

## 5 JACS East Africa Searching for Endogenous Solutions to Sustainable Development in a Challenging Environment

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Fig. 1  
Nanyuki, an important centre  
within the highland-  
lowland system of  
Mt. Kenya.  
Photo: Urs  
Wiesmann, 2002



\* On behalf of all the participants of the workshop held in Nanyuki, Kenya, 28-30 May, 2001  
(listed in Annex 1, p. 445)

## **Abstract**

Kenya, Uganda and Tanzania are the countries covered by the JACS East Africa. These three countries share a similar political history as well as similar socio-economic, cultural and ecological characteristics, and face common development challenges related to environmental and economic issues.

Kenya, Uganda and Tanzania attained independence from Britain in 1961, 1962 and 1963 respectively, although Tanzania had been under German rule before 1918. All three countries have great cultural and ethnic diversity, embedded in the practices of multi-tribal societies. Whereas Kenya and Tanzania are now young multi-party democracies after three decades of single-party statesmanship, Uganda still remains with a single-party system. The rate of population growth in all three countries has declined markedly in the last few years. A large proportion of the population is still rural and predominantly agro-pastoral. Large parts of the region are arid and semi-arid. Explosive population pressure in the high-potential areas has resulted in massive waves of migration into the neighbouring low-potential, semi-arid lands, causing unprecedented pressure on the already fragile environment. The ensuing land use practices and farming systems are incompatible with prevailing ecological conditions, and options for diversification are limited by the lack of local innovative capacities and government failure to promote the right strategies. Coupled with the problem of recurrent severe droughts and intense competition for scarce natural resources, these factors make East Africa one of the world's most challenging environments – characterised by severe land degradation and declining productivity, growing conflicts over resource use, the prevalence of poverty and insecure livelihoods, as well as increasing social and economic dependence. Most government and non-governmental programmes have failed to address these problems. Hence endogenous solutions must now be sought. IPI, together with other collaborating IPs, is assessing and promoting utilisation of the endogenous potential for sustainable development in this region.

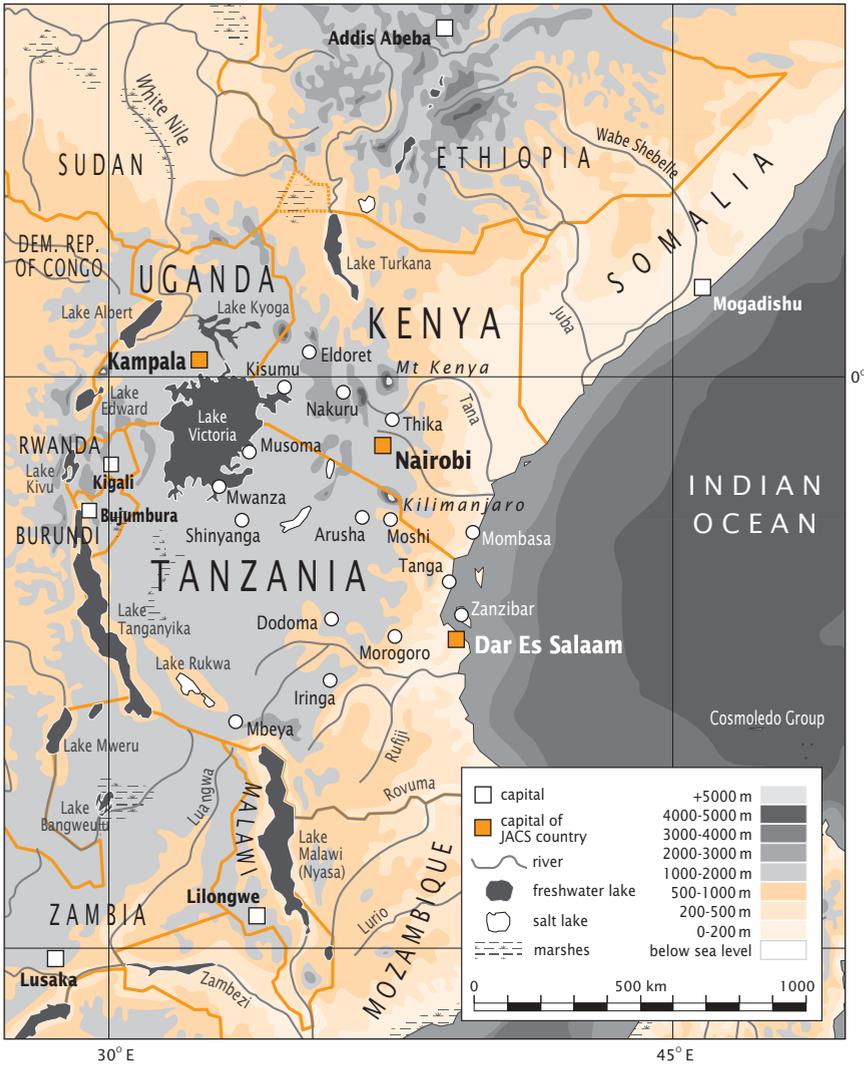


Fig. 2: JACS East Africa. Kenya, Tanzania and Uganda, three countries in what has traditionally comprised the East Africa region, not only share a common past under British colonial rule, but also have similar regional ecological characteristics and key natural resources, such as freshwater, wildlife habitats and major landforms.

## **5.1 Introduction to the JACS East Africa region**

The region known as East Africa has traditionally been comprised of Kenya, Tanzania and Uganda. These three countries came into existence in their present form between 1890 and 1910, as a result of the colonisation process in Africa. They attained independence from Britain in 1961, 1962 and 1963 respectively. Hence they have a similar political history and a heritage of British colonial rule, although Tanzania was under German rule before 1918.

The three countries also share similar local and regional ecological characteristics, as well as key natural resources such as freshwater lakes (Lake Victoria) and rivers, wildlife habitats and major landforms. Among these resources, Mt. Kilimanjaro and the Mara/Serengeti savannah grassland, with its wildlife and tourism potential, are shared by Kenya and Tanzania.

There are also many ethnic groups distributed throughout the region who share an indigenous social and cultural heritage. The present JACS East Africa report will focus on Kenya and Tanzania only. Key data on the two countries and on Uganda are presented statistically in Table 1.

Table 1

	Year	Kenya	Tanzania	Uganda
<b>Geography and social indicators</b>				
Surface (thousand sq. km)	2000	580	945	241
Total population (million)	2000	30.7	35.1	23.3
Annual population growth rate (%)	1990–2000	2.4	2.8	3
Urban population (% of total population)	2000	33	28	–
Annual urban growth rate (%)	1990–1995	6.2	6.5	5.6
<b>Development and economic indicators</b>				
GDP per capita, at purchasing power parities (USD)	2000	1,022	523	1,208
HDI rank (total 173)	2002	134	151	150
Human Poverty Index (% of population below poverty line)	1989–2000	42	51.1	35.2
Population in agriculture male / female (% of labour force)	1998–2000	20/ 16	–	–
Public expenditure on education / health (% of total public expenditure)	1995–1997/ 1998	6.5/ 2.4	–/ 1.3	2.6/ 1.9
Population with access to safe water / adequate sanitation (%)	2000	49/ 86	54/ 90	50/ 75
<b>Environmental indicators</b>				
Crop land per capita (hectares)	1997–1999	0.14	0.12	0.24
Area of severe soil degradation (% of country)	2000	30	25	53
Protected area (% of total surface)	1999	6.2	15.6	9.6
Energy consumption per capita (kilogram of oil equivalent)	1999	499	457	–

Some key indicators for the countries in the JACS East Africa.

