

**THE UNITED REPUBLIC OF TANZANIA
PRIME MINISTER'S OFFICE**



**Southern Agricultural Growth
Corridor of Tanzania (SAGCOT)
Investment Project**

**STRATEGIC REGIONAL ENVIRONMENTAL
AND SOCIAL ASSESSMENT (SRESA)**

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Abbreviations

AAGIT	African Agricultural Growth and Investment Task Force
ACT	Agricultural Council of Tanzania
AECF	Africa Enterprise Challenge Fund
AFSP	Accelerated Food Security Project
AGG	Agriculture Green Growth
AGRA	Alliance for a Green Revolution in Africa
AKIRIGO	Association of Kilombero High Quality Rice Growers
ALAT	Association of Local Authorities of Tanzania
ANSAF	Agricultural Non-State Actors Forum
ASDP	Agricultural Sector Development Program
ASDS	Agriculture Sector Development Strategy
AWF	African Wildlife Foundation
AZE	Alliance for Zero Extinction
BAGC	Beira Agricultural Growth Corridor
BIDP	Bagamoyo Irrigation Development Project
BoT	Bank of Tanzania
BP	Bank Procedure
BTC	Belgian Development Agency
CAADP	Comprehensive Africa Agriculture Development Programme
CBD	Convention on Biological Diversity
CBNRM	Community Based Natural Resource Management
CBO	Community Based Organisation
CCAA	Climate Change Adaptation in Africa
CCBA	Climate Community and Biodiversity Alliance
CCRO	Certificate of Customary Right of Occupancy
CEO	Chief Executive Officer
CEPF	Critical Ecosystem Partnership Fund
CF	Catalytic Fund
CGIAR	Consultative Group on International Agricultural Research
CIA	Central Intelligence Agency
CIMU	Conservation Information Management Unit
CIP	Commodity Investment Plan
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on the Conservation of Migratory Species of Wild Animals
COSTECH	Commission for Science and Technology
CRO	Customary Right of Occupancy
CSO	Civil Society Organisation
CTI	Confederation of Tanzanian Industries
DADP	District Agricultural Development Plan
DAP	Di-ammonium Phosphate
DC	District Council
DED	District Executive Director
DEMO	District Environmental Management Officer
DEO	District Environment Officer
DfID	Department for International Development (UK)
DIDF	District Irrigation Development Fund
DLUFP	District Land Use Framework Plan
DNRO	District Natural Resource Officer
DoE	Division of Environment

DPG-E	Development Partners Group-Environment
DSS	Decision Support System
EA	Environmental Assessment
EAFCMP	Eastern Arc Forest Conservation and Management Project
EFA	Environmental Flow Assessment
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EITI	Extractive Industry Transparency Initiative
ELAN	Ecosystems Livelihoods and Adaptation Network
EMA	Environmental Management Act
eMJee	eMJee Development Consult
EMO	Environmental Management Officer
EMP	Environmental Management Plan
ERM	Environmental Resources Management Ltd.
E&S	Environmental and Social
ESAP	Environmental and Social Action Plan
ESMF	Environmental and Social Management Framework
EU	European Union
EWURA	Energy and Water Utilities Regulatory Authority
FAO	UN Food and Agriculture Organisation
FBD	Forestry and Beekeeping Division
FCS	Foundation for Civil Society
FDI	Foreign Direct Investment
FM	Fund Manager
FPIC	Free Prior and Informed Consent
FSC	Forest Stewardship Council
FR	Forest Reserve
FSDT	Financial Sector Deepening Trust
FtF	Feed the Future
GCA	Game Controlled Area
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIS	Geographic Information System
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GMO	Genetically Modified Organism
GoT	Government of Tanzania
GP	Good Practices
GPS	Global Positioning System
GR	Game Reserve
GRO	General Right of Occupancy
GTZ	see GIZ
GW	Gigawatt
GWH	Gigawatt-hour
HAKIARDHI	Land Rights Research and Resources Institute
HEC	Human-Elephant Conflict
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immunodeficiency Syndrome
HR	Human Resources
IAIA	International Association for Impact Assessment
IANRA	International Alliance on Natural Resources in Africa
IBA	Important Bird Area
IDA	International Development Association
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation

IIED	International Institute for Environment and Development
ILC	International Land Coalition
ILIMS	Integrated Land Information Management System
ILO	International Labour Organisation
ILLOVO	Illovo Sugar Ltd.
IMP	Integrated Management Plan (for the Kilombero wetlands)
INM	Integrated Nutrient Management
IP	Indigenous Peoples
IPBES	Intergovernmental Platform on Biodiversity and Ecosystem
Benefits	
IPM	Integrated Pest Management
IPMP	Integrated Pest Management Plan
IPPC	International Plant Protection Convention
IPPF	Indigenous Peoples Planning Framework
IRA	Institute for Resource Assessment (Univ. of Dar es Salaam)
ISDS	Integrated Safeguards Data Sheet
ISO	International Standards Organisation
IUCN	International Union for the Conservation of Nature
IWRM	Integrated Water Resources Management
IWRMD	Integrated Water Resources Management and Development
KATRIN	Kilombero Agricultural and Technical Research Institute
KBA	Key Biodiversity Area
KILORWEMP	Kilombero and Lower Rufiji Wetlands Ecosystem Management Project
KIVEDO	Kilombero Valley Environmental Organisation
KPL	Kilombero Plantations Ltd.
KSCL	Kilombero Sugar Company
kV	kilovolt
KVRS	Kilombero Valley Ramsar Site
KVTC	Kilombero Valley Teak Company
LA	Land Act
LEAT	Lawyers' Environmental Action Team
LGA	Local Government Authority
LGR	Local Government Roads
LGRP	Local Government Reform Programme
LHRC	Legal and Human Rights Centre
LUP	Land Use Plan
LWG	Land Working Group
M&E	Monitoring and Evaluation
MAFC	Ministry of Agriculture, Food Security & Cooperatives
MEA	Millennium Ecosystem Assessment
MGF	Matching Grants Facility
MLFD	Ministry of Livestock & Fisheries Development
MLHSD	Ministry of Lands, Housing and Human Settlements
Development	
MJUMITA	Community Forest Conservation Network of Tanzania
MIS	Management Information System
MKUKUTA (NSGPR)	National Strategy for Growth and Reduction of Poverty
MNRT	Ministry of Natural Resources and Tourism
MoU	Memorandum of Understanding
MTEF	Mid-term Expenditure Framework
MVIWATA	Mtandao wa Vikundi vya wakulima Tanzania (a small farmers' association)
MW	Megawatt

MZITSU	Morogoro Zonal Irrigation & Technical Service Unit
NAFAKA	Tanzania Staples Value Chain (USAID-sponsored under FTF)
NAFCO	National Agricultural and Food Corporation
NAPA	National Adaptation Programme of Action
NARCO	National Ranching Company
NAWAPO	National Water Policy
NAWESO	National Sustainable Wetlands Management Committee
NDC	National Development Corporation
NEMC	National Environment Management Council
NEP	National Environmental Policy
NGO	Non-government Organisation
NIMP	National Irrigation Master Plan
NIP	National Irrigation Policy
NLP	National Land Policy
NLUPC	National Land Use Planning Commission
NMB	National Microfinance Bank
NORAD	Norwegian Agency for Development Cooperation
NTC	National Technical Committee (of SAGCOT)
NSGPR (MKUKUTA)	National Strategy for Growth and Poverty Reduction
NWWG	National Wetlands Working Group
O&OD	Obstacles and Opportunities Development
OECD	Organisation for Economic Cooperation and Development
OHS	Occupation Health and Safety
OP	Operational Policy
OPG	Open Government Partnership
PA	Protected Area
PAD	Project Appraisal Document
PAP	Project-Affected Person
PASS	Private Sector Agriculture Support Scheme Trust
PCP	Participation and Consultation Plan
PCPD	Public Consultation and Disclosure Plan
PCU	Project Coordination Unit
PEA	Preliminary Environmental Assessment
PELUM	Participatory Ecological Land Use Management - Tanzania
PES	Payment for Ecosystem Services
PFM	Participatory Forest Management
PGP	Partnership Generation Programme
PINGO	Pastoralists' Indigenous Non-governmental Organisation
PLG	Project Liaison Group
PMO	Office of the Prime Minister
PMO-RALG	Prime Ministers Office Regional Administration and Local Government
POPs	Persistent Organic Pollutants
PPE	Personal Protective Equipment
PPP	Public-Private Partnership
PRAI	Principles of Responsible Agricultural Investment
PS	Performance Standard
PSCP	Private Sector Competitiveness Project
PSDP	Private Sector Development Programme
RAP	Resettlement Action Plan
RBWO	Rufiji Basin Water Office
REA	Rural Energy Agency
REDD	Reducing Emissions from Deforestation and Forest Degradation

REF	Rural Energy Fund
REPOA	Research in Poverty Alleviation
RPF	Resettlement Policy Framework
RUBADA	Rufiji Basin Development Authority
SACCO	Savings and Credit Cooperative
SAGCOT	Southern Agricultural Growth Corridor of Tanzania
SAN	Sustainable Agriculture Network
SBT	Sugar Board of Tanzania
SEA	Strategic Environmental Assessment
SIL	Specific Investment Loan
SME	Small and Medium Enterprises
SMUWC Catchment	Sustainable Management of the Usangu Wetland and its Catchment
SOP	Standard Operating Procedure
SPILL	Strategic Plan for Implementation of the Land Laws
SRESA	Strategic Regional Environmental and Social Assessment
SRI	System of Rice Intensification
STD	Sexually Transmitted Disease
SUA	Sokoine University of Agriculture
SVCF	Social Venture Capital Fund
SWMRG	Soil Water Management Research Group
TAC	Technical Advisory Committee
TAFSIP	Tanzania Agriculture and Food Security Investment Plan
TAGT	Tanzania Agriculture Growth Trust
TAHA	Tanzania Agricultural and Horticultural Association
TANAPA	Tanzania National Parks
TANBIF	Tanzania Biodiversity Information Facility
TANESCO	Tanzania Electric Supply Company Ltd.
TANROADS	Tanzania National Roads Agency
TANZAM	Tanzania-Zambia (road)
TAP	Tanzania Agricultural Partnership
TAPHGO	Tanzania Pastoralists, Hunters and Gatherers Organisation
TARIPA	Tanzania Rice Partnership
TASAF	Tanzania Social Action Fund
TAWIRI	Tanzania Wildlife Research Institute
TAWLA	Tanzania Women Lawyers' Association
TAWLAE	Tanzania Association of Women leaders and Environment
TAZARA	Tanzania-Zambia Railway Authority
TBD	To be determined
TCCIA	Tanzania Chamber of Commerce, Industry and Agriculture
TDHS	Tanzania Demography and Health Study
TEMESA	Tanzania Electrical, Mechanical and Electric Services Agency
TEU	Twenty-foot Equivalent
TFCG	Tanzania Forest Conservation Group
TFS	Tanzania Forest Service
TGNP	Tanzania Gender Network Programme
TIC	Tanzania Investment Centre
TNBC	Tanzania National Business Council
TNRF	Tanzania Natural Resources Forum
ToR	Terms of Reference
TPA	Tanzania Ports Authority
TPAWU	Tanzania Plantation and Agricultural Workers Union
TPIL	Tanzania Pharmaceutical Industries Ltd.
TPSF	Tanzania Private Sector Foundation
TRC	Tanzania Railways Corporation

TSHTDA	Tanzania Smallholders Tea Development Agency
TSIP	Transport Sector Investment Plan
TSP	Triple Superphosphate
UDSM	University of Dar es Salaam
UEMC	Udzungwa Ecological Monitoring Centre
UMNP	Udzungwa Mountains National Park
UN	United Nations
UNDP	United Nations Development Programme
URL	Universal Resource Locator
URT	United Republic of Tanzania
UNESCO	United Nations Education, Scientific and Cultural
Organisation	
USAID	United States Agency for International Development
UWAKEPI	Umoja wa Wauzaji wa Pembejeo Kilombero (Union of Kilombero Agro-dealers)
VAT	Value Added Tax
VCS	Voluntary Carbon Standard
VICOBA	Village Community Bank
VLA	Village Land Act
VLUP	Village Land Use Plan
VPO	Vice President's Office
WB	World Bank
WBG	World Bank Group
WCA	Wildlife Conservation Act
WCFT	Wildlife Conservation Foundation of Tanzania
WCS	Wildlife Conservation Society
WCST	Wildlife Conservation Society of Tanzania
WD	Wildlife Division
WDC	Ward Development Committee
WEF	World Economic Forum
WFP	World Food Programme
WMA	Wildlife Management Area
WHO	World Health Organisation
WSDP	Water Sector Development Programme
WWF	Worldwide Fund for Nature / World Wildlife Fund

Units

BCM	billion cubic metres
ha	hectare
GW	gigawatt
GWH	gigawatt-hour
km	kilometre
km ²	square kilometre
m	metre
mm	millimetre
MW	megawatt
t	tonne
TEU	Twenty-foot equivalent unit (a measure of cargo handling capacity based on containers)
Tsh	Tanzanian shilling
USD	US dollar

EXECUTIVE SUMMARY

THE STUDY

This report presents the findings of a study to prepare a Strategic Regional Environmental and Social Assessment (SRESA) of proposed activities and investments in the Southern Agriculture Growth Corridor of Tanzania (SAGCOT)¹.

The Terms of Reference for the study were drawn up by the Vice President's Office in consultation with the SAGCOT Centre and the World Bank. These are attached at *Annex A*, and in summary they involve the following tasks:

- Assessment of the potential environmental and social impacts of World Bank support to the SAGCOT programme (**hereafter the “SAGCOT Investment Project”**) and, by extension, the impacts of the Government of Tanzania’s SAGCOT initiative as a whole (**hereafter the “SAGCOT Programme”**).
- Consultation with stakeholders in the corridor to identify their concerns and to help in formulating solutions.
- Preparation of an Environmental and Social Management Framework (ESMF) and a Resettlement Policy Framework (RPF) to guide the environmental and social management of individual projects supported by SAGCOT with World Bank funds. Both the ESMF and the RPF were prepared and issued in 2012, as companion reports to this SRESA.
- Preparation of a strategic environmental and social impact assessment report for the GoT, the World Bank, SAGCOT partners and other stakeholders (this document).

THE GOVERNMENT OF TANZANIA’S SAGCOT PROGRAMME

The SAGCOT Programme is a public-private partnership intended to improve the incomes, employment opportunities and food security of smallholder farmers in southern Tanzania. This will be done by linking them to internationally competitive supply chains and accelerating commercial agricultural development, in particular by using foreign direct investment attracted by the removal of policy and infrastructural constraints to competitiveness and by facilitated access to land. SAGCOT lies along an existing road, rail and power corridor running from Dar es Salaam west through Iringa to Mbeya and beyond. Initially investments will be focused on

¹ The study was commissioned by the Bank of Tanzania (BoT) on behalf of the Government of Tanzania (GoT) and was carried out under a contract issued by BoT to Environmental Resources Management (ERM).

six areas with high potential for quick agricultural development ("clusters"), including the Kilombero Valley. Over the next 20 years the initiative aims to bring 350,000 ha of land into commercial production, increase annual farming revenues by US\$1.2 billion, and lift some 450,000 farming households out of poverty.

PROPOSED WORLD BANK SUPPORT: THE SAGCOT INVESTMENT PROJECT

The Government of Tanzania has requested targeted support from the World Bank in implementing the overall SAGCOT Programme. The World Bank will fund specific activities under the SAGCOT Investment Project that aim to improve smallholders' agriculture productivity, increase rural income and employment opportunities through both promotion and expansion of partnerships between smallholder farmers and agribusiness in the Southern Corridor. This targeted support is expected to include the following activities:

- (i) \$13M for strengthening agribusiness support institutions, specifically through technical assistance to core SAGCOT organisations including both the SAGCOT Centre and the Tanzania Investment Centre (TIC);
- (ii) \$45M to support the SAGCOT Catalytic Fund, specifically partial financing of the Fund's management costs and full financing of one of the two Fund windows, a Matching Grants Fund (MGF) to co-finance the efforts of established commercial agribusinesses to expand their commercial linkages with smallholder farmers by building or extending competitive supply chains. The MGF will cover, e.g., removal of bottlenecks restricting access to inputs, warehouse construction, and the expansion of contract farming; and
- (iii) \$2M for a Project Coordination Unit in the Prime Minister's Office.

THE ISSUES

Southern Tanzania has high agricultural potential being relatively well watered and with backbone infrastructure already in place (major roads, railway, electrical grid). However, this region is also of exceptional national and global ecological importance with large areas under some form of conservation designation. In addition to sheltering unique plants and wildlife and supporting a major tourism industry, the protected areas provide natural resources critical to the surrounding rural populations (wood, grazing, bushmeat) and ecosystem services essential for downstream agriculture, fisheries, hydropower and urban areas (water, flood regulation).

Degradation of this varied landscape is ongoing and rapid in some areas due to a variety of processes including population growth and in-migration, continuing poverty and dependence on natural resources, land conversion, uncertain resource tenure, weak institutions and poor governance, etc. Rapid agricultural development in the Usangu Flats has created severe negative

impacts on the hydrology of the Great Ruaha River. Climate change creates additional stress and uncertainty. The SAGCOT institutions and implementing procedures are at an early stage of development: programme-specific environmental and social conditionality and monitoring mechanisms remain to be developed.

If it were not implemented in a coordinated and sustainable manner, the SAGCOT Programme could:

- (i) risk the displacement of land users without sustainable benefits to local communities;
- (ii) accelerate habitat degradation and fragmentation; and
- (iii) affect river flows: the water issues experienced in the Usangu Flats could be repeated in the Kilombero Valley on a larger scale unless lessons are learned and applied in the development and implementation of the SAGCOT Programme.

In short, the SAGCOT Programme carries potentially significant risks unless it can be implemented without the documented negative social and environmental consequences that have accompanied foreign direct investment in land seen elsewhere in Africa. Nevertheless, the existing socio-economic situation in rural Tanzania is untenable and the SAGCOT Programme has been conceived (and is being) designed to provide the structures and processes to address and improve this existing situation, while taking the necessary steps to mitigate the apparent risks.

THE ENVIRONMENTAL AND SOCIAL CONTEXT

Natural Environment

The 307,000 km² SAGCOT area contains some of Tanzania's most ecologically diverse landscapes:

- (i) the Southern Highlands are an eco-region characterised by crater lakes and rivers, unique plateau grasslands and montane and riverine forests with exceptional floristic diversity and unusual wildlife;
- (ii) eight of the 13 Eastern Arc mountain blocks are within the SAGCOT area; the Eastern Arc Mountains are one of the world's 25 top biodiversity hotspots with many endemic birds, endemic plants, and endemic or near-endemic primates at high risk of extinction;
- (iii) the Katavi-Rukwa-Lukwati landscape and adjacent Greater Ruaha System cover some 70,000 km² including many large wetlands, one of Africa's largest national parks, Ruaha, with over 35,000 elephants, and Katavi National Park with Tanzania's greatest concentrations of buffalo, Nile crocodile and hippopotamus;
- (iv) the Kilombero Valley floodplain is East Africa's largest natural wetland (a 7,000 km² Ramsar site), its seasonally-flooded grasslands and

surrounding miombo woodland formerly harbouring Africa's highest density of lions and still the home of the near-threatened puku antelope and endemic birds, plants and fish;

- (v) the Kilombero River provides most of the flow of the Rufiji River, Tanzania's largest, with a unique fish assemblage, a lower floodplain supporting a flood-dependent rural population, and a delta with the most extensive and varied mangrove forests in East Africa, also recognised as a Ramsar site;
- (vi) on the southern side of the corridor lies the Selous Game Reserve, recognised as a World Heritage Site for its exceptional faunal diversity and numbers and undisturbed nature.

At least 40% of the SAGCOT landscape comprises areas that could be considered important natural habitats under internationally recognized standards (for example, as Critical Natural Habitat under the World Bank's Operational Policy 4.04), especially the Eastern Arc forests and many of the wetlands.

This globally important region is undergoing rapid change due to a variety of stressors, including rapid growth of a poor rural population dependent on natural resources, the associated habitat conversion and land degradation, deforestation, increasing grazing pressure and associated wildlife depletion, over-fishing, habitat fragmentation by farms, roads, mines and powerlines, water abstraction for irrigation, and possible climate change.

Social Environment

There are three main urban centres in the corridor, Morogoro, Iringa (both hosting universities) and Mbeya. Urbanisation is a continuing process, but the large majority of the population in the southern corridor lives in rural areas and is engaged in agriculture, pastoralism and/or fishing. There is a significant commercial agricultural sector including successful smallholder schemes, e.g. in tea, but the majority of farms are small, rainfed, and use traditional techniques. Yields are generally low and post-harvest losses high.

Since the 1970s cattle herders from the north have entered and settled in the area. Most are Wasukuma agro-pastoralists, but the migrants include small numbers of pure pastoralist Barabaig. Increased pressure on land has led to conflicts between resident crop farmers and incoming pastoralists and agro-pastoralists.

The population is young and increasing rapidly, but education levels are low, with few people reaching secondary education. Physical and financial access to health services is limited and the services available are constrained by low budgets. Gender relations are generally unequal, with women having less access to, control over and decision-making power compared to men with respect to many livelihood resources. The most vulnerable groups are female

headed households, the elderly, the disabled and people with long-lasting/chronic illnesses, such as HIV/AIDS, as well as children. An additional vulnerable group is refugees from Burundi, whose future is uncertain.

Governance

As a result of decentralisation, local governments at district and village level now have decision-making powers concerning land use and natural resources. However, the technical capacity of the supporting local administrations at the district level will require strengthening if it is to support and enable the SAGCOT programme. Other challenges include the need to create more effective implementation mechanisms for some Government policies, to remove residual inconsistencies between laws and overlaps in institutional mandates, and to ensure transparency in decision-making. In particular, responsibility for oversight and monitoring of SAGCOT-related safeguard measures and risks has yet to be defined; if the above challenges are taken into account in defining this responsibility, it will go a considerable way to addressing the above challenges.

Land

In Tanzania all land is vested in the President in trust for the people. Rights of occupancy are granted by the Commissioner for Lands or may be held through customs and tradition. Land falls into three categories - Reserved Land (National Parks, forest and game reserves etc., managed by their respective ministry or agency), Village Land (all land inside the boundaries of registered villages, managed at village level) and General Land (all other land, managed by the Commissioner). Government retains significant powers to reclassify and expropriate land, creating perceptions of insecurity at village level. There is no functional "land bank" of land ready to be leased to investors, clear of title and without formal or informal users. There remains a widespread perception of a potential significant risk of impacts on livelihoods due to land acquisition for commercial agriculture. Compensation for the acquisition of land and assets is covered by various laws, but these do not align fully with international best practice, including the standards and processes set forth in World Bank policy for persons whose livelihoods are affected by compulsory land acquisition (OP 4.12).

IMPACT ASSESSMENT

Proposed World Bank-supported SAGCOT Investment Project

A majority (75%) of the Bank's loan will be directed to support of the SAGCOT Catalytic Fund. Activities eligible for Matching Grants Fund financing, e.g. warehouse refurbishment or improvement of product grading systems, will be small scale and with very limited potential for negative social or environmental impacts.

The Fund's other window, the Social Venture Capital Fund (SVCF), will not be directly financed by the Bank loan, although the Bank loan will be contributing to the overall management of the Catalytic Fund. The SVCF will promote the development and expansion of smaller and younger agribusinesses with links to smallholders, activities which have the potential for localised negative environmental and social impacts (in relation to, e.g., land acquisition, livelihoods, employment standards, water and wildlife).

Most of the remainder of the Bank's loan (22%) will be directed towards support for two key SAGCOT institutions. The project will (i) finance the core functions of the SAGCOT Centre which is tasked with facilitating the entire SAGCOT programme, and (ii) support core functions at the TIC, including its ability to attract agribusiness investment. These two organisations are central to the operations of the SAGCOT programme, and therefore their activities are directly associated with the overall risks of the programme (see below).

Kilombero Valley

Because of the scale and complexity of the corridor a single cluster with significant investor and donor interest - the Kilombero Cluster - was identified as a case study for this Strategic Regional Environmental and Social Assessment. The Kilombero River provides two-thirds of the total flow of the Rufiji River, Tanzania's largest watercourse. The cluster is located in the Kilombero Valley of which the main feature is East Africa's largest wetland, a seasonally flooded grassland some 260 km long and up to 52 km wide, surrounded by farmland, miombo woodland, the Mahenge Mountains to the south and the forested Udzungwa Mountains to the north. In 2002 the Valley was designated a Ramsar site in recognition of its international importance as a wetland, in particular as home to the Africa's largest population of the near-threatened puku antelope. In recent years rapid population growth and immigration, conversion of the woodland and grassland to farms and settlements, a major incursion of cattle and illegal hunting have led to very significant drops in both wildlife numbers and the productivity of the fishery. There is also some evidence of reduced dry season river flows.

Spreadsheet scenarios modelling agricultural change in the Kilombero Valley confirm the high pressures on natural resources: there is little unused land; population increase is rapidly converting remaining village land to crops; grazing land and fuelwood supplies are already critical issues in some areas; dry season river flows will not support the planned irrigation expansion unless storage dams are built; and in any case large-scale irrigation development is likely to have significant negative hydrological and ecological effects through consumptive use of water and contamination by agrochemicals and wastes.

On present trends, the cumulative ecological and environmental impacts of roads, hydropower dams (Kihansi, Ruhudji, Mpanga), irrigation, land conversion and population increase in the Valley are and will continue to be severe, negative and irreversible, with consequent impacts on downstream

users of the Rufiji River including the proposed Stiegler's Gorge dam, residents and irrigation developments in the Lower Rufiji, the delta and the fishery.

SAGCOT as a Whole (the SAGCOT Programme)

The short-term economic impacts of SAGCOT investments will be significant and positive. However, until clear mechanisms for ensuring fair compensation and sustained smallholder and community benefits have been designed and implemented, the benefits of these positive impacts will not accrue equitably to the various stakeholders and interest groups. Those who may not receive benefits may include pastoralists, unless they are included in land use planning and decision-making.

The impacts of the SAGCOT Programme on the corridor as a whole will vary from cluster to cluster, but with a disproportionate impact on wetlands since these are actively targeted by investors for irrigation development and they currently have little effective protection.

Through land conversion and by encouraging in-migration, without suitable mitigation and control measures SAGCOT investments would likely accelerate and intensify existing trends of habitat degradation, fragmentation and loss, with negative consequences for biodiversity including severance of strategic wildlife corridors and an increase in the risk of local extinctions. Critical Natural Habitats may be affected. Large irrigation schemes and multiple small schemes would have significant hydrological effects with negative consequences downstream, including impacts on water quality as well as dry season flows. These processes would affect the sustainability of SAGCOT's benefits.

However, if the SAGCOT Programme is implemented using a “green growth” approach, and with positive actions to promote gender equality and climate change mainstreaming, the programme has the potential to achieve significant economic development with limited negative environmental and social impacts.

MAIN CONCLUSIONS AND RECOMMENDATIONS

Key Risks

On the basis of the significance of negative environmental and/or social impacts and their likelihood of occurrence, the following key risks have been identified which will require development of appropriate mitigation and control measures:

1. **World Bank-supported SAGCOT Investment Project Component 1: Strengthening Agribusiness Support Institutions: moderate risk** as a result of enhanced capacity to attract investment and the difficulty of

developing, applying and enforcing appropriate environmental and social safeguards to the institutions' activities and associated investment operations.

2. **World Bank -supported SAGCOT Investment Project Component 2: SAGCOT Catalytic Fund: low to no risk** due to the small scale of the proposed investments under the Matching Grants Fund and feasibility of mitigation, and **low risk** as a result of operation of the Catalytic Fund as a whole, assuming environmentally and socially responsible operation of the Social Venture Capital Fund.
3. **Kilombero Valley: high risk** from accelerated agribusiness investment due to the very high biodiversity values at risk, the presence of vulnerable groups and indigenous people, the absence of regional land use planning and lack of awareness/ recognition of village land use plans (and the associated risk of social conflict arising from this), the weakness of government institutions and the shortage of accurate data, especially on hydrology. The highest concerns relate to impact of SAGCOT Programme investments on natural habitats and pest management. Risks of involuntary displacement may be mitigated to a great extent if the ongoing village land use planning (VLUP) programme is completed successfully, with due regard to transparency, participatory processes and informed choice.
4. **SAGCOT Programme as a whole: high risk** from accelerated agribusiness investment for the same reasons as given above for the Kilombero Valley, especially if SAGCOT cannot adequately resolve existing and intensifying competition for environmental resources and services. In particular, by attracting people to land adjacent to Eastern Arc Mountain forests, SAGCOT-related investments risk increasing pressure on the forests and their biodiversity as a result of fuel wood collection, hunting, charcoal production and timber harvesting. Adequate mitigation measures to avoid this will be essential.
5. **Reputational risk:** the possibility of negative public perception of government policy and development partners is considered **high** due to the potential for significant negative environmental and social impacts arising from some SAGCOT activities.

Key Opportunities

It is clear that the existing situation is untenable both socio-economically and environmentally, with continuing high levels of poverty and ongoing unsustainable natural resource exploitation and degradation. The SAGCOT Programme provides an opportunity to reverse this by:

- (i) providing resources for resolving resource tenure issues;
- (ii) building natural resource management capacity; and
- (iii) creating mechanisms to bring sustainable benefits to rural residents.

To achieve this it will be necessary to develop a more focused approach to both policy and practice in relation to land tenure and land use planning,

resource management, environmental and social conditionality, consultation and transparency, and institutional mandates and capacity for ensuring compliance and monitoring.

Key Recommendations

Taken together, the following sets of recommendations address both the key risks and the key opportunities identified above. The recommendations have been grouped in relation to: i) World Bank support for the SAGCOT Investment Project; ii) the Kilombero Valley; and iii) SAGCOT Programme as a whole. Proposed responsible lead organisations are noted in **bold**.

i) World Bank-supported SAGCOT Investment Project

The following recommendations are intended to cover the safeguard issues associated with the proposed World Bank-supported SAGCOT Investment Project.

1. Catalytic Fund

The logical lead agency for implementation of these recommendations is **Catalytic Fund management**.

1.1 Resettlement Policy Framework: apply the measures described in the RPF to all sub-projects under the Catalytic Fund where these involve land acquisition, including agreeing a common approach between the Matching Grants Fund and the Social Venture Capital Fund. The RPF is designed to fill the gaps between Tanzanian law and practice and the requirements of the Bank's *OP 4.12 Involuntary Resettlement*, most importantly in relation to:

- Extent of coverage (to include persons with non-formal property rights).
- Timing of payments (to be done before not after loss of assets).
- Relocation and resettlement (assistance with resettlement to be provided).
- Livelihood restoration (measures to ensure effective livelihood restoration to be provided).
- Consultation (to be more inclusive and to be used in planning).
- Grievance redress mechanisms (to be created and/or improved).

1.2 Environmental and Social Management Framework: apply the measures in the ESMF to all sub-projects under the Catalytic Fund, including agreeing a common approach between the Matching Grants Fund and the Social Venture Capital Fund. The ESMF is designed to ensure the compliance of sub-projects with both Tanzanian law on EIA and World Bank safeguard policies.

1.3 Other Safeguards: as part of RPF and ESMF implementation, it will be important to screen the proposed sub-projects against the requirements of the *Indigenous Peoples Planning Framework* (IPPF, currently in draft) and *Pest Management Plan* (see (4.3) below) and to ensure compliance with the World

Bank's Operational Policy 4.04 on *Natural Habitats* with regard to addressing potential issues of forest degradation associated with agricultural development. The Catalytic Fund should also require recipients to avoid activities that would result in a net increase in emissions of greenhouse gases due to the clearance of natural forest and woodlands.

1.4 *Eastern Arc Mountains*: linked to the above, the Catalytic Fund should exclude any initiatives that do not adequately address (through effective implementation of regulatory EIA and participatory planning processes) the potential direct or indirect risks of clearance or degradation of the Eastern Arc Mountain forests as a globally important Critical Natural Habitat.

1.5 *Catalytic Fund capacity*: provide Catalytic Fund management with the staff, training and budgets necessary for implementation of recommendations (1.1) and (1.2).

2. PMO

The logical lead agency for implementation of this recommendation is the **Prime Minister's Office** (PMO).

2.1 *Investment Principles and Guidelines*: foreign direct investment should be accompanied by effective environmental and social safeguards on the ground. Therefore it is recommended that GOT not only ensure that investors subscribe to the *Principles for Responsible Agricultural Investment that Respects Rights, Livelihoods and Resources* (PRAI) but also commit to following the *Voluntary Guidelines for Land Tenure, Forestry and Fisheries* or the equivalent Tanzanian guidelines (currently under development through an FAO-assisted initiative)¹, together with the establishment of effective monitoring and compliance mechanisms (see also (2.3) above). This will require strengthening of responsible line agencies and LGAs, the creation of a SAGCOT environmental and social monitoring system, and the inclusion of environmental and social conditionality in licensing mechanisms such as the Certificate of Incentives issued to investors by the TIC.

3. Environmental and Social Safeguards and Monitoring

3.1 *World Bank-supported SAGCOT Investment Project*: confirm the institutional location for environmental and social safeguards monitoring and reporting in relation to the World Bank project: either (i) the Project Coordinating Unit (PCU), or (ii) the SAGCOT Centre, and provide the responsible organisation with the necessary staffing, training and budget.

3.2 *Monitoring of the Wider SAGCOT Programme*: the purpose and mandate of the core SAGCOT institutions has yet to be defined with respect to environmental and social policy coordination, implementation and monitoring. Therefore World Bank institutional support could usefully be directed towards a review of the mechanisms for implementing the investment guidelines now under development (see recommendation (3.1)),

¹ "Corporate Social Responsibility Guidelines for Responsible Agriculture Investments"

and to associated institutional adjustments. Note that the basic biophysical indicators requiring measurement in order to monitor programme impacts fall naturally into three categories, and the Bank could usefully extend support to the concerned agencies:

- Land: (i) forest and grassland cover and condition, and (ii) extent of cropland. Both of these can be generated by analysis of satellite imagery with limited ground-truthing.
- Water: (i) flows, and (ii) water quality. Flows require physical measurement at gauging stations, water quality requires sampling and analysis – or, preferably, application of biomonitoring approaches which are much cheaper (and have already been pioneered in the Kilombero Valley by KVTC).
- Biodiversity: (i) mammals, specifically endangered species such as puku, (ii) birds, especially endangered endemic and migratory species, and (iii) fish. Biodiversity monitoring requires regular repeat surveys on the ground (or for large mammals, from the air) using an identical procedure each time.

3.3 *Integrated Pest Management*: implementation of integrated pest management (IPM) approaches to crop protection (and also to livestock husbandry) would have many ecological, social and economic benefits, as well as ensuring compliance with the World Bank's Operational Policy 4.09 for any Bank-supported sub-projects. Pest management is a major subject requiring further support. It is recommended that World Bank institutional support to SAGCOT include formulation of a project for significant technical assistance in the promotion of IPM as standard practice for SAGCOT investors and associated smallholder/outgrower operations. This initiative would logically be lead by the **Ministry of Agriculture, Food Security and Cooperatives** (MAFC).

ii) Kilombero Valley

These recommendations are intended to be taken up by the **PMO, SAGCOT Centre and partners** as part of urgent development of the planning framework necessary for sustainable accelerated agricultural development of the Kilombero Valley.

4. Water

The logical lead agency for these actions is the **Ministry of Water**.

4.1 *Water for Irrigation*: because of the risks of significant irreversible negative impacts to critical habitats, ecosystem services and downstream users as already demonstrated on the Great Ruaha River, large-scale irrigation developments in the Kilombero Valley should be temporarily postponed until there is (i) a better understanding of water availability, (ii) a full understanding of the water requirements of the floodplain ecosystem and downstream users, and (iii) an effective sub-basin water management organisation.

4.2 *Water Information:* given the momentum behind accelerated agricultural development of the Valley and therefore the urgent need to answer the questions above, there is a need to (i) accelerate re-establishment of the hydrometeorological instrumentation of the Valley, (ii) commission a comprehensive hydrological review of the Valley based on available data, (iii) undertake an environmental flow assessment (EFA) based on the full range of ecosystem and livelihood services provided by the Kilombero River and its tributaries (see also (6.3) below), and (iv) establish a water quality baseline in view of the future intensive use of agrochemicals.

4.3 *Water Management:* water is a critical resource for accelerated agricultural development and requires appropriate management. Therefore it is recommended that the Rufiji Basin Water Board is assisted to set up a sub-basin (catchment) organisation as a priority. In addition, the ongoing Rufiji Integrated Water Resources Management and Development (IWRMD) Plan needs to be completed and implemented as a priority (see also 'SAGCOT as a Whole' recommendation below).

5. Ecology and Wildlife

The logical lead agency for these actions is the **Ministry of Natural Resources and Tourism (MNRT)**.

5.1 *Protection of Endangered Habitat and Wildlife:* agree a strategic plan to both maintain the Valley's flagship wetland-dependent mammal, the puku, and restore wildlife connectivity for large mammals across the Valley between the Selous and Udzungwa ecosystems. (Note: organised tourism and hunting (including sport-fishing) can provide significant financial returns to communities and act as major deterrents to illegal activities, so restoration of wildlife populations to the point where they can sustain hunting and are attractive to tourism should be a key aim of Valley planning).

