generating activities; (ii) the mitigation of human wildlife conflicts, and (iii) support for community-based natural resources management (TANAPA 2006).

Frankfurt Zoological Society (FZS) and TANAPA recently implemented the Serengeti Ecosystem Management Project (SEMP), a five year (2005-2010) project aimed at piloting the CBD's Ecosystem Approach in the Serengeti ecosystem. The Ecosystem Approach recognizes that since local stakeholders are important beneficiaries of healthy ecosystems as well as a major threat to the maintenance of ecosystem functions, it is vital they are at the forefront of conservation and sustainable use. Strengthening local institutions is also fundamental to the success of community-based wildlife management (Nelson 2007). SEMP has gone beyond other projects in trying to reconcile the multiple functions and institutions in the ecosystem by focusing project activities on the Approach's five operational guidelines:

- establishing inter-sectoral ecosystem cooperation mechanisms
- improving understanding of ecosystem processes and functions
- decentralising management to local institutions
- improving benefits and incentives for local stakeholders
- introducing adaptive management systems

Among other things, SEMP has supported the Serengeti Ecosystem Community Conservation Forum (SECCF). SECCF is a local NGO established to improve inter-sectoral ecosystem cooperation and mobilize stakeholders to collaborate on key issues "in order to strengthen sustainable conservation utilization and social economic development" (SECCF 2010). In doing so, the SECCF also aims to increase awareness of the unsustainable nature of resource use and encourage participative approaches that mutual enhance sustainable livelihoods and conservation across the ecosystem. A number of values are outlined that underpin the overall governance strategy, including trust, commitment, transparency, accountability, sustainability, fair and equitable benefits, cooperation, partnership, and empowerment. A wide range of stakeholders are represented, a MoU was signed in 2008 (albeit not by all members), and a draft strategic plan (2010-2015) has been developed. Although challenges remain (e.g. community interests are underrepresented at present, sustainable funding is lacking, transparency and

accountability need strengthening (Borner and Mwangeni 2010)), the SECCF has the potential to be an effective platform for stakeholder participation in the governance and, ultimately, management of the Serengeti ecosystem.

## **CURRENT MANAGEMENT CHALLENGES**

It is apparent that most management initiatives to date have encountered a range of problems that have undermined their effectiveness or limited their contribution to a multifunctional approach to management. As a result many of the ecosystem's functions remain threatened. In particular, high levels of illegal use persist (see Rentsch et al., Chapter 21); hunting accounts for nearly two-thirds of all incidences of illegal activity picked up by the SENAPA law enforcement department (TANAPA 2006). Furthermore, the majority of people report no benefits from conservation (Schmitt 2010) or insufficient benefits to offset costs from wildlife (e.g. crop damage) or foregoing other activities (e.g. hunting, Holmern et al. 2002). In fact, despite previous outreach/development activities in the Serengeti ecosystem, less than one third of the local population is even aware of the existence of the park or other protected areas (Schmitt 2010). Lack of benefits is also cited as an underlying cause of negative attitudes among communities adjacent to the Masai Mara (Sitati 2003). It is clear that these circumstances undermine wildlife conservation, poverty reduction and sustainable resource use goals laid out in many of the national development strategies. But what are some of underlying reasons for the current unsustainability of management approaches, particularly those aimed at curbing illegal behaviour and promoting local development and conservation compatible livelihoods in park adjacent communities?

First, poverty and illegal behaviour do not interact straightforwardly. For instance, it is generally assumed that bushmeat hunting in developing countries is poverty driven and that hunters can be transformed into conservationists given the right economic opportunities or incentives. This may seriously underestimate the cultural, social, and political benefits of hunting (Gibson 1999) and the range of attitudes and values to wildlife which influence hunting or other illegal behaviour (Fulton et al. 1996; Kaltenborn et al. 1999). A number of other obstacles are evident (Kaltenborn et al. 2008; Schmitt 2010). First, there are still few, if any, alternatives for poor, resource dependent households in many villages or conservation friendly alternatives are not economically competitive with other resource uses. Second, where benefits due accrue from wildlife tourism, there is a lack of transparency, accountability and equitability with regards to

revenue distribution and benefit sharing. Third, such benefits are not tangible at the individual or household level nor are they conditional on compliance. Fourth, law enforcement does not render the costs of illegal activity high enough to outweigh the benefits from wildlife.