Sources:  
UNDP, 2002;  
World Bank,  
2002a+b;  
FAO, 2000

## 5.2 Selection and explanation of core problems

### 5.2.1 Definition of syndrome contexts

In the case of the JACS East Africa, the three broad syndrome contexts were elaborated in order to reflect geographical diversity. This resulted in the following seven area-specific contexts:

- Urban and peri-urban areas:** (1) Urban and peri-urban areas (large and medium-size cities).
- Semi-arid areas in transition:** (2) Semi-arid areas with mixed use, irrigation and great economic and political disparities.
- (3) Semi-arid areas with encroaching agro-pastoralism practiced by marginalised smallholders.
- (4) Semi-arid areas with predominantly pastoralist use in the economic and political periphery.
- (5) Semi-arid areas that include protected areas and their surroundings.
- Highland-lowland areas:** (6) Mountains and highlands with a broad range of conflicting uses and stakeholders.
- (7) Areas of interaction between mainly productive highlands and semi-arid lowlands.

#### *Urban and peri-urban areas*

The urban and peri-urban syndrome context includes the large cities and medium-size towns in the JACS East Africa. These are areas that exhibit similar clusters of core problems relating to sustainability. In Kenya, they include cities like Nairobi, Mombasa and Kisumu, and medium-size towns such as Nakuru, Eldoret and Thika. In Tanzania the cities include Dar es Salaam and Mwanza, while the medium-size towns are Arusha, Moshi, Morogoro, Mbeya, Dodoma, Musoma, Iringa, Shinyanga and Tanga. The rest are considered rural towns and trading centres, and are included in relevant syndrome contexts.

*Semi-arid areas with mixed use and irrigation, and agro-pastoral areas*

The semi-arid areas with mixed rainfed and irrigation agriculture in the two countries cover approximately 25% (43% of which is in Kenya) of the total land area of about 1,527,746 km<sup>2</sup>. Despite their semi-arid characteristics, these areas are endowed with water resources, especially wetlands and river water traversing from the neighbouring highlands that allow for some irrigation. Otherwise, they are largely agro-pastoral. The areas include Dodoma, Singida, North Iringa and some parts of Arusha and Shinyanga in central Tanzania, and Morogoro (except Kilombero, Wami Basin and Ulugulu Mountains), Lindi and SW Mtwara in southern Tanzania. The Kenyan portions include districts in the south: Kajiado, Narok and Transmara. In the north and central rift valley the districts are Laikipia, Baringo, parts of Samburu, parts of Marakwet and West Pokot, and in the east parts of north and central Meru, Tharaka, Mbeere, Mwingi, Kitui, Machakos and Makueni. The entire coast is also included, except Tana River district, and some small parts of central Kenya.

*Semi-arid, pastoral protected areas and forest areas*

The semi-arid pastoral and protected areas, such as national parks and forest areas, are largely dominated by pastoral communities and used almost exclusively for livestock herding. In Tanzania, these areas include the northern and north-eastern plains, encompassing the Maswa Game Reserve, Mkomazi Game Reserve, Serengeti National Park and other dry Maasai plains in the north. The Kenyan parts include portions of Laikipia, Baringo, Nakuru, Kajiado, Narok, Transmara, Samburu, Meru North, Makueni, Mwingi, Marakwet and West Pokot. Other districts included are Marsabit, Isiolo and Turkana.

*Highland areas (mountains and highland-lowland interactions)*

The Mt. Kenya and Mt. Kilimanjaro regions are typical examples of highland-lowland systems, with resource-rich highland areas surrounded by vast resource-poor lowlands. Other mountains and highlands include the Aberdare ranges in central Kenya, and Mt. Elgon in western Kenya bordering Uganda. In Tanzania, these areas include Mt. Meru, the Eastern Arc Mountains and the Southern Highlands in Tanzania and their adjacent lowlands.

### 5.2.2 Selection of core problems

Based on these 7 syndrome contexts, a total of 34 core problems were defined and assigned to the 5 major scientific realms, which include political and institutional issues, socio-cultural and economic issues, population and livelihood issues, infrastructure and land use issues and bio-physical and ecological issues. These are presented in Table 2.

Table 2

Core problems and  
scientific realms.

Realms	Core Problems (CP)
Political & institutional	1. Conflicts, instability, lack of capacity and co-ordination among formal institutions
	2. Erosion and weakening of community-based and traditional institutions
	3. Inadequate and conflicting policies coupled with lack of implementation
	4. Insufficient grassroots and institutional empowerment, failures of governance
	5. Corruption and obstructive power structures
	6. Inequitable and inadequate allocation of power and resources
	7. Dominating and conflicting world views and ethical values
Socio-cultural & economic	8. Social and ethnic tensions
	9. Violent conflicts
	10. Great socio-economic and gender disparities
	11. Unused innovative capacities, knowledge and skills
	12. Incompatible and fragile economic systems with limited market and employment opportunities
	13. Dominance of the global economy over national economies
	14. Limited and inadequate essential social services and facilities
	15. Development constraints resulting from cultural norms and practices
Population & livelihoods	16. Rapid population growth, pressure and migration
	17. Increasing social and economic dependence
	18. High risks and vulnerability to disease (AIDS, epidemics, emerging diseases)
	19. Prevalence of poverty and insecurity of livelihoods
	20. Insecurity and rising crime rates (banditry, poaching)
	21. Violation of human rights and constraints on individual development potential

Realms	Core Problems (CP)
Infrastructure & land use	22. Inadequate sewage, sanitation and solid waste management
	23. Inadequate water supply systems and management
	24. Inadequate and insufficient infrastructure
	25. Rapid and haphazard physical growth and expansion of cities and settlements
	26. Inequitable access to suitable and adequate land
	27. Non-optimal productivity levels and inappropriate land use systems
	28. Conflicts of interest and use of protected areas
	Bio-physical & ecological
30. Land degradation	
31. Loss of biological diversity	
32. Environmental pollution	
33. Risks of natural and human-induced hazards and climate change	
34. Overuse of renewable and non-renewable natural resources	

### 5.2.3 Explanation of the main core problems

Not all 34 core problems defined by the JACS East Africa research activities carry the same weight in terms of magnitude in the different scientific realms. Thus in order to identify the main problems among these 34, the following criterion was used: all core problems with a score of 5–7 in at least 6 of the 7 syndrome contexts were considered major. In addition, core problems with a score of 7 in any of the syndrome contexts, even if in less than 6 cases, were also considered major. Using this criterion, a total of 9 main core problems were identified. These problems are elaborated below.

#### *1. Conflicts, instability, lack of capacity and co-ordination among formal institutions*

This core problem falls under the political and institutional realm. Rapid population growth in both rural and urban areas has placed insurmountable pressure on existing resources and facilities. Competition for available resources and services results in conflicts among users and in ethnic and cultural tensions that threaten social and political stability in the areas affected. Efforts to address these conflicts have been compromised by lack of institutional capacities to formulate and co-ordinate the implementation of effective resolution mechanisms. This calls for stepped-up resources to support mitigation research in this area.

### *2. Incompatible and fragile economic systems with limited market and employment opportunities*

Internally, people eligible for employment but not formally employed have resorted to self-employment in the informal job market, albeit with low-quality products and services, owing to lack of technological support and a culture of innovation. At the same time, employment opportunities are depressed because the urban economy lacks strategies on spatial policy that link changes in population distribution and structure with internal factors that influence urbanisation and location of employment centres in towns. For these reasons, urban systems are dominated by incompatible and fragile urban economic activities, aggravating an already severe urban poverty situation.