5.2 *Information for Wildlife Management and Planning:* the strategic plan for wildlife requires better data on basic parameters such as wildlife population numbers and mapping of key habitats, so a major ecological survey with a spatial component is essential for effective planning and as an accurate baseline (**MNRT, KILORWEMP, TAWIRI and partner conservation research organisations and NGOs**).

5.3 *Information for Environmental Flow Assessment:* the environmental flow assessment recommended at (5.2) above will require a more reliable description of the aquatic ecosystem including the fishery, so the ecological survey (see (6.2) above) should include a significant freshwater component including the social and economic aspects of the fishery - subsistence, commercial and sport fishing - together with a better description of the river system's upstream-downstream linkages (**MAFC, MNRT, KILORWEMP and partner research organisations**).

5.4 *Development Partner Support:* a number of development agencies (e.g. BTC, DFID, EU, USAID) and large conservation organisations (e.g. AWF) are interested in supporting SAGCOT and/or managing the impacts of accelerated development. This provides an opportunity to focus their interest

on providing resources and skills for ecosystem restoration and conservation in the Valley (**KILORWEMP** as lead agency or platform).

5.5 *The Importance of Public Attitudes:* improved land and resource management in the Kilombero Valley depends in part on a major increase in public awareness and education, so as part of the planning exercise and its follow-up interested organisations could design and establish awareness-raising programmes. Early targets could be, for example: (a) restoration of the Nyanganje wildlife corridor; or (b) promotion of attitudinal change towards the colobus monkey as bushmeat (**KILORWEMP, LGAs and conservation/development partners**).

6. Land

The logical lead agency for these actions is the **Ministry of Lands, Housing and Human Settlements Development (MLHHSD)**.

6.1 *Mapping:* land use planning requires accurate maps of existing and planned land use and administrative boundaries. Therefore creation and dissemination to users (e.g. district, ward and village administrations) of comprehensive land use and administrative boundary maps of the Kilombero Valley should be undertaken urgently (**MLHHSD, NLUPC, MNRT, KILORWEMP**).

6.2 *Strategic Land Use Plan:* as soon as the new data, information (on water and wildlife) and maps have been assembled, stakeholders should be brought together to develop and confirm the strategic land use plan and establish firm limits on land conversion and irrigation in the Valley, to ensure the continuing hydrological, ecological and economic functioning of the floodplain and river system (**MLHHSD, NLUPC, MNRT, KILORWEMP**).

6.3 *Participation in Planning:* the planning exercise must ensure effective participation by all land users, including crop farmers, (agro)-pastoralists and fishing communities, to ensure that all community concerns and needs are considered (**MAFC, LGAs, KILORWEMP or other planning lead agency**).

6.4 *Gender Inclusivity:* the planning exercise should also be pro-active in relation to gender issues since key issues such as the division of labour, access to and control over resources and decision-making at household and community level all have gender aspects (**MCDGC, MAFC gender focal point, planning lead agency**).

6.5 *Livestock and Herders:* although new to the Valley, cattle herding is a major economic activity and cultural feature that must be included in land use planning, so the establishment of transparent mechanisms for agreeing and enforcing grazing areas and rights is critical for avoiding future farmer-pastoralist conflicts and resource degradation (**MAFC, LGAs, KILORWEMP or other planning lead agency**).

iii) SAGCOT Programme as a Whole

7. Land

This recommendation is intended to be taken up by the **PMO, SAGCOT Centre and partners** as they continue to develop the strategic planning framework for the SAGCOT Programme.

7.1 Land Bank: Strengthen MLHHS/D/NLUPC capacity for land administration and participatory land use planning including framework land use plans and clear identification of land for agricultural investment. The key to both investor and public confidence in SAGCOT is uncontested access to land. To achieve this GoT must establish an effective, fully functional "land bank" and streamline the land leasing process. This will require comprehensive attention to land administration, accelerated, transparent, informed and participatory land use planning at both regional and village levels, and transparent, effective, gender-sensitive compensation procedures and mechanisms that deal fairly with the issue of informal land users (**MLHHS/D, NLUPC, TIC**).

7.2 Participation in Planning: At the outset of planning and implementation, multi-scale, participatory, multi-sectoral land use planning should take place to ensure alignment of land uses with other initiatives and policies and necessary stakeholder buy-in. Local scale land use planning should be coordinated with other sectors and account for tradeoffs among ecosystem services, particularly between agriculture/irrigation and other societal and ecological needs, identifying "winners" and "losers" of interventions. These land use planning processes should also address sustainable management of biodiversity and ecosystems services outside of the existing protected area network. Relevant data are available, for instance, through the World Conservation Monitoring Center's recent biological assessments (**MLHHS/D, NLUPC**).

7.3 Resettlement Policy: develop a national Resettlement Policy with implementing regulations and mechanisms to supplement and extend the existing legal framework governing compulsory land purchase, bringing national land acquisition and compensation practice into line with international best practice (and taking advantage of current Ministerial support for development of such a policy) (**MLHHS/D, NLUPC**).

7.4 Standard Operating Procedures: the social acceptability and success of SAGCOT will depend on its ability to provide long-term benefits for smallholders and rural communities. The development of standard practices for both land acquisition and the provision of sustained benefits (benefit types, contracts, forms of agreement etc.), and their establishment as legally-binding procedures, should be a key element of operationalisation of the new agricultural investment guidelines. Note that all such procedures should mainstream best practice in relation to key policies on gender and health (**PMO, SAGCOT Centre and partners**).

7.5 Mapping: improved mapping services are essential for effective land use planning and administration, and especially their provision to end users at district level. Therefore support should be provided to enhance the Ministry's capacity to create land-related maps and supply them to users (building on

the Integrated Land Information Management System, ILIMS) (see also recommendation (7.1)).

8. Water

The logical lead agency for these actions is the **Ministry of Water, in coordination with MNRT.**

8.1 Environmental Flow Assessment: water is a very real limiting factor for irrigation development. To avoid a repeat of the water management issues that have arisen in the Usangu Flats and Great Ruaha River it is essential that all irrigation proposals are considered in the context of the needs of downstream users including wildlife, fisheries, irrigated and flood-dependent agriculture, hydropower and urban and industrial users. This implies the development and application of an environmental flow assessment capability in every SAGCOT river basin, with the necessary links to downscaled climate change models and hydrological forecasts (**Ministry of Water, MNRT, WSDP, development partners**).

8.2 Protection of Wetlands: within the SAGCOT area wetlands are being targeted for irrigation development, largely due to their lack of effective formal protection and the absence of inclusion of wetland values into strategic plans such as the National Irrigation Master Plan. This risks the loss of critical hydrological functions such as flood control and dry season baseflow, economic services such as fisheries and dry-season grazing, and globally important ecological values (endemic and internationally migratory wildlife). It is recommended that SAGCOT partners re-consider this approach in the light of the strategic value of wetlands to the nation, and instead direct investors away from wetlands (**MNRT, MAFC, MLD, MoW, NAWESCO, NWWG, SAGCOT Centre, TIC, NLUPC**).

8.3 Rice, Water Use Efficiency and Public Subsidies: proposed rice irrigation schemes receiving public subsidies should be subject to cost-benefit analysis comparing the cost of the developments versus the benefits from a similar public investment in the system of rice intensification (SRI), which has much lower infrastructure costs and water requirements (**MAFC, TIC**).

8.4 Hydropower and Maintaining River Ecosystems: given the importance of the Rufiji River as a linked upstream-downstream hydrological, ecological and economic system, it is recommended that major hydropower projects initially be developed in the headwaters of the river rather than on the main stem (i.e. the Mpanga and Ruhudji projects, not Stiegler's Gorge) (**TANESCO, RUBADA**).

8.5 Water Management: The ongoing development of integrated water resources management plans for Tanzania's major river basins should be prioritised and completed, in particular for those basins that overlap the SAGCOT corridor. These IWRM plans should address the suite of hydrological characteristics, including water flow and quality, and should identify sustainable yields and mechanisms for water allocation for economic development and environmental protection. Planning should not only consider climate change, but evaluate actions in a variety of climate change scenarios. Moreover, the distribution of water rights should always take

account of ongoing/existing IWRM processes and plans (Ministry of Water, development partners).

9. *Communication*

The logical lead agencies for this recommendation are the **SAGCOT Centre and TIC**.

9.1 *Public Perceptions and Social Acceptability of SAGCOT*: negative perception of the SAGCOT Programme by some communities, NGOs and the media (especially regarding fears of land-grabbing) jeopardize the successful take-off of the programme. SAGCOT needs to expand its communications to local levels on the basis of genuinely equitable and beneficial investment policies and procedures (**SAGCOT Centre, TIC**).

10. *RUBADA*

The logical agency to initiate and lead this review is the **PMO**.

10.1 *Role of RUBADA*: the SAGCOT Programme provides an opportunity for review of the role of the Rufiji Basin Development Authority (RUBADA) to ensure optimal programme implementation and institutional oversight, especially with respect to land use planning, land ownership and water resources management.

1 INTRODUCTION

1.1 BACKGROUND

This report presents the findings of a study to prepare a Strategic Regional Environmental and Social Assessment (SRESA) of proposed activities and investments in the Southern Agriculture Growth Corridor of Tanzania (SAGCOT) (hereafter the Government of Tanzania's "**SAGCOT Programme**"), including those that are expected to be supported under a World Bank supported project (hereafter "**the SAGCOT Investment Project**").¹.

1.2 PROGRAMME OVERVIEW

The SAGCOT Programme is a public-private partnership (PPP) aiming to mobilize US\$2.1 billion in private sector investment over the next 20 years to achieve rapid and sustainable growth in Tanzania's Southern Corridor, a very large area stretching west from Dar es Salaam through Morogoro, Iringa and Mbeya to Sumbawanga near the border with Zambia. The programme aims to attract local and foreign direct investment and facilitate the development of profitable agricultural businesses in 'clusters' along this corridor to achieve economies of scale, synergies and increased efficiency (*Figure 1.1*). The partnership is the centrepiece of Tanzania's high-level *Kilimo Kwanza* ⁽²⁾ strategy for enhancing food security, poverty reduction and reducing vulnerability to climate change.

The SAGCOT Programme is at an early stage of its organizational development, and the Government of Tanzania (GoT) has requested funding from the International Development Association (IDA) (a part of the World Bank) to support establishment of the necessary institutions, institutional reorganization, capacity building and initial operation of a promotional funding mechanism (the SAGCOT Catalytic Fund). The World Bank supported SAGCOT Investment Project, described in more detail below, would aim to improve smallholders' agriculture productivity, increase rural income and employment opportunity through both promotion and expansion of partnership between smallholder farmers and agribusiness in the Southern Corridor.

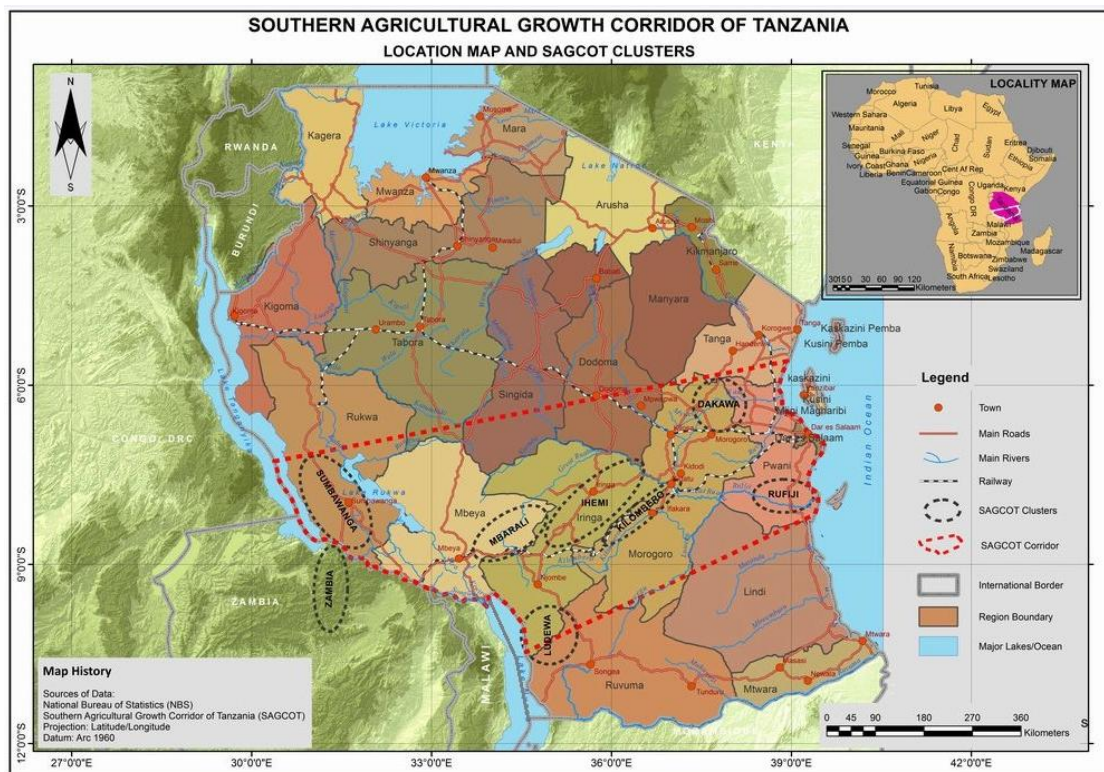
As an arm of the World Bank ("the Bank"), the IDA must comply with the Bank's environmental and social safeguard policies, in particular Operational Policy 4.01 *Environmental Assessment*. Screening of the proposed loan by the Bank (see 4.8.2) placed it into environmental Category A, which necessitates a

(1) The study was commissioned by the Bank of Tanzania (BoT) on behalf of the Government of Tanzania (GoT) and was carried out under a contract issued by BoT to Environmental Resources Management (ERM).

(2) *Kilimo Kwanza*: Agriculture First

comprehensive environmental and social assessment. Since the SAGCOT Programme, of which the SAGCOT Investment Project will be a part, covers a large but specific geographic area, a strategic and regional assessment is considered an appropriate tool for assessing impacts and mitigation measures that may have relevance for one or both of the Project and the Programme as a whole . (1)

Figure 1.1 Programme Location: SAGCOT and the Priority Clusters



Note: International border shown for Lake Malawi is the median boundary: this is not accepted by all riparian states.

Separately from the Bank's requirements for safeguard-related assessment prior to loan appraisal, this study examines the SAGCOT Programme with reference to Part VII of Tanzania's Environmental Management Act (2004), as described in the Strategic Environmental Assessment Regulations (2008). However, the TOR for this study, as prepared by GoT, do not require formal compliance with the specific procedures and requirements of the SEA Regulations.

1.3 STUDY OBJECTIVE

As stated in the study's Terms of Reference (TOR: see Annex A), the objective of the SRESA consultancy is "to improve investment decisions of all the different stakeholders" by identifying and incorporating environmental and

(1) Another common type of Strategic Environmental Assessment is 'Sectoral'.

social issues (both opportunities and constraints) in the development planning process, and preparing a collection of safeguard products and tools. The core task is a strategic environmental and social assessment of the SAGCOT Programme "that will integrate the baseline environmental and social circumstances in the southern corridor region and then assess the potential environmental and social impacts associated with the World Bank project", at the same time satisfying the requirements of the Bank's Operational Policy 4.01 *Environmental Assessment* for Category A projects.

1.4 *PURPOSE OF THIS REPORT*

This report is the main study report. An earlier draft report was circulated to elicit comments from concerned departments and agencies, and revised in the light of comments received prior to a final round of consultation and disclosure. It includes analyses of activities associated with the overall SAGCOT Programme, and makes recommendations relevant to both the proposed World Bank support for the SAGCOT Investment Project and the SAGCOT Programme as whole.

The report complements two other study outputs which are specifically directed towards the Bank's proposed support, an *Environmental and Social Management Framework* (ESMF) and a *Resettlement Policy Framework* (RPF). The ESMF was approved by the GoT and Bank in July 2012. The RPF was submitted in October 2012.

Readers should note that this report was prepared by independent consultants and contains recommendations for consideration by the Government of Tanzania and the World Bank. Although many government departments were consulted during the study process and commented on the draft, the report should not be considered an official statement of government policy.

1.5 *APPROACH AND METHODOLOGY*

1.5.1 *Overview*

Strategic and regional assessments are tools to help development planners design investment policies and programmes that are sustainable over large areas and long timeframes. They take into account environmental and social opportunities and constraints on a much wider basis than the more well-known project-focused Environmental Impact Assessments (EIAs) and Social Impact Assessments (SIAs). They take a regional perspective and provide strategic advice to decision makers.

A rapid methodology review is given in the following sections.

1.5.2 *Screening*

The proposed Bank-supported SAGCOT Investment Project was screened prior to the start of this study and was determined to trigger most of the Bank's "safeguard policies", including the framework Operational Policy 4.01 Environmental Assessment. The study's TOR include the task of reviewing which Bank policies are triggered by the proposal; the results are given at 4.8.2.

1.5.3 *Scoping*

Scoping is a process whereby the scope of an impact assessment study is determined based on preliminary information, so as to concentrate on the topics of most concern and avoid wasted effort. Ideally scoping results in preparation of the study's TOR. In this case the TOR already existed, so the process was used to re-confirm and add detail to the issues of most concern. Scoping activities included:

- literature review, including obtaining project reports ("grey literature") as well as published documents;
- discussion with key informants in the main stakeholder groups;
- preliminary fieldwork, mainly in the Kilombero Valley, and further meetings with key informants; and
- a scoping workshop, held in Dar es Salaam on 07 June 2012.

Key concerns raised by scoping are listed at 6.2.

1.5.4 *Baseline Description*

A baseline description characterising the study area and providing context for the more detailed assessment of the Kilombero Cluster is given in *Chapter 5*.

1.5.5 *Scenario Development*

To determine a typical range of potential impacts from the SAGCOT Programme, a set of scenarios has been developed for a single cluster, Kilombero. The three scenarios are:

- the "no-action" or "no-programme" scenario, i.e. what will probably happen without the SAGCOT Programme over the next 20 years;
- an "accelerated agribusiness" scenario, i.e. what could happen with the SAGCOT Programme but without any specific environmental or social conditionality or mitigation; and
- a "green SAGCOT" scenario, i.e. accelerated agribusiness investment in the cluster with comprehensive environmental and social planning and management.

The scenarios correspond to the three alternative development pathways envisaged in the SAGCOT Green Growth Investment Framework (Milder *et al.*, 2012) of "business as usual", agricultural intensification with prevailing practices (AIPP) and agricultural green growth (AGG). They have been built around key social and environmental indicators (e.g. population, land use, water use, crop yields and production). In addition, as far as possible the spatial component of each scenario is geographically realistic, based on mapping of actual locations and areas where investment, development and impacts may occur. The scenario approach and results are described in more detail in Chapter 7.

1.5.6 *Impact Assessment*

Prediction

The projections in the three scenarios have been used to determine probable impacts on a range of environmental and social values and indicators. These values include physical constraints and processes such as land and water availability, ecological values such as habitat connectivity, pressure on forests and impacts on endangered species, social processes such as demographic change and resource-use conflicts, and economic factors including employment. As far as possible quantitative indicators of each value have been used, e.g. areas of farmland and grazing, extent of wetland habitat, etc. The impacts may be positive or negative, direct or indirect, and cumulative.

Evaluation and mitigation

The strategic significance of the predicted impacts has been assessed in relation to both Tanzanian policies and standards and, where relevant, international policies and guidelines. The analysis is, in effect, a cumulative effects assessment of possible developments in the Kilombero Valley.

1.5.7 *Development of Mitigation Measures*

For each scenario, the study team has assessed what specific measures could be undertaken to avoid, minimise, or mitigate identified significant negative impacts and/or enhance positive effects. The measures include changes to policies as well as enhanced planning procedures, and the need for institutional changes as well as capacity development. Most importantly, the recommendations focus on physical sustainability in terms of key limiting factors such as water, environmental sustainability in terms of factors such as fuelwood production and water quality, and social sustainability in terms of ensuring benefit flows to smallholders and communities. Social sustainability also requires resolution of the long-running and intensifying land use conflicts between crop farmers and livestock herders.

The assessment and recommendations from the case study have been extrapolated to the corridor as a whole, and form the basis for a study recommendation for a "preferred alternative" for the SAGCOT Programme that minimises environmental and social risks and maximises sustainable

development benefits. This is largely consistent with the recommendations made in the SAGCOT Greenprint (Milder *et al.*, 2012).

1.5.8 *Consultation*

The main findings of the study's consultation process are described in Chapter 6 of this report and a Record of Consultation is given at *Annex B*. A Participation and Consultation Plan for the study and notes on the Scoping Workshop were presented in the study's *Interim Report* (ERM, July 2012).

The consultation process included engagement with other SAGCOT consultants, in particular EcoAgriculture Partners (USA) who have developed a Green Growth Investment Framework for SAGCOT (the "SAGCOT Greenprint", circulated in draft in August 2012⁽¹⁾ and due for completion in May 2013).

1.5.9 *Constraints and Limitations*

A number of factors have affected the study, including (a) a still evolving concept and description of the Bank-support SAGCOT Investment project; (b) the requirement for early submission of a key study output, the ESMF, to meet Bank loan processing deadlines, which was not consistent with the original work programme foreseen by the TOR; (c) the nature of the SAGCOT Programme, which lacks a physical presence or institutional implementing mechanisms; (d) the very large area targeted by the SAGCOT Programme with a vast range of environmental, social and economic conditions and associated stakeholders; (e) variable data availability and quality on the various topics requiring analysis; and (f) reluctance of some stakeholders, including in the private sector, to speak freely "on the record".

1.6 *REPORT LAYOUT*

This report contains nine chapters that are structured as follows:

- *Chapters 1 and 2* provide an introduction to the study, the report, the SAGCOT Programme and the proposed World Bank-supported SAGCOT Investment Project.
- *Chapters 3 to 6* provide the study context, reviewing the agricultural sector in Tanzania (*Chapter 3*), the policy, legal and administrative framework (*Chapter 4*), the SAGCOT corridor and clusters (*Chapter 5*), and highlighting key stakeholder concerns (*Chapter 6*).

⁽¹⁾ Available at <http://www.agriculturegreengrowth.com/>

- *Chapter 7 and 8* present a case study of the Kilombero Cluster, with background, change scenarios, an impact assessment and proposed mitigation and enhancement measures.
- *Chapter 9* summarises the study's findings on key risks and gives recommendations for the way forward in relation to World Bank support for SAGCOT, the Kilombero Valley, and SAGCOT as a whole.

The final parts of the report are a list of references and a set of annexes including the Study Terms of Reference (*Annex A*), a Record of Consultation (*Annex B*), Technical Data (*Annex C*), a description of the Scenario Methodology (*Annex D*) and a List of Study Team Members (*Annex E*).

2 THE SOUTHERN AGRICULTURAL GROWTH CORRIDOR OF TANZANIA

2.1 THE SAGCOT PROGRAMME

2.1.1 The SAGCOT Concept

The centrepiece of the GoT's strategy for economic development and poverty reduction is the *Kilimo Kwanza* (Agriculture First) initiative. This is a "national vision" of rapid transformation of the livelihoods of millions of Tanzanians. The policy is composed of ten "Pillars" that create a roadmap to improve financing and infrastructure within the sector, streamline or rationalise the institutional environment for agriculture, strengthen value chains, reduce the costs of doing business, improve trading opportunities, expand local production of inputs, adopt a science-based approach to meeting needs in the sector and address concerns related to access to and use of land (Boudreaux, 2012). Crucially, and unlike all previous attempts at major change in the rural economy, *Kilimo Kwanza* is to be led by the private sector. This involves the creation of Public Private Partnership (PPP) frameworks championed by the Private Sector Foundation and Government through the Tanzania National Business Council (TNBC). The new Tanzania Agricultural Growth Trust (TAGT) will oversee the development of implementation mechanisms such as agricultural projects in various 'corridors' (South, North, Central, etc) and other initiatives including the Tanzania Agricultural Partnership (TAP). TAGT also oversees financing mechanisms through its TAGT Fund Board and coordinates sources of funding in general (Tenga *et al.*, 2012).

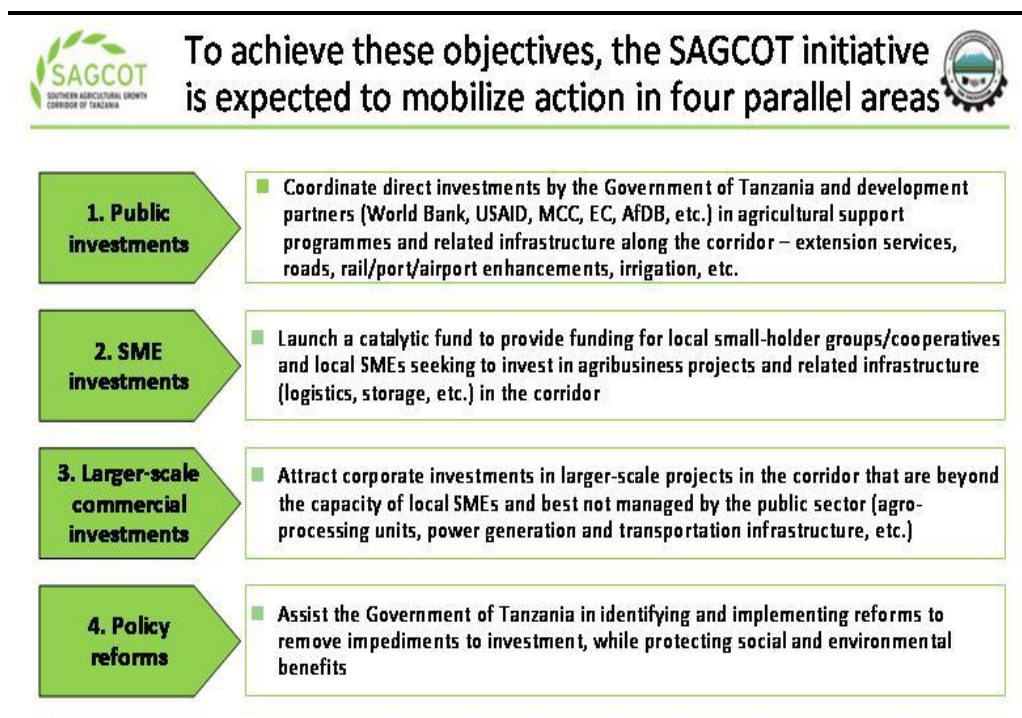
The SAGCOT Programme is a major initiative to articulate the *Kilimo Kwanza* policy, and is broadly identified as a public-private partnership explicitly designed to achieve higher rates of income growth and job creation through the development of competitive agribusiness value chains across the Southern Corridor. The programme has evolved as part of the "Grow Africa" concept initiated by governments, the private sector⁽¹⁾ and donors at the Africa World Economic Forum (WEF) in 2010, to promote coordinated public-private investment and policy reforms in key agricultural corridors around Africa. SAGCOT is the second such agriculture-focused corridor in the region, the other being the Beira Agricultural Growth Corridor (BAGC) in Mozambique.

The SAGCOT Programme has three ultimate objectives - to improve food security, to reduce rural poverty and to ensure environmental sustainability (TIC, 2012). To achieve this, action is envisaged in four key areas: public investment, small and medium enterprise (SME) investments, larger-scale commercial investments, and policy reforms (*Figure 2.1*). Over the next 20 years, the programme aims to bring 350,000 ha of farmland into commercial production for regional and international markets, to increase annual farming

(1) Especially major international agribusiness companies such as Dupont, Monsanto, Syngenta, Unilever and Yara.

revenues by US\$1.2 billion, and to lift more than 2 million people (roughly 450,000 farm households) out of poverty.

Figure 2.1 Key SAGCOT Action Areas

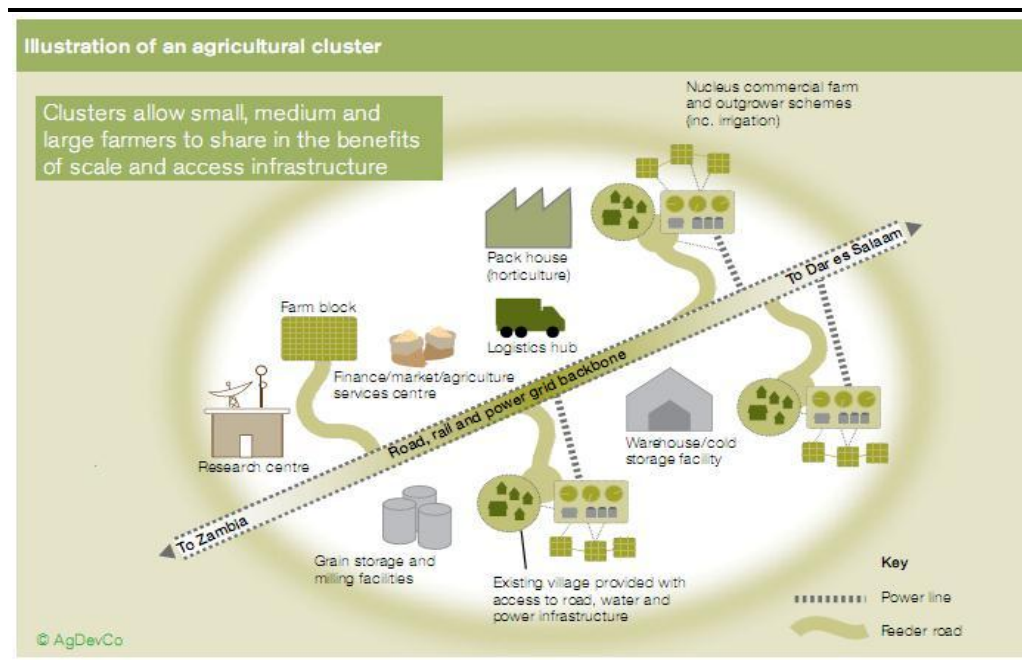


Source: TIC, 2012

As stated in the SAGCOT Investment Blueprint⁽¹⁾, one of the Programme's main objectives is to provide opportunities for smallholder producers to engage in profitable agriculture. It will do this by incentivising stronger linkages between smallholders and commercial agribusinesses, including "hub and outgrower" schemes that allow smallholders in the vicinity of large-scale farms to access inputs, extension services, value-adding facilities and markets. SAGCOT will also support smallholder producer associations, helping them enter into equitable commercial relationships with agri-processing and marketing businesses and providing irrigation through professionally-managed farm blocks. All this will be done in a set of priority areas termed "clusters" to gain advantages of scale and intensity of economic activity. The clusters - initially Kilombero, Rufiji, Ihemi, Mbarali, Sumbawanga and Ludewa - have been identified as having significant agricultural potential and opportunities for "early wins". Other clusters such as Dakawa are in the process of being identified. The cluster concept is illustrated in Figure 2.2.

(1) SAGCOT Investment Blueprint, Jan. 2011

Figure 2.2 Diagram of an Agricultural Cluster



Source: SAGCOT Concept Note, 2010

The Investment Blueprint goes on to state that "An agricultural transformation can be achieved if the public and private sectors (including development partners) work together to achieve shared goals. A SAGCOT partnership organisation will help coordinate and guide investments, focusing on the cluster areas. New financing facilities, including 'social venture capital' (for start-up businesses) and 'patient capital' (long-term debt for infrastructure), will help new farming and processing operations get established and become internationally competitive."

Further, "To ensure fairness and promote responsible investment, access to the SAGCOT financing facilities will come with strong conditions attached. Funding will only be made available to investors who demonstrate a commitment to building equitable and sustainable partnerships with smallholder producers. Compliance will be monitored and investment withdrawn if social or environmental obligations are not met."

"By helping new businesses overcome initially high costs and risks, SAGCOT will help kick-start a virtuous cycle of lower production costs, increased productivity, higher profitability, more investment and rapid growth."

In 2011 the next steps in SAGCOT Programme implementation were seen as:

"In 2011 the SAGCOT Partnership will move rapidly from the design to the implementation phase. Two key actions are needed to launch this process:

- establish the SAGCOT partnership organisation – supported by an independent and professional Secretariat – to act as a neutral coordinating body and focal point for planning, implementation and monitoring; and
- launch a catalytic fund, initially of \$50 million, with financial backing from the Tanzanian government and development partners. The catalytic fund will enable resources to be channelled into early stage investment opportunities, including some of the ‘early wins’ identified in the investment blueprint."

2.1.2 *SAGCOT Organisation*

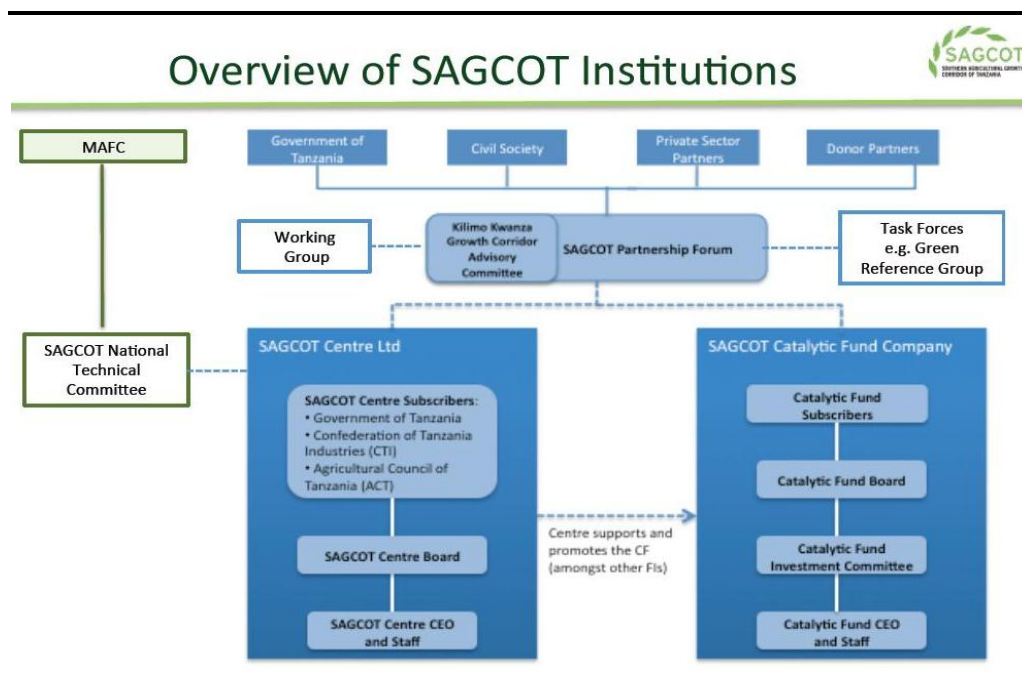
SAGCOT is conceived as a Partnership, comprising the Partners, the SAGCOT Institutions (the Centre and the Catalytic Fund) and all the collaborating stakeholders. The Partners are public, private or non-state actors who have signed up to the SAGCOT Partnership Principles, submitted an application form to the Centre, have paid for membership where relevant and have received confirmation of membership.

The mission of the SAGCOT Centre Ltd. (the Centre) is to play the role of an honest non-partisan partnership broker within the SAGCOT Partnership, facilitating Partners delivery of inclusive, sustainable and commercial agricultural value chains in the Corridor⁽¹⁾.

The organisational framework envisaged for the SAGCOT Programme is illustrated in *Figure 2.3*. In this structure the Centre and the SAGCOT Catalytic Fund are being guided by the SAGCOT Partnership Forum, which is supported by taskforces (amongst others the SAGCOT Green Reference Group) and the *Kilimo Kwanza* Growth Corridor Advisory Committee. The Centre itself is being steered by the SAGCOT National Technical Committee (NTC).

(1) Source: SAGCOT Centre (2013): 5 year Framework 2013 – 2017.

Figure 2.3 Overview of SAGCOT Institutions



Source: SAGCOT Centre, Basic Presentation, Slide 13

The SAGCOT Centre will facilitate the sustained pursuit of the overall mission of expanding agribusiness development in the corridor. Technical support for SAGCOT implementation is also required from agencies such as the Tanzania Investment Centre (TIC) and the Rufiji Basin Development Authority (RUBADA), and from line ministries, especially the Ministry of Agriculture, Food Security and Cooperatives (MAFC), and the Ministry of Lands, Housing and Human Settlements Development (MLHHSD).

These planning mechanisms and processes will need to link up to the national planning cycles for agriculture, natural resource management and land use management, which are each allocated to their specific line Ministries in parallel with the Local Governance Decentralisation by Devolution process.

As of mid-2012 the SAGCOT secretariat - the SAGCOT Centre - was in its initial stages of establishment and the Catalytic Fund awaited approval of the World Bank loan. At the same time an Investment Partnership Programme (IPP, formerly the Partnership Generation Programme) was launched to attract investors in priority sectors: cereals, sugar, livestock, power and transport (Box 2.1).