Second, until recently, there were no clear or transparent mechanisms for establishing shared goals, strengthening coordination among stakeholders, or resolving conflict among stakeholders. The creation of the SECCF is a step in the right direction in this respect. For one thing, it established a memorandum of understanding out of what were previously informal social links between actors. However, limited donor funding has restricted representation on the forum to only three of the seven districts on the Tanzanian side of the Serengeti ecosystem and key members, including TANAPA and WD, have not signed the MoU because of institutional obstacles preventing them from doing so. Poor representation of communities as well as lack of accountability and transparency are obstacles to effective governance (Borner and Mwageni 2010). Similarly, in the Ngorongoro Conservation Area there seems to be little genuine representation of Masai interests and rights in the management of the NCAA (Lane 1996; Odhiambo 2003; UNESCO/IUCN 2007). Within WMAs power sharing and revenue distribution between AAs, village governments and districts are often not clear or transparent (Walsh 2000). These local governance challenges are exacerbated by the need for policies and institutional structures for trans-boundary cooperation in the ecosystem.

## **THE WAY FORWARD FOR MANAGEMENT OF THE SERENGETI ECOSYSTEM**

Despite several attempts to establish institutional arrangements that reconcile multiple functions and institutions, the sustainability of the Serengeti ecosystem remains in question. In theory most institutions reflect the multiple claims towards the ecosystem, yet in practice these institutions are either in conflict or poorly adhered to. As the gaps between institutional goals and reality continue to widen, the need for institutional reform becomes increasingly apparent. The main challenge is how to manage the inevitable complexity (and tensions) arising out of diverse interests and power relations across the landscape. We put forward the following recommendations taking into account international best-practice:

- Strengthen institutions for protected area management
- Enhance co-management approaches to governance
- Promote institutional compliance
- Evaluate management effectiveness

### **Strengthen Institutions for Protected Area Management**

As part of the process of institutional reform, Tanzania could make wider use of the IUCN Protected Areas Management Categories and guidelines for best practice in protected area management. The IUCN categories were established with the aim of developing a common (albeit flexible) understanding of the aims of different types of protected areas (Bishop et al. 2004). Broadly speaking, a protected area is designated as one of the six categories based on its primary management objective and the level of human modification or intervention (Table 23.2). Categories V and VI were established to explicitly recognize the compatibility between the rights of traditional people, sustainable use and conservation (IUCN 1994) and the IUCN guidelines outline mechanisms for reconciling conflicts between competing objectives and priorities as part of sustainable development (IUCN 2002). These guidelines provide internationally recognized norms and standards that can be used to guide institutional issues with respect to land tenure, user rights, participation, partnership building, governance and other issues to do with protected area management in the Serengeti ecosystem.

The Convention on Biological Diversity (CBD), to which Tanzania is a signatory, endorses the categories system in their Programme of Work on Protected Areas (CBD/COP7) adopted in 2004 and “encourages Parties, other Governments and relevant organisations to assign protected area management categories to their protected areas, and provide information consistent with the refined IUCN categories for reporting purposes”. Although Tanzania’s obligations under international commitment such as the CBD and CITES are mentioned, no reference is made to the IUCN categories system in either the Wildlife Policy or the Wildlife Conservation Act. Nevertheless, IUCN categories have been designated for Serengeti National Park (Category II), Masai Mara National Reserve (Category II) and Ngorongoro Conservation Area (Category VI) although designations are lacking for Game Reserves, Game Controlled Areas, and Wildlife Management Areas. Assigning IUCN categories through a participatory approach that involves both national agencies and local stakeholders could help clarify the objectives of these areas and using the relevant guidelines wherever possible would help ensure management approaches are in line with best practice internationally.

### **Enhance Co-Management Approaches to Governance**

While institutions are the rules by which activities are regulated (North 1990), governance covers the structures, processes and traditions by which responsibilities are allocated, decisions are

made, and authority is exerted (Graham et al. 2003). In a protected area landscape with multiple functions and institutions, management will involve a wide range of stakeholders on different societal levels making governance particularly challenging. Governance structures and processes will need to incorporate complex relationships, objectives, and power struggles (Lockwood 2010) and, given the trans-boundary nature of the Serengeti ecosystem, national sovereignty, legislation and country-specific interests will also play a role.