### *3. Prevalence of poverty and insecurity of livelihoods*

The problems of poverty and insecure livelihoods have become prevalent in both rural and urban environments, and are increasing rapidly. The proportion of Kenyans (in both rural and urban areas) living below the poverty line in 1997 was 52.6%, as against 1994, when the figure was 40.1% overall. In rural areas 53.1% of the population are poor. Poverty in urban areas has increased significantly, by 20.3%. Although poverty has always been considered a rural phenomenon, it is now obviously prevalent in urban areas as well (GoK, 2000a). Rural areas continue to depend on agricultural production systems that are subject to the vagaries of weather. The urban poor, on the other hand, engage in the so-called informal trade, where the market is characterised by previously biased demand and the operating environment is generally not enabling. The situation in Tanzania is no better. Thus there is a need to continue supporting research in this area in order to identify effective ways of mitigating problems in both rural and urban areas.

### *4. Inequitable access to suitable and adequate land*

The issue of equitable distribution of productive land has featured prominently in debates on land reform in Kenya over the years. The current framework of land policy and legislation provides, among other things, for private ownership of land, with exclusive rights of ownership and use reserved for individuals or corporate entities. This makes for very inequitable access to land. Scarcity of land has also led to the problem of landlessness in some areas, especially those adjacent to protected areas such as national parks. The main question, therefore, is how to institute appropriate reform measures to ensure land redistribution in order to address the problems associated with inequitable access to suitable and adequate land. This applies as well to

Tanzania. Research that contributes to solutions to this problem will be a step in the right direction.

#### *5. Conflicts of interest and use of protected areas*

Past management practices and the corresponding policy and legislative framework for protected areas in East Africa alienated communities from the use of resources in these areas, resulting in conflicts between these communities and the authorities. Similarly, the nature of use in the adjacent areas (mainly agricultural) conflicted with use in areas where wildlife was protected, especially where agricultural land falls within the main dispersal corridors. However, this trend has been changing over time, and community-based conservation initiatives have emerged. Yet even after more than a decade of implementation of such initiatives, many have failed to incorporate local communities into the management systems, largely because of problems stemming from weaknesses in project design and implementation. Hence there is a need to support further research in these areas in order to help formulate better project designs and propose workable implementation approaches.

#### *6. Inadequate sewage, sanitation and solid waste management*

The 7 syndrome contexts are characterised by inadequate and malfunctioning sewage and sanitation facilities, not to mention the absence of effective solid waste management systems. As a matter of fact, in semi-arid pastoral areas, such facilities are lacking altogether. In urban areas, increased incidences of frequent flooding, inability to manage urban solid waste and the widespread lack of effective sewage systems have made health problems worse. Thus the significance of these facilities in terms of health cannot be overemphasised. This is a reason for continued mitigation research.

#### *7. Inadequate water supply systems and management*

The goal of the Kenyan government to supply water to every household in rural areas has remained a dream since it was stated at the beginning of the 1970s (see also various government policy documents and National Development Plans). Instead, the past decades have witnessed increasing deterioration of existing water supply systems, owing to vandalism and poor management. As a result of growing demand for more owing to population increase, already dilapidated supply systems have been rendered inadequate. Given limited water resources, especially in semi-arid areas, the available options for exploiting untapped potential, especially in rainwater

harvesting, need to be aggressively explored. Strategies to divert the ever-growing demand for irrigation water are also necessary (Kiteme et al., 1998; Wiesmann, 1998; Wiesmann and Kiteme, 1998). Overall water supply management approaches must be reviewed in order to help improve the current situation. Research to support these initiatives is imperative.

#### *8. Loss of biological diversity*

Continued heavy disturbance of areas in Kenya and Tanzania known for great biological diversity, through poaching/hunting and encroachment for incompatible uses such as agriculture, logging and other human activities, have led to loss of biodiversity of both flora and fauna. For example, recent studies have shown that some important wood species such as *Ocotea usambarensis*, *Juniperus procera*, *Podocarpus* spp. and *Olea* spp. are particularly threatened on Mt. Kilimanjaro and Mt. Kenya (Emerton, 1995). Animal species are also affected, as revealed in a survey done by Milner (1993), which was unable to trace any Bushbuck (*Tragelaphus scriptus*) in the Embu-Kirinyaga region, suggesting that they may have been hunted to extinction owing to the attractive prices they command.

Similar trends in loss of biological diversity have been reported in semi-arid areas in transition, especially in protected areas and other areas that are well endowed with natural resources. Concerted efforts will be required to reverse these worrying trends, and research in these areas could make a significant contribution towards achieving the desired outcomes.

#### *9. Overuse of renewable and non-renewable natural resources*

There is increasing concern about the adequacy of the natural resource base of countries in East Africa. This concern stems from the increasing overuse of both renewable (forestry, fisheries, related water systems and agriculture) and non-renewable (minerals) resources, triggered by the growing demand for local, national and export markets, as well as escalating competition for control by different user groups. Recent developments such as the policy shift in Tanzania, whereby foreign companies were invited to invest in the mineral mining sector (e.g. gold), are likely to aggravate the situation if not well implemented. Hence there is a need for continued research in this area to provide information on appropriate policy intervention to address the associated problems.

## 5.3 Status and dynamics of core problems

### 5.3.1 Urban and peri-urban areas

#### *Political and institutional issues*

The core problem in the urban and peri-urban context in this realm is the lack of a comprehensive urban land use policy and a complete absence of political will on the part of the government to formulate and implement such a policy. Secondly, both the local and central governments lack the capacity to facilitate planning and influence management of development and transformation. Inter and intra-institutional relations are weak as a result of competing rather than complementary power relations, occasioning institutional inertia in terms of political accountability.

Because of poor urban governance, civil society institutions and individuals are excluded from decision-making processes. Furthermore, the municipal authorities are denied the requisite scope to formulate and implement legitimate planning and management policies dealing with resources. Problems of governance at the national level have become entrenched by forms of political organisation that make political office dependent on ethnic and personal considerations (Balogun, 1998). This stifles civil culture by personifying state power and local institutions, and has resulted in serious conflicts involving central and municipal governance.

Urban planning and development practices in East Africa have long been based on improper land use planning policy and characterised by a lack of urban development policies. The Strategic Structure Plan (SSP) for Nakuru (Kenya) in 1998, and the Strategic Urban Planning Framework (SUPF) for Dar es Salaam (Tanzania) in 1999, are the most recent attempts by the respective governments to revise urban planning and development policies in the urban areas concerned. Furthermore, these were prepared as part of the two countries' participation in the implementation of the Habitat II Agenda in East Africa (Mwangi, 1997; Dar es Salaam City Council, 1999). Prior to this initiative both cities had relied on plans prepared in the 1970s.

These political problems have ultimately suppressed the requisite ethics for sustainable urban planning and development. Formal and informal actors continue to unduly influence the process of physical organisation and local economic development through the least transparent administrative decisions in land allocation, piecemeal urban land subdivision schemes in public

and freehold land, and corrupt practices of enforcing land use and development requirements.

*Socio-cultural and economic issues*

Urban and peri-urban development issues are intricately linked to a dichotomy of issues relating to economic production and employment. There are no demonstrable municipal economic policies and programmes to enable economic partnerships among councils and investors that would create more employment opportunities (Peterson, 1994). Those eligible for employment but not formally employed have resorted to self-employment in the informal job market, albeit with low-quality products and services, owing to lack of technological support and a culture of innovation. At the same time, employment opportunities are depressed because the urban economy lacks strategies on spatial policy to link changes in population distribution and structure with internal factors influencing urbanisation and location of employment centres in towns. For these reasons, incompatible and fragile urban economic activities dominate urban systems and have made already severe urban poverty even worse.