Box 2.1 *Projected Impacts of Successful Investment Promotion*

Projected impacts if SAGCOT succeeds in attracting 20 large scale investments (5 each in sugar, cereals and livestock, 3 in power, 2 in transport):

- Create employment and raise incomes for at least 80,000 families in rural areas: 40,000+ direct jobs and 40,000+ outgrowers

- Including at least 2,000 skilled jobs in agronomy, engineering, finance and so on
- Reduce Tanzania's import bill by at least \$300 million per year
- Increase Tanzania's export revenues by at least \$500 million per year
- Increase food crop yields and livestock production, thereby reducing food insecurity
- Eliminate Tanzania's power shortage, by adding 300+ MW in generation capacity
- Reduce the cost of fertilizers and agro-chemicals by at least 20%
- Reduce the costs-to-market of Tanzania's exports by at least 20%
- Increase average incomes of rural households in the corridor by at least \$400 per year
- Improve Tanzania's net carbon footprint

Source: TIC, 2012

SAGCOT Principles

Organisations with an interest in the development of SAGCOT may apply to become a member of the "SAGCOT Partnership" and will then be required to accept five "Partnership Principles" (Box 2.2). SAGCOT partners will have access to all services offered by the SAGCOT Centre including a Partnership Forum which will meet every six months.

SAGCOT partners' social and ethical obligations are stated as "Members must never intentionally injure, directly or indirectly the professional reputation, prospects or business of the SAGCOT Partnership" (SAGCOT Centre, undated).

SAGCOT Partnership Principles

- (i) *Agreement on the whole SAGCOT Objectives* - sharing the SAGCOT objectives for responsible commercial growth and poverty reduction. This includes the need for commercially viable agricultural business to incorporate emergent and small-scale farmers and their interests into the operation.
- (ii) *Agreement to work with other members to promote a harmonised approach and strategy* – so that within their own particular sphere of activities each member will cooperate with the overall, coordinated SAGCOT program of planning, investment, implementation and policy reform.
- (iii) *Agreement to engage with the partnership, maintain communication and support the SAGCOT Centre* – to support the SAGCOT Centre in its work. Until such time as the benefits become evident, the underlying trust and intrinsic goodwill of each member will be essential to maintain progress.
- (iv) *Agreement to contribute to the resolution of policy and infrastructure constraints* – by bringing to the attention of the SAGCOT Centre their own concerns about specific factors that currently hinder local and national development of commercial agriculture. Members at all levels must be prepared and able to contribute to identifying these impediments, each according to their role and capacity.
- (v) *Agreement to consider new and innovative financing mechanisms* – which are aimed at catalyzing additional private investment in SAGCOT in ways that ensure that major benefits also accrue to smallholder farmers. This will require creative investment, and the willingness of farmers and agribusiness to accept new types of risk and modifications to traditional practices.

Source: SAGCOT Centre (undated)

Green Growth

A "Green Growth" strategy was commissioned by the Government of Tanzania to inform the development of the SAGCOT investment framework. Agriculture Green Growth (AGG) is described as "a contemporary approach to sustainable development that recognises the need for any development to take place within the limits of local, regional and global ecosystems" (EcoAgriculture Partners, 2012). The framework report - the SAGCOT Greenprint" - is currently available.

2.2**PROPOSED WORLD BANK SUPPORTED SAGCOT INVESTMENT PROJECT****2.2.1****General**

The proposed World Bank support to SAGCOT ("the Project") will be in the form of a Specific Investment Loan (SIL). The Bank has prepared a Project Concept Note (PCN) and is preparing a Project Appraisal Document (PAD)

for the proposed Southern Agricultural Growth Corridor Investment Project (P125728-IDA). The proposed Project Development Objective (PDO) aims to improve smallholders' agriculture productivity, increase rural income and employment opportunity through both promotion and expansion of partnership between smallholder farmers and agribusiness in the Southern Corridor.

The Project will have three components (budgets are approximate):

- **Component 1. Strengthening Agribusiness Support Institutions** (US\$ 13 million: described below).
- **Component 2. SAGCOT Catalytic Fund** (US\$ 45 million: described below), in support of the Matching Grants window of the Catalytic Fund
- **Component 3. Project Implementation Support** (US\$2 million): a Project Coordination Unit (PCU) will be created in the Prime Minister's Office to manage the overall implementation of the financing agreement and to monitor the budget and implementation of the Project Implementation Manual. The PCU will facilitate communications between key SAGCOT stakeholders including the SAGCOT Centre, SAGCOT Catalytic Fund, and the Tanzania Investment Centre.

At present the World Bank is preparing the documentation necessary for loan appraisal.

2.2.2

Catalytic Fund

The main objective of the Catalytic Fund (CF) is to catalyze agribusiness investment in the Southern Corridor in ways that reduce poverty, improve food security and benefit smallholder farmers. The Fund is expected to have two windows:

- **The Matching Grants Facility** (MGF) will finance the efforts of established commercial agribusinesses to expand their commercial linkages with smallholder farmers by building or extending competitive supply chains. The Matching Grant, in effect, shares the risks of incorporating larger numbers of smallholders into sustainable commercial supply chains. These grants may be used to support the expansion of contract farming, the improvement of access to more productive production inputs (seed, fertilizer, planting material), the improvement of product assembly systems, the improvement of grades and standards and related support strategies. It is possible that a matching grant could be used to resolve small infrastructure bottlenecks in the supply chain such as fixing drainage problems blocking rural feeder roads, the electrification of a

processing plant or the refurbishment of a warehouse required for product assembly⁽¹⁾.

- **The Social Venture Capital Fund (SVCF)** is expected to promote the development and expansion of smaller and younger agribusinesses with supply chain links with smallholders to become commercially and financially viable businesses. The financing will be provided as low-cost or interest-free loans, repayable as soon as the business attracts private finance or equity depending on the specific situation. IDA will not contribute to this fund.

The World Bank funds will support operation of the Matching Grants Facility including a contribution toward the operations of the Board, Investment Committee and Fund Manager⁽²⁾ in conjunction with other partners⁽³⁾ providing catalytic funding.

2.2.3 *Support Institutions*

The Project will support two core institutions involved with the SAGCOT Programme: the SAGCOT Centre, which will facilitate the sustained pursuit of the overall mission of expanding agribusiness development in the corridor; and the Tanzania Investment Centre (TIC)⁽⁴⁾.

Subcomponent 2A: Support for the SAGCOT Centre

The objective of this project sub-component (approximately US\$5 million in value) is to strengthen the capacity of the newly established SAGCOT Centre.

The SAGCOT Centre, registered as a private organisation, was established to coordinate activities and investments that support large-scale, emergent and small-scale farmers and agribusinesses in targeted high potential areas in the Corridor. The Centre will also support, manage and expand the SAGCOT Partnership, attracting key actors needed to ensure improvement in selected crop and livestock value chains. Other Centre responsibilities are identifying business opportunities; assisting access to finance; promoting public-private partnerships; facilitating the resolution of policy constraints; and providing aspects of monitoring and evaluation.

(1) The Catalytic Fund design team has yet to complete the details of the operational arrangements and funding conditions for both windows of the Catalytic Fund.

(2) There may be two fund managers, one for each window in the Catalytic Fund. This decision will be guided by the advice of the design team.

(3) These include USAID, the Government of Tanzania, DFID and the EU which are also considering providing funding.

(4) The World Bank and other partners are also involved, through other mechanisms and projects, in supporting (or in considering future support to) the Ministry of Lands, Housing and Human Settlements Development (MLHSD) in activities that will have relevance to addressing the land issues affecting the SAGCOT Programme as a whole, including demarcation and certification of village boundaries, participatory land use planning, securing of land rights through (inter alia) issuance of certificates of customary rights of occupancy, identification of options for inclusive partnership models for investment, etc.

This subcomponent will support the Centre by financing operating costs (goods and services), staff salaries, consultancies and training costs of the SAGCOT Centre's following core functions:

- (i) *Coordination and information sharing:* the SAGCOT Centre is responsible for stakeholder coordination, communications and private-public dialogue. The Centre will also function as the Secretariat to the SAGCOT Partnership Forum and the SAGCOT Advisory Committee. The Centre will generate and disseminate periodic updates on the SAGCOT programme through print and electronic media, organize regular stakeholder meetings, and facilitate the coordination of the activities of the various public and private sector stakeholders at national, regional and local levels.
- (ii) *Strengthening the enabling environment:* the SAGCOT Centre will periodically review the main policy, regulatory and institutional constraints to agribusiness investments in the SAGCOT, carry out relevant diagnostics, and present options for their resolution. The results of these analyses will be presented to the Partnership Forum, and to the National Steering Committee on the Investment Environment Roadmap for implementation through Government plans. These constraints and issues are expected to include questions of taxation (simplification and streamlining tax administration, rationalization of tax incentives and improving the tax regime for SMEs), trade policy including export bans and non-tariff barriers, cost of business entry, operations and exit, and investor protection. The Centre is expected to conduct the diagnostics and advocacy work in close coordination with the Department of Investment and Private Sector Development in the Prime Minister's Office which is leading the national business environment reform programme.⁽¹⁾

The SAGCOT Centre will also initiate the preparation of a prioritized public infrastructure investment plan (focusing on integrated road network and power supply development) for the SAGCOT initially focusing on the three priority clusters: Kilombero, Ithemi and Mbarali. A preliminary review estimates the total cost to rehabilitate about 552 km of rural roads and maintain 1104 km of within-cluster road networks, as well as construct 191 km of 33kV power distribution lines, at about US\$259 million. However, the relative priority to be attached to these proposals still needs to be clarified.

As this diagnostic work evolves, the Centre will need to ensure that SAGCOT's infrastructure requirements are reflected in the Government's sectoral development plans such as the upcoming Second Transport Sector Investment Plan (TSIP II 2012/13 - 2017/18) of the Ministry of Transport. The Centre also needs to coordinate closely with

(1) The IFC Investment Climate Program is one of several agencies contributing to this effort.

the Rural Energy Agency to ensure that SAGCOT priorities are clearly reflected in the current Rural Electrification Master Plan.

The Centre is expected to perform an advocacy role targeting continuing improvements in the overall backbone transportation infrastructure in SAGCOT including the TANZAM highway, the TAZARA railway and Dar es Salaam port, all of which are critical to the success of the SAGCOT programme.

- (iii) *Monitoring of safeguards and SAGCOT performance:* the SAGCOT Centre will monitor the overall compliance of the Project investments with the social and environmental safeguards policies and instruments. This function will be carried out in close coordination with the National Environmental Management Council (NEMC) and the relevant District Councils. The Centre will be responsible for the compilation and delivery of timely monitoring reports on the implementation of the approved safeguards instruments such as the ESMF and the Resettlement Policy Framework (RPF). The Centre will also monitor the activities of its SAGCOT partners to ensure that these are in compliance with the SAGCOT Partnership Principles. In addition, the Centre is expected to monitor the level of achievement of agreed performance targets for the SAGCOT Programme as a whole by establishing a comprehensive monitoring and impact evaluation system.

Subcomponent 2B: Support for the Tanzania Investment Centre (TIC) for investment generation

The TIC (~ US\$ 4 million in value) is the first port of call for all investors coming into the country, including those from the agribusiness sector. The agency is responsible for approving new investment projects and then issuing a Certificate of Incentives detailing the package of incentives for which the investor has qualified (e.g. duty-free imports, corporate tax holidays, VAT exemption etc). It is understood that international agribusiness investors seeking land for investment purposes must, most cases, also obtain a sub-lease from the Centre.

The TIC is strengthening its efforts to attract agribusiness investment into the country through an Investment Partnership Programme (IPP). Under this plan, the TIC is working with the SAGCOT Centre to make foreign and domestic investors aware of the opportunities in the southern corridor, facilitate the removal of specific barriers to investment, and help investors and the Government bring potential investment commitments to a successful conclusion. As part of the IPP, the TIC has assessed investment opportunities along three initial agricultural value chains (cereals, sugar, livestock) and two categories of infrastructure support (power, transport). The TIC expects to continue this programme for an evolving listing of priority agri-business sectors over the next few years.

The TIC will continue to perform these activities in close coordination with the SAGCOT Centre (with a coordinated effort to resolve enabling environment constraints related to the business environment and infrastructure) as well as with the SAGCOT Catalytic Fund.

3 THE AGRICULTURE SECTOR IN TANZANIA

3.1 INTRODUCTION

This chapter provides an overview of the agriculture sector in Tanzania as context for the SAGCOT Programme.

3.2 AGRICULTURE AND THE TANZANIAN ECONOMY

3.2.1 Overview

In Tanzania, the agricultural sector is the leading sector of the economy and accounts for over half of the GDP annually, and about 60% of foreign exchange earnings. The agricultural sector includes all farm related activities, such as crops, livestock, horticulture, biofuels and fishing. About 80% of the population live and earn their living in rural areas with agriculture as the mainstay of their living. Almost all the food (95-97%) consumed in the country is grown locally, and the agricultural sector is the major source of raw materials for local as well as overseas industries.

Food crops are dominated by maize, followed in terms of tonnage by cassava, sweet potatoes, legumes, bananas, sorghum and rice. National production of cereals and non-cereals is some 5 M tonnes each. However, at a national level food security has not been achieved yet due to regional variations in supply and demand, and market inefficiencies. Large amounts of wheat are imported each year. Major export crops are cotton, coffee and tobacco, each achieving around \$100M in export value in 2009 (UCCS, 2009).

The livestock sub-sector is an integral part of Tanzania's economy and cattle dominate the livestock industry. The contribution of the livestock sector to agriculture and the national gross domestic product is 30% and 6.1% respectively. The links between the livestock sub-sector and other sectors are also important. Livestock play an important role in providing income and employment opportunities, mostly in the rural economy, but increasingly in the commercial sector. The potential to increase both livestock production and productivity and its contribution to GDP exists as the carrying capacity of up to 20 million Livestock Units has not been fully utilized. In addition, livestock play a crucial role in household food security as they indirectly support crop production through draught power and manure. They are the most significant source of income and store of wealth for smallholders and thereby provide a reliable source of access to food and overall household food security.

The agricultural sector is particularly important for poor people in Tanzania, 80% of who reside in rural areas where poverty is most severe. According to the Government of Tanzania's (GOT) Household Budget Survey (HBS) 2000/01, some 18.7% of the Tanzanian population lives below the food

poverty line and about a third of the population falls below the basic needs poverty line, rising to about 40% of in rural areas. The HBS 2000/01 results also reveal that illiteracy rates are high and overall quality of education low.

While Tanzania's overall economic growth trajectory has been in line with the national poverty reduction strategy, the agricultural sector has only grown at an annual rate of about 4 to 5% in the last 10-15 years (in 2010 it was 4.2%). Nevertheless, the sector is central to the country's growth and poverty reduction prospects, providing a quarter of national GDP and accounting for 75% of rural household income. The contribution of agriculture to GDP was 24.1% in 2010, compared to 24.6% in 2009. In the southern corridor (Rufiji Basin), agriculture contributes more than 75% to rural household incomes, with crop production more important than animal husbandry.

Farming Systems

Table 3.1 summarises the principal farming systems in the Rufiji Basin, which are representative of the corridor as a whole. Maize production dominates (accounting for 75% of all cereals produced in Tanzania) although the southern corridor is also an important rice producing area, especially the Rufiji's alluvial plains (Usangu flats, Kilombero Valley and lower Rufiji floodplain and delta).

Table 3.1 *Farming Systems in the Rufiji Basin*

Farming system	Location	Characteristics
Banana/coffee horticulture	Outside Rufiji Basin	-
Maize/legume	Occurs widely in the basin, especially the parts of the basin within Iringa, Morogoro, Mbeya and Rukwa regions	<ul style="list-style-type: none"> • Maize and legumes (beans, peas, groundnuts etc) sometimes intercropped with Arabica coffee • Land is abundant • Shifting cultivation
Cashew/coconut/cassava	In the coastal parts of the basin – Rufiji, Liwalo and Kilwa districts	<ul style="list-style-type: none"> • Land is not scarce • Shifting cultivation • Low rainfall • Low soil fertility
Rice/sugarcane	In alluvial river valleys, especially Kilombero Valley	<ul style="list-style-type: none"> • Maize commonly grown alongside rice and sugarcane • Reliable rainfall • Fertile clay soils and alluvial fans • Many large scale / commercial farms
Sorghum/bulrush millet/livestock	Outside Rufiji Basin	-
Tea/maize/pyrethrum	In Njombo and Mufindi districts	<ul style="list-style-type: none"> • Tea, maize, Irish potatoes, beans, wheat, pyrethrum, wattle trees and sunflower • Highlands • Reliable rains • Moderately fertile soils • Dairy cattle kept
Cotton/maize	Sikongo, Manyoni, Chunya, Mbarali, Kilosa, Morogoro Rural and Rufiji districts	<ul style="list-style-type: none"> • Cotton, sweet potatoes, maize, sorghum and groundnuts • Intensive cultivation • Livestock is kept

Farming system	Location	Characteristics
Horticulture	Iringa Rural and Morogoro Rural districts	<ul style="list-style-type: none"> • Vegetables (cabbages, tomatoes, paprika, cauliflower, lettuce, onions and local) and fruits (apples, plums, pears, passion fruits and avocado) • Maize, coffee, Irish potatoes, tea and beans are also grown in these areas
Wet-rice and irrigated system	In river valleys and alluvial plains, particularly the Kilombero, Ulanga, Usangu and Lower Rufiji plains	<ul style="list-style-type: none"> • Rice, vegetables and maize grown in small and large commercial farms.
Pastoralism (Pastoralists and Agro-pastoralists)	In semi-arid parts of the basin – Mpwapwa, Dodoma Rural, Manyoni, Sikongo, Chunya and Mbarali districts	<ul style="list-style-type: none"> • Low and unreliable rain • Limited resource base • Traditional pastoral systems with strong attachment to livestock and simple cropping system • Shifting cultivation of millet • Moderate to low population density

Source: WREM Int. (2012), Vol. I, p23

Approximately 95% of the 2.1 million ha under crop production in the southern corridor is farmed by smallholders using traditional rain-fed methods, primarily for subsistence farming. In general, yields are low, with grain and pulse yields averaging less than 1.5 t/ha.

The low productivity mainly results from the limited use of quality inputs, including water, seeds and fertilizers, a lack of mechanization (often originating from a lack of access to credit), a lack of information on farming techniques and market intelligence, and low value addition/ agro-processing. Further constraints include:

- low farm-gate prices;
- high post-harvest losses;
- poor connectivity between agricultural villages and markets (feeder roads);
- high disease and pest prevalence; and
- high cost of agrochemicals (and often low quality).

Despite its huge potential there is currently very limited large scale irrigated farming in the southern corridor. Of the 7.5 million ha of arable land, less than 2% is irrigated (mainly public irrigation schemes for smallholder rice production).

Extension Services

Tanzanian farmers' skills and knowledge of improved farming techniques are low. The Tanzanian government has tried to improve this situation since independence by a variety of approaches, but with limited success. The extension services are constrained by low numbers of extension officers per district and limited budgets.

Livestock

Livestock rearing is very important in the Rufiji Basin, with most crop-producing households also keeping livestock (primarily cattle). Only about 1% of agricultural households are considered to be 'livestock only' or 'pastoralist'. Livestock rearing is not evenly distributed within the basin, and tsetse fly infestation is partly responsible for restricting livestock to the drier areas. The Sukuma, Maasai and Barabaig keep the largest cattle herds. Pastoralism is discussed further below.

Pastoralism

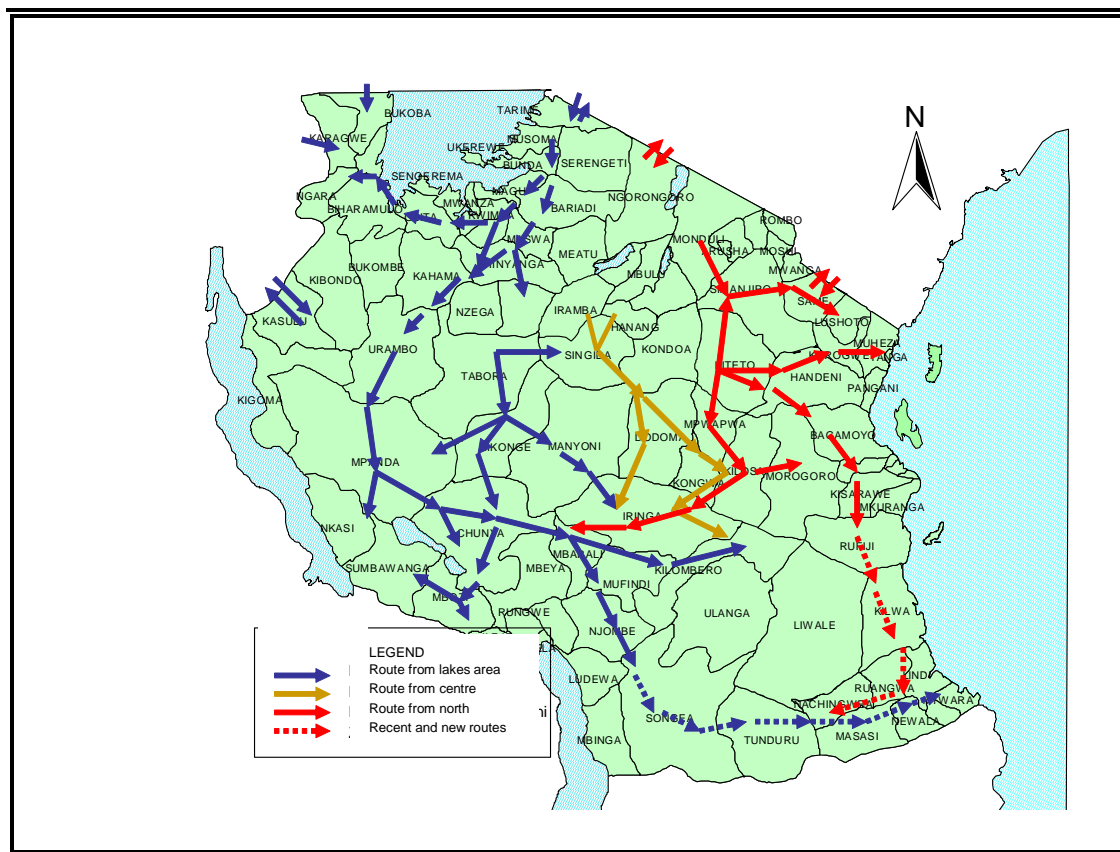
Livestock accounts for about 30% of the total agricultural GDP in Tanzania and is traditionally a crucial component of people's livelihoods. There are an estimated 18 million head of cattle in Tanzania, making it the third largest population in Sub-Saharan Africa after Ethiopia and Sudan. The number of livestock is increasing, with cattle numbers rising by 16% between 2000 and 2005, goats by 30%, pigs by 64% and chickens by 10% during the same timeframe.

Around 90% of all domestic livestock are traditional indigenous species. While they may have limited potential for commercial meat and milk production, their characteristics represent adaptations to the environment. Historically cattle cultures have been located in the seasonally dry grasslands of northern Tanzania where indigenous pastoralist groups such as the Maasai, Barabaig, and to a lesser extent, the Sukuma and Gogo, moved their herds throughout the year to optimize the use of available grazing.

In recent decades a combination of active government relocation programmes and reduced availability of rangeland associated with a variety of government policies, development schemes, the commercialisation of agriculture and establishment of large protected areas has resulted in a movement of cattle-owning groups to the centre and south of Tanzania. This large scale movement (*Figure 3.1*) has been accompanied by significant resource degradation and pastoralist-farmer conflicts, for example in the Mkata Plains north of Mikumi National Park.

The various pastoralist groups have different cultures with respect to natural resources, to sedentary life and to crop farming - the Barabaig and Maasai are pure pastoralists, the Wasukuma are agro-pastoralists who may settle in an area and take up cultivation as well as herding. As a cultural and economic group the Wasukuma are now a major feature of life in the Kilombero Valley.

Figure 3.1 Pastoralist Migrations



Source: Hella (undated)

Fishing

The traditional inhabitants of the Rufiji floodplains and delta (the Nderegereko and Nyangatwa) are widely engaged in fishery activities. In Kilombero district fishing is ranked second to agriculture in economic importance. Most fish caught are consumed locally, but there is a significant trade of dried fish with other regions.

Research

Agricultural research remains a core function of government. Private sector involvement in agricultural research planning and funding is encouraged, especially by crop agencies, cooperative societies, unions and commodity boards. Government funding is directed mainly to food crop, livestock, resource management and engineering research.

Seeds

As described on the GoT website, the private sector is allowed to produce, distribute and market seeds. Production of breeder seed is done at research institutes, foundation seed is produced at five foundation seed farms now under the Department of Research and Development, and certified production by contract growers in Arusha, Morogoro and Iringa regions. The Tanzania Official Seed Certification Agency (TOSCA) is responsible for quality control

from the foundation seed farm stage up to the sale of certified seed to farmers. The main seeds produced are hybrid and composite maize, sorghum, beans, wheat and sunflower. Tanzania Seed Company (TANSEED) is involved in both foundation seed farms and certified seed production. Private companies involved in seed production and distribution include Cargill Hybrid Seeds, Pioneer Hybrid International and Paunar and Rotian Seeds Company.

3.2.2 *Land Use*

Land cover in the southern corridor, interpreted from 2009 satellite imagery, is given in *Table 3.2*.

Table 3.2 *Land Cover in the Southern Corridor*

Land Cover	Area (km²)	Percent of Total Area
Urban and other artificial areas	447.9	0.1
Croplands (crops occupy >70% of area)	10,134.5	3.3
Mosaic croplands (crops occupy <70% of area)	71,544.8	23.3
Evergreen forest	12,841.0	4.2
Deciduous forest	71,234.7	23.2
Woodland	57,826.6	18.8
Shrubland	37,891.7	12.3
Grassland	31,111.2	10.1
Wetland	4,316.9	1.4
Water bodies	10,107.3	3.3
Total land area	307,456.6	100

Source: Milder et al. (2012)

3.3 *PRIORITIES FOR DEVELOPMENT OF THE AGRICULTURE SECTOR*

3.3.1 *Current Initiatives for Agricultural Development*

The challenges facing the farm sector in Tanzania have been widely documented in consultancy reports ⁽¹⁾ citing critical problems such as low productivity, inefficient product and input markets, reliance on rainfall (thus being prone to drought), lack of technology, inadequate processing, poor logistical handling, poor transport systems, farmers' disorganization, lack of access to financial services, poor extension services, institutional setup problems, poor research and development, and fund mismanagement.

To address these challenges, the Government - in collaboration with donors - has developed a sequence of policies and strategies. Some of these have been implemented and others are in various stages of implementation. Substantial funds have been extended and in many cases planned milestones achieved, but progress in terms of transforming life for the beneficiaries, has been relatively limited. During the pre-liberalisation era many of the initiatives

(1) References to consultancy report are provided in the detailed discussion and analysis below (and throughout this report).

were targeted at smallholder farmers, and the government was directly involved in the provision of services to farmers and in processing and marketing. Following economic liberalisation and the move away from direct state involvement in economic activities, many of these initiatives have now shifted to LGAs, NGOs and the private sector. The framework is provided by the *Agricultural Sector Development Strategy (ASDS)* which was formulated by the Government in 2001 to provide a framework for directing public and private resources into the sector, and for eventually contributing to the goals of economic growth and poverty reduction. The ASDS objectives are to a) improve agricultural productivity and profitability in order to raise farm incomes, b) to reduce rural poverty and achieve greater food security. The ASDS identifies five strategic issues: (i) strengthening the institutional framework; (ii) creating a favourable environment for commercial activities; (iii) clarifying public and private sector roles in improving support services; (iv) strengthening marketing efficiency for inputs and outputs; and (v) mainstreaming planning for agricultural development in other sectors.

Following the broad consensus around the ASDS, the *Agricultural Sector Development Programme (ASDP)*, was developed financed through a basket funding arrangement. The programme is aimed at (i) improving the capacity of farmers to more clearly articulate demand for agricultural services and to build partnerships with service providers; (ii) reforming and improving the capacity of both public and private agricultural service providers to respond to demand and provide appropriate advice, services and technologies; (iii) improving the quality and quantity of public investment in physical infrastructure through more devolved, technically-sound planning and appraisal, and (iv) improving market institutions. In addition, the government, together with donors, has implemented several other programmes, including the Participatory Agricultural Development Programme (PADEP), District Agricultural Sector Investment Programme (DASIP), Agricultural Sector Programme Support (ASPS), and the Agricultural Marketing Systems Programme (AMSP).

The first phase of the ASDP has been completed, and the government has recently embarked on formulation of the second phase of ASDP (ASDP II). On top of ASDP there are several macro-frameworks including the *National Strategy for Growth and Reduction of Poverty (NSGRP or MKUKUTA)*, the *Tanzania Agricultural and Food Security Investment Plan (TAFSIP)* under the *Comprehensive African Agricultural Development Plan (CAADP)*, and the *Five Year Development Plan (2011-2016)*. All of these are intended to work through ASDP.

Some of the government's policy commitments to improve the agriculture sector are summarised in *Table 3.3*.

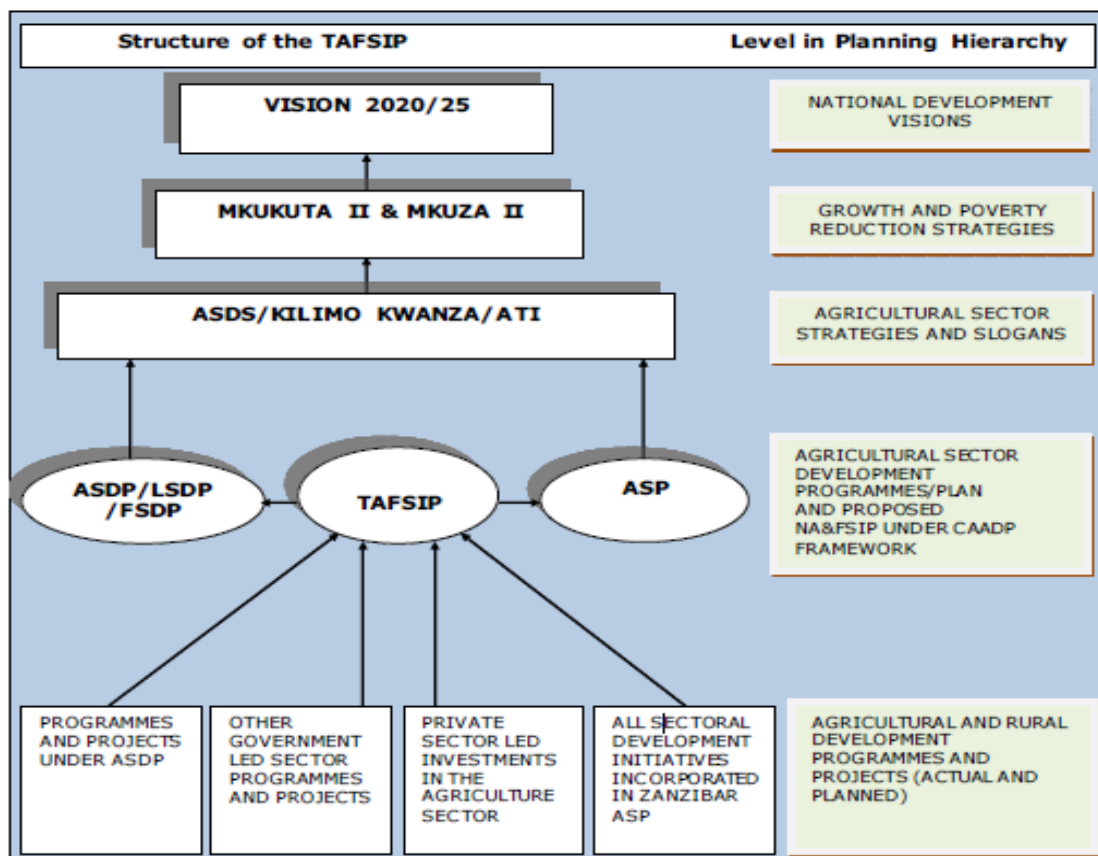
Table 3.3 *Agricultural Investment Supporting Policies*

No.	Policy	Policy Statement
1	Agricultural and Livestock Policy	To produce and supply raw materials, including industrial crops, livestock, by-products and residues for local industries, while also expanding the role of the sector as a market for industrial outputs through the application of improved production, marketing and processing technologies.
2	Land Policy	Special Area for various investments will be identified and set aside for allocation to investors by the Government.
3	Trade Policy	The Government will expedite reforms of the legal and regulatory framework and encourage self-regulation by the private sector as part of measures to enhance the enabling business environment so as to stimulate higher FDI flows and increase domestic investments.
4	National Investment Promotion Policy	The Government will provide both fiscal and non-fiscal investment incentives to investors. The fiscal or tax incentives include investment allowances on capital expenditure, reinvestment allowances on capital expenditure, infrastructure allowances on infrastructure expenditure, preferential tax rates for withholding tax on dividends, royalties and interest, preferential tax rates on personal income tax, preferential rates on indirect taxes, and double deductions of approved/specified costs and expenses. In addition, the incentives must be stable, affordable and competitive.
5	Sustainable Industries Development Policy	Recognition and encouragement of the development of the private sector including measures appropriate to both local and foreign investors. Streamlining the processing of resident and work permits and business visas.
6	Employment Policy	To provide tax relief and easy to accept investment conditions to investors in order to promote employment.
7	SME Policy	The Government will enhance implementation of programmes aimed at simplification and rationalization of procedures and regulations so as to encourage compliance and minimize transaction costs.
8	National Strategy for Economic Growth Reduction of Poverty (NSGRP II),	The focus will be on modernization and commercialization of private sector based small, medium and large-scale agriculture for increased productivity, employment creation, profitability and increased incomes, especially in rural areas.
9	Five-Year Development Plan (2011/12-2015/16)	Goal: Modernization, commercialization, and productivity enhancement of the agriculture sector
10	Mini-tiger plan 2020	One village one product program (OVOP) Cash crop Special Economic Zone program
11	National Vision 2025	Ensure food self-sufficiency and food security
12	Agricultural sector Development Strategy	Transformation from subsistence to commercial agriculture Reduced proportion of rural food poor (men and women) from 27% in 2000/01 to 14% by 2010. Productivity in crop and livestock enterprises increases by at least 20%
13	Agricultural Marketing Systems Development Programme (AMSDP)	Increase incomes and food security of the rural poor in Northern and Southern Highlands agro-ecological and marketing zones of Tanzania. Improved structure, conduct and the performance of agricultural marketing systems in the country Producer empowerment and market linkages and improved rural marketing infrastructure development
14	Agricultural Marketing Policy	Farmers and agricultural marketing actors to be supported to negotiate and compete effectively in regional and international markets; Encourage producers to directly enter the markets instead of using middlemen. Promote adherence to quality, standards and grade in agricultural products to start with the domestic market; Enhance access to agricultural marketing finance

Source: Extracted from the respective policy and strategy documents

Recently, the government has adopted an African framework for developing agriculture under what is known as the Comprehensive African Agricultural Development Programme (CAADP). At the national level, CAADP is intended to be implemented through local plans and strategies. The Tanzania Agriculture and Food Security Investment Plan (TAFSIP) 2011-12 to 2020-21 indicates the linkages between different frameworks as follows (Figure 3.2).

Figure 3.2 TAFSIP in the National Planning Hierarchy



Source: URT, 2011

Government is now promoting rapid agricultural change through its *Kilimo Kwanza* (Agriculture First) initiative (Box 3.1). *Kilimo Kwanza*, and now the SAGCOT Programme, are the first initiatives to focus on engaging the private sector in the development of agriculture in Tanzania, and aim to provide clearer rules of engagement for investors.

- Political will to push our agricultural transformation.
- Enhanced financing for agriculture.
- Institutional reorganization and management of agriculture.
- Paradigm shift to strategic agricultural production.
- Land availability for agriculture.
- Incentives to stimulate investments in agriculture.
- Industrialization for agricultural transformation.
- Science, technology and human resources to support agricultural transformation.
- Infrastructure Development to support agricultural transformation.
- Mobilization of Tanzanians to support and participate in the implementation of Kilimo Kwanza.

Source: The Tanzania National Business Council (2009). The Kilimo Kwanza Resolution.

3.3.2

Rationale for SAGCOT Programme

As stated by Prorustica¹, for many parts of Africa with high agricultural potential the urgent challenge is to catch up with international competitors, many of whom already benefit from good infrastructure and mature agribusiness clusters. Achieving this will not be easy: the private sector is reluctant to invest in agricultural situations in Sub-Saharan Africa unless it can be assured of access to affordable infrastructure, and a supportive policy and business environments; conversely governments and state utility companies are unlikely to commit significant public resources to building out infrastructure in rural areas where there is only limited commercial farming activity, and hence low demand for services. The agricultural growth corridor model is a way of breaking the impasse and catalysing large volumes of private investment and enabling high potential agricultural regions to become internationally competitive (<http://www.prorustica.com/>).