There are, in general, four protected area governance models that are recognised by, for example, the IUCN: governance by government, shared governance, private governance, and governance by indigenous people and local communities (Dudley 2008), each of which could be applied to any of the IUCN protected area categories. No single governance structure will be sufficient to address the multifunctionality of the Serengeti ecosystem, especially as there are multiple centers of power and layers of authority with respect to the management of geographic areas and sectors. This is a case of polycentric governance i.e. systems in which “political authority is dispersed to separately constituted bodies with overlapping jurisdictions that do not stand in hierarchical relationship to each other” (Skelcher 2005). Polycentrism or any governance structure that involves a plurality of institutions can be advantageous when complex problems need to be addressed (Imperial 1999) since different geographical scopes can be managed at different scales and where governance systems overlap resources can be shared and social learning can take place (Ostrom 2005). However, a certain level of coordination is needed for pluralistic governance approaches to be effective at distributing authority across multiple institutions. This is one of the greatest challenges currently facing the Serengeti ecosystem.

In Tanzania, the state became the direct coordinator and main implementer of government services after the Arusha Declaration in 1967. However, decentralization of decision-making to local actors gave rise to co-management approaches to governance. Co-management is more or less interchangeable with terms such as cooperative management, collaborative management, joint management or participatory management and generally indicates some form of cooperation between the state and local actors (Berkes et al. 1991). The IUCN (1996) defines it as “a partnership in which government agencies, local communities and resource users, non-governmental organizations and other stakeholders negotiate, as appropriate to each context, the authority and responsibility for the management of a specific area or set of resources”.

Co-management is often understood as a governance *structure* that formalizes power sharing between stakeholders (Jentoft 1985) but it may also comprises a set of loosely connected

actors coordinating management of complex issues as is the case, for instance, in polycentric governance (Imperial 1999). Importantly, it also describes a *process* for collecting and exchanging information, coordinating activities and solving problems in an iterative way, as in adaptive management (Carlsson and Berkes 2005). More specifically, adaptive co-management is “a process by which institutional arrangements and ecological knowledge are tested and revised in a dynamic, ongoing, self-organized process of learning-by-doing” (Folke et al. 2002). Adaptive co-management is particularly suited to multifunctional landscapes where there are diverse values, interests and levels of power since it emphasizes dialogue, deliberation and negotiation towards joint problem solving (Olsson et al. 2004; Carlsson and Berkes 2005). The dynamic and iterative nature of adaptive co-management not only enable decision-making feedback loops conducive to solving complex problems through trial and error, but also incorporate the uncertainty and unpredictability that stem from incomplete knowledge of the ecosystem as well as environmental and social change (Olsson et al. 2004).

There is no panacea for how to operationalise adaptive co-management as a governance approach, but some essential features include: (i) local decision-making power and financial support; (ii) information exchange and knowledge sharing towards collaborative learning; (iii) linkages between organizations and institutions at different levels and scales; (iv) analytical and strategic decision-making based on multiple sources of information; (v) monitoring and evaluation feedback systems for adaptive management (adapted from Olsson et al. 2004). Importantly, local actors need to feel there is a genuine commitment to cooperation and collaboration on the part of the state (rather than mere consultation or coercion). This not only requires that the rights and experiences of local actors are recognized but that local institutions have the capacity and incentives to participate in problem solving and decision-making (see Carlsson and Berkes (2005) for practical steps that can be taken to build stakeholder capacity for genuine participation in co-management arrangements).

### **Promote Institutional Compliance**

Institutions are enforced and entrenched through incentives and sanctions (or disincentives). That being said, compliance is also dependent on a number of political, socio-cultural, and economic factors. First and foremost is the need for consistency and coherence between institutions relating to wildlife management, land tenure and rights, tourism development, and poverty reduction in Tanzania. Coherence should exist horizontally (across sectors) and vertically (across local, national and international institutions) to facilitate compliance with policy and legal frameworks.

Compliance also depends on legal clarity and a mutual understanding of the institutional framework among stakeholders. Clear, unambiguous laws and policies reduce the possibility of arbitrary interpretation by government officials and facilitate the work of the police, judiciary and others with discretionary power. Stakeholder participation in the negotiation of institutions will not only improve consistency and coherence, but also promote legitimacy, transparency and awareness of the policies and laws they will be expected to enforce and/or adhere to.