*Population and livelihood issues*

Throughout the 1980s and 1990s the urban population in the two countries increased rapidly, greatly constraining social service delivery systems, especially in housing, health, education, recreation and supply of clean water. The rise in unemployment as a result of this high population growth (especially rural-urban drift) and retarded overall economic growth have in turn resulted in widespread poverty and extreme economic disparities among the people living in these urban areas. As the effects of poverty bite deep, illicit strategies, adopted as coping mechanisms, become manifest among the affected groups in the form of severe problems of insecurity and a rise in crime rates. The result is a near total breakdown of formal and indigenous social and support networks. Community policing initiatives have not been fully established, while the high level of unemployment has reduced the productivity of urban social systems. This is evident in increasing numbers of street dwellers (children, beggars and the mentally retarded), single mothers and homeless persons. These outcomes contradict the essence of the Habitat Agenda and commitments to poverty reduction and unemployment (Okpala, 1996). Following the withdrawal of national public health care services, and given the lack of a strong private sector to manage health care, most people in urban and rural areas have very limited access to curative and preventive health facilities and services and health information, and live in poorly con-

structed structures without proper ventilation and sanitation facilities. Increased incidences of frequent flooding, inability to manage urban solid waste and a widespread lack of effective sewage systems have aggravated urban environmental health problems (Lee-Smith, 1989). More than ever before, the urban population is thus continually exposed to high risks and vulnerable to disease.

#### *Infrastructure and land use issues*

The main infrastructure and land use problems are associated with haphazard decisions taken by the government to expand municipal council boundaries and elevate lower level councils to higher levels, without a corresponding increase in funding for development of infrastructure and services such as solid waste management, water supply, drainage and roads, and mortuaries. Most of these are either inadequate or poorly maintained and therefore not operational. This has created unplanned, indefinite limits in peri-urban areas (Kulaba, 1989), occasioning serious land use conflicts. Other associated problems include inadequate distribution and provision of other essential utilities such as recreational and burial sites.



Fig. 3  
 Peri-urban growth around Nairobi, posing major challenges for planning and for the development of infrastructure, services and communities.  
 Photo: Urs Wiesmann, 2001

*Bio-physical and ecological issues*

Poorly planned and unplanned urban development further underscores the increased incidence of environmental pollution in the forms of air, water, soil and noise pollution. Major parts of urban areas are without reticulated sanitation, have poor drainage and lack functioning solid waste disposal mechanisms to cope with unusually high-density urban settlements. While poor urban drainage systems lead to frequent flooding, poor urban solid waste management causes serious water pollution, especially during floods. Urban wetlands are especially heavily polluted (Fig. 3) because they are often seen as repositories for waste disposal.

Improper planning and inadequate land allocation in urban areas are also responsible for the disappearance of urban wetlands and loss of biodiversity. In recent years the Msimbazi Wetland in Dar es Salaam has rapidly changed from a natural habitat to a settled industrial and agricultural area.

**5.3.2 Semi-arid areas, mixed use and irrigation, and agro-pastoral areas**

*Political and institutional issues*

The arid and semi-arid lands (ASALs) have continued to deteriorate in terms of overall economic development, despite deliberate efforts to introduce appropriate sector-oriented policy interventions. This is largely because the present policy and institutional framework for development of these areas is still overcrowded, to the extent that most programmes are implemented against a backdrop of unco-ordinated and conflicting policies. Furthermore, frequent reformulation and reshuffling of the institutions responsible, coupled with inadequate capacity and high turnover of professional and technical staff, have made efficient and effective implementation of these policy instruments a daunting task.

Participation by local communities in development has remained passive and inactive, due to poor empowerment: these communities are characteristically poor, with low literacy levels and below-average income. They are engaged in naturally marginalised and insecure livelihood systems and are therefore highly vulnerable to famine and political manipulation as they struggle to survive.

*Socio-cultural and economic issues*

Competition for scarce resources due to rapidly growing populations and the resultant high demand in semi-arid areas has in turn resulted in intensified resource use conflicts, especially conflicts related to water scarcity, particularly during the prolonged dry season in these areas. Resource conflicts more often than not awaken latent conflicts, which tend to remain dormant as long as all is well. In most cases these resource use conflicts take the form of social and ethnic conflicts (Kiteme and Gikonyo, 2002).

In areas where large-scale irrigation is practised, e.g. for rice, with a labour force comprised of people from different ethnic backgrounds, breakdown of social norms has been on the increase.

Communities in semi-arid areas are also characterised by socio-cultural practices and political and institutional structures that promote gender and socio-economic disparities between different social strata. These are manifested in terms of disparities in income and access to income, access to and control of resources (especially land and livestock), and discriminatory decision-making and resource-sharing processes especially disadvantageous to women.

*Population and livelihood issues*

Communities in the semi-arid areas depend largely on marginalised and insecure livelihood systems. Subsistence crop production constitutes the primary source of livelihood. In areas where irrigation agriculture is possible, fruit cultivation and horticulture focus mainly on local trading centres. Livestock constitutes the secondary source of livelihood; the main types are local breeds of shoats, cattle and donkeys. In the northern and eastern semi-arid areas of Kenya, livestock production is threatened by high rates of cattle rustling. These activities are very vulnerable to drought, which means that food deficits are virtually permanent. Consequently, communities in these areas are characteristically poor, as manifested by low levels of income, malnutrition, poor health and lack of access to essential social services and infrastructure. Most of the coping mechanisms, such as small-scale trade and bee keeping, are subject to the performance of farming activities, or are illicit (charcoal burning) because they contribute to environmental degradation. In this situation, communities have become highly (and almost perpetually) dependent on external relief – indeed there is a marked culture of dependency here.



Fig. 4  
Recurrent poor  
crop performance  
in marginal areas  
has compromised  
local efforts to  
enhance food  
security.

Photo: Urs

Wiesmann, 1992

In areas where irrigation schemes have been established and livelihood systems greatly enhanced, there has been a marked increase in transmission of infectious diseases such as diarrhoea, dysentery, cholera, typhoid, skin and eye diseases, filariasis and dengue fever, among others. Furthermore, many government-established irrigation schemes are riddled with major land use conflicts resulting from displacement of people and their traditional land use systems.

#### *Infrastructure and land use issues*

Physical infrastructure (water supply systems, communication and sanitation facilities) in the semi-arid areas of East Africa is in a largely deplorable condition. To date, use of unsafe sanitation (pan/bucket, uncovered pit latrine and bush) or lack of it (20% of the households) in the ASALs is still rampant (GoK, 2000b, 2000c). Furthermore, urban sanitation systems (flushing toilets) are, in many rural towns and centres, real health hazards due to inadequate water supply. Similarly, the available water storage and supply systems are not adequate to satisfy current demand for water in these



Figs. 5 and 6  
The problem of  
water scarcity:  
Exploring the rain-  
water harvesting  
options of rock  
catchments and  
subsurface dams.

Photos:  
Urs Wiesmann,  
1992,  
Hanspeter Liniger,  
1993

areas, either for domestic purposes or livestock, let alone for irrigation. There is a need to develop the infrastructure to address these problems, especially poor delivery of water for domestic use.

#### *Bio-physical and ecological issues*

Prevailing rainfall characteristics are largely responsible for the moisture deficit conditions in semi-arid areas. This makes rainfed agriculture difficult, leading to frequent crop failure and recurrent famines. Inadequate and unreliable rainfall also implies inadequate availability of water resources. Therefore, communities in these areas depend largely on shallow wells in the dry riverbeds and subsurface dams for the better part of the year. The potential for groundwater utilisation is limited by the high costs of drilling and maintenance, and by water quality and quantity.

The problem of land degradation has reached alarming proportions in semi-arid areas. Population growth has resulted in high rates of devegetation, as more land is cleared for settlement and cultivation. Loss of vegetation cover as a result of ensuing land use changes exposes the soils to the agents of erosion. Land degradation is also evident in the semi-arid areas where irrigation agriculture has long been practised, especially where water with high salinity levels is used, coupled with use of inefficient drainage reticulation systems. Moreover, prolonged use of agro-chemicals in irrigation schemes has resulted in serious chemical pollution affecting soil and water in the irrigated areas.