Note: as part of Tanzania's "Green Revolution" (TNBC 2009), SAGCOT activities should contribute to sustainability rather than undermining it. To this end, the SAGCOT Centre has prepared a Green Investment framework document. The document is centred on the concept of "Agricultural Green Growth" (AGG), i.e. agricultural investments and practices that are economically, socially and environmental sustainable. As stated by the Green Growth consultants, EcoAgriculture Partners:

"Agriculture Green Growth (AGG) includes agricultural production, processing, distribution, and marketing that is productive and profitable while also protecting and restoring the environment. AGG uses energy, water and other inputs efficiently; manages local ecosystems to increase farm productivity; and helps farmers prepare for and respond to droughts and climate change. AGG in the SAGCOT region is a collaborative process that

(¹) Prorustica were consultants for development of the SAGCOT Blueprint.

requires active participation from diverse stakeholders and sectors to make decisions about where and how agriculture should take place to maximize its benefits." (Buck & Milder, 2012).

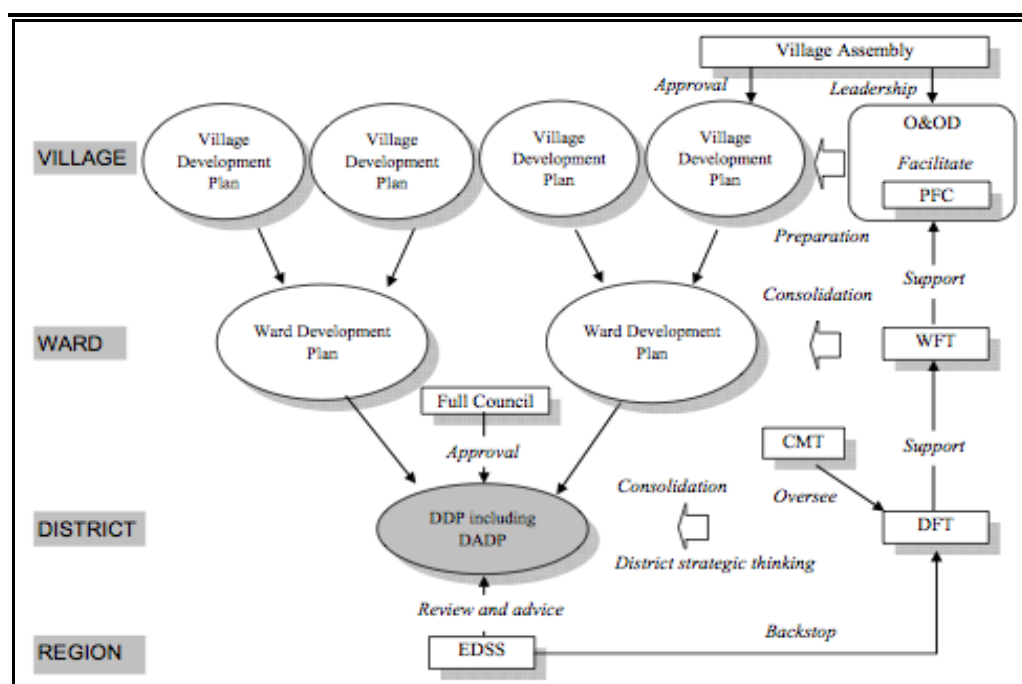
Key AGG activities are described as falling into four "domains" - crop and livestock systems, ecosystem management, markets and value chains, and democratic governance, planning and coordination (EcoAgriculture Partners 2012). Typical proposed innovations include the System of Rice Intensification (SRI), rainwater harvesting, participatory extension and adaptive research, "community-designed local natural areas", greener agricultural practices (e.g. integrated pest management), preservation of wildlife corridors, links to carbon markets through REDD, shortened value chains, product differentiation, and coordinated land use planning.

If these proposals can all be operationalised and mainstreamed into SAGCOT activities there will be major benefits to the programme's sustainability - economic, social and environmental. Without them there is a high risk of "business as usual" with significant increases in agricultural investment and economic activity coming at the price of significant lost opportunities for enhanced development and the many negative impacts on local communities and natural resources already documented elsewhere in Africa (see, e.g., Anseeuw *et al.*, 2011).

3.3.3 *District Level Agricultural Planning*

The process of developing District Agricultural Development Plans (DADPs) is outlined in *Figure 3.3*. The process begins at grass-roots level with the preparation of Village Development Plans (VDP), part of the approach being "O&OD" (Obstacles and Opportunities Development), a participatory planning tool introduced by GoT to plan for development at village level. The VDPs are compiled into Ward Development Plans and then into DADPs (as a component of District Development Plans). Following approval by the full District Council the plans are then sent to the relevant Regional Secretariat which determines whether they are in line with the Mid-Term Expenditure Framework (MTEF) guidelines and associated budget ceilings. They are then forwarded to the concerned Parliamentary Committee (PAC-LAAC). Eventually, the Ministry of Finance receives all the adjusted plans and prepares the National Budget, which is discussed in the June Parliamentary session every year.

Figure 3.3 The SAGCOT Centre and Social and Environmental Responsibility



Source: Agricultural Development Strategy Program (ASDP): Guidelines for District Agricultural Development and Implementation, Nov. 2006

Implementation of the DADPs is dependent on receipt of funds from central government. This can sometimes be erratic and is often not consistent with the approved DADPs, largely due to capacity and budget constraints and high staff turnover within some of the government agencies involved.

Recently the Tanzania Agricultural Partnership (TAP), which is active in 25 districts, has developed a process to establish Commodity Investment Plans (CIPs) that bring together government authorities, farmers and agri-business in focusing effort and investment in a specific, locally important commodity. This is proving a useful tool in stimulating agricultural commercial development at the district level, as well as a vehicle for accessing additional support, via the district agricultural development plans, from the agricultural sector development programme.

3.4 FINANCING POLICIES AND INCENTIVE STRUCTURE IN AGRICULTURE

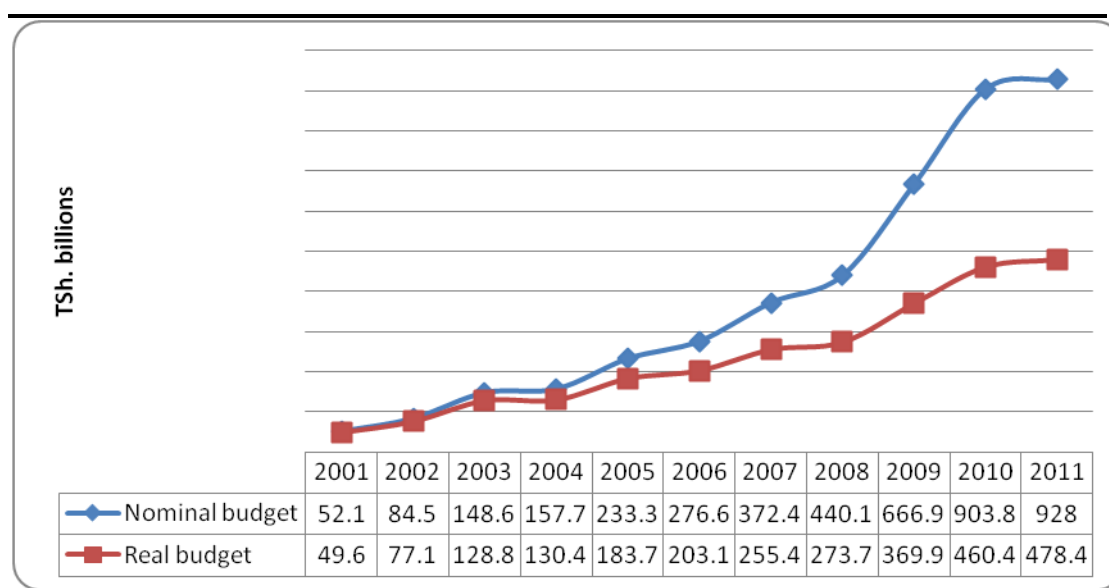
The role of finance in agriculture (as in the industrial and service sectors) cannot be over-emphasized, given its essential role in supporting production. Some of the more important financial policies relating to agriculture are highlighted below.

3.4.1 Government Agricultural Financing

GoT is the main funder of the agricultural sector, though development expenditures are predominantly funded by development partners (see below). The agricultural budget in Tanzania steadily increased in the period 2001 to

2011, from 3.0% of the national budget (TZS 52.1 billion) in 2001/02 to 7.8% in 2010/11. However, thereafter there was a small decline to 6.9% in 2011/12 (TZS 928 billion) (Figure 3.4).

Figure 3.4 The SAGCOT Centre and Social and Environmental Responsibility



Source: EAFF, 2011

GoT expenditure on agriculture is to increase to 10% in line with the Comprehensive African Agricultural Development Program (CAADP) commitment. A large proportion (about 75%) of all the agricultural sector funds is spent at district level where all agricultural activities take place. Recognising that the sector has a direct impact on the livelihoods of a majority of Tanzanians, since 2006/2007 GoT has been implementing the Agriculture Sector Development Programme (ASDP), largely through District Agricultural Development Plans (DADPs).

Of the total budget for the sector for the financial year 2011/12, TZS 258 billion was allocated to the MAFC. Of this, TZS 152 billion was planned to be spent on recurrent expenditure while TZS 105 billion was planned for development expenditure. (development expenditure comprises a part (91 billion Tanzania shillings) predominantly funded by donors (TZS 91 billion) and a part raised locally (TZS 14 billion)).

MAFC also allocated TZS 6 billion to cooperatives development, TZS 32.89 billion to the District Irrigation Development Fund (DIDF) and TZS 10.6 billion to the National Irrigation Fund (NIF). A total of US\$ 40 million was acquired during financial year 2010/11 from India to import tractors, power tillers and irrigation pumps. In addition, under the Tanzania Investment Bank, about TZS 40 billion has been set aside in the form of soft loans to support smallholder farmers in purchasing agricultural equipment, although difficulties with providing collateral have usually prevented smallholders from accessing these loans.

Government spending on agriculture is mainly for subsidising smallholders to produce strategic crops and construction of rural infrastructure - rural roads, dips, chaco dams (small dams made from local materials) and irrigation schemes.

3.4.2 *Tanzania Investment Bank (TIB)*

The Tanzania Investment Bank (TIB) is a government-owned development bank, the first development finance institution established by GoT. Recently TIB has been re-capitalised, its strategic development plans re-vamped and its management re-structured. As of December 2010, TIB had a total asset base in excess of US\$ 62 million (TZS 93 billion). The government intends to raise that figure to US\$ 265 million (TZS 400 billion) in the next few years. The TIB's principal objective is to provide long, medium and short-term working capital to investors. Recently TIB has established a special product for agricultural investors – an agricultural financing window. This is designed to finance production, processing and marketing (for borrowers who involves in production and/or processing) of all agriculture and agriculture-related projects for the short, medium and long term. The target market for this credit programme window includes all agricultural and livestock projects with good track records and competent management teams. The focus for this facility is mainly on producer communities organised as cooperatives, as well as corporate entities and microfinance institutions involved in agriculture. Start-ups that meet critical eligibility criteria are also considered. Specifically, the target market for this credit product comprises:

- small and medium size farms organized as cooperatives or out-growers of larger farms;
- medium and large-scale commercial farms, plantations and ranches;
- downstream lenders to the agricultural sector, e.g. community banks and micro-finance institutions (NGOs, SACCOS); and
- intermediate agricultural activities in the value chain, e.g. storage, processing and marketing.

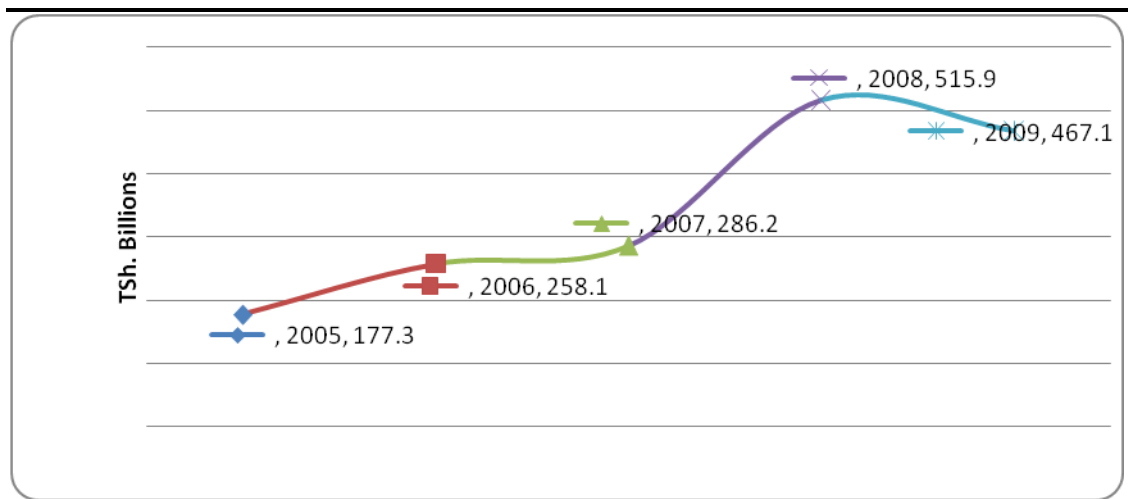
3.4.3 *Tanzania Agricultural Development Bank*

Preparations are being finalized to establish a fully fledged agricultural bank to be called Tanzania Agricultural Development Bank (TADB). The purpose of the TADB will be to assist farmers in accessing inexpensive long-term loans to be used for purchasing essential farm inputs and acquiring new farming techniques. The decision to establish TADB was reached after observing that agriculture was receiving about 10% of the total loans disbursed by commercial banks to the private sector but only 0.8% of this 10% was being reserved for actual agricultural production initiatives, the rest going to the short-term marketing of agricultural products.

3.4.4 *Agricultural Lending by Commercial Banks*

The Bank of Tanzania report of 2010 shows that flows of lending to the agriculture sector by domestic commercial banks in 2009 decreased to TZS 467.1 billion from TZS 515.9 billion in 2008 (9.5%) contrary to the earlier rising trend from 2005 to 2008 (Figure 3.5).

Figure 3.5 *The SAGCOT Centre and Social and Environmental Responsibility*



Source: BoT (2010)

According to Africa Investor Report 2011, banks operating in Tanzania supply more than 20% of the capital financing needs of foreign firms. Banks in Tanzania come top of the list of providers, supplying more than a third of capital to domestic firms.

3.4.5 *Export Processing Zones Authority (EPZA)*

In an endeavour to attract more investors, in April 2002 Tanzania established Export Processing Zones (EPZ) by Act of Parliament, effective March 2003. In February 2006 the Act was amended to strengthen supervision of the programme and to improve the incentive package by establishing the Export Processing Zones Authority (EPZA). The objectives of the Authority are to attract and promote investment for export-led industrialisation, increase foreign exchange earnings, create and increase employment opportunities, attract and encourage transfer of new technology, and promote processing of local raw materials for export (value addition). The EPZA does not specifically target agriculture but some agriculture-related businesses, especially in the textile sector, have been established in EPZs. They also provide an opportunity for the SAGCOT programme as potential locations for agri-food processing and value addition.

3.4.6 *Tax Regime for Agriculture in Tanzania*

In the recent past, the Government of Tanzania has taken steps to ease the tax burden on the agricultural sector. These changes are set out in various laws,

including the *Income Tax Act of 2004*, *Customs Tariff Act, 1976*, *Stamp Duty Ordinance (CAP 332)*, *Local Government Finances Act, 1982*, *Government Expenditure Budgets*, the *Vocational Education and Training Act (VETA)*, and *Value Added Tax Act, 1997*.

The circumstances that led to the Government enacting the new *Income Tax Act of 2004* were perceived shortcomings in the economy in relation to domestic revenue, the tax structure, and donor dependence. The new income tax covers all sources of revenue including agriculture.

To promote the agricultural sector the government has put in place a tax regime conducive to investment in the sector and enabling for small-scale farming. The establishment of an enabling environment for agricultural development is in line with the Poverty Reduction Strategy. The predominance of agricultural output in GDP and its massive share of employment in the total workforce make it an important ingredient for the strategy's success.

4 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

4.1 INTRODUCTION

This chapter provides a summary of the policy, legal and administrative framework relevant to the SAGCOT Programme, with notes on areas of institutional weakness. Due to the scale and complexity of the Programme, the chapter focuses on management of land and natural resources, agriculture and social issues.

4.2 ENVIRONMENTAL POLICY AND LEGISLATIVE FRAMEWORK

This section outlines the environmental policies and regulations most relevant to the development and implementation of the Project. The main legislation is:

- National Environmental Policy (1997).
- The Environmental Management Act (Cap. 191) (2004).
- Environmental Impact Assessment and Audit Regulations (2005).
- Registration of Environmental Experts Regulation(2005).
- Strategic Environmental Assessment Regulations (2008).

National Environmental Policy (1997)

The National Environmental Policy (NEP) provides a policy framework for environmental protection in Tanzania. The NEP provides policy guidelines and plans for the determination of priority environmental actions, and for monitoring and reviewing policies, plans and programmes. It further provides for sectoral and cross-sectoral policy analysis in order to achieve compatibility among sectors. The policy requires that project development be done in a way that does not compromise environmental integrity, and it stipulates that the technologies chosen for projects should be environmentally sound, socially acceptable and economically viable.

In relation to poverty alleviation, the policy focuses on the satisfaction of the basic needs of citizens with due cognizance of protecting the environment. Article 46 emphasizes achieving food security and the eradication of rural poverty by production systems, technologies and practices which are environmentally sound. Further relevant provisions of this policy are in Article 32 which refers to the development of biodiversity and wildlife and Article 45 which cites the importance of internalizing environmental considerations into sectoral policies and programmes, a fundamental requirement of sustainable development. Other articles, 48(c) and 56 (f), advocate technologies that use water efficiently, provide wastewater treatment and protect workers' health from environmental health hazards.

The NEP advocates the adoption of Environmental Impact Assessment (EIA) as a tool for screening projects which are likely to cause adverse environmental impacts. It stipulates the establishment of a legal regime requiring EIA to be mandatory for all development projects, including projects such as those to be initiated under SAGCOT.

Environmental Management Act, Cap 191, 2004

The Environmental Management Act (EMA) (CAP 191 No. 20 of 2004) provides the legal and institutional framework for management of the environment and implementation of the nation's environmental policy.

Section 81 of the Act establishes the obligation to undertake an EIA prior to the commencement or financing of a project, even if the proponent has a permit or license under any other written law. Section 81 also states that not undertaking an EIA when required is an offence. Section 82 refers to EIA regulations and guidelines by which EIAs will be conducted under the EMA and states that where "law requires an EIA to be done in respect of any project or undertaking and the manner in which an EIA is to be done, then it is not necessary to apply standards stipulated in the Act unless the standards prescribed under the law doesn't meet minimum standards".

The EMA, as described in Part VI EIA and Other Assessments, also empowers the National Environmental Management Council (NEMC) to screen, review and determine the types of development projects subject to EIA. The Act outlines projects that require a full EIA or those that may be subjected to full EIA, after NEMC determination. Under the Act the NEMC is mandated to undertake enforcement, compliance, review and monitoring of EIA and has the roles of facilitating public participation in environmental decision making, exercising general supervision and coordinating overall matters relating to the environment.

Environmental Impact Assessment and Audit Regulations, 2005

The Environmental Impact Assessment and Audit Regulations No. 349 of 2005 were made pursuant to Section 82 (1) and 230 (h) and (q) of the Environmental Management Act. The regulations provide the procedures and requirements for undertaking EIAs for various types of development projects with significant environmental impacts. In addition the regulations provide a list of projects that qualify for EIA. The regulations set out in detail the process to be followed in conducting an EIA, the form and content of EIAs, the review process, decision-making processes and appeals.

Regulation 46(1) classifies projects into two types: (i) Type A Projects requiring a mandatory EIA; and (ii) Type B projects requiring a Preliminary Environmental Assessment (PEA). The First Schedule lists typical examples of Type A and B projects. Some SAGCOT-related investment projects may fall into the category of projects that require mandatory EIA. Items twenty two (i) and (vii) of the First Schedule list land development planning, land

reclamation, housing and human settlement, resettlement/relocation of people and animals and development of residential and commercial estates on ecologically sensitive areas including beach fronts, as projects that require a mandatory EIA. The steps that must be taken to conduct an EIA are provided in the Fourth Schedule, whilst Regulation 16 directs that the EIA study, in addition to environmental impacts, also must address social, cultural and economic impacts. Regulation 17 stipulates the need for public participation during the EIA process and Part V, Regulations 18 (1), (2) and (3) directs the content and format of the EIS. According to this regulation, the investor first registers the project, by submitting Form EA1 to NEMC, with an outline of the project and its likely impacts. Following the assessment process, an Environmental Impact Statement (EIS) is submitted to a Technical Advisory Committee (TAC) coordinated by NEMC, for review. The proponent covers all EIA process costs.

Registration of Environmental Experts

Regulation 31 of GN No. 349/2005 directs the Registrar of Environmental Experts to publish each year in the Gazette and the media the list of individual persons duly certified and registered by the NEMC as Environmental Experts in the relevant year. New applications should be submitted to the Council annually. The experts are entitled to undertake EIAs and audits of development projects in mainland Tanzania.

SEA Regulations, 2008

The SEA Regulations (2008), promulgated under Section 230 (2) of the Environmental Management Act (CAP. 191), require a Strategic Environmental Assessment (SEA) to be undertaken (a) when a Bill which is likely to have an effect on the management, conservation and enhancement of the environment or the sustainable management of natural resources; (b) when promulgating regulations, policies, programmes and development plans; and (c) when any major mineral or petroleum resource is identified or when a major hydroelectric power station or water project is being planned.

The SEA must contain: (a) a full description of the policy, Bill, legislation, strategy, program or plan being considered; (b) identification, description and assessment of the positive and negative effects of the implementation of the proposed document on the environment and the sustainable management of natural resources; (c) identification, description and assessment of the likely effects of alternative means to meet the objectives of the proposed instrument; and (d) identification, description and assessment of a range of practicable measures that could be taken to avoid, mitigate or remedy any adverse effects that may result from the implementation of the proposed policy, Bill, legislation, strategy, programme or plan being considered.

Land issues in Tanzania have been analysed in depth in four recent reports:

- *The Land Governance Assessment Framework: Identifying and Monitoring Good Practice in the Land Sector* (Deininger et al., 2012). This World Bank report includes a detailed review of land governance in Tanzania, and concludes that the National Land Policy of 1996 "has not lived up to expectations" (p87). Areas where improved performance would be highly desirable include surveys, mapping, and registration; affirmative action to address gender issues; the redefinition of institutional mandates; the strengthening of decentralization; more participatory land use planning; changes in expropriation practices; and ways to improve conflict resolution mechanisms.
- *Making Land Investment Work for Tanzania – Scoping Assessment for Multi-stakeholder Dialogue Initiative* (Makwarimba & Ngosi, 2012). This report for REPOA, TNRF and IIED⁽¹⁾ identifies numerous problems in the land governance system including increasing conflict between existing land users and investors, contradictions between the two fundamental laws (Land Act and Village Land Act) and also with other laws such as the Wildlife Conservation Act, 2009, cumbersome procedures, lack of security of tenure at village level, non-transparent implementation of land acquisition and compensation processes, weak administration especially at local level, lack of accountability, corruption, and lack of strategies to mitigate risks to smallholders and herders from commercialisation of agriculture (pp2-4). Stakeholders consulted for the study were very interested in a multi-stakeholder dialogue on land issues especially those relating to land-based investments.
- *An Assessment of Concerns Related to Land Tenure in the SAGCOT Region* (Boudreaux, 2012). This report for USAID directly addresses the critical issue of land availability for investors in the Corridor, pointing out that all land already has users and that land for agri-business investors will have to be taken from villagers. The report asks the question: "As they are currently configured, do the property rights to land that exist in Tanzania create strong enough incentives for investors all along the agricultural continuum – from smallholders to large-scale foreign investors – to invest, trade, conserve, and protect against harms and fraud?" It concludes that there are three broad categories of concern - institutional, legal and political - which contribute to a weak enabling environment for the SAGCOT Programme and if not addressed could result in a lose-lose situation rather than win-win. Three key risks are identified: the role, powers and capacity of RUBADA; the GoT's publicly stated policy, captured in the National Land Use Planning Framework, to transfer 17.9% of lands from villages into the General Land category which may lead to displacement of villagers, loss of grazing rights, migratory corridors and water sources for pastoralists, and risks igniting land-based conflict, and

(1) These are national and international development NGOs.

the proposed "Land for Equity" policy requiring foreign investors to provide GoT (or their agents) with a 25% equity stake in exchange for land leases - to the exclusion of villagers.

- *Study of Policy, Legal and Institutional Issues related to Land in the Project Area* (Tenga & Kironde, 2012). This report was commissioned directly by the World Bank to identify the land-related challenges in the Corridor, learn from past lessons and provide inputs to project design. Amongst the study's many findings are (i) the non-existence of the "land bank" generally believed to be held by either the TIC or the Ministry of Lands, or possibly the Regional Authorities, (ii) the importance of resolution of "the pastoralist issue" to the success of the SAGCOT programme, (iii) the need for transparency in all land acquisition procedures, and (iv) the need to expedite land use planning at village level.

The remainder of this section provides a more formal overview of prevailing land policy and legislation.

4.3.2 *National Land Policy (1997)*

The overall aims of the *National Land Policy* (NLP: 2nd edition, 1997) are "to promote and ensure a secure land tenure system, to encourage the optimal use of land resources, and to facilitate broad-based social and economic development without upsetting or endangering the ecological balance of the environment."

Under the Constitution, in Tanzania the President owns all land in trust for present and future generations. The Commissioner for Lands acts on behalf of the President and administers the land. The NLP maintains the dual system of land tenure introduced by the colonial administration: right of occupancy, which is the main form of tenure, can be acquired through a grant by the Commissioner for Lands or through customs and tradition.

The NLP promotes protection of natural resources and the environment. Village lands and some communal areas can be reserved for conservation purposes (e.g. forests on village land). Highly sensitive areas such as water catchment areas, forests areas of biodiversity, national parks, wetlands and etc. are also protected: the Policy declares that "mechanisms for protecting sensitive areas will be created. These areas or parts of them should not be allocated to individuals." (NLP: para 4.2.10). Furthermore, the NLP states that "The government will ensure that permits, licenses, claims and rights for exploitation of natural resources are issued in line with land use polices, and environment conservation policies and programmes." (NLP: para 7.1.1).

To overcome the challenges of implementation, especially in relation to intersectoral coordination and the devolution of land management responsibilities from the Commissioner for Lands to local governments, GoT developed a Strategic Plan for Implementation of the Land Laws (SPILL). The programme has received mixed reviews (see, e.g., Kosyando, 2007).

4.3.3

Land Acts (1999)

The *Land Act, 1999* and the *Village Land Act, 1999* facilitate implementation of the National Land Policy. They confirm the National Land Policy directive that all land in Tanzania is public land vested in the President as trustee on behalf of all citizens.

The major function of the Land Act (No. 4, 1999) is to promote the fundamentals of the National Land Policy, through giving clear classification and tenure of land, land administration procedures, rights and incidents of land occupation, granted rights of occupancy, conversion of interests in land, dispositions affecting land, land leases, mortgaging of land, easements and analogous rights, co-occupation and partitioning and settlement of land disputes. Under the Act, Tanzanian land falls into three categories, namely;

- Reserved Land, which is set aside for wildlife, forests, marine parks, etc., and the way these areas are managed is explained in the laws that protect each sector (e.g. Wildlife Conservation Act, National Parks Ordinance, Marine Parks and Reserves Act, etc.). Specific legal regimes govern these lands under the laws which established them.
- Village Land, including all land inside the boundaries of registered villages, which the Village Councils and Village Assemblies are given power to manage. The Village Land Act governs the land and gives details of how this is to be done.
- General Land, which is neither Reserved Land nor Village Land and is therefore managed by the Commissioner. It includes urban areas as well as land occupied by parastatals and by government agencies such as the prisons and the National Service.

The Ministry of Lands and Human Settlements Development presently classifies: 70% of Tanzania's land area as Village Land; 28% as Reserved Land; and 2% as General Land.

In general terms, the Land Act (LA) covers General and Reserved Lands, while the Village Land Act (VLA) creates rules and processes to allocate land use rights to most rural lands. There is concern amongst some observers that the definitions of "general land" in the two laws are ambiguous because the VLA and the LA do not define "general" land the same way: in Section 2 of the VLA, "general land" means all public land which is not Reserved Land or Village Land, but in Section 2 of the Land Act, "general land" means all public land which is not Reserved Land or Village Land *and includes unoccupied or unused Village Land*. As a result of these differing definitions, observers such as Boudreaux (2012) consider that the Land Act may allow category (iii) village lands to be considered as General Land because they are "unused or unoccupied", creating uncertainty and insecurity amongst local residents. There is widespread agreement among civil society, land tenure experts, and

many Tanzanians that this ambiguity in the definition of “general land” needs to be resolved (Boudreaux, 2012).

4.3.4 *Land Acquisition and Compensation*

Land acquisition and compensation are governed by the *Land Acquisition Act (2002)* and the *Land (Assessment of the Value of Land for Compensation) Regulations, 2001*. However there is no direct law or legal provision specifically for “resettlement” in Tanzania in the sense implied in World Bank Operational Policy 4.12. There is a *National Resettlement Policy Framework of 2003* but, as yet, this has not been adopted as official policy by Government. Resettlement is generally guided by a variety of national policies and supported by legislation in relation to land acquisition, tenure and compensation. This includes the:

- *Constitution of the United Republic of Tanzania (1977 - as amended);*
- *National Land Policy (1996);* and
- *National Environmental Policy (1997).*

The Constitution provides for the protection of the rights and interest of citizens in matters concerning their property and its acquisition. Under article 24 (1), every person is entitled to own property, and has a right to the protection of property held in accordance with the law. Sub-article (2) prescribes that it is unlawful for any person to be deprived of property for any purposes without the authority of law, which makes provision for fair and adequate compensation.

With respect to land acquisition and compensation, the NLP states that:

- all land is public land vested in the President as trustee on behalf of all citizens;
- land has value;
- the rights and interest of citizens in land shall not be taken without due process of law; and
- full, fair and prompt compensation shall be paid when land is acquired.

Compensation should be paid to any person whose right of occupancy or recognized longstanding occupation or customary use of land is revoked or otherwise interfered with to their detriment by the state or is acquired under the *Land Acquisition Act Cap 118*.

The principal laws that provide the legal basis for compensation in Tanzania are listed below. These do not cover resettlement issues, but do provide requirements related to tenure and compensation:

- *Land Act No. 4 (1999);*

- *Village Land Act No. 5 (1999);*
- *Land Acquisition Act (1967);*
- *Land Disputes Act No. 2 (2002);*
- *Roads Act (2007);*
- *Urban Planning Act (2007);*
- *Land Use Planning Act (2007);*
Graves (Removal) Act (1969);
- *Local Government (District Authorities) Act (1982, revised 2000);* and
- *Local Government (Urban Authorities) Act (1982, revised 2000).*

Other Acts of relevance to land use and administration include the *Wildlife Conservation Act*; the *Tanzania Investment Act* and the *Rufiji Basin Development Authority (RUBADA) Act*; and also acts related to farmers' cooperatives, contract farming, and access to credit.

4.4 **SECTORAL POLICIES AND LEGISLATIVE FRAMEWORKS**

4.4.1 ***Agriculture***

Agricultural policies are discussed in Section 3.3. Key agricultural laws are:

- *Centre for Agricultural Mechanization and Rural Technology Act (1981);*
- *Agricultural Irrigation Development Fund (Establishment Management) Act (1984);*
- *Food Security Act (1991);*
- *Agricultural Inputs Trust Fund Act (1994);*
- *The Plant Protection Act (1997);*
- *Seeds Act (2003);*
- *The Warehouse Receipts Act (2005);*
- *Fertilizers Act (2009);*
- *The Grazing-Land and Animal Feed Resources Act (2010);*
- *The Plant Breeder's Rights Act (2012);* and
- Crop-specific laws, including for *Coffee (2001)*, *Cotton (2001)*, *Cashew Nuts (1984)*, *Pyrethrum (1997)*, *Sisal (1997)*, *Sugar (2001)*, *Tea (1997)*, and *Wattle (CAP. 158, RE 2002)*.

Notes on these laws are provided below, in chronological order.

Centre for Agricultural Mechanization and Rural Technology Act (1981)

This Act establishes the Centre for Agricultural Mechanization and Rural Technology. The functions of the Centre include:

- To take over and continue such of the functions and businesses of existing projects as the Minister shall, by order published in the Gazette, direct;

- To carry out and promote the carrying out of applied research to facilitate the designing, adaptation and development of machinery and equipment suitable for use in agricultural and rural development;
- To develop and manufacture approved prototypes, components and cultural techniques and technologies, and evaluate their suitability for adaptation and alternative use in rural agricultural production:
- To adapt foreign designs of agricultural machinery and equipment to suit local conditions of manufacture and maintenance, for use in rural agriculture;
- To develop and manufacture approved prototypes, components and spares of agricultural machinery and equipment which are not available in large quantities in the United Republic;
- To perform tests on all types of machinery and equipment intended for use in agricultural and rural development in the United Republic, and to publish the results;
- To formulate and conduct short courses designed to provide practical training and further knowledge to village and other artisans in the use and maintenance of agricultural machinery and other appropriate technology machinery and equipment; and
- To advise and provide support services to organizations and persons undertaking the extension and implementation of programmes and projects resulting from the work of the Centre.

Agricultural Irrigation Development Fund (Establishment Management) Act (1984)

This Act makes provisions for the establishment of the Agricultural Development Fund, the purposes of which include:

- Financing by way of loan or equity of fixed investment by parastatal organizations, district development corporations, cooperative societies or villages engaged in the production, processing or marketing of food products;
- Financing by way of loan or grant, procurement or purchase of agricultural inputs by organizations engaged in the production, processing or marketing of food produce and other related products;
- Financing by way of loan or grant, procurement or purchase of equipment or the training of the citizens of the United Republic by or for the benefit of organizations or other public authorities engaged in carrying out of irrigation schemes and projects for agricultural development; and

- Financing by way of loan or grant any project agreed or approved for implementation pursuant to any agreement or memorandum of understanding between the United Republic and foreign Governments or International Organizations.

Food Security Act (1991)

This Act establishes a Food Security Department for overseeing the strategic grain reserve, under a Board whose functions are to oversee and co-ordinate the activities of the Government designed to procure, store and release grain for security purposes and preparedness for any crisis in the country. The Act also establishes an independent Department, the Food Security Department, within the MAFC.

Agricultural Inputs Trust Fund Act (1994)

This Act provides for the establishment of a revolving Agricultural Inputs Trust Fund under the management and control of a Board. The objective of the Fund include:

- To make available loans for importation and distribution of agricultural inputs; and
- To finance consultancy services or other technical assistance in relation to acquisition, distribution and use of agricultural inputs.

The Plant Protection Act (1997)

This Act is intended to prevent the introduction and spread of harmful organisms, ensure sustainable plant and environmental protection, control the importation and use of plant protection substances, regulate the export and imports of plants and plant products, and ensure the fulfillment of international commitments. It entrusts Government with all plant protection regulatory functions.

Seeds Act (2003)

This Act provides for the control and regulation of the standards of agricultural seeds. The act also establishes a technical committee - the National Seeds Committee - to advise the Ministry in the following areas:

- All matters relating to seeds;
- Implementation and amendment of the seeds legislation;
- Formulation and implementation of seed industry policy and implementation of guidelines;
- Co-ordination and supervision of the seed industry; and

- Approval of plant varieties.

The Warehouse Receipts Act (2005)

This Act provides for the establishment of a regulatory framework for warehouse receipts, licensing procedures, and related matters.

The Cereals and Other Produce Act (2009)

This Act makes provisions for the establishment of the Cereals and Other Produce Board, and for the promotion and development of cereals. The Board's functions are:

- To carry out commercial activities and such other activities as are necessary, advantageous or proper for the development of the cereals and other produce industry.
- Facilitation of agricultural research on cereals and other produce; extension services to growers and other dealers of cereals and other produce; input services, including fertilizers and agrochemicals; promotion of production, marketing, processing and storage of cereals and other produce; the dissemination of information or data relating to cereals and other produce; the promotion of technological advancement in cereals and other produce; and the provision of assistance in the formation of farmers' Co-operatives or Organizations.

Fertilizers Act (2009)

This Act provides for the regulation of manufacturing, importation, exportation, sale and utilization of agricultural fertilizers, and repeals the *Fertilizers and Animal Food Stuffs Act (1962)*. It also establishes the Tanzania Fertilizer Regulatory Authority as a corporate body and provides rules relating to the manufacture, importation, use and trade in fertilizers, or fertilizer supplements, e.g. growth stimulators and regulators and similar products. The Act also provides for fertilizer quality control.

The Grazing-Land and Animal Feed Resources Act (2010)

The objective of this Act is to provide for the management and control of grazing-lands, animal feed resources and to provide for related matters. The law has six parts, of which the following two are the most relevant to SAGCOT:

- Part II proposes establishment of a National Grazing-land and Animal Feed Resources Advisory Council, with associated provisions for the Council's membership, functions and powers and the designation by the Minister of local authority employees to be inspectors for the purpose of performing some functions provided under the Act.
- Part III deals with grazing-land development and management. It provides for matters relating to safeguarding the development of grazing-

land and enables communally owned grazing-land to be managed by village councils. This Part also provides for inspectors to take measures in case of excess livestock units (overstocking).