Awareness alone, however, will not deter illegal behaviour unless a number of other conditions are also met. First, wildlife must provide economic gain at the household level for there to be adequate incentives for conservation compatible activities. Furthermore, the benefits of conservation must be sufficient to offset the costs of foregoing other activities that are seen as more economically profitable (Ottichilo et al. 2000; Emerton 2001; Homewood et al. 2001). Second, whether a 'fences and fines' or benefits-based approach is taken, law enforcement authorities (including the police and judiciary) must have sufficient capacity to ensure detection and conviction of offenders. Unfortunately, protected areas are often ill-equipped and under-resourced and, thus, the risk of illegal activities being detected and punished is too low to deter potential offenders. Law enforcement activities need to be strengthened in protected areas and community managed areas which also need sufficient human, financial and institutional capacity to enforce rules over common property management. Third, ensuring land tenure and user rights would improve compliance in community managed areas by promoting a local stake in sustainable management. This would not only increase the incentives for local people to comply with the law but also insist on the compliance (or exclusion) of outsiders.

### **Evaluate Management Effectiveness**

Ecological monitoring has been a key activity in the Serengeti National Park and Ngorongoro Conservation Area for decades, including censuses of buffalo and wildebeest since 1958 (Sinclair 1973; Sinclair et al. 2007). A number of studies have also assessed the socio-economic status of communities (e.g. Campbell et al. 2001; Schmitt 2010) which provides a foundation for long-term monitoring of community development activities in the ecosystem. A number of studies have used monitoring data to examine long-term trends and assess changes in the ecosystem (Sinclair and Arcese 1995; Sinclair et al. 2007) including the impact of policies and institutional issues such as land tenure (Hilborn et al. 1995; Homewood et al. 2001), but much more could be done to examine the institutional and governance dimensions of effective (and adaptive) management.

Collecting and evaluating information on how well a protected area is being managed in terms of the extent to which resources, plans and action are being generated and, in turn, objectives and goals are being met (Hockings et al. 2006) a key part of the adaptive management cycle (CMP 2007). The CBD also emphasises setting concrete performance targets for assessing management effectiveness as part of Programme of Work on Protected Areas (CBD/COP7). The IUCN guidelines provide an internationally recognized framework for assessing management effectiveness with respect to the appropriateness of the design of individual areas or protected area systems (context and planning), the adequacy of management approaches (inputs and processes), and progress towards protected area goals and objectives (outputs and outcomes) (Hockings et al. 2006, Fig. 23.2). Governance can also be evaluated by indicators that define standards for good protected area governance using, for example, a framework such as Lockwood's (2010) which characterizes governance quality according to seven principles: legitimacy, transparency, accountability, inclusiveness, fairness, connectivity, and resilience (Fig. 23.2). Indicators could be developed to specifically assess essential elements of adaptive co-management, including multiscale characteristics and the capacity of the system to react to feedback and adapt accordingly. Table 23.3 lists key variables and indicators from the literature (see Cundill and Fabricius 2010) that could be used as the basis for monitoring collaborative governance in the Serengeti ecosystem. Developing a comprehensive monitoring programme for evaluating management effectiveness in the Serengeti ecosystem is an area for future collaboration between organisations and institutions.

## **CONCLUSION**

The multifunctionality of the Serengeti ecosystem is evident in the range of ecological, economic and social-cultural goods and services across the landscape and the many institutions designed to manage these functions. Navigating the institutional complexity with respect to wildlife, land and local community rights in Tanzania remains a huge challenge. Most of the relevant policies recognize the linkages between functions and institutions, but they are still, for the most part, sector oriented with no clearly defined mechanisms for collaboration with other sectors or stakeholders. As a result the existing institutions tend to guard the ecosystem's functions only partially or selectively. In some cases, local institutions - both formal (e.g. police, judiciary, rural development authorities) and informal (e.g. social norms and customs) - exist but are not being used effectively and, in the case of local informal rules, may be eroding over time. This

institutional interplay is increasingly giving rise to conflicts between actors and the functions they seek to enhance.