### **5.3.3 Semi-arid pastoral areas, protected areas and forested areas**

#### *Political and institutional issues*

Until the 1990s, semi-arid pastoral areas suffered from insufficient state funding because they were considered 'unsuitable and unable' to contribute meaningfully to national economic development. The effects of these prejudicial tendencies by the authorities continue today in the form of policies inadequate to guide development activities and lack of empowerment of local communities, which would allow them to participate effectively in decision-making processes. However, this has changed over the years, and laudable efforts by the government and other development agents have now been made in programmes initiated to support development activities in these areas, albeit with the problem of lack of horizontal and vertical co-ordination among and between implementing institutions. The net results are duplication of effort and creation of undesired impacts.



Domestic tourism is grossly underdeveloped, largely owing to lack of policies to promote it. This has greatly restricted the participation by most local residents to entertaining foreign tourists and producing curios in the form of carvings for sale to visitors.

*Socio-cultural and economic issues*

Semi-arid pastoral areas are characterised by limited economic options. The leading economic enterprise, livestock production, is below optimum level due to lack of access to livestock markets and related infrastructure, among other serious problems such as disease and drought. In cases where commu-

Fig. 7  
Heavily degraded  
lands in Muko-  
godo, Laikipia,  
Kenya. Photo:  
Urs Wiesmann,  
2003

nities are able to generate good livestock proceeds, they are imprudently utilised owing to lack of alternative opportunities for re-investment.

Facilities to cater for provision of education and health services in these areas have remained largely inadequate and in some areas quite inaccessible. Therefore, education and health standards in these areas are still very poor, as reflected in high mortality rates, the high incidence of disease (25 %), low secondary school enrolment rates (19%), and high adult illiteracy rates (30%) (GoK, 2001). Consequently, a large proportion of the active labour force is highly unproductive because of poor health and low levels of education. This leads to low levels of individual empowerment, participation and development, and an inability to realise the full personal potential to gain maximum benefits from available opportunities. These factors combine to greatly limit individual and societal innovative capacities. Furthermore, communities in these areas have remained largely tied to their tradition-bound cultural practices, which are gender-discriminative and therefore impact negatively on sustainable resource use and management in these areas. The desire to involve local communities in the conservation of protected areas has been stepped up in the recent past against the backdrop of resources inadequate to police and manage these areas. There are, however, serious challenges arising from the inequitable manner in which the costs and benefits of conservation are currently shared. The conservation authorities continue to reap disproportionately huge benefits at the expense of the local communities.

#### *Population and livelihood issues*

The problem of inadequate water supply in semi-arid areas with mixed agro-pastoral activities and irrigation agriculture has been elaborated elsewhere in the present report. The situation is much worse in semi-arid pastoral areas. Watering facilities become concentration points for human settlement and associated land use systems, leading to localised population pressure and resulting land degradation.

Health problems associated with the lack of safe sanitation, especially in human waste disposal, are very evident. A high percentage of pastoral communities dispose of human waste in open bushes in the backyard of their *manyattas*. This waste becomes a major contaminant in run-off water that collects at various public consumption points once the rains come, and leads to serious outbreaks of water-borne diseases.

Poverty is another serious problem facing the communities living in semi-arid pastoral areas. It is indeed the cause, as well as the effect, of marginalised and insecure livelihood systems in these areas. Pastoralists depend largely on livestock production, which is subject to adverse weather and problems of insecurity such as banditry and cattle rustling. Poverty also fosters a mentality of dependence, sometimes resulting in misdirected priorities, thereby increasing great vulnerability to drought and famine. Poaching, although not so pronounced, is also experienced in isolated cases within the protected areas and presents a major security concern in the affected areas.



Fig. 8  
Livelihoods in marginal areas have to cope with the contrasts between local traditions and modern influences.  
Photo: Urs Wiesmann, 2003

#### *Infrastructure and land use issues*

Semi-arid pastoral areas are at times described as 'remote areas' to insinuate the general paucity of appropriate infrastructure. These areas are almost completely disconnected from other parts of the country. People walk long distances (10–15 km or more) on foot for services that are not even guaranteed. Donkeys and camels are the main means of transport for goods, young children and sick people.

In the midst of these poorly served areas are national parks and reserves, which are characterised by over-construction of tourist facilities, resulting in serious environmental pollution and degradation, especially in areas where disposal and rehabilitation initiatives do not exist.

Changing economic lifestyles and increasing population pressure in these areas have led to an increase in sedentary agriculture, bringing with it inappropriate land use practices such as crop production. There is encroachment on grazing and wildlife areas for agriculture, leading to pasture shortages. There is a gradual shift to agriculture as a coping strategy by pastoral communities. However, the marginal conditions in these areas cannot sustain agricultural production, resulting in low levels of productivity.

*Bio-physical and ecological issues*

The core problems identified in this realm include loss of biological diversity, lack of energy for consumption, soil degradation, lack of water, floods, fires and pollution due to military and mining activities, forest degradation and desertification.

**5.3.4 Highland-lowland areas (mountains and highland-lowland interactions)**

*Political and institutional issues*

The existence of multiple stakeholder institutions supporting sector-based intervention programmes for management of mountain resources has resulted in the formulation of sector-specific policies and less stakeholder participation, leading to conflicts of interest. Even with these policies in place, implementation has been lacking due to poor co-ordination and insufficient financial and human resources. Lack of effective participation by local communities has greatly contributed to erosion and weakening of hitherto effective community-based and traditional institutions. This has resulted in great inefficiencies and inequitable distribution of costs and benefits. In response, local communities are compelled to over-exploit and degrade their environment. Corruption is another big problem that has accelerated the degradation of forest resources in the two countries.

*Socio-cultural and economic issues*

Despite the resource endowment of mountains and highland areas, marketing infrastructure is poorly developed. Post-harvest losses of perishable fruits and vegetables are high due to skewed production patterns unrelated to



patterns of demand. Employment opportunities are limited. Land shortage is constraining employment in the agricultural sector, which is the main economic base. Local communities are not allowed to obtain resources from protected areas except for fodder, which is obtained by permit. Thus most of the population, who are largely smallholders, are concentrated in the upper and middle parts of the catchments. These tenure arrangements have encouraged encroachment into the forests and introduction of illicit activities by communities in adjacent areas (Lambrechts et al., 2002; Gathaara, 1999). The result is conflict between these communities and the government authorities. Violent conflicts between farmers and pastoralists are common in the lowlands where, because of immigration from the highlands, pasture and water resources are constrained as grazing lands are converted to agricultural lands and demand for water for irrigation increases tremendously.

#### *Population and livelihood issues*

The high population densities in the mountains and highlands of East Africa have created enormous pressure on resources (Liniger et al., 1998), especially land, leading to land fragmentation and land scarcity. This in turn causes a considerable out-migration to the adjacent lowlands, which are relatively marginal. Farm sizes on the mountain slopes vary from 0.3 ha to 0.5 ha, while in the marginal lowlands they increase up to about 4 ha.

Poverty is a problem for mountain people despite the resource endowment of mountain areas. It is manifested in many dimensions – social, economic and political. Many of the poor depend on agriculture as a source of livelihood, and on land and water for success. Owing to limited opportunities for diver-

Fig. 9  
The highland-lowland system of Mt. Kenya covers several ecological belts that are being used by a broad range of stakeholders.

Photo: Urs Wiesmann, 1990

sification and the scarcity of land and water that can support agriculture, this livelihood system has become marginalised and insecure and therefore non-sustainable.

#### *Infrastructure and land use issues*

The high population densities described above have also created enormous pressure on resources, especially land, leading to non-sustainable sub-division and fragmentation of the land. Parcels of land have been reduced to small sizes, which are uneconomical and cannot support a household. As already noted, many farmers own small plots of land, while others are landless. This results in inequitable access to suitable and adequate land.