The Plant Breeder's Rights Act (2012)

This Act deals with the protection of new varieties of plants to promote plant-breeding activities that will in turn facilitate and improve agricultural research in the country through the granting and regulation of plant breeders' rights and the establishment of a plant breeders' rights office. Sections of interest to SAGCOT include:

- Part II, which provides for the establishment of a plant breeders' rights office. It also provides for the formation, composition and functions of a Plant Breeders' Rights Advisory Committee.
- Part III, which deals with the essential features of varieties that may be protected and the mechanism for their recognition.
- Part VI, which contains provisions for breeder's rights, the scope of breeder's right, exhaustion of breeder's rights, varieties to which plant breeder's rights apply, exceptions to breeder's rights, duration of a plant breeding right, damage for infringement of breeder's rights and annual fees.

4.4.2

Water

The Tanzanian water resources management framework is described in the *National Water Policy* (NAWAPO 2002), the *National Water Sector Development Strategy* (NWSDS 2006) and *Water Resources Management Act No. 11, 2009* (WRMA). These are the principle policies and laws guiding water resources management. The Act promotes integrated water resources management for sustainable water use. Since water resources are a cross-cutting issue, the Act has provided that WRM is undertaken within the context of other natural resources, among them environment, minerals, forests, wildlife and land. Stakeholder participation is stressed in both the NAWAPO and WRMA. The principles of Integrated Water Resources Management (IWRM) are basically the objectives of the Policy and the Act.

The WRMA provides for preparation and implementation of Basin IWRM Plans as the basis for managing and developing water resources in each basin. The institutional framework for water resources management at all levels (i.e. national, basin, catchment, sub-catchment, water user association and village levels) is provided for in the Policy, NWSDS and the WRMA. The Act establishes Basin Water Boards and their subsidiary institutions and, as explained well in WREM Int. Inc. (2012), mandates them with the overall responsibility for guiding water resources management and development in the basin. The Rufiji Integrated Water Resources Management and Development Plan Interim Report (WREM Int. Inc. 2012) also lists and

describes other policies and laws which are applied in WRM in the country. These include:

- *National Health Policy (1990);*
- *National Energy Policy (2003);*
- *The National Land Policy (1995);*
- *National Environmental Policy (1997);*
- *The National Agriculture Policy (1997);*
- *The National Livestock Policy (1997);*
- *The National Forest Policy (1998);*
- *National Fisheries Policy (1998);*
- *National Wildlife and Wetland Policy (2007);*
- *The National Irrigation Policy (2010);*
- *Local Government Act (1982, revised 2000); and*
- *Rural Development Policy and Strategy (2001).*

Other WRM-related acts are:

- *Wildlife Conservation Act (2009);*
- *The Land Act and Village Land Act (Nos. 4 and 5) (1999);*
- *The Local Government (District Authorities) Act (1982);*
- *The Forest Act, (2002);*
- *The Fisheries Act, (2003);*
- *Environmental Management Act (2004);*
- *Water Supply and Sanitation Act (2009);*
- *Land Use Planning Act (2007); and*
- *Mining Act (2010).*

The institutional setup of WRM, as provided for in the WRMA 2009, involves six levels of management: the first is the National Water Board which is advisory in its functional setup, then the Basin Water Boards (nine in all) of which five fall within the Corridor (Rufiji, Wami Ruvu, Lake Nyasa, Lake Rukwa and Lake Tanganyika), as well as very small parts of the Internal Drainage and Pangani Basins. The other four levels are Catchment Committees and Councils, Sub-Catchment Committees and Councils, Water Users' Associations and Water User Groups. The current status of these institutions is described below.

Water Boards

The National Water Board (NWB) was established in 2011. The functions and mandates of this Board are well described in the WRMA 2009 and also in WREM Int. Inc. (2012). Basin Water Boards (BWBs) have been established and are functioning in all five basins in the Southern Corridor.

Catchment Committees and Councils (forums)

The WRMA provides for the establishment of Catchment Committees, to which BWBs are mandated to appoint three to five members. However, since

the law became effective in August 2009, not a single legal committee has been set up. The establishment of catchment committees goes in parallel with the demarcation and declaration of catchments, which is to be done by the Minister responsible for water affairs (catchments are sub-units of larger basins). These processes require financial and human resources which the Boards do not have in sufficiently amounts to cover all their obligated functions. Consequently at present the Basin Water Boards are assuming all WRM functions in all their catchments.

The catchments relevant to the SAGCOT clusters are the Wami in the Wami Ruvu Basin; the Lower Rufiji, Kilombero and the Great Ruaha Catchments in the Rufiji Basin; the Ruhuhu Kitewaka, Lumbira, Nkiwe, Mbaka, Kiwira, Rufirio and Songwe catchments in the Lake Nyasa Basin; the Kalambo catchment for the Lake Tanganyika Basin; and Muse catchment for Lake Rukwa Basin.

In the Rufiji Basin a forum acting as a Great Ruaha Catchment Council was formed under Act No. 42 of 1974, with 26 members. The council will have to be reformulated as a committee to take into account the requirement of the new law.

Sub-catchment Committees and Councils

Sub-catchment institutions are provided for in the WRMA 2009, but as yet no such institutions have been established in the Corridor. In the Rufiji sub-catchment councils have been formed for the following rivers: Ndembera, Mkoji and Kimani; in the Great Ruaha Catchment; and for Kihansi in the Kilombero Catchment. Though not the only example, the Wami Ruvu BWB in particular has established 11 Water Users' Associations (WUA) at sub-catchment level, which may provide the basis for creation of sub-catchment councils. Other basins are working towards the goal of establishing interim institutions while also targeting declaration of areas into sub-catchments or catchments.

Water User Associations (WUA)

Most BWBs have started the creation of Water User Associations for water governance in their areas. However, many of these institutions are not functioning well for reasons including lack of support and cooperation with government authorities at village, ward, division or district levels, inadequate funding sources and levels, and absence of sub-catchment or catchment officials.

Water User Groups (WUG)

There are many Water User Groups (WUGs) registered under various laws. Most of them are water user utilities (domestic, irrigation, livestock, fishing, and environment). Some of them are village based with a variety of purposes. Most WUGs are functional. Detailed information on all these institutions is available in WREM Int. Inc. (2012).

Strengths and Weaknesses of the WRM System

The WRM systems in Tanzania and specifically in the SAGCOT area have both strengths and weaknesses. Strengths are that the National Water Board is already established, Basin Boards are in place and functioning in all the five basins in the corridor, and the process of establishing the Catchment and sub-catchment organisations has started in most BWBs; all BWBs are assisting water users to establish and form Water User Associations, which are functioning although at different levels depending on the Basin - the WRMA 2009 is actually being implemented in every Basin; all the Basins are now in the process of preparing Integrated Water Resources Management and Development (IWRMD) plans (this initiative is at various stages in the different basins); there is a strong political will towards the implementation of WRMA and IWRM guidelines; and awareness and education campaigns on WRM are being conducted at the basin and community levels.

The weaknesses that are clearly apparent are all based on the capacity of the institutions to perform their legal functions: the IWRM approach requires stakeholders to actively participate in all WRM activities but this is in its early stages: so far no Basin Plans have been prepared in line with IWRM principles and WRMA 2009 provisions, and as a result each sector plans and executes water resources development projects independently. The water sector has worked with the *Water Utilisation Act (1974)* for 35 years, and although it has now been repealed, adaptation to the new Act is a challenge.

In addition, the establishment of WUAs and Catchment/Sub-catchment Committees and Forums (Councils) is also slow. Up to 2012 (the third year since WRMA effectiveness) there was no single catchment or sub-catchment that had been declared and therefore no associated catchment office or committee. This is major gap in the implementation of the Act. Effective institutions at all levels are necessary for enforcement of the WRMA 2009 and other related legislations. Furthermore, the WUA formation process has been implemented very differently from one basin to another (until recent harmonisation by the Ministry of Water). In principle the water institutions' areas of jurisdiction are hydrological boundaries, and this requires a high level of cooperation from the various administrations within each hydrological unit (Region, District, Division, Ward and Village).

Adoption and implementation of IWRM is a capital-intensive process. Responsible institutions including the Ministry of Water do not have sufficient financial resources to handle their IWRM obligations. There is also a major shortage of professional and technical personnel in the basins. In the corridor NGOs have proved to be important stakeholders who are actively involved in many WRM activities. They have been mobilising additional financial and technical resources to supplement the BWBs' efforts as well as mobilising and sensitising local communities on environmental management and water resources management issues. Catchment conservation activities such as tree planting have been supported by NGOs or

CBOs and by some individuals. NGOs play a lead role for local communities in information dissemination and capacity building and for farmer groups in promoting good farming practices, efficient water use, household hygiene, sanitation practices, and appropriate irrigation technologies. Large NGOs involved in WRM-related activities in the corridor include WWF, IUCN, WCS, WCST, Plan International, iWASH and WaterAid.

Some private sector companies have played an important role in catchment conservation and in water resources development projects, such as Kilombero Sugar Company, the TANWAT Company, and Green Resources in Iringa (see Green Resources Ltd, 2009) in the headwaters of the Kilombero.

IWRM mandates are still overlapping between institutions. These pose institutional and WRM challenges which require some sort of harmonisation.

4.4.3 *Forestry*

National Forest Policy (1998)

The overall goal of the *National Forest Policy* (NFP) is “to enhance the contribution of the forest sector to the sustainable development of Tanzania and the conservation of her natural resources”. The policy is divided into four policy areas including ecosystem conservation and management, and it states that all forest reserves with high biodiversity values will be upgraded to Nature Reserves to ensure their protection. The policy also states that biodiversity conservation and protection of watershed areas will be incorporated in management plans of forests. Furthermore, the policy states that EIAs will be required for investments which convert forest land to other land use.

The NFP calls for coordination between wildlife and forest authorities to be promoted, particularly where game controlled areas or game reserves and forest reserves overlap. The policy recognizes that when people can satisfy their needs, have control of the resource base as well as have secure land tenure, then long term objectives of environment protection can be satisfied. Emphasis is placed by government on decentralization of authority to the local level and promotion of community involvement in planning and management of forest resources.

The Forest Act No. 14 (2002)

The Forest Act states that in order for a forest to be declared a Forest Reserve a detailed forest management plan must be approved and will be subject to a full review not less than once every five years. Village Land, Community and Private Forests are those reserves that are declared in an area of Village Land. The Act states that any proposed development in a forest reserve, private forest or sensitive forest area including watersheds will submit an EIA.

The government may declare, in an area of General Land, that any tree or class of trees is reserved. No person, without a license, may fell, cut, or damage any reserved tree. If government considers that the cutting of timber on any land may interfere with water supplies, interfere with natural regeneration, cause loss of biodiversity, or deterioration of the environment, it may direct the occupier of the land to adopt mitigation measures. The government may, after taking account of any international agreements, publish in the gazette lists of protected wild plants so as to preserve and maintain biodiversity and genetic resources. All biological and genetic resources occurring within forests belong to the government and will be conserved and utilized for the people of Tanzania. The transfer of any biological resources shall not extinguish the sovereignty of Tanzania over those resources.

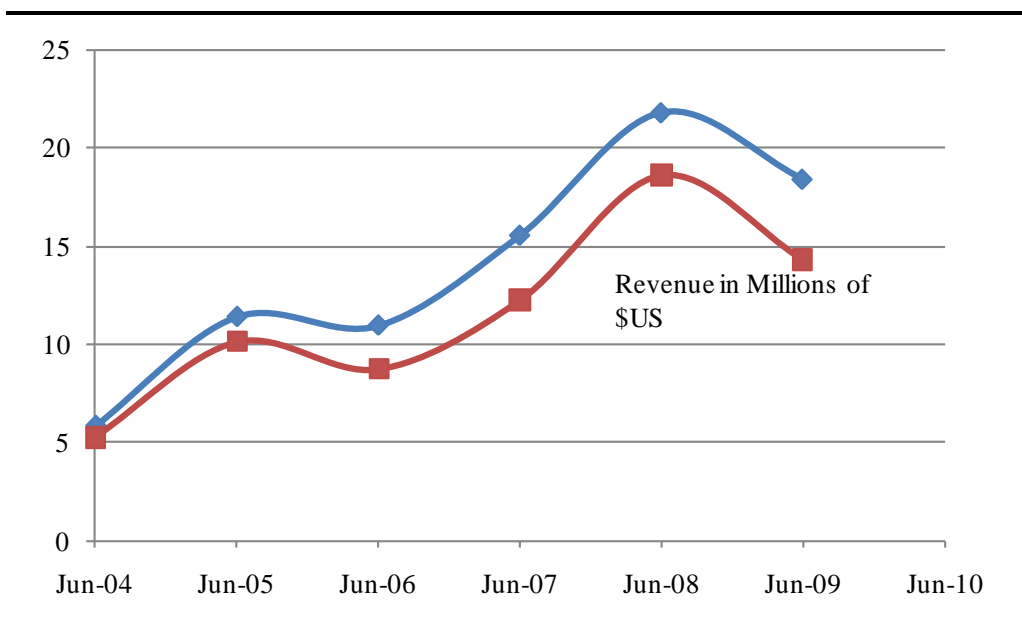
Forestry and Beekeeping Division and Tanzania Forest Services Agency: the Forestry and Beekeeping Division (FBD) is a division within the Ministry of Natural Resources and Tourism. It has the mandate to protect, manage and conserve forest resources across mainland Tanzania. The FBD is guided by the NFP which set the framework for a reorientation of forestry away from traditional top-down approaches to more facilitation of local involvement in the management of forest resources. As a division of MNRT, the FBD's budget and strategic plans are subject to parliamentary approval.

With a view to improving the performance of government institutions in the forestry sector the Tanzania Forest Services Agency (TFS) was established on 30 July 2010, in accordance with the *Executive Agencies Act Cap. 245* (URT, 2010). The FBD retained responsibility for development of policy, laws, regulations and overseeing their implementation in the sector. The TFS core functions include (i) establishing and managing central government natural forest reserves, government forest plantations and forest on general land; (ii) enforcing Forest legislation; (iii) providing forest extension services; and (iv) collecting Forestry revenues.

The TFS budget will no longer be determined by parliament but instead will be met from revenue collected from sales and charges for forest products. TFS strategic plans and budgets will no longer require parliamentary approval but will instead be approved by the Minister after advice from an advisory board. Unlike the Director of the FBD, the Chief Executive Officer of TFS will have full control over staff and budgets and is allowed to carry over any unspent amount to subsequent financial years (URT, 2010). In 2001, the last year for which data is available, FBD had a total of 1,643 staff of whom 279 were degree holding forest officers (MNRT, 2005b). The TFS has inherited this staff complement and is in the process of redeploying staff to 7 or 8 zonal offices throughout Tanzania. The long term plan is for the majority of Tanzania's 506 central government forest reserves to be managed by a resident Forest Manager. This intention will only be possible with a substantial increase in hiring of staff by TFS. The TFS has been able to place a Forest Manager in each of the existing 8 Nature Reserves and 15 Forest Plantations. The FBD's collected revenues have increased by an average annual 9% from 2004 to 2009 (MNRT, 2010: *Figure 4.1*). TFS has budgeted for TZS 26.6 billion in 2012/13 of

which TZS 1.9 billion has been set aside for activities associated with ecosystem stability and biological diversity maintenance (MNRT, 2012).

Figure 4.1 *Forest & Beekeeping Division Revenue Collection Trends*



Source: MNRT, 2010

4.4.4 *Wildlife, Wetlands and Conservation*

The National Wildlife and Wetland Policy (2007)

The policy states that almost 24% of Tanzania’s land surface area is covered by areas protected for wildlife. Fourteen National Parks cover some 4.4% of Tanzania, 13% is covered by 34 Game Reserves (GR) and 5.5% is covered by 38 Game Controlled Areas (GCA) (note: TANAPA lists 15 national parks on its website as of March 2013: Arusha, Gombe Strea, Katavi, Kili, Kitulo, Mahale, Manyar, Mikumi, Mikomazi, Ruaha Rubondo, Saadani, Serengeti, Tarangire, Udzungwas). In National Parks and Game Reserves no human settlements are allowed whereas in GGAs settlements can be allowed. The Policy describes wetlands in Tanzania as covering 10% of the total land area, of which 5.5% is four Ramsar Sites. Most of the Ramsar Sites are also formal wildlife protected areas but with low protection status, such as GCAs, as in the Kilombero Valley. The Policy states that Tanzania has been successful in establishing a protected area system whose long-term goal is to maintain great biological diversity, which contributes to a healthy environment and growth of the economy.

In order to attain this goal the *National Wildlife and Wetland Policy* emphasizes further developing the wildlife PA network and healthy wetland areas while involving stakeholders in the management of these resources, especially local communities and the private sector. The policy identifies roles of different stakeholders. Communities living on village lands with populations of wildlife have the role of protecting and benefiting by setting aside wildlife

conservation areas, and to this end the policy (i) devolves responsibility for wildlife and wetlands management to Local Government Authorities (LGA), and (ii) recognized Community Based Natural Resource Management (CBNRM) as key to sustainable use by empowering village governments as custodians of wildlife and wetlands on Village land. District Authorities and NGOs are assigned the task of assisting the MNRT's Wildlife Division in the extension of support to communities and the enforcement of bylaws for the sustainable management of their wildlife and wetlands (URT, 2010).

Challenges are recognized to include a failure to establish wildlife conservation as a land use able to compete adequately - in practice - with other forms of land use, persistent illegal taking of wildlife, the illegal wildlife trade and insufficient coordination for wetlands conservation. The government intends to confer user rights to various stakeholders to access wildlife and wetlands resources in order to ensure that abuses are controlled.

The Wildlife Conservation Act No. 5 (2009)

This Act defines various wildlife protected areas, including Game Reserves, Wetlands Reserves, Game Controlled Areas, Wildlife Management Areas and Species Management Areas. The Act provides for added protection for wildlife corridors, dispersal areas, buffer zones and migratory routes, and prevents unlicensed hunting, crop production and grazing in game reserves and GCAs. The new Act requires the minister to review the existing list of GCAs in order to ascertain their potential and to ensure that no Village Land is included in GCAs.

The Act provides for Species Management Areas (SMAs) to be gazetted by the government in order to protect animals and their habitats. Restrictions in SMAs include cutting or burning vegetation as well as unlicensed hunting or trapping of protected animals. The government can also declare an animal to be national game whose commercial use can be regulated. The new Act fully recognizes communities' rights to benefit from wildlife resources by declaring Wildlife Management Areas (WMAs). WMAs must be on Village Land and outside core protected areas. Managers of WMAs have the right to negotiate and enter into contracts with investors.

The Minister may gazette any wildlife species which migrates through Tanzania and which is protected under International Convention or Treaty as a protected species. Finally the Act also describes the conditions under which an EIA is mandatory including any development within wildlife protected areas or WMAs, buffer zones, migratory routes or dispersal areas.

Wildlife Division: the Wildlife Division is a division within the Ministry of Natural Resources and Tourism. The Division operates under the overall guidance of the *National Wildlife and Wetland Policy (2007)* and *Wildlife Conservation Act (2009)*. It has responsibility for the management of wildlife resources outside National Parks, including on Game Reserves, Game Controlled Areas and on general lands. The new policy puts a greater

emphasis on community based wildlife management as well as wise use of wetlands resources. The Wildlife Division is also the focal point for the *Ramsar Convention* in Tanzania: the secretariat within the Wildlife Division, called the Wetlands Unit, has overall responsibility for management of wetland resources in Tanzania and for overseeing the implementation of the National Wetlands Strategy.

Revenues from wildlife are collected from consumptive uses (hunting) and non-consumptive uses (primarily game viewing in Game Reserves). Although data shows increasing receipts from game viewing, most revenues are derived from hunting. Over time revenues have increased in real terms at an annual rate of roughly 14.6% over the period 2004/5 to 2007/8 (MNRT, 2010: *Table 4.1*). Resource allocation to the Wildlife Division, as a division of a government ministry, is subject to parliamentary approval and oversight. Although the division is a revenue collecting entity, the funds collected do not translate to budget allocation for the division.

The Wildlife Division has a total of 570 rangers deployed to 26 Game Reserves. An additional 225 rangers are deployed to a number of Zonal Anti Poaching Units, which supplement law enforcement in Game Reserves and are active in Game Controlled Areas and in general lands.

Table 4.1 *Wildlife Division Revenue Collection Trends*

Activity	Unit	2004-2005	2005-2006	2006-2007	2007-2008
Tourist hunting	US\$	9,775,459	11,621,513	12,030,510	14,704,370
Export of live animals	TZS	166,441,151	165,466,745	180,686,042	206,671,427
Photographic tourism	TZS	10,584,505	180,686,042	51,532,100	32,834,150
	US\$	400,573	711,029	623,645	664,736
Total	US\$	\$10,333,248	\$12,608,581	\$12,837,148	\$15,573,812

Source: MNRT, 2010

The National Parks Act No. 11 (2003)

The *National Parks Act (2003)* allows the president, with the consent of the National Assembly, to gazette an area of land to be a national park. National Parks represent the highest level of resource protection, and no proclamation of a national park can be amended or revoked without the authority of an Act of Parliament. Where an area of land is declared to be a national park all rights, titles, interests, claims or exemptions cease and are forever extinguished. No person is allowed to hunt or capture any animal, including fish, or disturb any egg or nest or within a national park. The Act restricts entry, settlement and development by any person in a national park. The National Parks Act makes no provision for licensed hunting or capture of animals.

TANAPA: the *Tanganyika National Parks Ordinance (1959)* established the organization now known as Tanzania National Parks (TANAPA), and the Serengeti became the first National Park. By February 2008, TANAPA had

grown to 15 national parks, with plans to add one more in the near future, as well as to expand existing parks (TANAPA, 2012). Conservation of ecosystems in all areas designated as national parks is the core business of the organization. Nature-based or wildlife tourism is the main source of income that is ploughed back for management, regulation, and fulfilment of all organizational mandates in the national parks. TANAPA operates as an independent parastatal, and is allowed to retain funds earned from Park fees although it is required to pay income taxes to the Treasury. TANAPA's revenues from tourism were reported to be US\$ 50 million in 2007/8 (Green *et al.*, 2011).

A percentage of park revenues is used to assist community development initiatives, such as schools, health dispensaries, water schemes and roads. Villagers are encouraged to develop cultural tourism projects to cultivate their own financial returns from park visitors. According to studies by international development organizations, Tanzania National Parks is one of the most efficient and productive bureaucracies in Africa. The personnel structure is streamlined, with a workforce of only 1650 staff (TANAPA, 2012). Expansion of existing National Parks and the creation of new National Parks is a continuing process, and currently the potential for Mount Rungwe Forest to be annexed to Kitulo National Park is being assessed.

The Fisheries Policy and Strategy (1997)

The overall goal of the National Fisheries Policy is to promote conservation, development and sustainable management of fisheries resources for the benefit of present and future generations. Amongst the objectives of the policy are to encourage the sustainable use of fish and aquatic resources, protect biological diversity of coastal and aquatic ecosystems by preventing habitat destruction, pollution and over exploitation, and promote sound use of the ecological capacity of water based areas for generating income and diet. These objectives are to be attained by improving the involvement of fisher communities in the planning and management of fishery resources.

Strategies under the policy objective to protect the productivity and biological diversity of coastal and aquatic ecosystems include developing EIA guidelines, controlling destructive fishing and processing methods; promoting the protection of fragile ecosystems, ecosystem processes and conservation of biodiversity, protection of endangered and threatened aquatic species throughout their life, and the protection of vulnerable species, habitats and areas of special ecological significance through accordance of special legal status such as marine parks, marine reserves and closed breeding areas. Fisheries authorities are called on to collaborate with other sectors to develop water quality monitoring systems, combat the spread of noxious-water weeds, discourage the translocation of exotic species between water systems and promote collaborative management approaches with communities.

The Fisheries Act No. 22 (2003)

This Act allows measures to maintain or restore stocks at levels of maximum sustainable yield including, measures to avoid over-exploitation of stocks, conservation of biodiversity of aquatic habitats, ecosystems and endangered species, restoration of depleted stocks, assessment of adverse environmental impacts and remedial measures on the resource, and minimization of pollution and waste. The government may restrict fish establishment owners from carrying out fishing in specified water bodies or prohibit fishing of any fish species or aquatic flora. The government may declare the conservation of any critical habitat or endangered aquatic species.

The Act requires all fishing vessels to be registered and all fishers to be licensed. The Act empowers the Minister to impose closed season for designated areas, species of fish and methods of fishing and to prohibit fishing in designated areas or to limit the amount, size, age and other characteristics of fish that may be caught. The Act also provides for the regulation of management practices in the fisheries sector such as the landing of fish, fisheries monitoring and enforcement to ensure compliance with conservation measures. The Act calls for the facilitation of the formation of community management units for the protection and conservation of fishery resources. The Act allows the Director of Fisheries to enter into management agreements with community based Beach Management Units for the whole or part of some specific fishery activity within any water body.

Wetlands

There is no specific wetlands legislation in Tanzania. Instead, wetlands management is provided for in several different laws. The *Land Act (1999)* allows land to be set aside for special purposes, for example land parcels within a natural drainage system from which a water resource or drainage basin originates can be gazetted as Reserved Land. Under this law the Minister may declare wetlands to be reserved as "hazardous land". Furthermore, the *Village Land Act (1999)* allows the Minister to declare any area of Village Land to be hazardous land, which may include a wetland area and hence be subject to the provisions in the *Land Act*.

The *Environmental Management Act (2004)* (EMA) allows the Minister responsible for environment to declare any area of land to be a protected wetland. Environmental coordinators are required to furnish the Director of Environment with information on the management and status of wetlands under their jurisdiction.

The *Wildlife Conservation Act No. 5 (2009)* allows the Minister responsible for wildlife conservation, in consultation with the Minister responsible for environment, to prepare regulations and guidelines prescribing the establishment of sustainable management of wetlands reserves and wetlands area.

The guiding principles of the *Water Resources Act No. 11 (2009)* include sustainable integrated water resources management, the precautionary principle and the principle of ecosystem integrity. The Act identifies preferences for water allocation as (a) domestic purposes; (b) environmental reserve; and (c) socio-economic activities. The Act allows the establishment of a Protected Zone on land draining to any catchment, swamp, wetland, or any other water source. A protected zone is established for the purpose of protection of water sources from pollution, erosion or any other adverse effects. The establishment of a protected zone may limit activities within the protected zone or may require any occupier of land within the protected zone to take protective measures.

Under the *Land Use Planning Act No. 10 (2007)* district and village land use planning authorities are required to prepare land use framework plans that ensure secure environmentally sustainable development and preserve village land resources including forests and wildlife. The Act requires all planning authorities to determine appropriate criteria for protection of the environment and sustainable use of natural resources. Furthermore, land use plans must include designation of land for various uses including preservation of protected land and other sensitive areas, including swamps, beach land, biodiversity colonies and other flora and fauna. The Act allows for the creation of buffer zones for the protection of natural forests, water catchments areas, rivers, dams and river banks.

Sustainable Wetlands Management Programme: the following description is based on URT (2010). In 2000 Tanzania joined the international convention on wetlands (Ramsar Convention). The associated National Strategic Plan was revised in 2006-9 and became the precursor to a "10 Year, National Sustainable Wetlands Management Strategy". On instructions from Cabinet, the draft Strategy has since undergone re-alignment to make operational the various wetlands strategies which appear in the *National Wildlife and Wetland Policy (2007)* and the *Wildlife Conservation Act (2009)*. These called for a Multi-Sector Wide Approach (Multi-SWAp), and accordingly the wetlands strategy has now taken on a more "programme approach" and is emerging as the Sustainable Wetlands Management Programme (SWMP). The SWMP is now closely aligned with Participatory Forest Management (PFM). As stated by GoT (URT, 2010), recent legislation and the EMA (2004) mean that all natural resource management sectors, fish, forest, wildlife, wetlands, etc. are all more or less treated the same way when it comes to Community-Based Natural Resources Management (CBNRM) under the Decentralized Natural Resource Management (DeNRM) approach. Therefore SWMP has adopted the same six steps to achieve CBNRM. Consequently the current picture is of a holistic, integrated approach, implementable under the government planning system and Medium Term Expenditure Framework (MTEF). In this way, CBNRM should be mainstreamed in District (and Village) Development Planning (DDP) processes, and Development Partners (DPs) should align implementation under one standardised set of rules (the Administration and Finance Management Manual (AFM Manual)).

The SWMP is currently overseen by a governing body, the National Wetlands Management Steering Committee (NAWESCO), made up of nine wetland-related Ministries at Permanent Secretary (PS) level. NAWESCO is the policy oversight body for both SWMP and the Ramsar Convention. It is chaired by MNRT with the aim of guiding sectors and development partners (i.e. donors, NGOs) to introduce SWMP as a cross-cutting initiative, harmonized with government policy under the Joint Alignment Strategy for Tanzania (JAST). NAWESCO is assisted by a technical body made up of some 35 institutions, the National Wetlands Working Group (NWWG). The Wildlife Division (WD) in MNRT is the Secretariat to these bodies, through the Wetlands Unit (WU). The WU has a mandate to support all sectors at all levels for implementation of the SWMP, from central to local government, NGOs, the private sector, donors and the public at large. The Directorate of Sector Coordination (DSC) in PMO-RALG is responsible for coordinating local government involvement and for feedback and monitoring.

As of 2010 the SWMP, with support from Danida, was being tested under a programmatic approach in 14 pilot Districts, 5 Regions and 6 Protected Areas (PA) in Usangu Wetlands, and two Ramsar Sites (Malagarasi-Moyovosi and Lake Natron). The aim of these pilot studies is to develop a systematic approach to CBNRM under decentralization. Through support from BTC (the Belgian Development Agency), MNRT has also experimented with a more project-oriented modality in two districts of Kilombero Ramsar Site. This is soon to be expanded to downstream districts on the Rufiji through KILORWEMP.

Key components of the SWM Action Plan are listed in **Box 4.1** (URT, 2010):

Box 4.1

Key Components of Sustainable Wetlands Management Action Plan

- **SWMP Strategy:** as yet the national strategy for sustainable wetlands management has not been formally approved, so there is still no official guiding framework and wetlands do not feature in national development plans (except as targets for irrigation). Government and DPs need to jointly host a conference, to put together with NAWESCO an agreed national SWMP document, a Multi-SWAp on which all future donor support can be considered as an integral component of a DeNRM basket fund, with a clear, coordinated roll-out strategy to all 153 districts.
- **SWM Guidelines:** the technical (SWM Manual) and administrative guidelines (AFM Manual) for integrating SWM under DeNRM are in draft, as is a SWM CEPA Guide and national training strategy and training aides. MNRT and PMO-RALG need assistance from DPs to conclude the review and ownership of these instruments, to align them fully with government protocols, and to instil support to institutionalize training through local institutions (i.e. Mweka, Hombolo, etc), testing them first in the 16 pilot districts (with Danida and BTC support), before developing a nationwide capacity building campaign and wetlands training fellowship scheme.
- **SWM Regulations:** the legal framework for wetlands management is an unclear mix between the EMA, Water Act, Wildlife Conservation Act, Village Land Act, Livestock Policy, Irrigation Policy, etc. The *Wildlife Conservation Act (2009)* lays the foundation for a new *Wetlands Reserve and Wetlands Area Regulation*. NAWESCO needs assistance from DPs to ensure that a single National Wetlands Regulation is produced, a document that will guide and harmonize and be cross-cutting over all sector policies and legislation, attaining a balance between no use and wise use.

Source: URT (2010)

Recently, Tanzania has developed gender equal policies and legislation, and also conducts gender-responsive budgeting. An overview of the most important policies and initiatives is given below (*Table 4.2*). However, while much of the legal environment in the form of policies and strategies are in place, implementation continues to be a challenge: the gender development index (GDI) for Tanzania has improved slightly over the last decade, from 0.41 in 2000 to 0.464 in 2005, but the country is still ranked very low overall, at 138 out of 177 countries. This low ranking directly reflects gender inequalities in terms of literacy rates, school enrolment, access to health care and per capita GDP.

A 2012 study by the Ministry of Community Development, Gender and Children (MCDGC)⁽¹⁾ identified several factors affecting implementation of gender equality:

- Varying political will and leadership on gender equality within government structures varies.
- Non-functional accountability and coordination systems for promoting gender equality, leading to weak ownership and accountability.
- Prevailing misconceptions on gender equality as a concept and a strategy, leading to technical approaches rather than challenging the patriarchal nature of policies and implementation processes.
- Capacity development strategies have been too focused on 'raising awareness' rather than on adopting institutional approaches for human resource development for sustainability and enhanced impacts.
- Limited financial commitments for making implementation and delivery on gender equality as stipulated in the MKUKUTA I framework and other sector policies.

(1)URT, MCDGC. 2012. *A National Gender Diagnostic Study in Tanzania – Final Report*.

Table 4.2 Gender Policies, Strategies and Initiatives

Item	Summary⁽¹⁾
Policy	The National Development Vision 2025 aims to attain “gender equality and the empowerment of women in all socio-economic and political relations and cultures.” Tanzania adopted a Women and Gender Development Policy (WGDP) in 2000 to ensure gender mainstreaming in all government policies, programs, and strategies. GoT has taken affirmative action to include women in decision-making. In 2000 Parliament passed a bill to increase the number of women’s special seats (33% in local government councils and 20% in the Union parliament)
Strategy	The 2005 National Strategy for Gender Development (NSGD) specifies how gender mainstreaming is to be implemented. MKUKUTA 1, the national development strategy, included poverty-reduction measures with gender equality objectives and the development of various sector policies (education and training, water and irrigation, labour and employment, and others) with a gender perspective.
Ratification of international instruments	Tanzania has ratified most major international human rights instruments, including CEDAW, ICESCR and ICRC, and has signed the 1997 SADC Heads of States Declaration on Gender and the Beijing Declaration and Platform for Action (BDPFA) (1995).
Constitutional reform	Through a special amendment passed in 2000, discrimination on the basis of gender is prohibited under the Constitution. This also protects the right of women to own land.
Legal reform	Parliament has enacted a number of laws in support of women’s economic and social well-being, including the <i>Sexual Offences (Special Provisions) Act of 1998</i> and the two Land Acts of 1999, which established that women should be treated equally with men in terms of rights to acquire, hold, use and deal with land. The <i>Employment and Labour Relations Act of 2004</i> prohibited discrimination in the workplace on the basis of gender, required employers to promote equal opportunities, introduced maternity leave, and contained provisions protecting a mother’s right to breastfeed and to be protected from engaging in hazardous employment.
Gender-responsive budgeting	Gender responsive budgeting processes are being institutionalised in all ministries, regional and local authorities.
Limitations	The Ministry of Community Development, Gender and Children (MCDGC) has a broad but unfocused mandate. The WGDP, NSGD and other action plans and policies are not prioritised nor implemented effectively. Progress in passing gender sensitive laws has not been matched by effective implementation (e.g. customary laws regarding women’s ownership of land often overrule national law). Gender based violence (GBV) remains a pervasive problem in Tanzania. Gender responsive budget has stalled. ²

(1) Main information sources: (i) IFC. 2007. *Tanzania Gender and Economic Growth Assessment*; (ii) URT, MCDGC. 2012. *A National Gender Diagnostic Study in Tanzania – Final Report*.

(2) WorldBank. 2004. *Tanzania Strategic Country Gender Assessment*.

4.4.6

Education

The 2011 Education Sector Analysis of Tanzania Mainland¹ identified a number of key challenges in coming years. Crucial to future development of the sector are the cost effective use of public resources, ensuring continued investment allocated to secondary education and efforts to tackle the underlying issues behind high dropout rates for girls (including social pressures for girls to fulfil traditional roles in society, with early marriage and teenage pregnancy).

The analysis also highlighted the need to improve pedagogical management and to reduce the disparities between schools in different locations. The challenges faced by higher education are of particular importance: among other issues, higher education funding mechanisms are highly inefficient, and student career objectives and the distribution of graduates by subject area need adjustment to reflect labour market needs.

An overview of relevant education policies is given in *Table 4.3*.

Table 4.3 *Education Policies and Initiatives*

Item	Summary
Education	<ul style="list-style-type: none"> • Policies: <i>Education and Training Policy (1995)</i> (under review) • <i>National Higher Education Policy (1999)</i> (under review) • Programme: Education Sector Development Programme (ESDP II 2008) • International Treaties: <ul style="list-style-type: none"> ○ World Declaration on Education for All (EFA), Jomtiem 1990 - to ensure access to and to promote quality of education for girls and women and to remove every obstacle that hampers their participation. ○ Dakar Framework of Action (2000) which states that education is a fundamental human right and a key to sustainable development and peace and stability, within and among countries. <ul style="list-style-type: none"> ○ UN Convention on the Rights of the Child (CRC) (1989).
Challenges⁽²⁾	<ul style="list-style-type: none"> • Increasing enrolment in primary school. • Improving access to secondary education. • Ensuring gender parity for post-primary education. • Raising education standards. • Increasing education funding and efficiency. • Adjusting higher education programmes to reflect labour market needs .