Given all this, “strengthening governance systems at relevant scales is perhaps the most important challenge of the next century for biodiversity conservation” (Agrawal and Ostrom 2006). In this chapter, we have described the concept and principles of adaptive co-management as a framework for a more dynamic approach to governance in the Serengeti ecosystem that explicitly recognizes the multifunctionality of the landscape. The state may continue to play a strong coordinating role in co-management arrangements, but reforms should establish clearer mechanisms for collaboration between stakeholders and, in particular, communication with and participation of communities. Strengthening local institutions will be important in order to empower local stakeholders to participate in decision-making in ways that support their interests. In this sense, the role of the SECCF could be strengthened given its potential to be a platform for exchanging information, encouraging dialogue and resolving conflict at the local level. Tensions arising from the competing needs and demands of stakeholders will persist, but a commitment to building political will, requisite management capacity and problem solving mechanisms through co-management approaches to governance will go a long way to resolving conflict and improving management effectiveness. Enhancing adaptive co-management can not only help reconcile the multifunctionality of the Serengeti ecosystem but also improve its resilience to environmental and social change and, ultimately, help ensure sustainability.

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Table 23.1. Protected areas in the Serengeti ecosystem

Protected area	Management Authority	Management Objective	Area (km <sup>2</sup> )
Serengeti National Park	TANAPA	Protection with non-consumptive use only	14,763 km <sup>2</sup>
Ngorongoro Conservation Area	NCAA	Protection with multiple use but no consumptive use	8,285 km <sup>2</sup>
Loliondo GCA	Wildlife Division and District Councils	Consumptive and non-consumptive use	4,500 km <sup>2</sup>
Maswa GR	Wildlife Division	Protection with consumptive and non-consumptive use	2,897 km <sup>2</sup>
Ikorongo GR			605 km <sup>2</sup>
Grumeti GR			420 km <sup>2</sup>
Ikona WMA	Authorized Associations (with Local Government Authority and Wildlife Division input)	Consumptive and non-consumptive use	242 km <sup>2</sup>
Makao WMA			480 km <sup>2</sup>
Masai Mara NR	Narok County Council and Trans Mara County Council (with the Mara Conservancy)	Protection with non-consumptive use only	1510 km <sup>2</sup>

Table 23.2. The IUCN Protected Area Management Categories (IUCN 1994)

Areas managed mainly for:

- I. Strict protection (a.) Strict Nature Reserve and b.) Wilderness Area)
- II. Ecosystem conservation and protection (National Park)
- III. Conservation of natural features (Natural Monument)
- IV. Conservation through active management (Habitat/Species Management Area)
- V. Landscape/seascape conservation and recreation (Protected Landscape/Seascape)
- VI. Sustainable use of natural resources (Managed Resource Protected Area)

Table 23.3. Key variables and indicators for collaborative governance monitoring (taken from Cundill and Fabricius 2010)

<b>Attribute</b>	<b>Key Variable</b>	<b>Indicator</b>
Social capital (Pretty and Ward 2001; Pretty 2003)	Trust building	Trust building takes place among the groups involved in collaborative decision-making. Decision-making is perceived as open and fair. Information is shared and understood by all participants.
	Common rules and norms	See “Rule compliance” under “Preconditions for adaptive governance”
	There are common-interest groups	There is a common interest and a shared vision. Participants jointly identify and agree on the problems to be solved and what the future should look like. It is clear to all participants why a decision-making body is needed. Participants agree on what the major problems are and what the benefits might be of resolving these problems.
	Financial and capacity-support from higher levels of organization	A long-term investment has been made. The state or its partners are committed to making a substantial and long-term financial investment in the project. Long-term skills and leadership development programs are in place. Planning and decision-making support is offered.
	Security of tenure over the resources of concern	There is long-term security of access to resources. The decision-making body is confident that they are or will be able to prevent outsiders from using the resources.
Adaptive capacity (Armitage 2005)	Economic or other incentives for collective action	People who contribute more are rewarded. People who lose ways of earning a living because of the project are compensated.
	Willingness to learn from mistakes	All actors, within and outside the community, listen to each other and are willing to change what they are doing in response. The organization or committee involved in the initiative is made up of people from the community and from outside the community. These actors respect one another and listen to each others’ points of view.
	Willingness to engage in collaborative decision-making	All participants are willing to engage in collaborative learning and decision-making. Participants recognize the value of sharing information among actors. Experts are willing to learn from resource users, and resource users are open to alternative ways of doing things. The project is viewed as a learning process by everyone involved.