Because of their favourable natural setting, these areas are intensively used for crop production. Many farmers have adopted inappropriate land use management practices, with cultivation being undertaken on slopes with gradients above 50% and no terraces. Cultivation has also been extended to riverbanks, leading to erosion due to removal of trees.

The sustainability of mountain areas is becoming increasingly compromised due to deterioration of mountain land use systems and declining productivity. Poor land husbandry has led to erosion, declining soil fertility and land degradation, which have in turn led to declining crop yields, increased food insecurity and dependence on forest resources for livelihoods.

#### *Bio-physical and ecological issues*

Over-exploitation and destruction of forests through harvesting of natural hardwood for timber, cutting of trees for firewood, charcoal production, encroaching agriculture and fire have resulted in deterioration and loss of trees and forest habitat throughout the montane forests, culminating in serious loss of forest biodiversity (Lambrechts, 2000).

Deforestation and changes in forest structure have also led to inadequate availability and scarcity of water in mountain regions. Land degradation is also evident (Liniger et al., 1998). Other areas of concern in the mountains are the high risk of natural and human-induced hazards such as earthquakes and landslides and, recently, the effects of climate change, which are believed to be responsible for receding glaciers on Mt. Kilimanjaro.

## 5.4 Synopsis and syndrome contexts

The present chapter presents a synopsis of evaluation and weighting of the core problems described in Chapter 5.3. Core problems were evaluated in order to determine the level of magnitude and severity in each of the syndrome contexts. Weightings ranging from 1 to 7 were attached to each problem, with 7 signifying the worst-case scenario at the global scale. The results are summarised below.

### 5.4.1 Political and institutional realm

From Table 3 it can be observed that there are 7 core problems identified in the political and institutional realm. Except for the problem of eroding and weakening of community-based and traditional institutions, the core problems impact more heavily on the urban and peri-urban context than on the other syndrome contexts. The problems of conflicts, instability, lack of capacity and co-ordination among formal institutions, including erosion and weakening of community-based and traditional institutions, cut across all

Table 3

Core problems	Syndrome contexts							
	1 Urban and peri-urban	2 Semi-arid areas		3 Semi-arid areas		4 Highland-lowland		
		Mixed irrigation	Agro-pastoral	Pastoral	Protected areas	Mountains	Highland-lowland interactions	
1. Conflicts, instability, lack of capacity and co-ordination among formal institutions	6	5	5	5	5	5	5	
2. Eroding and weakening of community-based and traditional institutions	3	5	5	5	6	4	6	
3. Inadequate and conflicting policies coupled with lack of implementation	6	4	4	5	4	4	4	
4. Insufficient grassroots and institutional empowerment; failures of governance	5	4	4	5	2	6	6	
5. Corruption and obstructive power structures	6	3	3	2	6	6	5	
6. Inequitable and inadequate allocation of power and resources	5	3	5	5	2	3	5	
7. Dominating and conflicting world views and ethical values	6	2	2	2	4	4	2	

Political and institutional realm.

the syndrome contexts, more or less at the same magnitude. The highland-lowland context is plagued by bad governance and minimal community participation in the management of natural resources, especially in protected areas, as well as by corruption and power structures that hinder sustainable use of ecosystems.

### 5.4.2 Socio-cultural and economic realm

In the socio-cultural and economic realm, 8 core problems were identified, as presented in Table 4. From the table it appears that, with a few exceptions, the core problems are not heavily weighted over the syndrome contexts. The urban and peri-urban syndrome context is close to the worst-case scenario in terms of incompatible and fragile economic systems with limited market and employment opportunities, dominance of the global economy over national economies, and limited and inadequate essential social services and facilities. Similarly, the semi-arid syndrome contexts are seriously affected by the problems of social and ethnic tensions, which at times result in violent

Table 4

Socio-cultural and  
economic realm.

Core problems	Syndrome contexts							
	1 Urban and peri-urban	2 Semi-arid areas		3 Semi-arid areas		4 Highland-lowland		
		Mixed Irrigation	Agro-pastoral	Pastoral	Protected areas	Mountains	Highland-lowland interactions	
8. Social and ethnic tensions	4	5	6	6	4	3	5	
9. Violent conflicts	5	5	6	6	4	3	6	
10. Great socio-economic and gender disparities	4	4	4	5	2	4	5	
11. Unused innovative capacities, knowledge and skills	4	2	3	3	2	3	4	
12. Incompatible and fragile economic systems with limited market and employment opportunities	6	6	6	6	3	5	5	
13. Dominance of the global economy over national economies	6	5	3	3	4	2	2	
14. Limited and inadequate essential social services and facilities	6	5	5	6	3	4	5	
15. Development constraints resulting from cultural norms and practices	2	4	4	6	3	3	4	

conflicts over scarce natural resources. The highland-lowland syndrome context is least affected by these problems.

### 5.4.3 Population and livelihood realm

With the exception of the problems of rapid population growth, pressure and migration on the one hand, and prevalent poverty and livelihood insecurity on the other, which seem to cut across the syndrome contexts, most problems are concentrated in the urban and peri-urban areas and semi-arid areas with irrigation, and areas with mixed, agro-pastoral and pastoral uses (Table 5). Understandably, the urban and peri-urban syndrome context is greatly affected by almost all the core problems in this realm. Some clusters of these core problems also considerably affect the highland-lowland syndrome context areas.

Table 5

Core problems	Syndrome contexts							
	1 Urban and peri-urban	2 Semi-arid areas		3 Semi-arid areas		4 Highland-lowland		
		Mixed irrigation	Agro-pastoral	Pastoral	Protected areas	Mountains	Highland-lowland interactions	
16. Rapid population growth, pressure and migration	6	5	5	4	1	6	6	
17. Increasing social and economic dependency	5	5	5	6	4	4	5	
18. High risk and vulnerability to disease (AIDS, epidemics, emerging diseases)	6	5	5	6	4	4	5	
19. Prevalent poverty and livelihood insecurity	6	6	6	6	1	5	6	
20. Insecurity and rising crime (banditry, poaching)	6	4	4	5	5	4	4	
21. Violation of human rights and constraints on individual development potential	4	4	4	4	4	4	4	

Population and livelihood realm.

### 5.4.4 Infrastructure and land use realm

In the realm of infrastructure and land use (Table 6), 7 core problems hinder sustainability in the 7 syndrome contexts. The problems are present at varying magnitudes in the respective syndrome contexts. In some cases the worst-case scenario is at the global level.

The urban and peri-urban and the semi-arid areas with mixed farming, irrigation and agro-pastoral uses are significantly affected by the problems of inadequate sewage, sanitation and solid waste management. Equally problematic in the two context areas is water supply systems and management. These clusters of problems have the greatest order of magnitude in the semi-arid areas under pastoralism, therefore presenting the worst-case scenario at the global scale.

The mountains and highland-lowland syndrome context areas are grappling with the problem of inequitable access to suitable and adequate land, conflicts of interest and use of protected areas, and non-optimal productivity levels and inappropriate land use systems.

Table 6

Infrastructure and  
land use realm.

Core problems	Syndrome contexts							
	1 Urban and peri-urban	2 Semi-arid areas		3 Semi-arid areas		4 Highland-lowland		
		Mixed irrigation	Agro-pastoral	Pastoral	Protected areas	Mountains	Highland-lowland interactions	
22. Inadequate sewage, sanitation and solid waste management	6	5	5	7	5	4	4	
23. Inadequate water supply systems and management	6	6	6	7	3	4	5	
24. Inadequate and insufficient infrastructure	4	5	5	6	3	4	5	
25. Rapid and haphazard physical growth and expansion of cities and settlements	6	4	4	4	4	4	4	
26. Inequitable access to suitable and adequate land	5	5	5	6	2	6	5	
27. Non-optimal productivity levels and inappropriate land use systems	4	5	5	4	2	5	5	
28. Conflicts of interest and use of protected areas	5	3	5	6	6	5	5	

### 5.4.5 Bio-physical and ecological realm

There are 6 core problems related to the bio-physical and ecological realm, as outlined in Table 7. The urban and peri-urban context is not so greatly affected by these problems, save for the area of environmental pollution. The semi-arid areas with mixed irrigation and pastoral uses are faced with the problems of inadequate availability of freshwater, land degradation and serious loss of biological diversity. These problems, together with over-use of renewable and non-renewable natural resources, are also prominent in the highland-lowland syndrome context areas.