4.4.7

Health

The health sector reform programme has focused on decentralisation by devolution, financial reforms including cost sharing, pre-payment and health insurance, and public/private partnerships, as well as integration of vertical health programmes into the general health services. The programme aims at improving access to and the quality and efficiency of primary health services

(1) URT. 2011. Tanzania: Education Sector Analysis. Developed by a multi-ministerial team with the support of UNESCO.

(2) URT. 2012. *Tanzania Education Sector Analysis. Executive Summary*. Ministry of Education and Vocational Training / UNESCO.

(dispensary, health centre and district hospitals), as well as strengthening and re-orienting secondary and tertiary service delivery in line with the primary health care approach⁽¹⁾.

Poverty remains a significant underlying factor influencing health status, with more than half of Tanzania's population living below the poverty line of US\$ 1/day.

Health sector policies and initiatives in mainland Tanzania are outlined in *Table 4.4* and form the context for health service provision in the SAGCOT area.

Table 4.4 *Health Policies and Initiatives*

Sector	Summary
Instruments	<p>Policies: <i>National Health Policy (2007)</i>: the Health Policy vision is to have a healthy community which will contribute effectively to individual development and the country as a whole. The mission is to facilitate provision of basic health services, which are proportional, equitable, quality, affordable, sustainable and gender sensitive ⁽²⁾.</p> <p><i>National Policy on HIV/AIDS (2001)</i> (Prime Minister's Office).</p> <p>Programme: <i>Primary Health Services Development Program (PHSDP), 2007 – 2017</i>: the PHSDP aims at having a dispensary at every village, a Health Centre in every ward and a District Hospital in every District.</p> <p>Strategies: <i>Health Sector Strategic Plan III 2009-2015 (HSSP III)</i>: the Tanzanian mainland's HSSP III includes eleven strategies that cover specific health service delivery areas as well as four cross-cutting components: quality, equity, gender, and governance. Strategic objectives include increasing access to decentralized healthcare; reducing the healthcare financing gap; improving maternal, new-born, and child health; and strengthening social welfare, communicable and non-communicable disease services, including HIV/AIDS, TB, malaria, and substance abuse services, prevention, and control ⁽³⁾.</p> <p>International Treaties: <i>Abuja Declaration (2001)</i>: African Union countries, including Tanzania, met and pledged to set a target of allocating at least 15% of their annual budget to improve the health sector⁽⁴⁾.</p>
Limitations	<p>Financial planning and resources: the Abuja Declaration commitment of 15% budget allocation not yet met.</p> <p>Human resources: a shortage of skilled personnel: estimates from the 2009 Joint Health Sector Review suggest that only 35% of the required skilled health workforce is active in the rural areas⁽⁵⁾.</p> <p>Health information: there is limited availability and reliability of sentinel and HMIS data and over-reliance of the sector on survey data for planning and monitoring purposes.</p>

(1) WHO. *WHO Country Cooperation Strategy 2010-2015, Tanzania*.

(2) URT. 2008. *Human Resource for Health Strategic Plan 2008-2013*. Ministry of Health and Social Welfare.

(3) URT. 2011. *Tanzania Global Health Initiative Strategy 2010-2015*.

(4) WHO. 2011. *The Abuja Declaration: Ten Years On*.

(5) Koot, J. & P. Kilima. 2009. *Joint Health Sector Review*. Desk Study for Technical Review [http://hdptz.esealtd.com/fileadmin/documents/Other_Health_Meetings/Final_JAHSR-tech-rev-deskstudy_as_at_15.09.09.pdf] accessed 11 Aug 2012]

Sector	Summary
	Service delivery: hospitals are under-funded and lack qualified staff and an adequate supply of essential medicines.
	Community health: coordinated engagement and mobilisation of communities and households for enhanced and safer community health practice to improve efficiency and effectiveness.

4.4.8 *Human Rights*

Despite Tanzania's significant record as a peaceful country since independence more than 50 years ago, human rights remain a concern, as indicated by the Tanzania Human Rights Report 2011 (LHRC & ZLSC, 2012). Issues highlighted in the report relate to the right to life - extra-judicial killings, mob violence, killings in relation to witchcraft; to governance and the democratic process - lack of freedom of assembly and expression and poor access to information; and to the delivery of economic, social and cultural rights - challenges with health care, education, gender issues and protection of children.

4.5 *IMPLEMENTATION OF POLICIES AND REGULATIONS IN PRACTICE*

Tanzania as a location for "Doing Business"

Planning and its subsequent implementation are often two different stories and Tanzania is no exception. The country faces significant challenges in implementing policies and plans. This is reflected in the country's place in the World Bank's "ease of doing business" list (*Table 4.5*). The table summarizes the key "doing business categories" and their respective ranking against 184 other countries, and relates to the ease of starting and operating a local firm.

Table 4.5 Tanzania's Ranking in the World Bank's "Doing Business" List

Topic Ranking	2011 Rank	2012 Rank	2013 Rank	Change in Rank
Starting a business	122	123	113	+9
Dealing with construction permits	177	176	174	+3
Getting electricity	80	78	96	-16
Registering property	155	158	137	+18
Getting credit	96	98	129	-33
Protecting investors	93	97	100	-7
Paying taxes	123	129	133	-10
Trading across borders	115	92	122	+7
Enforcing contracts	33	36	36	-3
Resolving insolvency	120	122	129	-7

Source: The World Bank (2013) <http://www.doingbusiness.org/rankings> accessed 14.04.2013

Key issues determining the score relate to (i) dealing with licenses and registration of property, (ii) the tax regime, (iii) protection of investors, (iv) obtaining credit, (v) enforcing contracts, (vi) labour issues (availability and skills, labour laws), (vii) land related issues, (viii) infrastructure (roads, energy, water, etc.), and (ix) export bans. These nine challenges in Tanzania are discussed briefly below.

(i) Dealing with Licenses and Registration of Property

Dealing with licenses in Tanzania remains a challenge for businesses including those in the agriculture sector. The 2010 USAID report on Commercial, Legal and Institutional Reform in Tanzania's Agriculture Sector⁽¹⁾ contains some informative insights (this report is important for SAGCOT because it is used by the US government to guide its support to the agribusiness sector in Tanzania through USAID). The report observes that generally, the implementation of the licensing system as it applies to agribusinesses in Tanzania takes place within a climate of uncertainty that promotes minor rent-seeking activities by licensing agents. In some cases, multiple licensing aggravates the situation. In most cases, however, the costs of the delays incurred are much more significant than the relatively minor costs of rent-seeking. Delays also occur through lack of coordination between local government (district level) and central government institutions. As a result, businesses that would ideally receive licenses from local agents require licensing by authorities based in Dar es Salaam, while information collected from businesses by central authorities remains unavailable to local authorities. Fuller implementation of the *Business Activities Registration Act (2007)* should address such issues, although facilitation of the process may require technical assistance.

(ii) Tax Regime

In Tanzania, the tax base is small and most of the government's income comes from a handful of taxpayers. The Tanzania Revenue Authority (TRA) estimates that in a country with a population of around 40 million, only about 1% (400,000) are registered (business) taxpayers. For those that do pay taxes, the legal framework for paying income tax is sound and incorporates best international practices. The framework includes individual income tax, corporate tax, a pay as-you-earn system for employees, presumptive income tax for small individual businesses, provisional and final withholding taxes, and a capital gains tax. While corporate taxpayers are taxed at a fixed rate of 30% of profits (one of the highest rates in the region), individual taxpayers pay according to a graduated scale, with the maximum rate being 30%.

Investors, agribusinesses, may benefit from both tariff and non-tariff incentives. These ease the burden of taxes such as produce cess, income tax and VAT.

(1) Booz Allen Hamilton. 2010. AgCLIR Tanzania: Commercial, Legal and Institutional Reform in Tanzania's Agriculture Sector. Report for review by USAID.

(iii) Protection of Investors

Formally, Tanzania welcomes all forms of investment, with no discrimination against businesses conducted or owned by foreign investors. There are no barriers to 100% ownership of businesses by foreign investors in agriculture. There is no recent history of expropriation or nationalization, and no restrictions apply to the transfer or repatriation of capital and income earned.

With the possible exception of company law, Tanzania's general commercial legal framework is quite strong, with laws largely consistent with international best practices. Corporate governance is a necessary part of a modern commercial legal framework. Most Tanzanian businesses, especially in the agricultural sector, need to address basic good business practices like bookkeeping and management rather than disclosure duties and shareholder protection. Higher-level corporate governance concerns will increase in importance as Tanzania's economy continues to grow. As the need for stronger corporate governance develops, ensuring that an adequate framework is in place and being used will be important. In the meantime, Tanzania should continue to support and encourage a culture of good business management, which will benefit the broader business community and lay the foundation for more advanced corporate governance practices to come.

Among the credits given to GoT is its ability to maintain peace and political stability. The country has never had a coup or a civil war, it has enjoyed consistent modest economic growth since 2002, and the currency is stable. Corruption remains a problem, but it is not high by regional standards. There is a well-articulated investment promotion policy that details how investors will be protected. There is no restriction on ownership of companies by external investors. Investors enjoy working in such a peaceful environment, however to some extent investors feel unprotected when the government does not have restrictions on imported goods that are cheaply produced and can distort the market price of domestic products.

(iv) Obtaining Credit

One of the major challenges facing the agricultural sector in Tanzania is the availability and accessibility of credit. In many parts of the country agriculture mainly depends on rainfall, which is unpredictable, and so banks shy away from risking their money. To minimize the risks banks tend to charge high interest on credit, a complaint of many investors in the agricultural sector. In Tanzania, lending to the agricultural sector is extremely risky. With few hedges on natural risks, limited financial infrastructure to hedge repayment risk, and an inability to predict government intentions, banks either price loans to protect themselves – excluding most poor customers – or simply focus on other sectors.

Commercial banks do not lend to smallholder agriculture. Some of the reasons are the high risk of lending, unpredictable demand for loans, the

seasonality of farming, high levels of poverty and a lack of collateral. The Alliance for a Green Revolution in Africa (AGRA) argues that unless agro-dealers in rural areas are given access to finance, farmers will not be able to secure farm inputs. Hence AGRA, in partnership with the National Microfinance Bank of Tanzania, (NMB), has signed an agreement to release US\$6.1 million to improve Tanzania's network of rural agro-dealers. The money will go to an innovative financing plan that will boost options for the country's smallholder farmers. A critical part of the loan program is an additional US\$1.1 million "guarantee fund" provided by AGRA and the Tanzanian government's Financial Sector Deepening Trust (FSDT). The guarantee fund would cushion NMB against losses that could result from defaulted loans.

NGOs and small farmers contribute significantly to agricultural financing through participatory initiatives. The contribution by private sector is well recognized in medium and large-scale farming and currently by *Kilimo Kwanza*.

In the long term, establishment of an agricultural bank would be a solution to the problem. In the short term a possible intervention would be GoT guarantees for agricultural credits to reduce lenders' risks and interest rates.

In 2007 the Bank of Tanzania committed itself to create a credit reference bureau and its associated regulations although as yet this is not operational. The BoT also promised to open an office tasked with setting up a reference database on credit information, accessible to private credit bureaus. The Tanzania Bankers' Association has announced plans to establish a credit reference bureau to use this data bank. Until some of these tools are available for lenders' use during the loan application process, the cost of lenders' due diligence will remain high, the cost of borrowing will remain high, and lending to the agricultural sector in particular will remain low.

Despite these indications of progress, access to credit is still limited to a few enterprises with solid collateral in key urban areas. Small and medium enterprises as well as firms located outside the main urban areas are virtually excluded. Commercial banks have displayed increasing risk aversion in lending, preferring to hold a large portion of their liquidity in risk-free government securities. Interest rates on loans have remained high and the spread between lending and deposit rates remains wide (13.3% in 2006). ESRF (2012) states that competition in the banking sector on interest rates will receive a boost from GoT's initiatives to address aversion to lending by commercial banks, as well as their preference towards holding risk free government paper (ESRF, 2012).

(v) Enforcing Contracts

In Tanzania both formal and informal contracts for goods and services are in use throughout the agricultural supply chain. Stakeholders at all levels are generally familiar with various types of contracting opportunities such as contract farming. Occasionally farmers disregard their contracts and sell

produce elsewhere. Farmers' associations and cooperatives have been advocated as a solution to this problem since investors will be signing contracts with an organization rather than an individual.

Factors affecting contract law include a scarcity of legal services focused on agriculture in Tanzania's rural communities; an acute shortage of lawyers and advocates in particular; the absence of practical guidance on the formation and enforcement of agricultural contracts; attitudes at all levels that take contracts merely as guidelines for business relationships rather than as strict commitments on which enterprises can base arrangements for the future; primary-level courts that lack sufficient resources, streamlined practices, and public confidence; and significant interference by crop boards and crop-related policies in farmers' ability to establish their own terms of sale and delivery.

Solutions are seen as a continued commitment to strengthening Tanzania's legal services and courts, particularly beyond the larger cities and municipalities, to strengthen the rule of law in Tanzania's vast agricultural sector; and continued emphasis on informing less formal or less educated constituencies about the importance of making and honouring contracts.

(vi) Labour Issues

The vast majority of workers in Tanzania's agricultural sector work informally. They are farmers or herders on small plots held by their families or villages; they work at various junctures along product value chains at "piece" rates, often on a seasonal basis, or they hold milling, shelling, sorting, or similar jobs under casual circumstances that fall far short of compliance with the minimum conditions for wages, hours, safety, and health established by the national labour laws.

Agricultural workers typically function as part of family networks. With low rates of urbanization, around 80% of Tanzanians live in small towns and villages among their extended families, usually defined by paternal lineage. Their collective livelihoods depend on members' working in a variety of paid and unpaid jobs, with a few adults sometimes employed by the government, or in entrepreneurial pursuits or even abroad. Children perform both light and heavier aspects of agricultural work and women are relegated to disproportionately burdensome, poorly compensated, and low-status activities.

Tanzania's new regime of labour laws and regulations, enacted between 2003 and 2008, seeks to bring clarity and structure to labour relations in an economy newly oriented toward free market principles. However, the relevance of this regime to most Tanzanian workers remains minimal. A small minority of agricultural workers - probably around 25,000-50,000 - are employed on 400 or so privately owned plantations where they are represented by a labour union. Conditions for these workers are significantly better than those for most jobs in the agricultural sector, with most plantations

subject to regular inspections for labour conditions and occupational health and safety. In contrast, most agricultural workers in the informal sector receive little attention from state agencies, labour unions, and employers' associations.

Labour is not cheap in Tanzania in comparison with some other agricultural commodity producers, e.g., Vietnam, India, China, Madagascar etc. Competitiveness depends on making use of the enormous potential of the existing (often unqualified) labour force, keeping production costs low and increasing profit margins by reducing operational costs linked to poor roads, high electricity tariffs, high and multiple tax requirements, etc. that all contribute to investors' overheads. In addition, investments in the agricultural sector require building the necessary human skills and know-how about the various commodities. For example, despite being an important producer and processor of sugar, expertise in this sector is difficult to hire or retain due to the limited number of experts in the country and the lack of tailor-made training options to address the knowledge gap.

(vii) Land Related Issues

Tanzanian law does not permit foreign investors to hold title to land. To overcome this constraint, TIC was mandated to develop a "land bank," a database of land available for development, to which TIC will obtain title for 99 years, granting derivative rights to foreign investors for 98 years. In 2010 the TIC Executive Director was quoted as saying this responsibility had been transferred to the Regional administrations. Recent analysis on behalf of the World Bank has found that in practice, the land bank is effectively non-functional (Tenga *et al.*, 2012). Foreign investors report little confidence in this key service, preferring instead to identify land themselves and to sublease from Tanzanian nationals.

The *Land Act (1999)* provides for access to the fundamental agricultural input, land, while the Customary Right of Occupancy enhances land tenure for very small farms. However the legal basis under which foreign investors can purchase the right to occupy land is unclear. Similarly, although procedures for land acquisition and compensation are clear, the process whereby people who are occupying land without formal user rights can receive compensation if they have to vacate are not clearly detailed or regulated.

One common complaint is the re-encroachment of land properly acquired by an investor, after due compensation had been paid (either directly or through the TIC). Sometimes within two years of acquisition, villagers re-enter land, and the investor receives little support for their eviction. A second common complaint is larceny, reported in areas where food security is an issue. A third issue is that recourse through the courts is ineffective, in that even when cases might be won, court orders are rarely enforced. This lack of capacity to maintain security of tenure on the part of either the courts or the police constitutes a further disincentive to investment.

To many investors, availability and access to land is not a major issue; the government facilitates access to land as part of the incentive package for investors. Nevertheless in some cases boundary problems result in trespassing and land conflicts.

(viii) Infrastructure (roads, energy, water, etc)

Poor infrastructure is among the challenges impeding growth of the agricultural sector in Tanzania. The absence of reliable railway transportation increases production costs to investors because they have to use the rough and unreliable roads. Electricity is another major obstacle in the sector. Investors are discouraged by inadequate supply of electricity from TANESCO, and the frequent power rationing results into unnecessary costs for investors. Water scarcity is also an increasing problem, and is likely to be accentuated by climate change in some catchments. Overall the area of rural infrastructure needs many improvements especially in energy, water and transport.

(ix) Export Bans

One area in which state intervention has had a major impact on agriculture is in the regulation of exports, especially the recent temporary bans on the export of cereals, particularly maize. Farmers, traders, and millers all report that such bans have reduced the profitability of the maize sector at all levels and that the climate for increased investment in domestic agriculture was damaged by their imposition. This situation had been exacerbated by the unclear manner in which the export bans were imposed and removed, resulting in opportunistic profits for some traders and millers who were able to export during a brief hiatus in the ban. The decision to ban exports appears was made unilaterally by the GoT to safeguard national food security, and did not involve consultation with the private sector.

4.6

GOOD GOVERNANCE

Participation of citizens (men and women) in decision-making processes that affect their lives, particularly at the local level, is highly important and an essential component of good governance. In Tanzania, according to the 2007 government study *Views of the People*, 22% of rural respondents said they had participated in a local level planning exercise⁽¹⁾. Similar rates of participation were reported by respondents in urban areas (other than Dar es Salaam), but only 9% of rural and urban adults reported having attended a full local council meeting. Of all respondents, whether rural or urban, nearly 40% of people thought that government officials do not listen to citizens' voices.

Pastoralist communities are often perceived as being transient (non-resident), and therefore they form a special group which researchers have found to have

(1) URT. 2007. *Views of the People 2007*. Ministry of Planning, Economy and Empowerment, Dar es Salaam.

very limited participation and representation in political processes at local level⁽¹⁾. Political participation tends to be monopolised by the more sedentary communities.

The challenge now is to ensure that governance systems are more effective and inclusive, with citizens participating and represented in governance processes.

Gender

Women's participation and representation in developing government policies and programmes remains low. However efforts have been made by the government to increase the proportion of women in decision-making processes, such as the introduction of a quota system of preferential or reserved seats in local councils.

The percentage of women in parliament is set at a quota of 33%⁽²⁾. There are less than ten female ministers in the current government and the number of women nominated by political parties is low compared to the number of men. In other non-political positions, many women often hold lower-skilled positions, such as messengers and personal secretaries⁽³⁾.

The law also ensures women's participation in local government bodies: one third of the members of each District Council and one quarter of the members of each Township Authority and Village Council have to be women. However, women's participation in traditional structures remains limited: in a 2007 study of six Tanzanian councils, including Kilosa and Iringa in the SAGCOT area, discussions with various council officials indicated that the issue of gender mainstreaming had not been important when developing the councils' plans (REPOA, 2007). The process of gender mainstreaming including appropriate training, (regular workshops on gender related issues) and the development of gender sensitive monitoring and evaluation systems, were all absent or poorly implemented in most of the councils visited. Women were also said to be afraid to run for elections for cultural and social reasons⁽⁴⁾.

(1) Mattee, A.Z. & M. Shem. 2006. *Ambivalence and contradiction: a review of the policy environment in Tanzania in relation to pastoralism*. IIED.

(2) <http://www.ipu.org/pdf/publications/wmnpersp10-e.pdf> [accessed 9 August 2012]

(3) http://www.tawla.or.tz/index.php?option=com_content&view=article&id=78&Itemid=98 [accessed 9 August 2012]

(4) REPOA. 2007. *Local Governance in Tanzania: Observations from six councils 2003-2003*. Special Paper 07.22. Mkukina Nyota Publishers.

4.7 THE SAGCOT INSTITUTIONS

4.7.1 SAGCOT Centre

The SAGCOT Centre is the key coordinator of the SAGCOT Programme with numerous cross-cutting roles. The Centre has been established to facilitate investment and manage the coordination of the partnership to ensure the successful achievement of its objectives. Its activities include:

- Managing and expanding the SAGCOT Partnership;
- Information provision & Market intelligence;
- Facilitating introductions;
- Facilitating access to finance;
- Coordination of cluster and corridor development;
- Identification of enabling environment obstructions and helping to address these; and
- Monitoring and evaluating progress.

With this remit, the SAGCOT Centre will be instrumental in communicating the principals of sustainable investment across stakeholders in both the public and private sectors. To accomplish this mandate, the SAGCOT Centre will need to have the capacity to:

- Keep stakeholders updated on environmental and social issues surrounding development in the Corridor, including those associated with resettlement and compensation.
- Communicate to potential investors, in collaboration with TIC and RUBADA, the sustainable and green investment principles which SAGCOT will promote, including resettlement principles as contained in this RPF.
- Be the first “stop” for all investments regarding transparent land transfer requirements.
- Provide preliminary information on clean technology and reduced carbon footprint opportunities for investors.
- Guide investors in good practice for consultation and engagement with local villagers and communities.

Finally, the SAGCOT Centre will also be the focal point for annual reporting on safeguard progress across the implementing agencies and organizations to the World Bank.

Major concerns are the Centre's institutional capacity, which is very low, and its authority - it is a private sector entity with no legal mandate for enforcement, as noted by a recent study on corporate social responsibility (*Box 4.2*).

Case Study:**Mobilizing the Southern Agricultural Growth Corridor of Tanzania***Harvard Kennedy School Corporate Social Responsibility Initiative*

"The SAGCOT Centre will also not enforce principles of social and environmental responsibility. It will promote such principles and help players comply by sharing best practices, providing tools, and facilitating partnerships. But it can provide limited disincentives for non-compliance compared to other key stakeholders, such as the government or the planned Catalytic Fund."

Source: Jenkins (2012)

4.7.2

Tanzania Investment Centre

The Tanzania Investment Centre (TIC) was established under the provisions of the Tanzania Investment Act, Cap 38 (Act No 26 of 1997). The Centre is designated to be a one-stop shop for investors and is mandated to co-ordinate, encourage, promote and facilitate investment in Tanzania and to advise the Government on investment policy and related matters. Within this remit, the TIC has the authority to:

- Identify investment sites, estates or land together with associated facilities on these, for the purposes of investors and investments in general.
- Assist investors to obtain permits, licence approvals consents, authorisations, registrations and other matters required by law for a person to set up and investment.
- Enable certificates issued by the Centre to have full effect.

TIC will assist in incorporation and registration of enterprises, promote both foreign and local investment activities, and grant certificates of incentives. As the first port of call, the TIC will need to develop a set of guidelines for potential investors that detail the principles of sound sustainable agriculture development in the Corridor, including those for resettlement.

These principles should cover the following topics:

- (i) reliable information on land availability with maps (in a modern format (GIS));
- (ii) information linking land suitability to potential crop production;
- (iii) transparent methods for land transfer, registration and leasing arrangements;
- (iv) land lease revenue options or equivalents;
- (v) corporate social responsibility and community development funds, including those related to resettlement and livelihood restoration programmes;
- (vi) the role of grievance mechanisms, tribunal or adjudication assurance for investors and villagers, and

(vii) probable road blocks and ways to navigate around these complex issues.

The guidelines will be developed from technical information from both RUBADA and the Ministry of Lands, Housing and Human Settlements Development.

4.7.3

MLHHS

The responsibilities of the Ministry of Lands, Housing and Human Settlements Development (MLHHS) include activities relating to land administration, land use, survey and mapping, land information management systems and adjudication. With World Bank support, the Private Sector Competitiveness Project (PSCP) is supporting capacity building in this ministry following the Strategic Plan for Implementation of the Land Laws (SPILL). This support includes several activities with direct relevance to the SAGCOT Programme:

- (i) decentralization of land administration and registration of village land;
- (ii) computerization and streamlining of land administration services;
- (iii) strengthening dispute resolution mechanisms; and
- (iv) upgrading infrastructure for surveying and mapping.

Progress is being made with the detailed design and implementation of an Integrated Land Information Management System (ILIMS), important in modernizing land administration information. Also, in terms of transparency and resolution of land disputes, the Ministry has developed two main activities to strengthen dispute resolution mechanisms – support for functioning District Land and Housing Tribunals and support to reduce the backlog of land cases.

National Land Use Planning Commission (NLUPC): the NLUPC, originally established in 1984, is the executing agency for the *Land Use Planning Act (2007)* and has responsibilities for both policy coordination and physical planning. The Commission is headed by a Board of Commissioners supported by a Secretariat under a Director-General. Key departments are the Directorate of Land-use Coordination, Communication and Policy and the Directorate of Physical Planning, which is responsible for preparation of all land use plans - national, district and village - and forwarding them to the Ministry for gazettelement.

4.7.4

RUBADA

The Rufiji Basin Development Authority (RUBADA) was established by the Rufiji Basin Development Authority Act of 1975. Under the act, the authority's functions include hydropower development, flood control, the promotion of tourism, and the promotion and regulation of industrial activities, agriculture, forestry, fisheries, navigation and road transport, all within the Rufiji basin. RUBADA has limited technical capacity and is

focusing on promotion of the Stiegler's Gorge hydropower project and facilitation of investor access to land.

There is some question as to RUBADA's powers and role in relation to SAGCOT implementation. To effectively promote, regulate, coordinate and facilitate sustainable and balanced long term ecological and socioeconomic development in the Rufiji Basin, RUBADA will need to expand land surveys and land use planning across the Corridor with new streamlined procedures for the transparent and efficient allocation of land to investors, and for facilitating communications and partnerships between farmers and large investors. The sustainable practices SAGCOT is committed to will require RUBADA to incorporate key environmental and social considerations into its baseline analysis, mapping activities and land acquisition and leasing procedures, including resettlement requirements as set out in the Resettlement Policy Framework.

4.8 *INTERNATIONAL CONSIDERATIONS*

4.8.1 *International Conventions and Agreements*

Tanzania is a party to many international agreements on environmental and social issues. Some of the most relevant to SAGCOT are:

Environmental

- The African Convention on the Conservation of Nature and Natural Resources (1968);
- Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention, 1972, ratified 1977);
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES: 1974, ratified 1979);
- UN Framework Convention on Climate Change (UNFCCC: 1983).
- Nairobi Convention (1985);
- Montreal Protocol on Substances that Deplete the Ozone Layer (1987);
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989);
- Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa, Bamako, Mali (1991);
- Convention on Biological Diversity (CBD: 1992, ratified 1996);
- Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification particularly in Africa (CCD: 1994, ratified 1994);
- Lusaka Agreement on Cooperative Enforcement Operations Directed at Illegal Trade in Wild Fauna and Flora (1994); and
- Convention on Wetlands of International Importance (Ramsar Convention, 1971, came into force in Tanzania 2000).

Social

- International Covenant on Economic, Social and Cultural Rights (1966, ratified 1976);
- UN Convention on the Elimination of All Forms of Discrimination against Women (1979);
- UN Convention on the Rights of the Child (1989); and
- UN Convention on the Rights of Persons with Disabilities (adopted 6 December 2006).

Together with 35 ILO Conventions including, most recently:

- Worst Forms of Child Labour Convention (No. 182, 1999, ratified 2001).

In addition to these international legal agreements, there are now many sets of principles, codes of conduct and best practices available to guide business decisions and national policies. Some of the most relevant for SAGCOT are:

Land Governance

- *AU Framework and Guidelines on Land Policy in Africa* (AUC *et al.*, 2010).
- *FAO Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security* (FAO, 2012).

Business and Human Rights

- *UN Guiding Principles on Business and Human Rights: Implementing the United Nations "Protect, Respect and Remedy" Framework* (UN, 2011).

Corporate Social Responsibility (CSR)

- Organisation for Economic Cooperation and Development (OECD) *Guidelines for Multinational Enterprises* (OECD Publishing, 2011 - 5th ed.).
- *ISO 26000 Guidance on social responsibility* (ISO, 2010).

Finance

- *UNEP Finance Initiative* (<http://www.unepfi.org/index.html>).
- *Equator Principles*, based on the IFC's *Performance Standards on Social and Environmental Sustainability*.
- *UN Principles for Responsible Investment* (2006).
- *Private Equity Council Guidelines for Responsible Investment* (PEC, 2009).

There are also many other initiatives and guidelines specific to individual sectors, such as the Round Table on Sustainable Bio-fuels and the Extractive Industries Transparency Initiative (EITI). A review is provided in a recent paper on land investment in Tanzania (Mwakwarimba & Ngowi, 2012). Note also that some of these guidelines and principles have been criticised by civil society organisations as not going far enough, lacking teeth, and/or providing cover for 'business as usual'.

In relation to SAGCOT, an important initiative is underway to develop CSR guidelines specific to the agriculture sector in Tanzania (Box 4.3).

Box 4.3

CSR Guidelines for Responsible Agricultural Investment in Tanzania

Corporate Social Responsibility (CSR) is an issue that is working its way into many policy debates and corporate agendas. As measures are taken in Tanzania to increase investments in agriculture to stimulate economic growth it is imperative for the GoT to put in place appropriate mechanisms to safeguard environmental, social and economic standards that can make a positive contribution to society. With commercial activity increasing in rural areas and land made available for big-scale farming, a CSR framework for agriculture investments is a feasible approach to be applied to ensure upheld respect for rights, livelihoods and resources.

The Food and Agriculture Organization of the United Nations (FAO), in collaboration with a wide range of stakeholders, is currently supporting the GoT to develop **CSR Guidelines for Responsible Agriculture Investments**. The guidelines are based on the FAO, UNCTAD, IFAD and WB proposed principles for responsible agricultural investment including transparency, good governance and accountability; social, environmental and economic sustainability; stakeholder involvement; recognition of domestic food security and rural development concerns⁽¹⁾.

FAO and its partner organizations will be conducting comprehensive consultations with all relevant stakeholders so as to build consensus in order to translate the said principles into CSR guidelines for agro investors, GoT, DPs and international agencies for implementation at different levels. The participatory process will result in domesticated principles as well as an institutional set-up, indicating what institution (s) will play the coordination role and guide/oversee/report on the implementation of the guidelines.

Source: FAO (pers. comm.).

For more information:

- Nora Kokanova (nora.kokanova@fao.org) – FAO Tanzania
- Francesca Dalla Valle (francesca.dallavalle@fao.org) – FAO HQ, Rome

4.8.2

World Bank Safeguards

Initial screening of the Bank's proposed support to the SAGCOT Investment Project resulted in assignment of an EA Category A, due to the potential for a variety of adverse environmental and social impacts as a result of SAGCOT Programme implementation. Projects with this categorisation require full assessment in line with the requirements of World Bank OP 4.01 *Environmental Assessment*.

A summary of the current status of the SAGCOT Investment Project with respect to the Bank's safeguard policies is given below.

⁽¹⁾ http://unctad.org/en/docs/ciicrp3_en.pdf

Table 4.6 World Bank Safeguard Policies Triggered by Project

Applicable?	Operational Policy
Yes	Environmental Assessment (OP/BP/GP 4.01) The Programme will promote expanded investment in agribusiness leading to intensified commercialized agriculture and employment generation across agricultural value chains in the Southern Corridor. Given the Project's scale and its location in a region with many environmentally sensitive areas with high biodiversity and numerous Critical Natural Habitats, the policy is triggered.
Yes	Natural Habitats (OP/BP 4.04) There are numerous critical natural habitats and natural habitats (mainly forests and wetlands) in the corridor, some of which may be degraded or converted by SAGCOT Investment Project activities. Therefore the policy is triggered.
Yes	Forests (OP/BP 4.36) There are numerous natural forests and critical forest areas within the corridor. SAGCOT Investment Project activities have the potential to affect the health and quality of these forests and the rights and welfare of local residents dependent on forest resources. Therefore the policy is triggered.
Yes	Pest Management (OP 4.09) The project will promote intensive commercial agriculture in tropical and subtropical environments with significant pest and disease control challenges. Therefore the policy is triggered.
Yes	Physical Cultural Resources (OP 4.11) The corridor covers about one third of Tanzania's land area and therefore must contain significant physical cultural resources, including culturally significant natural sites. However most remain undocumented. Some SAGCOT Investment Project activities may involve extensive earthworks and land use change and therefore have the potential to directly affect PCR. Therefore the policy is triggered.
Yes	Involuntary Resettlement (OP/BP 4.12) World Bank project investments will not be used directly for land acquisition for agriculture, but may be used to acquire land for last-mile infrastructure such as roads and/or for agro-processing facilities. In addition some environmental conditionality may restrict residents' access to natural resources. . Therefore the policy is triggered.
Yes	Indigenous Peoples (OP 4.10) SAGCOT-related activities will be undertaken in areas used by livestock herders belonging to the Barabaig ethnic group, which has previously been recognized as an indigenous group in Tanzania under the World Bank's policy. Therefore the policy is expected to be triggered, although appropriate approaches to the application of OP 4.10 in the context of the Project are under discussion between the Government of Tanzania and the Bank.
No	Safety of Dams (OP/BP 4.37) According to the current design of the World Bank SAGCOT Project, there will not be any funds used for dam construction.
No	Projects in Disputed Areas (OP/BP/GP 7.60) There will not be any activities in disputed areas.
TBD	Projects on International Waterways (OP/BP/GP.7.50)

Notes:

- **OP 4.01 Environmental Assessment:** the principal response to the requirements of this policy has been implementation of this strategic environmental and social assessment and preparation of (i) strategic recommendations (Chapter 9), and (ii) an *Environmental and Social Management Framework* (ESMF) to guide loan processing and decision-making by the Catalytic Fund and other aspects of the World Bank project.
- **OP 4.09 Pest Management:** pesticide use and management will be guided by the Agricultural Sector Development Project's (ASDP) Integrated Pest Management Plan (IPMP) which provides appropriate guidance for IPM in the agricultural sector in Tanzania. To support this, the SAGCOT programme will also need apply the standards described by FAO's *International Code of Conduct on the Distribution and Use of Pesticides*. This encourages responsible and generally accepted trade practices and sets out the “conduct for public and private entities engaged or associated with the distribution and use of pesticides.” The Code is designed for use within the context of national legislation as a basis whereby government authorities, pesticide manufacturers, those engaged in trade and any citizens concerned may judge whether their proposed actions and the actions of others constitute acceptable practices. In addition, it describes the shared responsibility of many sectors of society to work together so that the benefits to be derived from the necessary and acceptable use of pesticides are achieved without significant adverse effects on human health or the environment.

Further information can be found at:

<http://www.fao.org/docrep/005/y4544e/y4544e00.htm>

- **OP 4.10 Indigenous Peoples:** under OP 4.10, the World Bank recognises the importance of the rights of local communities and indigenous groups in the formulation and implementation of programmes that involve issues of land tenure, benefit-sharing and access to resources. It also outlines the need for ‘free, informed and prior consent’. A number of the 120 distinct ethnic groups present in Tanzania are represented within the Southern Corridor, but the process of determining which of these might be recognised as Indigenous Peoples is ongoing. The Barbaig and Hadzabe have received initial recognition and a draft *Indigenous Peoples Planning Framework* (IPPF) has been prepared for the Corridor by the World Bank's lead indigenous peoples specialist, based on this classification. Further work will be carried out to establish which additional groups meet the ACHPR / UN principles. Given that the SAGCOT Investment Project activities may be implemented in areas where Indigenous Peoples are present, and such activities have the potential to have both adverse impacts on these groups, as well as potential benefits, it is expected that OP 4.10 will be triggered.
- **OP 4.12 Involuntary Resettlement:** in response to the requirements of this policy, as part of this study ERM have prepared a *Resettlement Policy*

Framework (RPF) to guide loan processing and decision making under the Catalytic Fund and other aspects of the World Bank-supported SAGCOT Investment Project .

5 THE SAGCOT CORRIDOR AND CLUSTERS

This chapter provides an overview of the biophysical and social baseline for the SAGCOT corridor (*Figure 5.1*). Where possible (i.e. where the data allow) the descriptions are focused on the SAGCOT clusters. Given its role as a case study for this assessment, particular attention has been given to describing conditions in the Kilombero cluster.

5.1 CLIMATE

5.1.1 Overview

The climate of the corridor reflects Tanzania's location just south of the equator, and is complex with wide regional variations dictated by topography and altitude, along with pronounced seasonality. Conditions in the coastal regions are generally warm and humid, with a tropical climate. Temperatures range from 25 to 27°C throughout much of the year, with a slight drop during the coolest months from June to September. Further inland, in the country's highland regions, the climate is temperate, and temperatures range from around 20 to 23 °C year round⁽¹⁾. The climate throughout the country is heavily influenced by the El Niño – Southern Oscillation (ENSO) cycle (Kilimo Kwanza Committee, 2011).