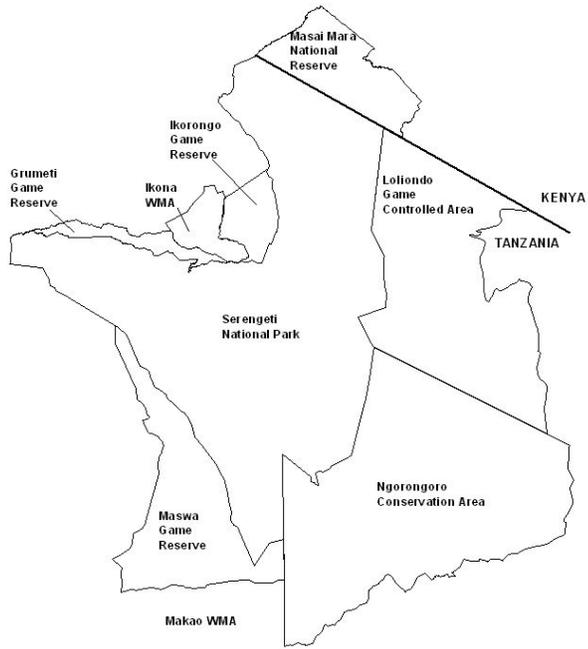
<b>Attribute</b>	<b>Key Variable</b>	<b>Indicator</b>
Self-organization (Olsson et al. 2004)	Willingness to accept a diversity of institutions	Participants understand that it is unlikely that one institution will be able to manage the entire ecosystem. Although a broad institution should be established to provide vision and overall coordination, members of the institution are aware that smaller groups may be formed to deal with specific issues.
	Maintaining options for adaptation (e.g. diversity of ecosystems, livelihoods and institutions)	Projects can bring many benefits, but they cannot solve all the problems. For example, it should be understood that not everyone can be employed on the project. People understand this and continue to do their work as usual. Over time, the projects provide some new opportunities.
	Enabling legislation is in place, is accessible, and is understood	Legislation is in place that allows people to form legal entities to manage natural resources. Project participants have access to and an understanding of the legislation.
	Funds are available for adaptive management	See “A long-term investment has been made” under Social Capital
	Information flow and social networks	Networks are established that connect the local decision-making body with other institutions. Outside partners such as government officials, researchers and nongovernmental organizations are involved and willing to devolve decision-making powers. Other relevant, local decision-making bodies are consulted and included in decision-making. The roles of these different actors are clearly defined.
	Various sources of information are combined for sense making	Information flow. There is good communication among everyone involved. People are informed about what is happening, and their views and opinions are heard.
	Arenas of collaborative learning	See “All actors, from within and outside the community, listen to each other and are willing to change what they are doing in response” and “All participants are willing to engage in collaborative learning and decision-making” under Adaptive Capacity
Preconditions for adaptive governance (Dietz et al. 2003)	Leadership	Leadership is effective and recognized. The leaders of the initiatives care about more than just their own interests. The leaders are trusted and acknowledged by all actors.
	Access to accurate and relevant knowledge and information	Combination of “Enabling legislation” and “Networks are established that connect the local decision-making body with other institutions” under Self-organization

<b>Attribute</b>	<b>Key Variable</b>	<b>Indicator</b>
	Conflict resolution mechanisms in place	Participants are aware that there will be conflict. The decision-making body is prepared for conflict and solves problems before they become serious. People are kept informed and their complaints and problems are heard.
	Compliance with rules and regulations	There are a management plan and rules for the use of natural resources, especially those that people depend on for their livelihoods. Resource users respect and adhere to the rules.
	Being prepared for change	A combination of “All actors, from within and outside the community, listen to each other and are willing to change what they are doing in response” under Adaptive Capacity and “Conflict Resolution mechanisms are in place” under Adaptive Governance.

## **CAPTIONS TO FIGURES**

Figure 23.1. Protected areas in the Serengeti ecosystem

Figure 23.2. Framework for management effectiveness (adapted from Hockings et al. 2006 and Lockwood 2010)



Protected Area