Table 7

Core problems	Syndrome contexts						
	1 Urban and peri-urban	2 Semi-arid areas		3 Semi-arid areas		4 Highland-lowland	
		Mixed irrigation	Agro-pastoral	Pastoral	Protected areas	Mountains	Highland-lowland interactions
29. Inadequate availability of freshwater	3	6	6	6	2	1	6
30. Land degradation	1	6	6	6	4	6	6
31. Loss of biological diversity	5	6	5	5	5	6	6
32. Environmental pollution	6	4	2	4	4	4	5
33. Risks of natural and human-induced hazards and climate change	5	3	3	4	5	4	4
34. Over-use of renewable and non-renewable natural resources	3	5	5	5	5	6	6

Bio-physical and ecological realm.

## 5.5 Research status and focus

### *Overview of research proposals*

Overall, 65 different research themes were formulated by the think tank meeting held in Nanyuki in May 2001. The distribution of the proposed themes was as follows: Urban and peri-urban (25); Semi-arid/mixed irrigation and agro-pastoral (16); Semi-arid/pastoral and protected areas (8); and Highland-lowland (16). After the research themes were formulated they were ranked according to criteria of importance and urgency, in order to develop a priority list. Table 8 presents the themes that received first priority.

Table 8

Research themes with highest priority.	Contexts	Research themes
	Urban and peri-urban	1. Ongoing conflicts and the capacity of existing political institutions to address these conflicts
	Semi-arid (mixed irrigation and agro-pastoral)	1. Promoting farmer innovations for improved food security in arid and semi-arid lands (ASALs) 2. Institutional arrangement for community participation in rural development 3. Negotiation strategies between pastoralists and agro-pastoralists 4. Water use conflicts and resolution mechanisms 5. Strategies to enhance food security in ASALs
	Semi-arid (pastoral and protected areas)	1. Community awareness creation in the use of renewable resources 2. People's perceptions of gender roles in sustainable resource management in ASALs 3. Promotion of multiple land use in protected areas 4. Developing appropriate management systems for equitable cost and benefit sharing in protected areas 5. Local level initiatives for combating desertification and mitigating drought in ASALs
	Highland-lowland	1. Capacity building in natural resource management 2. Prevalence of poverty and livelihood insecurity

### **5.5.1 Research focus in the urban and peri-urban syndrome context**

*Ongoing conflicts and the capacity of existing political institutions to address these conflicts*

In the recent past the scene in major cities has been characterised by growing tensions and conflicts, whose origins can be traced to political, social, cultural and even economic causes. The manner in which these conflicts begin and spread unabated calls into question the ability of existing institutions to address them effectively. To date, there has been no research with respect to these issues; hence the high priority accorded to this theme.

### **5.5.2 Research focus in the semi-arid (mixed irrigation and agro-pastoral) syndrome context**

*Promoting farmer innovations for improved food security in ASALs*

The question of food security in the arid and semi-arid areas, especially with mixed use and irrigation practices, has long been a major problem. Various strategies have been tried and studies have been conducted to support the implementation of such strategies in order to improve the situation. Major work in this area done in the 1990s includes Adaptive Strategies of the Poor in Arid and Semi-Arid Lands (1994–95) by the International Institute for Sustainable Development (IISD), and Promoting Farmer Innovations (PFI) (1995–2000) in Kenya under the UNDP UNSO initiative.

*Institutional arrangement for community participation in rural development*

The term “community participation” (and debates associated with it) became fashionable among rural development agents and a catchword in donor circles throughout the 1980s and 1990s, to the extent that any proposal that did not feature the term stood little chance of acceptance. Unfortunately, while heavy investments were made in the name of community participation, very little effort was made to provide insight into the most pertinent questions about how to make it effective, in terms of institutional arrangements: the capacity of the communities in question; the policy and legislative framework necessary for an enabling environment; government institutions and their respective organisational structures (level of flexibility and accommodation); and monitoring and evaluation mechanisms, among others. The focus of research on this theme will be to address these issues in order to streamline the process of community participation and maximise the benefits associated with it.

### *Negotiation strategies between pastoralists and agro-pastoralists*

More often than not relations between pastoralists and agro-pastoralists are dominated by conflicts related to resource use (water and pasture). Several studies have been carried out to address these conflicts by providing a platform where negotiations for win-win solutions can be realised. In association with a study to develop a multi-level multi-stakeholder strategy for water resources conflict management (Kiteme, 2002), Water Users Associations were formed in the Ewaso Ngiro north subcatchments. These have proved to be effective negotiation platforms for resolving conflicts related to water use in the catchment (Wiesmann et al., 2000; Kiteme and Gikonyo, 2002). Fisher (1992) has also done research on consensual negotiations (conflict resolution, alternative conflict management, alternative dispute resolution [ADR], principled negotiation and conflict transformation) as an effective approach to conflict management. More research is needed, however, to help identify and promote negotiation strategies between these two communities for long-lasting conflict management solutions.

### *Water use conflicts and resolution mechanisms*

The implications of the conflicts discussed above are quite undesirable – loss of both humans and livestock. Even greater cause for concern is the fact that these conflicts have continued to intensify where they existed and have become evident in new areas. Therefore, the search for ways to minimise such conflicts, and for effective resolution mechanisms, has continued over the years. Greater efforts are still required in this direction, which is the reason this research theme received high priority during the SPSP workshop.

A considerable amount of work has been done in the two basins in the past decade. Mujwahuzi (2001), Kiteme (2000, 2002), Kiteme and Gikonyo (2002), Wiesmann et al. (forthcoming), and Wiesmann (1998) have looked at water use conflicts in both the Pangani and Ewaso Ngiro north basins, focusing on the various situations triggering conflicts in the two areas. The following have been identified as the main causes of conflicts: competition for scarce water resources, unmet expectations, needs and interests, unequal power or authority, differences in organisational status and influence, and jurisdictional ambiguities, among others. Different types of conflicts were found to exist in the basins. These include conflicts between small-scale and large-scale irrigators and upstream and downstream riparian irrigators, conflicts involving domestic water use and other uses, industrial vs. environmental use, agricultural vs. industrial use, and donors supporting different projects that depend on water as the main input in the production process.

### *Strategies to enhance food security in the ASALs*

Together with research focusing on strategies to promote farmer innovations and community empowerment (see discussions under research theme (1) above), more work has been done on the development of improved rainfed cropping systems incorporating rainwater harvesting (RWH)/conservation. In Tanzania, for example, between 1992 and 1999, a collaborative initiative between Sokoine University of Agriculture (SUA) and Newcastle University (UNEW) in the UK sought to conduct researcher-managed field experiments and develop a computer model of the key processes in various cropping systems.

### **5.5.3 Research focus in the semi-arid (pastoral and protected areas) syndrome context**

#### *Community awareness creation in the use of renewable resources*

Little if any research has been carried out so far in this area. Research in this area will promote generation and dissemination of information to create awareness among local communities about sustainable use of renewable resources, which is currently quite low. Concern about the growing overuse of these resources, which is elaborated elsewhere in this report, justifies the need to invest in research on this theme.