Seasonal rainfall patterns in Tanzania are affected by the migration of a low pressure/high precipitation zone known as the Inter-Tropical Convergence Zone (ITCZ) around the equator. The wet season in central and southern parts of the country, lasting from around October to March, is associated with the presence of the ITCZ in this area. Eastern areas of Tanzania instead experience two distinct wet seasons associated with the migration of the ITCZ southward through the country in October to December, and northward in March to May. Wet season rainfall ranges from 50 to 200 mm per month, but can reach up to 300 mm per month in the wettest regions. Sea surface temperatures influence the timing, duration and intensity of rainfall, and these features therefore show inter-annual variation ⁽²⁾.

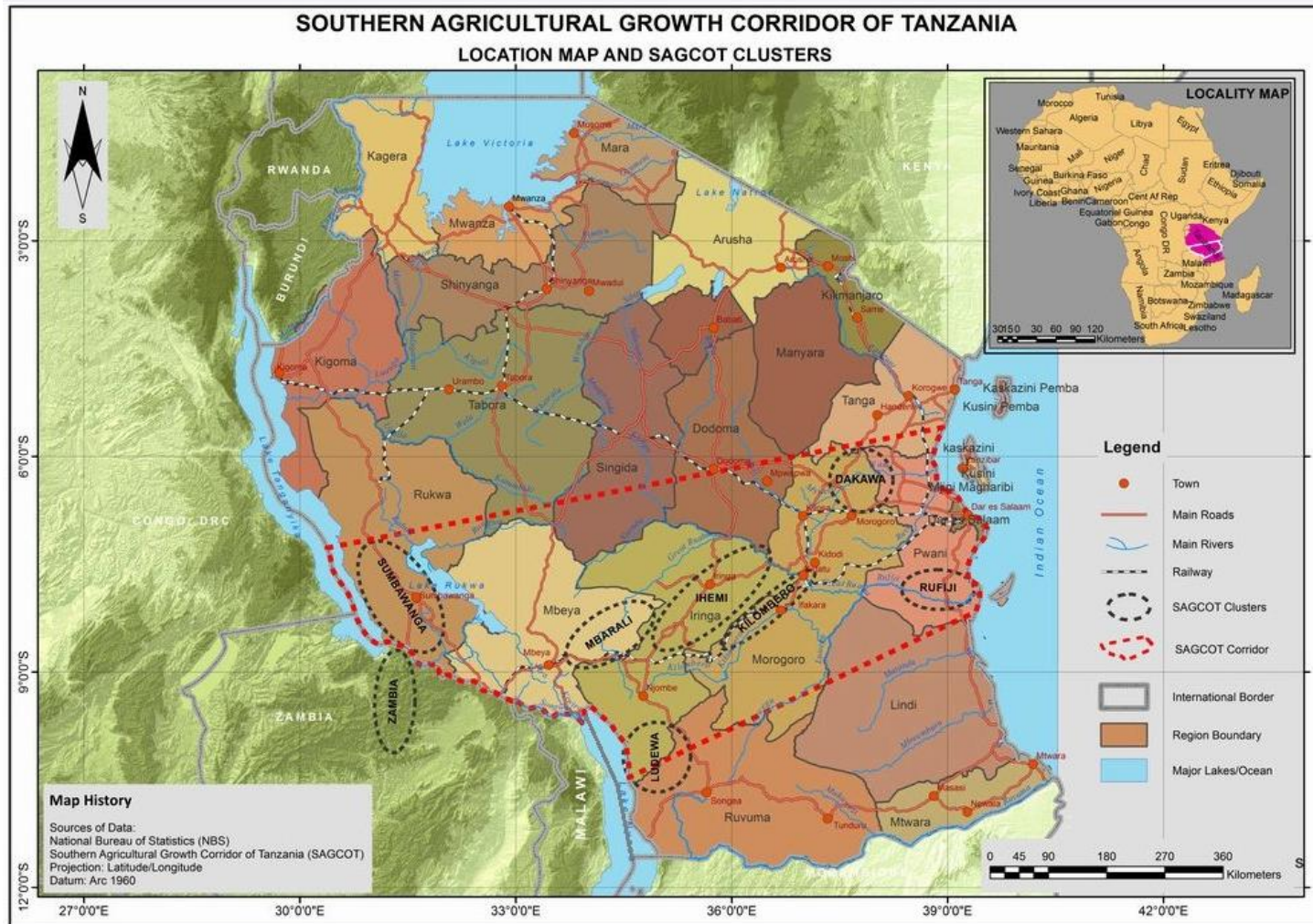
Existing climate variability leads to significant economic costs for Tanzania, since much of the economy is dependent on activities sensitive to climate, such as agriculture. Periodic extreme events occur, such as major droughts in 2005/2006 and major flooding in 1997/1998⁽³⁾. These are largely linked to the ENSO cycle, with flooding associated with El Niño phases and droughts associated with La Nina phases (Kilimo Kwanza Committee, 2011).

(1) Sweeney, New & Lizcano (2010). UNDP Climate Change Country Profiles - Tanzania. Available at: <http://country-profiles.geog.ox.ac.uk>

(2) *ibid*

(3) DFID (2011). The Economics of Climate Change in the United Republic of Tanzania.

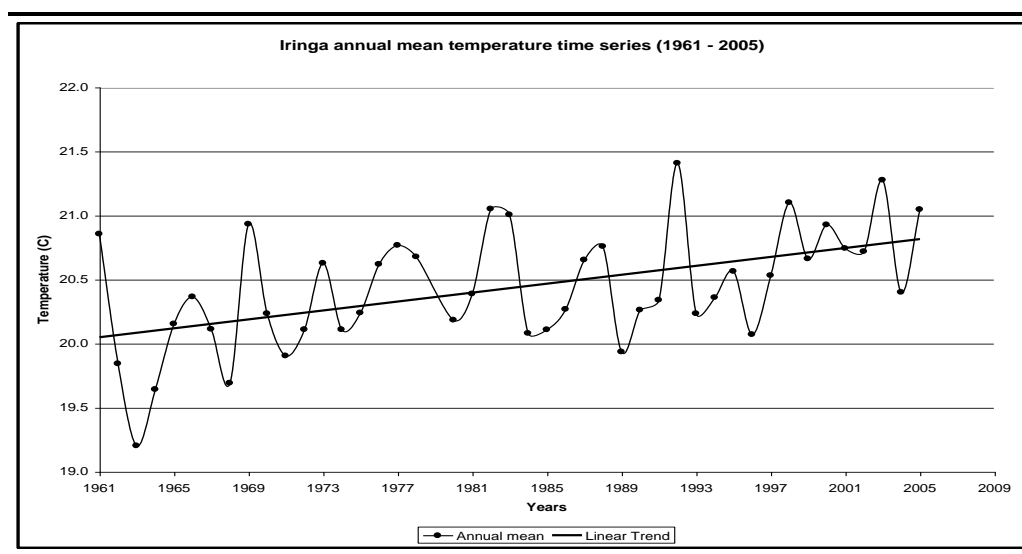
Figure 5.1 SAGCOT Corridor and Clusters



Note: International border shown for Lake Malawi is the median boundary: this is not accepted by all riparian states.

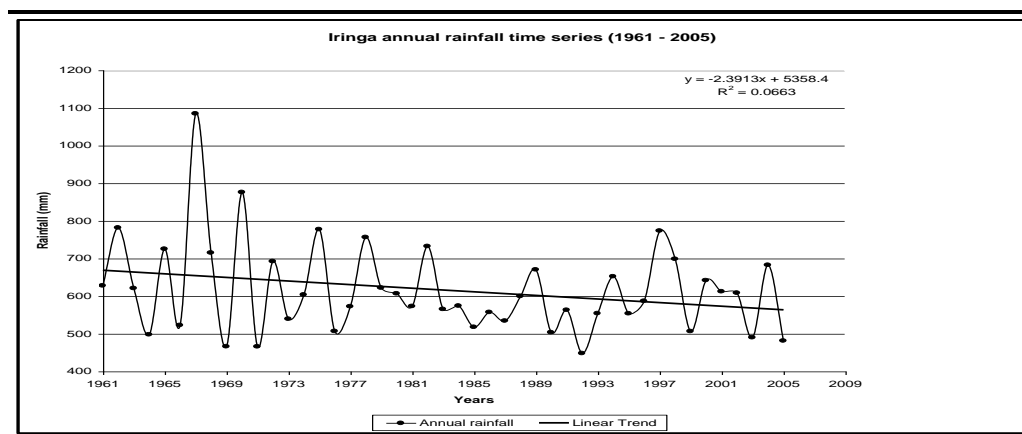
There is some indication that extreme events have intensified over recent decades, indicating that the country's climate is already experiencing climate change ⁽¹⁾. An average temperature increase of 0.23°C per decade for Tanzania has contributed to an increase in mean annual temperature of 1°C since 1960; this increase is most pronounced in January and February. An average decrease in annual rainfall of 2.8 mm per month per decade has also occurred, with the greatest decreases in the south of the country. Decreases in rainfall have been most pronounced for the March to May period⁽²⁾. Both trends are illustrated in *Figure 5.2* and *Figure 5.3* which depict annual mean temperature and rainfall for Iringa, a city located in the centre of the southern corridor.

Figure 5.2 *Annual Mean Temperature for Iringa, 1961-2005*



Source: Kangalawe (2012)

Figure 5.3 *Annual Mean Precipitation for Iringa, 1961-2005*



Source: Kangalawe (2012)

(1) *ibid*

(2) Sweeney, New & Lizcano (2010). UNDP Climate Change Country Profiles - Tanzania. Available at: <http://country-profiles.geog.ox.ac.uk>

Future climate predictions carry a high level of uncertainty and vary greatly depending on the model used, with significant disagreements between models. The information in this section follows the results of the recent DFID review of climate predictions for Tanzania, the Economics of Climate Change (ECC) in the United Republic of Tanzania⁽¹⁾, unless another source is referenced.

The ECC report highlights that, despite uncertainty relating to changes in specific parameters, the impacts of climate change for the country are likely to be large. There is broad agreement between models that an increase of average annual temperatures of 1 °C to 3 °C above that of the baseline period is possible by the 2050s. By 2100, a rise in temperature of up to 5 °C has been predicted with a higher global emissions scenario, while with lower emission scenarios temperatures are still expected to increase by between 1.5 to 3 °C. The greatest increases in temperature are predicted for the north and north-east of Tanzania (Kilimo Kwanza Committee, 2011).

While all models show changes in precipitation they do not agree on how it will change, in terms of both the direction and size of the change. Variability in predictions is compounded by differences between seasons, regions and rainfall regimes. Changes in rainfall patterns are expected to vary regionally with greater increases predicted in the north of the country, while some areas may experience decreased precipitation⁽²⁾. Many models predict increased precipitation, especially towards the end of the summer months. Within the corridor, some models predict a decrease in rainfall during the shorter early rainy season in the upper reaches of the Wami-Ruvu and Rufiji basins. As a result the rivers fed by these basins may experience decreases in flow of up to 10% (Milder *et al.*, 2012). Other models, however, predict an increase in flow in the Rufiji river as a result of changes to rainfall and soil moisture⁽³⁾.

Other regional differences include the threat presented to coastal regions by climate change. Predictions suggest that approximately 8% of Tanzania's coastal wetlands could be lost by 2050 as a result of flooding associated with sea level rise.

Predictions relating to future changes in extreme events, as opposed to averages, are even more uncertain. Many models indicate that there will be an intensification of heavy rainfall, with patterns of change again varying regionally. With an increase in the intensity of rainfall and the number of extreme rainfall events, flood risks will increase⁽⁴⁾. Wetter regions in

(1) DFID (2011). The Economics of Climate Change in the United Republic of Tanzania.

(2) IIED. 2009. Cultivating success: the need to climate-proof Tanzanian agriculture. M. Chambwera & J. MacGregor. IIED Briefing: www.iied.org/pubs/display.php?o=17

(3) Wingqvist (2010). Tanzania Environment and Climate Change Policy Brief. Environmental Economics Unit, University of Gothenburg.

(4) Ibid.

particular are at risk of more frequent and more severe flooding. Predictions for changes to drought events vary greatly, with both intensifications and reductions in drought severity predicted depending on the model and the region⁽¹⁾. In both cases, the most severe events are likely to be exacerbated if coupled with El Niño or La Nina events in the Pacific Ocean.

Climate change may result in increased intensity and frequency of extreme events and related natural disasters, such as landslides. In addition, adverse impacts are also expected in terms of changes in the prevalence of pests and of diseases such as malaria, and aggravation of existing environmental challenges including water scarcity, land degradation, loss of biodiversity and ecosystem services, deforestation and air pollution. These may lead to social impacts affecting poverty, vulnerability, health and economic development⁽²⁾.

Changes to temperature and precipitation are likely to have large economic impacts, particularly within the agricultural sector. Severe impacts have been predicted for some crops, with average maize yields expected to decrease by up to 16% by 2030, and by 35% by 2050 under the worst-case projections. In the most drought prone regions, such as Dodoma in central Tanzania (north of the SAGCOT corridor), cereal yield losses could reach up to 80% (Milder *et al.*, 2012). By contrast, yields of crops such as coffee, cultivated in the highlands, may increase if predicted changes to climate occur. While the details may not be certain at this stage, it is likely that the broad distribution of agro-ecological zones within the country will change, and that there will be greater variability in production, linked to increasing variability in the weather (Kilimo Kwanza Committee, 2011).

5.1.3 *Climate Change Adaptation*

Various studies report that at present Tanzania is not adequately prepared to address the likely impacts of future climate change, and that the country's vulnerability may be increased due to changes in land-use patterns, rising population pressure and increased demands on land and water⁽³⁾.

The main government body with responsibility for climate change issues is the Division of Environment. There is also a National Climate Change Steering Committee (NCCSC)⁽⁴⁾. Other important government agencies concerned with climate change include the Ministry of Water and Irrigation; Ministry of Agriculture, Food Security and Cooperatives; Ministry of Natural Resources and Tourism; Ministry of Energy and Minerals; Ministry of Infrastructure; Ministry of Industry, Trade and Marketing; the Tanzania

(1) DFID (2011). The Economics of Climate Change in the United Republic of Tanzania.

(2) Wingqvist (2010). Tanzania Environment and Climate Change Policy Brief. Environmental Economics Unit, University of Gothenburg.

(3) DFID (2011). The Economics of Climate Change in the United Republic of Tanzania.

(4) Wingqvist (2010). Tanzania Environment and Climate Change Policy Brief. Environmental Economics Unit, University of Gothenburg.

Meteorological Agency and the National Environmental Management Committee (NEMC).

As a low emitter by world standards - Tanzania currently releases relatively low levels of greenhouse gases, predominantly from its agricultural sector as well as from transport and industry - the majority of national and sectoral development plans for Tanzania do not consider the problems of increasing greenhouse gas emissions. There is concern that the current planning process commits Tanzania to higher emission levels (Kilimo Kwanza Committee, 2011). With increasing population growth, urban expansion and development, emissions are rapidly increasing and projections indicate that by 2030 emissions could be double their 2005 levels.

Tanzania's National Adaptation Programme of Action (NAPA) aims to mitigate climate change impacts with a focus on the agricultural sector. NAPA identifies priority activities required for climate change adaptation, such as increasing water efficiency in crop production; the development of alternative farming systems, water storage programmes and technology; and community based catchment conservation and management programmes. Other proposed activities aim to reduce deforestation and improve energy sources, including renewables. The effectiveness of NAPA is constrained by lack of funding.

Climate Change Adaptation in Africa (CCAA) is another relevant development programme, focusing on research and development to improve the ability of African countries to adapt to climate change. Within Tanzania, CCAA undertakes crop modelling to predict and assess future impacts on the agriculture sector, as well as capacity building through training in local communities to reduce farmers' vulnerability.

5.2 WATER RESOURCES

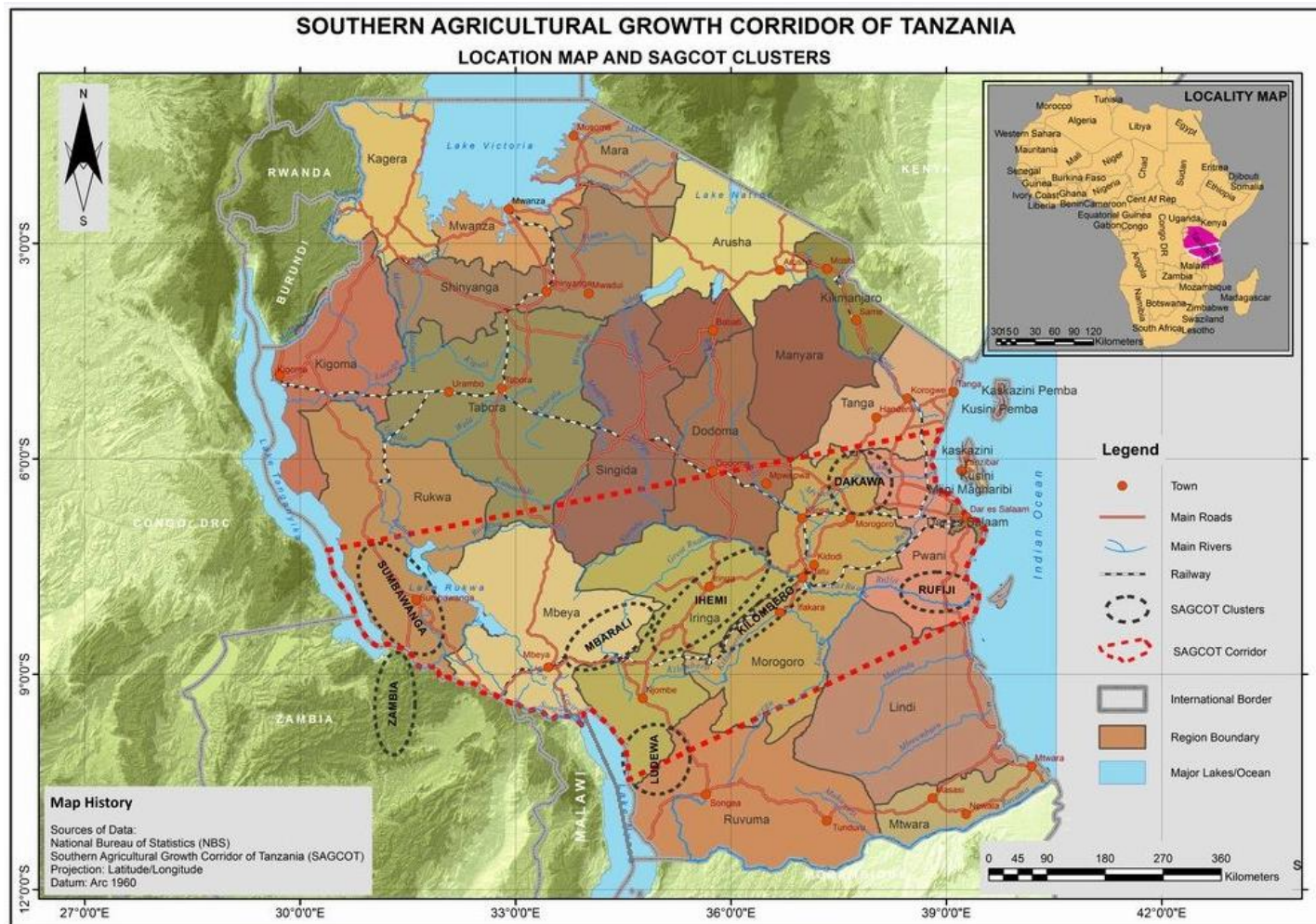
5.2.1 Introduction

The following sections describe the main hydrological characteristics of the study area, focussing on the river basins (and sub-basins) in which the SAGCOT clusters are located (see *Figure 5.4*). They include a description of the principal surface water features, a presentation of some of the key available water resources data (including their reliability) and a summary of the main water users in each basin. The descriptions focus primarily on surface water resources, although groundwater is discussed where this is a significant feature and where data are available. In addition, the presentation is based upon the current (or historical) hydrological situation in each basin: the possible future effects of climate change on these water resources were broadly discussed in *Section 5.1*.

Data Sources

The data and information presented in this section have been drawn from a number of different sources (details are included in the list of referenced literature at the end of the report). These include a series of technical studies and reports that have been prepared for the Rufiji and Wami river basins, where several of the SAGCOT clusters are located. In particular, the majority of the information presented for the four clusters that are located in the Rufiji Basin has been extracted from the Rufiji IWRMD Plan: Interim Report, published by WREM International in January 2012. Far less information is available for the Lake Rukwa and Lake Nyasa basins, and so these

Figure 5.4 SAGCOT Corridor Watersheds



Note: International border shown for Lake Malawi is the median boundary: this is not accepted by all riparian states.

areas have been described in a more qualitative manner based primarily upon semi-structured interviews with key informants in the various basin water administrations.

5.2.2 *Wami, Ruvu and Coast Basin*

The Dakawa cluster falls within the Wami River Sub-Basin in eastern Tanzania, which in turn forms part of the Wami, Ruvu and Coast Basin. The Wami River has its source in the Kaguru Mountains and flows in a south-easterly direction from the semi-arid Dodoma region, through the humid inland swamps of the Morogoro region to the Indian Ocean. The total sub-basin area is approximately 43,000 km².

The average annual rainfall across the sub-basin varies from 550-750 mm in the highlands near Dodoma, to 900-1000 mm in the central areas near Dakawa and towards the estuary (IUCN, 2010). There is a marked difference between wet and dry seasons, with the dry season typically lasting from July to October, and two distinct wet periods from November to December (the ‘short rains’) and March to June (the ‘long rains’).

As with rainfall, seasonal flows are not uniform across the sub-basin. Many large rivers such as the Wami, Mkata and Mkondoa (and a few smaller rivers) are perennial, while others like the Kinyasungwe, Lukigura and many small rivers are ephemeral (see *Table 5.1*). All sites have a defined peak flow during the long rains (typically peaking in April/May) and a second smaller peak in larger catchments during the short rains. The lowest flow periods of the year are typically in October for all sites, whilst low or no flow periods extend longer for seasonal rivers like the Kinyasungwe and Lukigura (IUCN, 2010).

Table 5.1 *Average Daily Flow at Six Gauging Stations in the Wami Sub-Basin*

River/tributary	Gauging station	Catchment area	Average daily flow (m ³ /s)	% days at zero flow
Wami	1G1 - Dakawa Bridge	28,488	25.8	0.0
Wami	1G2 - Mandera	36,450	60.6	0.6
Lukigura	1GA1A - Kimamba road bridge	1,060	4.0	36.3
Mziha	1GA2 - Kimamba	178	1.3	17.1
Mkondoa	1GD2 - Kilosa	17,560	10.2	0.2
Mdukwe	1GD31 - Mdukwe	460	4.6	0.0

Source: USAID, 2008

The sub-basin contains a number of different wetland systems, including palustrine (marsh), riverine, lacustrine and estuarine wetlands. The Dakawa swamp is a palustrine wetland located within the Dakawa cluster and is one of the largest wetland systems in the sub-basin. The swamp is perennial and

seasonally expands during the rainy season between November and May and shrinks during the dry season to its smallest spatial extent in late October.

Water resources in the Wami sub-basin are relatively undeveloped compared to the neighbouring Ruvu sub-basin, with fewer abstractions and infrastructural developments and no major dams or hydroelectric plants. Outside of the major urban areas (Morogoro, Dodoma, and Kibaha) agriculture is the predominant water use, including for large-scale irrigated production of sugarcane, sisal and cotton in districts such as Kilosa and Mvomero in the Morogoro region which have high rainfall and loamy soils with good agricultural potential (USAID, 2008). According to Wami River Basin Water Board figures (as presented in IUCN, 2010), a total area of approximately 7,100 ha is currently under irrigation in Mvomero district where the Dakawa cluster is located, with an average total licensed water abstraction of 0.02 Mm³/day. It is estimated that there is potential to irrigate some 15,800 ha in the district, including in the Dakawa wetland (without considering environmental constraints).

Water is also commonly used for domestic, fishing and livestock watering purposes throughout the sub-basin. The estimated average total water demand in Mvomero district where the Dakawa cluster is located is approximately 0.01Mm³/day for a population of around 130,000 people.

Water Quality

It has not been possible to locate any water quality data for the Wami sub-basin, although data from a 2006 UNESCO-funded water quality monitoring campaign (Kemikimba, 2006) are summarised for the Wami/Ruvu River Basin as a whole in the IUCN (2010). In broad terms, water quality in the basin is characterised by relatively good chemical quality and generally poor physical and bacteriological quality. In particular, all of the surface water samples that were collected in 2006 were contaminated with faecal coliforms from sources such as domestic washing, sewage and livestock. In addition, waters in close proximity to human activities such as deforestation, intensive cultivation and agro-processing (e.g. sugar refining) typically contained high sediment, nutrient and organic pollution levels from a combination of soil erosion, agrochemical runoff and untreated process wastewaters.

5.2.3

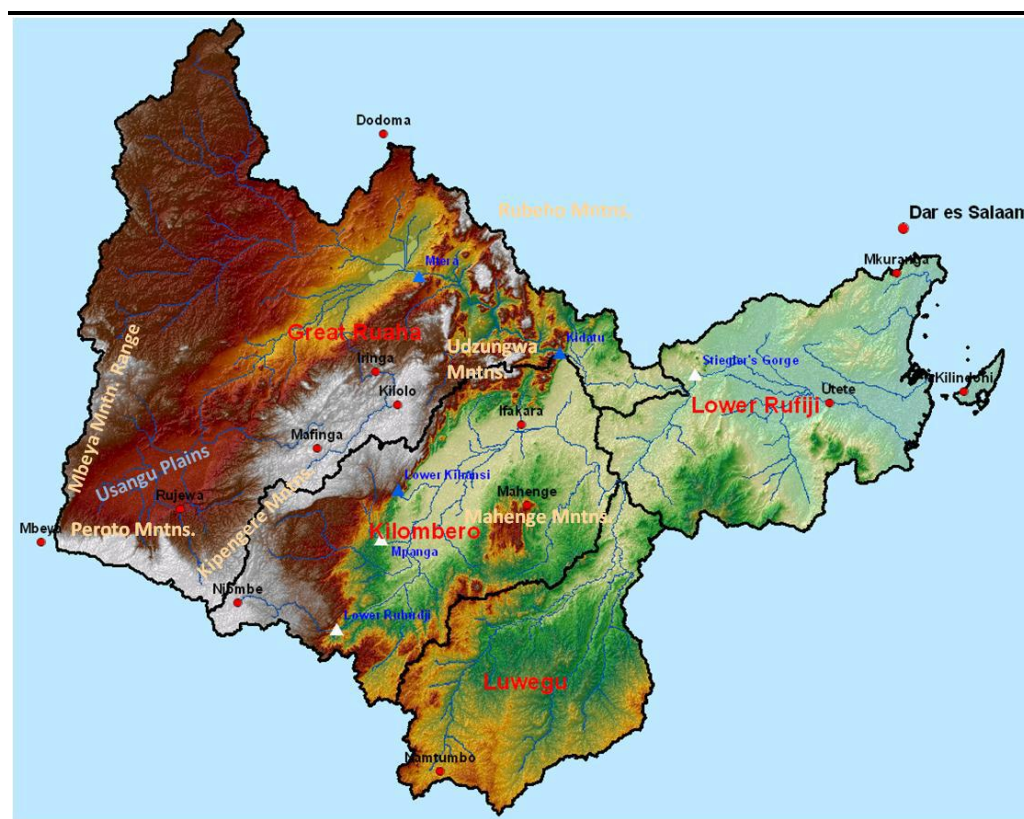
Rufiji Basin

There are four SAGCOT clusters within the Rufiji River Basin (*Figure 5.5*). The hydrological characteristics of each cluster and the particular sub-basin in which they are located are discussed in detail in the following sections. There follows a short discussion of the wider basin itself ⁽¹⁾.

(1) The majority of the information presented in these sections has been extracted from the Rufiji IWRMD Plan: Interim Report Volume II - Water Resources Availability Assessment, published by WREM International in January 2012.

With a catchment area of approximately 184,000 km², the Rufiji Basin covers approximately 20% of mainland Tanzania, and is the largest of the nine river basins in the country. It comprises four sub-basins (the Great Ruaha, Kilombero, Luwegu, and Lower Rufiji, as shown in *Figure 5.5*) and receives one third of all Tanzanian rainfall and produces one quarter of the country's river flow (WREM, 2012).

Figure 5.5 *The Rufiji River Basin and Sub-Basins*



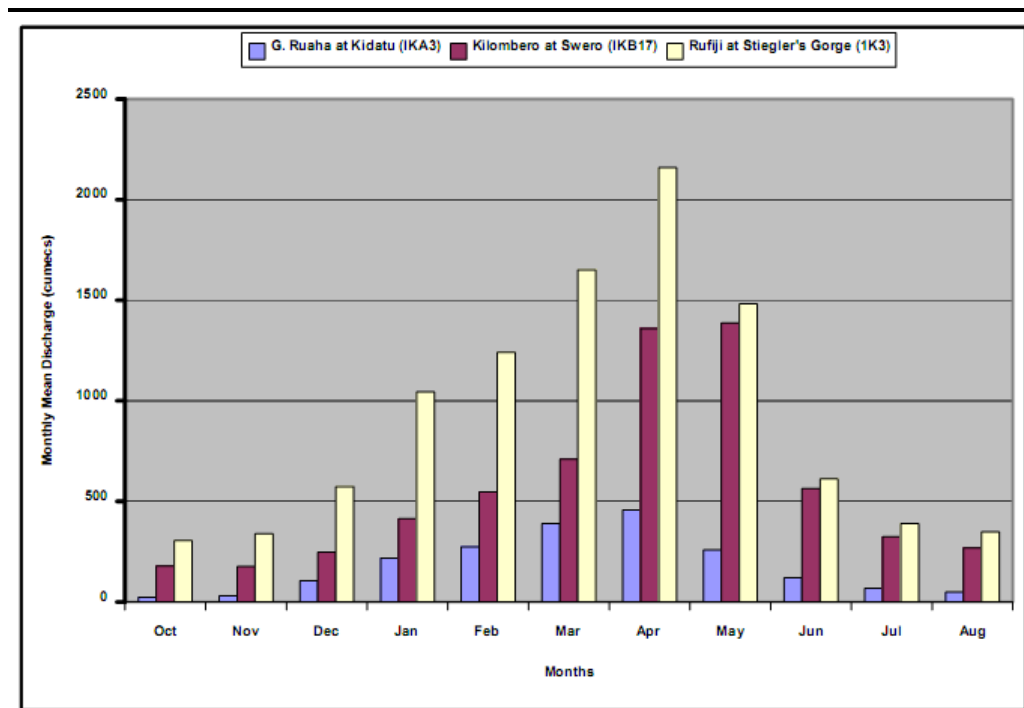
Source: WREM, 2012

The flow in the Rufiji River is markedly seasonal due to strongly seasonal precipitation, as clearly seen in *Figure 5.5*, which displays the long term monthly streamflow means at Kidatu (Great Ruaha River), Swero (Kilombero River), and Stiegler's Gorge (Lower Rufiji River). The figure shows that the highest flows are expected in March, April, and May, and the lowest in August, October, and November. The seasonal flow pattern of the Kilombero is shifted relative to that of Great Ruaha as a result of the delayed onset of the rainy season in the Kilombero Valley (WREM, 2012).

The figure also shows the contributions to river flow from some of the main sub-basins. In all, 62% of flow in the Rufiji is contributed by the Kilombero, which covers only 22% of the Rufiji Basin but receives twice the average annual basin rainfall. The contribution of the Great Ruaha is about 15%, and the remainder is contributed by the Luwegu (18%) and the Lower Rufiji (5%) (WREM, 2012).

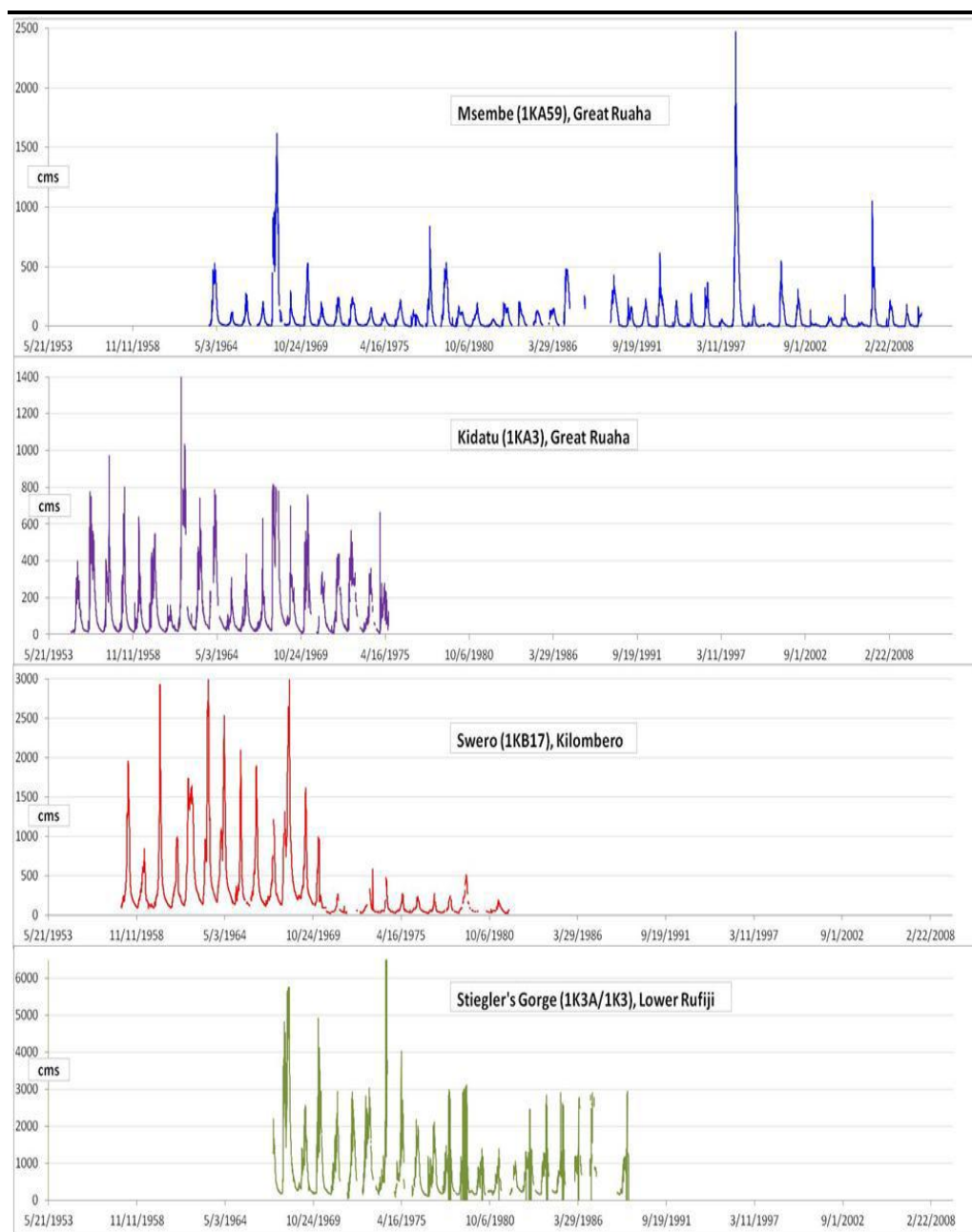
Figure 5.6 shows the data from four main gauging stations: Msembe (1KA59), Downstream Kidatu (1KA3), Swero (1KB17), and Stiegler's Gorge (1K3A combined with 1K3). The first two are on the Great Ruaha, the third (Swero) is at the outlet of the Kilombero, and the fourth is at the upstream end of the Lower Rufiji.

Figure 5.6 Monthly mean Discharge at Kidatu, Swero and Steigler's Gorge



Source: WREM (2012), Vol. II

Figure 5.7 Daily Streamflow at Four Stations in the Rufiji Basin



Source: WREM, 2012

The sub-basin flow data are discussed further in the following sections (including those for the Kilombero at Swero, where there appears to be a sudden shift in flow conditions pre and post 1970 that is likely due to data errors). However, the figure shows that although these are some of the best monitoring stations in the basin, their data records are characterised by many data gaps, obvious discrepancies (as in the post-1969 period at Swero), and inconsistent temporal coverage. These deficiencies limit the usefulness of the data records for hydrological analysis (WREM, 2012).

Despite these data issues, the graphs do show the distinct seasonality of the flows and their high annual and inter-annual variability. In particular, the observed records at Stiegler's Gorge indicate that the long term annual mean

discharge varies from 20 to 25 billion cubic metres (bcm) per year. However, the actual annual flow volume can fall as low as 10 bcm (a 50% reduction over the mean), or rise to 60 bcm (a 180% increase over the mean).

Water Quality

Table 5.2 summarises water quality data for the Rufiji Basin as a whole based on the records of the Rufiji Basin Water Quality and Environmental Laboratory (WQEL) from 2000 to 2011. The data allow the following generalisations (Box 5.1).