#### *People's perceptions of gender roles in sustainable resource management in ASALs*

The move to consider women's needs and roles as distinct from men's in the process of resource/environmental management has become quite popular, at least in the last 15 years (Joekes et al., 1995; Leach and Green, 1995). This essentially constitutes recognition of the role of gender in sustainable resource management.

Ongoing research in this area has tried to explore the interactions between urbanisation, environmental management and gender, by addressing questions about the opportunities and constraints experienced by women and men in managing natural resources, and how these hinder their practical and strategic needs (Mascarenhas, 1997). Questions about gender-related differences in rights, responsibilities and access to productive resources, and gender-related issues in environment policy planning (Ayoki, 2002) are also important. More research is still needed in order to shed light especially on the flawed conceptualisation of gender relations that ignores the differing interests of men and women, among other grey areas.

*Promotion of multiple land use in protected areas*

Although efforts to introduce an Integrated Conservation and Development (ICD) approach for the management of protected areas in East Africa have been made for more than a decade, most of the initiatives have failed to achieve the intended twin goals of biodiversity conservation and socio-economic development of the adjacent areas. This has been attributed to problems stemming from weaknesses in project design and implementation.

A considerable amount of research has been done in this area, focusing on issues such as wildlife conservation policies and laws (Lissu, 2000; Kangwana and Mako, 1999), and community conservation initiatives, among others. However, more is still required in order to help formulate better project designs and propose workable implementation approaches.

*Developing appropriate management systems for equitable cost and benefit sharing in protected areas*

The status of research and justification of the focus advanced for theme (5) above are also applicable here. In view of the problems associated with conservation, efforts to reconcile human interests with nature were initiated in several protected areas in the two countries (Ireneus et al., 1998; Boyd, 1999; Emerton, 1995). Others have focused on the economic value of wildlife for agricultural landholders in the adjacent areas, and how wildlife costs and benefits have been managed (Emerton and Mfunda, 1999). Additionally, Coughenour (1998) initiated a study seeking to develop an Integrated Modelling and Assessment System (IMAS) that integrates computer modelling, geographic information systems, remote sensing and field studies to provide the information and understanding necessary to conserve biodiversity, wildlife and ecosystem integrity while increasing pastoral food security. The IMAS is being implemented at Ngorongoro Conservation Area, Tanzania; Kajiado District, Kenya; and the Lake Mburo National Park in Uganda.

*Local level initiatives for combating desertification and mitigating drought in ASALs*

A considerable amount of research focusing on the key agents of desertification and drought, as described by the UN Convention to Combat Desertification (CCD), has been done in Kenya and Tanzania. An evaluation study by Kiteme (1999) on the local level initiatives supported by UNDP UNSO to combat desertification in two pastoral districts in Kenya elaborates the key challenges and important lessons, and suggests ways to improve the implementation of such initiatives. Other recent studies in this area have looked at

the effectiveness of customary tenure arrangements in controlling land use practices (Charles, 1996); land use and tenure changes (Heike, 1995); and institutional arrangements for environmental planning and management (Southgate and Hulme, 1996) as ways of enhancing local level participation in combating desertification and mitigating the effects of drought. Others have looked at the importance of Maasai indigenous knowledge systems in the utilisation, management and preservation of the natural resource base, on the one hand, and its relevance in the diagnosis, treatment and control of human and livestock diseases (Oduol, 1997) on the other hand.

#### **5.5.4 Research focus in the highland-lowland syndrome context**

##### *Capacity building in natural resource management*

Considering the current arrangements for natural resource management and evidence about the manner of resource use and management in the two countries, there is a great deal of action required in order to build capacity for resource management at individual, institutional and systemic levels. The current status of research on this theme is not very elaborate. The little that has been done is rather disjointed, owing to a focus at the individual level (individual, institutional or systemic), without attempting to examine the interconnectedness of the three. Research focusing on these aspects will therefore make a very significant contribution to sustainable resource management.

##### *Prevalence of poverty and livelihood insecurity*

Poverty and insecure livelihoods are now common phenomena in both the highlands and the neighbouring lowlands in East Africa. Population pressure and declining farm sizes have resulted in intensification of smallholder cropping activities. Higher cropping intensity places greater demands on soil fertility status that could culminate in a decline in productive capacity (Tanner, 1995). Well-being and livelihoods on Mt. Meru in Tanzania have become increasingly dependent on external resources. Other studies have attributed the growing incidence of poverty in the mountains to the manner in which distribution of the costs and benefits of conservation have favoured the conservators' side (Jambiya and Sosovele, 2001).

### **5.5.5 Themes for syndrome mitigation research: realms and priorities**

Of the 13 high-priority research themes, 9 were selected, with some modifications or as they were originally formulated, by the NCCR North-South in the region (see the list below). The research themes were deliberately selected in order to ensure adequate representation of all the contexts and realms, while at the same time looking for possibilities for topical integration in conformity with the special focus of IP1, which is the lead IP in the JACS East Africa. Individual Project IP1 deals with Conceptual Framework and Methodologies for Research on Syndrome Mitigation. Below are the 9 research themes finally selected for implementation:

1. Urban conflicts and the capacities of institutions to address these conflicts (U).
2. Institutional arrangements and capacities for syndrome mitigation (H-L, SA).
3. Conflict transformation and empowerment in and around protected areas (SA).
4. Negotiation platforms and social learning processes for sustainability (H-L, SA).
5. Local capacities for combating desertification and mitigating drought (SA).
6. Poverty reduction and securing livelihoods in marginal areas (H-L, SA).
7. Multi-stakeholder oriented alternatives in planning of land and water use (H-L).
8. Capacities and alternatives for sustainable natural resource management (SA).
9. Sustainable land use and water resource management in river basins (H-L, SA).

### 5.5.6 Institutional situation of research

The JACS East Africa is fairly well endowed with research organisations and institutions that are currently involved in a variety of research activities related to the present focus of mitigation research under the NCCR North-South framework. These research organisations/institutions can be classified as international, regional and local.

#### *International research organisations*

- African Wildlife Fund
- International Centre for Research in Agroforestry (ICRAF)
- International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
- International Livestock Research Institute
- International Union for Conservation of Nature (IUCN)
- United Nations Environment Programme (UNEP)
- AFRICOVER

#### *Regional research organisations*

- Regional Land Management Unit (RELMA)
- AHI/AFRENA

#### *Local research organisations/institutions*

##### *Kenya:*

- Local universities and the associated/affiliated research institutes:  
University of Nairobi: Centre for Urban Research; Housing Research and Development Unit; Institute of Development Studies; Institute of Population Studies; etc., including other departments; Moi University, Kenyatta University and Egerton University
- Kenya Agricultural Research Institute
- Kenya Forestry Research Institute
- Kenya Industrial Research and Development Institute
- Department of Remote Sensing and Resource Survey
- Central Bureau of Statistics
- Centre for Training and Integrated Research in ASAL Development (CETRAD)
- Mpalla Research Centre

*Tanzania:*

- Local universities and the associated colleges and research institutes:  
University of Dar es Salaam: various departments including Institute of Resource Assessment (IRA), Institute of Development Studies, Centre for Housing Studies at the College of Lands, Architecture and Surveying (UCLAS); Sokoine University of Agriculture
- Tanzania agricultural research organisations (seven regional research institutes: SARI, Horticultural Research Institute, Tengeru, Mlingano Research Institute, etc.)
- Tanzania Forestry Research Institute
- Soil Conservation and Agroforestry Project for Arusha (SCAPA)
- Heifer Project International (HPI)
- Mweka College of Wildlife Management (MCWM)
- Tanzania Industrial Research Development Organization (TIRDO)

In addition to the research organisations elaborated above, there are a host of other private institutions and NGOs whose activities involve generation of information in one way or another. Together, these form a very important institutional research framework that the NCCR North-South programme can seek to establish research collaboration with.

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