Box 5.1

Water Quality Characteristics of Rufiji Basin

- In general, the water resources of Rufiji Basin, both surface and groundwater, have relatively good chemical quality and poor physical and bacteriological quality.
- Surface waters have generally poorer physical quality than ground waters. The common physical quality problems are turbidity, colour, total suspended solids, and odour.
- Both surface and ground waters are contaminated with micro-organisms of faecal origin. Surface waters have a higher occurrence of faecal contamination, and higher numbers of faecal coliform organisms per unit volume, than ground waters.
- With respect to mineral content, both surface and ground waters are relatively fresh, with the larger proportion of waters having low concentrations of dissolved substances. Surface waters are relatively more fresh and softer than ground waters. Despite the lowly mineralized character of most waters, there are pockets of highly mineralized waters in the basin, especially in Great Ruaha and Lower Rufiji sub-basins.
- Notwithstanding the above, chemical quality problems do occur in some waters. The key problem parameters in relation to chemical quality, which are more common in ground waters than surface waters, are acidic and alkaline reaction, hardness, and relatively high concentrations of sodium, chlorides and sulphates.
- There is great variability in the degree of acidity or alkalinity of the waters (measured as pH), which ranges from 5.2 to 9.0 units in surface waters and 4.3 to 10.7 units in ground waters.
- Based on the above characteristics, the waters of the basin, both surface and ground, generally only require minor treatment (to remove colour, turbidity, and micro-organisms) to be fit for human consumption and other uses.
- There is strong seasonality in water quality in both surface and ground waters. In the wet season, turbidity, colour and bacteriological contamination problems increase while the chemical content gets diluted by rainwater. The opposite trend is observed in the dry season.

Source: WREM, 2012

Table 5.2 Summary of WQEL Water Quality Data for Rufiji Basin

Parameter	Units	Surface Water						Groundwater					
		No. samples	Range	Mean	25%ile	75%ile	Non-compliant	No. samples	Range	Mean	25%ile	75%ile	Non-compliant
Turbidity	NTU	359	0-945	41	4	35	29.5%	342	0-800	26	0	13	19.9%
pH	Units	368	5.2-9.0	7.07	6.60	7.50	16.8%	361	4.4-10.8	6.9	6.5	7.2	224.7%
Conductivity	µS/cm	371	5-1740	111	28	105	0.0%	367	7-7960	466	46	391	0.0%
Total Hardness	CaCO ₃ /l	319	0-283	25	11	26	0.0%	335	2-2025	103	10	68	5.1%
Na	mg/l	236	0.01-260	11.11	0.96	9.20	0.4%	217	0-1091	56.6	2.8	53.0	6.5%
K	mg/l	316	0-172	5.97	1.50	3.20	3.2%	295	0-163	10.1	2.0	6.3	5.8%
Ca	mg/l	325	0-62.8	4.77	1.60	4.40	0.0%	333	0-587	25.3	1.6	13.2	6.6%
Mg	mg/l	278	0-103	3.56	1.21	3.89	0.0%	251	0-236	12.6	1.2	7.4	0.0%
Mn	mg/l	295	0-5.6	0.25	0.00	0.30	8.5%	338	0-5.8	0.2	0.0	0.1	5.9%
Total Fe	mg/l	268	0-3	0.37	0.03	0.59	8.6%	329	0-1.7	0.1	0.0	0.1	1.2%
HCO ₃	mg/l	319	2-688	45.1	14.6	48.8	0.0%	331	0-2419	137.7	22.0	183.0	0.0%
SO ₄	mg/l	310	0-470	8.4	0.0	7.0	0.0%	336	0-1296	26.7	1.0	9.0	1.8%
Cl	mg/l	305	0-249	8.3	3.3	8.5	0.0%	333	0-1843	66.3	3.5	31.9	0.0%
F	mg/l	296	0-1.8	0.19	0.00	0.30	0.0%	324	0-5.7	0.4	1.0	0.7	0.9%
NO ₃	mg/l	310	0-27.5	1.28	0.20	1.58	0.0%	328	0-154	3.57	0.50	2.80	0.3%
NO ₂	mg/l	292	0-0.65	0.02	0.00	0.01	0.0%	295	0-0.56	0.00	0.00	0.00	0.0%
PO ₄	mg/l	21	0-0.42	0.107	0.050	0.120	0.0%	46	0-2.250	0.392	0.103	0.648	0.0%
Coliforms	cfu/100 ml	104	0-585	89	6	144	68.3	49	0-320	39	3	28	44.9%

Source: WREM, 2012

Note: Compliance (an indication of suitability) is with respect to the Tanzanian national standards for drinking water quality

The Rufiji cluster lies within the Lower Rufiji Sub-Basin in eastern Tanzania (*Figure 5.5*). The sub-basin has an area of approximately 32,600 km² (18% of the total Rufiji Basin area) and provides approximately 5% of the average annual runoff from the Rufiji Basin, which equates to 1,100 Mm³/year (WREM, 2012). It has abundant surface water resources, and comprises all five wetland types: riverine, palustrine, lacustrine, estuarine, and marine.

The Lower Rufiji's climate is hot and humid. Mean annual rainfall varies spatially from 600 mm to 1,200 mm and the region experiences two rainy seasons: the 'short rains' from November to January, and the 'long rains' from March to May. The wettest months are March and April and the driest months are June to October. The potential evaporation in the Lower Rufiji is estimated to range from 1400 to 2000 mm per annum (WREM, 2012).

The sub-basin encompasses the area below Stiegler's Gorge and includes the Rufiji floodplain and Delta. The Rufiji floodplain is approximately 150 km wide, and during flooding the river leaves its channel and forms meanders and ox-bow lakes. The floodplain has 10 permanent riverine lakes (the Tagalala Lakes) and supports a variety of natural vegetation including grasslands, forests, swamps, and woodlands. The river spreads into several 'distributaries' downstream of the longitudinal line between Kikale (north) and Mohoro (South) and then flows through the Delta mangrove wetland into the Indian Ocean. There are nine major distributaries within the Delta; the northern ones are currently experiencing increasing flows while flow in the southern distributaries is decreasing.

As shown in *Figure 5.5* and *Figure 5.6* there is a distinctly seasonal flow pattern in the Lower Rufiji River, with high annual and inter-annual variability. The average annual flow at Stiegler's Gorge (from 1972 to 2005) was 20.6 billion cubic metres (bcm), with the driest year yielding only 10.0 bcm (a 50% reduction below the average flow volume), and the wettest 58.2 bcm (a 180% increase over the average). However, as noted earlier the flow gauging data records throughout the Rufiji Basin are characterised by gaps and inconsistencies and there is some uncertainty about these values (see below for discussion with respect to the Kilombero River).

The Rufiji floodplain and its delta is inhabited by approximately 200,000 people who live by small scale farming and fishing. The Lower Rufiji Sub-Basin also supports significant agricultural activities. It is reported that about 114,000 ha are suitable for irrigation in the sub-basin, of which about 57,000 ha are highly suitable for agriculture, especially rice production (WREM, 2012). *Table 5.3* lists a number of plans for irrigation development in the sub-basin, several of which are at a fairly advanced stage.

Water Quality

There were insufficient data within the Rufiji Basin WQEL records to characterise the water quality of the Lower Rufiji sub-basin. However, it is unlikely that the conditions will differ markedly from the general Rufiji Basin characteristics described in *Box 5.1*.

Table 5.3 *Irrigation Potential in the Lower Rufiji Sub-Basin*

No.	Scheme	Potential (ha)	Crop	Status
1.	KORECA-RUBADA	15,000	Paddy	Feasibility study Conducted
2.	Vital Grain (Mholo/Nyamwange)	7,000	Sugarcane	
3.	CAS	7,000	Sorghum	
4.	Bungu	5,000	Cassava	
5.	Kilimani	4,000	Maize	
6.	Nyamweke	300		Smallholder under ASDP (feasibility has been done)
7.	Segeni	120		Smallholder; feasibility has been done
8.	Nyakitope Lugongwe	300		Smallholder; feasibility has been done
9.	Siasa	3,000		Smallholder; feasibility has been done
10.	Ruwe	2,500		Smallholder; feasibility has been done
11.	Ngorongo	200		Smallholder; feasibility has been done
12.	Namatipo	100		Smallholder; feasibility has been done

Source: WREM, 2012

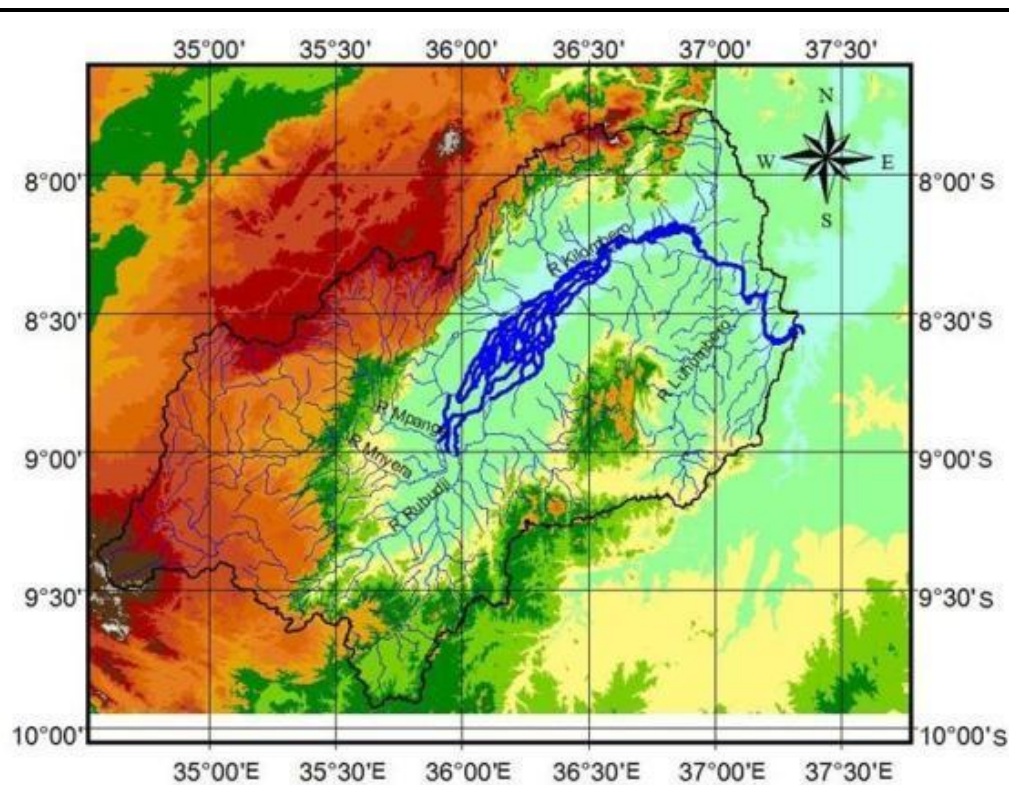
5.2.5 Kilombero Valley

The Kilombero cluster lies within the Kilombero Sub-Basin in south-central Tanzania (*Figure 5.4*). The sub-basin has an area of approximately 40,330 km² (22% of the total Rufiji Basin area) and provides some 62% of the average annual runoff from the Rufiji Basin, which equates to 13,800 Mm³/year (WREM, 2012).

The climate in the Kilombero sub-basin is highly variable between the highlands and the lowlands, and is hot and humid in the valley. Mean annual rainfall varies from 1,100 mm to 2,100 mm. The highest rainfall (1,500 – 2,100 mm) occurs in eastern Mahenge and the Central Udzungwa Mountains (which are drained by the Mpanga and Kihansi Rivers) and the low altitude southwest plains. The Kilombero plains receive about 1,200 to 1,400 mm of rainfall annually. The largest part of annual rainfall (80-90%) occurs during the rainy season between December and April, while the period from June through September is relatively dry with typical monthly amounts below 10 mm, except in the Udzungwa Mountains (WREM, 2012).

The river network in the Kilombero Sub-Basin consists of the main Kilombero River, which is formed at Kikowe where its two major tributaries, the Ruhudji and Mnyera Rivers meet (*Figure 5.8*). The Ruhudji originates from the Lupembe Escarpment and the Njombe Highlands, drains part of the south Udzungwa and east Livingstone Mountains, and has no major tributaries. The Mnyera River drains the western part of the Mufindi escarpment. The Mpanga River drains the central Udzungwa and joins the Kilombero River just downstream of the Ruhudji-Mnyera confluence. The Kilombero River drains the central Udzungwa and joins the Kilombero River just downstream of the Ruhudji-Mnyera confluence.

Figure 5.8 *Kilombero River System*



Source: WREM, 2012

The swamps, lakes, and the seasonally inundated flood plains in the Kilombero Sub-Basin comprise one of the largest freshwater wetlands in East Africa, covering an area of approximately 260 km by 52 km, that is also a designated Ramsar Site (Ramsar Bulletin Board, 2002). Many large, medium, and small rivers in the sub-basin are perennial, while a few small rivers are seasonal and flow only during the rainy season. Within the Kilombero floodplain and wetland, the main river gives way to a braided and meandering system of smaller channels and ponds (*Figure 5.8*). There is also a manmade lake, the Kihansi Reservoir, which has a 25 m high dam and an installed hydropower capacity of 180 MW, with a total turbine discharge capacity of approximately 25 m³/s.

Streamflow in the Kilombero sub-basin has been monitored at 32 river gauging stations a various times. The river network was originally established in the mid-1950s, although it fell into disrepair in many places

during the 1970s and 1980s and has only begun to be reinstated since the early 2000s. The Kihansi catchment in particular has a dense river gauging network consisting of 12 stations. Of these, eight are directly operated by TANESCO, one is operated jointly by TANESCO and RBWO, and the other three are operated by the Rufiji Basin Water Office (RBWO).

As shown in *Figure 5.6*, like the Rufiji Basin as a whole, the flows in the Kilombero River are markedly seasonal; the highest monthly flows (averaging around 1,400 m³/s, based upon the entire record) are expected in April and May, and the lowest (averaging around 200 m³/s, again based upon the entire record) are in October and November (note, the seasonal flow pattern of Kilombero is slightly shifted relative to the Great Ruaha as a result of the delayed onset of the rainy season in the Kilombero Valley). There is also a marked inter-annual variability in flows.

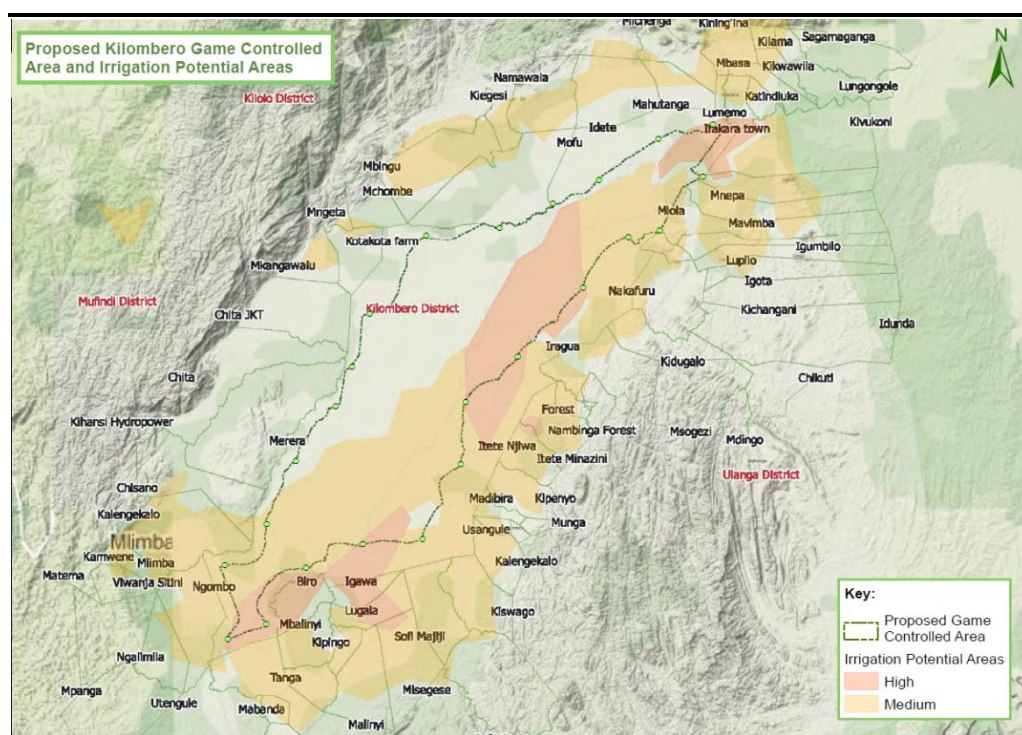
It is important to note that these absolute flow statistics, taken from the records at Swero (RBWB station 1KB17), are extremely dubious. The problem can be seen very clearly in *Figure 5.6* where the peak flows at Swero drop dramatically between 1969 and 1971. Closer inspection of the flow records of this station pre- and post-1970 indicates that there are unit conversion errors in the earlier data that have led to substantial overestimates of flows in the Kilombero River. If only the RWRB records from 1970 onwards are analysed (1970-1981 data are available), the *annual* mean daily flow at Swero is 85 m³/s, compared to a *dry season* average of 200 m³/s calculated previously, and the 95 percentile flow (i.e. the flow that is equalled or exceeded 95% of the time) is 32 m³/s. Although these flow statistics are based upon a relatively short record (1970-1981), nevertheless they indicate that the long-term water yield in the Kilombero Valley (from surface water) is relatively low in comparison to the likely water demands due to future expansion of irrigation (see below), and much lower than previously understood⁽¹⁾.

With regard to water users, although fishing and livestock rearing have traditionally been the primary economic activities in the sub-basin, agriculture (especially rice farming) is rapidly expanding and irrigation water use by far surpasses all other uses in volumetric terms. Estimates of potential irrigable area in the Kilombero Sub-Basin total some 330,000 ha (RUBADA, 2011). *Figure 5.8* shows the distribution of this area across the sub-basin, and *Table 5.4* details the existing and planned irrigation schemes, including the 43,000 ha planned for fast-track implementation with USAID sponsorship (*Figure 5.9*). It is critical to note that development of all of this land for irrigation even without the USAID schemes would require an estimated average daily water supply of approximately 180 m³/s, which far exceeds the mean daily flow in the Kilombero river as calculated using the post 1970 record (above). It should also be noted that the areas with highest irrigation potential (green in *Figure*

(1) During this period of record (1970-1981), the instantaneous minimum flow recorded was 25.70 m³/s and the maximum 513.00 m³/s.

5.8) are in the centre of the Kilombero Game Controlled Area and Kilombero Valley Ramsar Site.

Figure 5.9 *Potential Irrigable Areas in Kilombero Sub-Basin*



Source: WREM, 2012, adapted from National Irrigation Master Plan

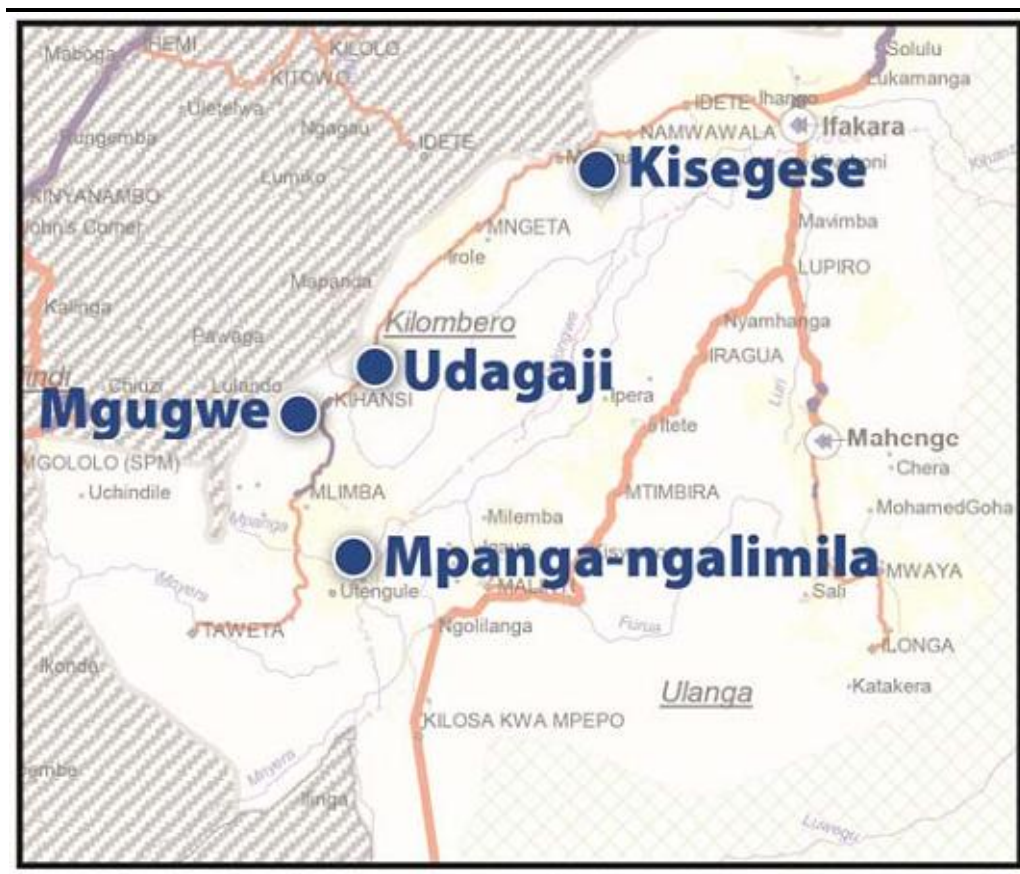
Table 5.4 *Current and Planned Irrigation Development in the Kilombero Sub-Basin*

No	Scheme	Potential (ha)	Developed (ha)	Product	Remarks
1.	Mngeta Farm	5,780	5,780	Paddy	Now Kilombero Holdings
2.	Kihansi Farm	5,100		Rice	
3.	Ngalimira	5,000		Rice	
4.	Ngohelanga	5,000		Rice	
5.	Kilombero Sugar Company	7,000	7,000	Sugarcane	
6.	Idete Prison	6,000	6,000	Rice	Irrigation status uncertain
7.	Mofu Farm	500		Rice	
8.	Mbingu Farm	3,000	3,000	Rice	
9.	Udagaji	1,935			Sponsored by USAID
10.	Mgugwe	2,270			Sponsored by USAID
11.	Kisegese	7,298			Sponsored by USAID
12.	Mpanga-ngalimila	31,500			Sponsored by USAID; may include Ngalimira (No. 3)
Total		123,383	16,000		

Note: KVTC (28,000 ha) and the Escarpment Forest Company (15,000 ha) also have irrigation rights, but only water their nurseries (a few ha).

Source: adapted from WREM, 2012, with additions

Figure 5.10 Location of Planned USAID Irrigation Schemes in Kilombero District



Source: WREM 2012

Water Quality

Table 5.5 summarises the surface water quality data for the Kilombero sub-basin based upon the aforementioned Rufiji Basin WQEL records (WREM, 2012). The data are consistent with the earlier generalisations for the Rufiji Basin as a whole (Box 5.1), in particular that the surface waters generally have poor physical and bacteriological quality, but good chemical quality. As discussed previously, the former is primarily due to contamination from sources such as domestic washing, sewage and livestock, and impacts due to human activities such as deforestation, intensive cultivation and agro-processing (eg sugar refining). Also of note is that the rivers in the Kilombero sub-basin have a mildly acidic character in comparison to those of the Rufiji Basin as a whole, and in particular the Great Ruaha sub-basin (as discussed in the next section). The Kilombero sub-basin rivers are also less mineralised. These differences are probably linked to the amount of rainfall and extent of weathering in the two sub-basins, with weathering in the Kilombero sub-basin being more advanced than in the Great Ruaha sub-basin (WREM, 2012).

Table 5.5 *Water Quality in Kilombero Sub-basin*

Parameter	Units	No. samples	Range	Mean	25%ile	75%ile	Non-compliant
Turbidity	NTU	58	0-186	43	9	69	48.3%
pH	Units	59	5.9-7.9	6.9	6.6	7.1	3.4%
Conductivity	µS/cm	59	15-266	57	26	65	0.0%
Total Hardness	mg CaCO ₃ /l	59	0.6-89	2.1	13	23	0.0%
Na	mg/l	40	0.1-34.9	4.1	1.1	4.0	0.0%
K	mg/l	59	0.1-17.5	3.9	1.5	5.3	0.0%
Ca	mg/l	59	0.4-15.6	3.4	1.2	4.0	0.0%
Mg	mg/l	59	0.1-12.2	3.1	1.7	3.8	0.0%
Total Fe	mg/l	28	0-0.9	0.3	0.0	0.5	0.0%
HCO ₃	mg/l	59	4.9-119.6	33.6	18.3	41.5	0.0%
SO ₄	mg/l	47	0-14	2.2	0.1	3.0	0.0%
Cl	mg/l	48	0.4-10.6	5.2	4.3	7.1	0.0%
F	mg/l	47	0-1	0.1	0.0	0.2	0.0%
NO ₂	mg/l	48	0-4.9	0.80	0.20	0.73	0.0%
Faecal coliforms	cfu/100 ml	-	-	-	-	-	-

Notes:

Compliance (an indication of suitability) is with respect to the Tanzanian national standards for drinking water quality

Based on data for Ruhudji River, Kihansi River, Kilombero River, Mchilipa River, Kiberege River, Sanje River, Sanjo River, Itete River, Lumemo River

Source: WREM, 2012

5.2.6 *Great Ruaha Sub-basin*

The Mbarali and Ihemi clusters lie within the Great Ruaha Sub-Basin in Central Tanzania (Figure 5.5). The Mbarali Cluster is located in the Usangu Plains, where the Great Ruaha emanates from the highlands (the Poroto, Kipengere, and Mbeya Mountains) and flows through a wetland system, the Usangu (or Utengele) Wetland, before flowing through Ruaha National Park (RNP) to the Mtera reservoir and power plants at Mtera and Kidatu. The Ihemi Cluster is primarily located in the Little Ruaha River catchment, a tributary that joins the Great Ruaha just as it leaves the RNP. The sub-basin has an area of approximately 85,550 km² (some 46% of the total Rufiji Basin area) and provides approximately 15% of the average annual runoff from the Rufiji Basin, which equates to 3,300 Mm³/year (WREM, 2012).

The Great Ruaha Sub-Basin is situated within a semi-arid belt which runs from north to south through the central portion of Tanzania. The mean annual rainfall in the sub-basin ranges from 400 mm to 1,200 mm. Rainfall increases southwards and on the slopes of the Udzungwa and Kipengere range. The sub-basin experiences a unimodal rainfall regime characterised by a single rainy season usually extending from late November to early-mid May. The dry season occurs earlier in the Great Ruaha than in Kilombero. The rainfall variability is high, and precipitation is often in the form of heavy showers causing rapid surface runoff and a sudden spate in seasonal streams and rivers. The climate is characterised by low humidity. Annual potential

evaporation is highly variable, estimated to range from 1,200 mm in the south to 2,000 mm in the north (in December and January) (WREM, 2012).

There are two large manmade lakes in the Great Ruaha Sub-Basin. These largely regulate the hydrological regime of the river downstream: the Mtera and Kidatu Reservoirs, both of which were constructed in the 1970s. Mtera is the larger of the two and was built to store water for hydropower production at both Mtera (80 MW) and Kidatu (200 MW). It has a 50 m high dam with live storage of 3.2 bcm, corresponding to about 90% of the long term mean annual natural flow at that location. This storage capacity is critical during low flows, providing the means to sustain the riverine flora and fauna and to support power generation at the Kidatu power station downstream. The importance of the Mtera-Kidatu system became abundantly clear in the early 1990s when the system storage was critically depleted causing a substantial reduction in industrial output and severe impacts on the Tanzanian economy (Ministry of Water, 1999). The turbine discharge capacity at Mtera is 96 m³/s, and at Kidatu 140 m³/s.

Upstream of the hydropower plants the river is heavily used for irrigation. Farming in the Great Ruaha is concentrated in the southern Usangu Plains (where the Mbarali Cluster is located) and involve cultivation of maize, beans, rice, and vegetables, with the former two crops grown mostly under rainfed conditions, and the latter under irrigation. Paddy rice is the predominant irrigated crop; a core area of 15,000 to 20,000 ha can be irrigated every year, which can expand to a maximum of about 40,000 to 55,000 ha depending on water availability.

With the exception of a few large farming ventures, most farmers use surface irrigation, the efficiency of which is low (15 to 20%). These practices combined with the continued expansion of irrigated land since the early 1990s have led to high water losses and noticeable river flow reductions in the central Usangu Plains, the flow in the Great Ruaha through Ruaha National Park⁽¹⁾, and the inflow to the Mtera reservoir. Specifically, the flow of many once perennial Usangu rivers now completely ceases for most of the period from September to January. This is most prominently observed at Msembe gauging station that is located just downstream of the Usangu area, and where flow has been monitored (intermittently) from 1964 to the present.

Figure 5.11 presents the Msembe data in annual and seasonal time steps, with the seasonal values averaged over the wet and dry season months (respectively December to May, and June to November). All plots show evidence of flow alteration post 1990, but the flow alteration during the dry season (bottom graph) is dramatic, reaching more than 50% of the pre-1990 conditions (WREM, 2012).

In addition to agriculture, the Usangu Plains are also an important pastoral area with livestock numbers in the hundreds of thousands and goats, sheep,

(1) As graphically documented at <http://www.suestolberger.com/river1.htm>

and donkeys in the tens of thousands. During the dry season, water is scarce on the central Usangu Plains, and pastoralists migrate to graze their herds to the only permanent water source, the Utengule-Ihefu wetland, compounding the water resources depletion issue described above (WREM, 2012).

Water Quality

Table 5.6 summarises the surface water quality data for the Great Ruaha sub-basin based upon the aforementioned Rufiji Basin WQEL records (WREM, 2012). The data are consistent with the generalisations for the Rufiji Basin as a whole (Figure 5.5), and indicate that the surface waters generally have poor physical and bacteriological quality, but good chemical quality. In addition, the rivers in the Great Ruaha sub-basin are more alkaline and mineralised in character in comparison to those of the Rufiji Basin as a whole, and in particular the Kilombero sub-basin as discussed in the previous section, probably due to the relatively low rainfall and reduced extent of weathering in the sub-basin (WREM, 2012).

Table 5.6 *Water Quality in Great Ruaha Sub-basin*

Parameter	Units	No. samples	Range	Mean	25%ile	75%ile	Non-compliant
Turbidity	NTU	65	2-945	73	19	66	58.5%
pH	Units	65	6.2-8.8	7.5	7.2	7.7	3.1%
Conductivity	µS/cm	65	18-1228	197	56	227	0.0%
Total Hardness	mg CaCO ₃ /l	53	6-223	38	18	42	0.0%
Na	mg/l	37	0.1-153	16.54	2.20	9.90	0.0%
K	mg/l	52	0.2-95	11.59	2.38	3.90	9.6%
Ca	mg/l	48	0.8-35.6	7.59	2.40	7.40	0.0%
Mg	mg/l	46	0.2-16.5	4.33	1.94	4.83	0.0%
Total Fe	mg/l	45	0-3	0.55	0.09	0.83	13.3%
HCO ₃	mg/l	53	7.3-68.8	81.69	29.28	85.40	0.0%
SO ₄	mg/l	50	0-110	15.3	3.0	15.8	0.0%
Cl	mg/l	49	0-66	10.3	5.6	10.6	0.0%
F	mg/l	49	0-1.3	0.24	0.00	0.41	0.0%
NO ₂	mg/l	49	0-22.1	1.51	0.30	1.70	0.0%
Faecal coliforms	cfu/100 ml	26	0-410	115	25	151	84.6%

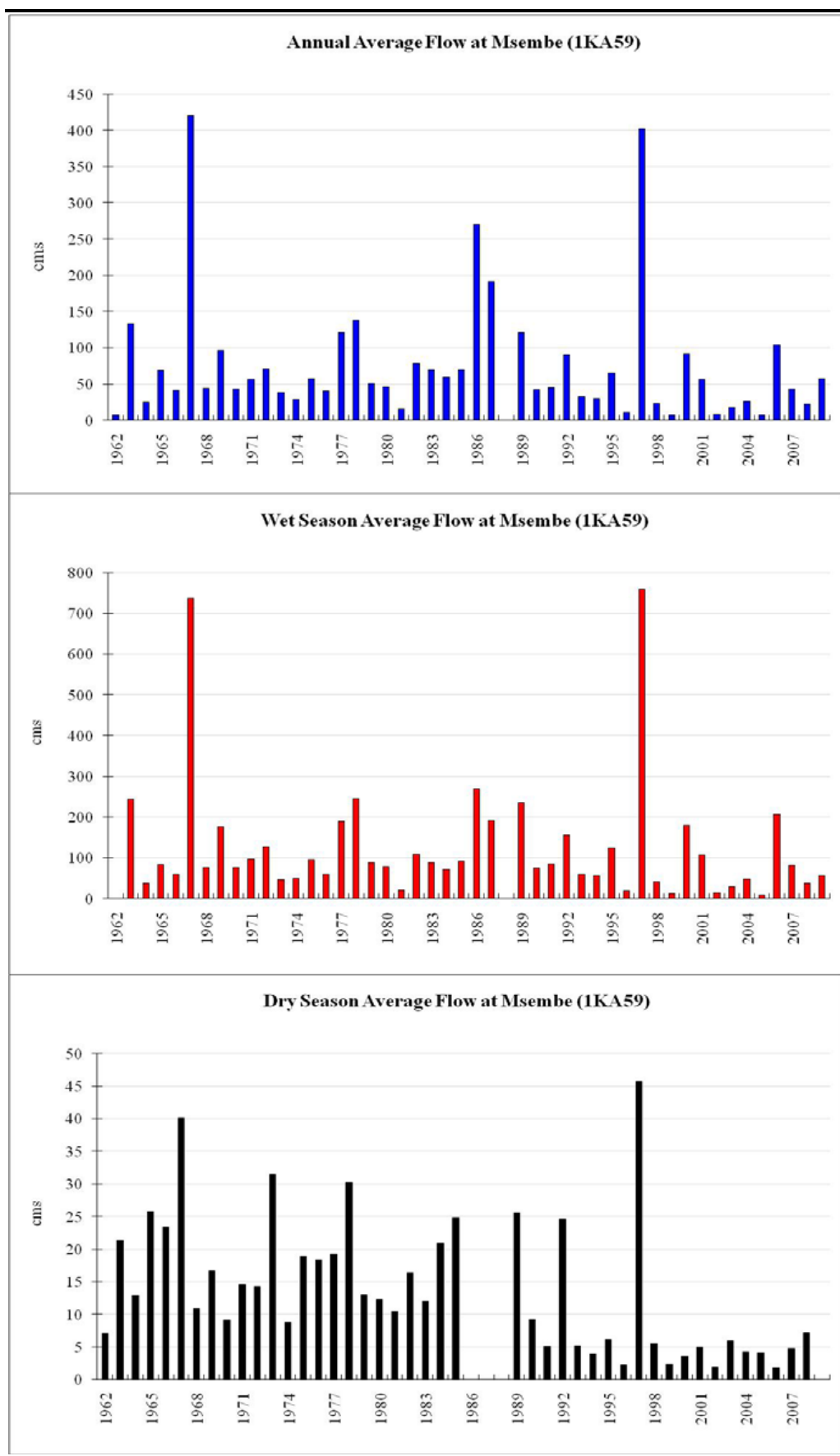
Notes:

Compliance (an indication of suitability) is with respect to the Tanzanian national standards for drinking water quality.

Based on data for GR River (at Mkupule, Msembe, Mtera dam), Ndembera River, Little Ruaha River, Mwega River, Chebi River, Lukosi River, Lyovi River, Mtitu River.

Source: WREM, 2012

Figure 5.11 Annual and Seasonal Flow at Msembe



Source: WREM, 2012

5.2.7

Lake Nyasa Basin

The Ludewa cluster forms a large part of the Lake Nyasa drainage basin that lies within south-west Tanzania (*Figure 5.4*). The main water sources in the cluster are Lake Nyasa itself, and the Luhuhu River and its tributaries, the Kitewaka, Mchuchuma, Nkiwe and Lumbira. In addition, according to anecdotal information from the LNBWB there are several boreholes in Ludewa District, both in the upper plateau and in the Lake Nyasa lowlands, which is an indication of good groundwater potential. It has not been possible to find any flow data or information for any of these rivers or boreholes.

The main water uses in the region are for domestic, irrigation and fishing purposes, although the irrigation potential is understood to be relatively undeveloped at present. According to LNBWB sources, a total area of approximately 17,000 ha is planned for irrigation in the Lake Nyasa basin, although this is mainly in the Illeje, Kyela and Rungwe districts that lie to the north of the lake and away from the Ludewa Cluster. Approximately 2,700 ha are currently under, or planned for irrigation in the cluster itself, with an average total water demand of approximately 0.5 Mm³/day. In addition, there are six licensed water supply permits in the cluster, including one village supply and three mines owned by the National Development Corporation. No abstraction data were available for these sites.

No water quality data could be found for this river basin.

5.2.8

Lake Rukwa and Lake Tanganyika Basins

The Sumbawanga cluster sits astride the watershed divide between the Lake Rukwa and Lake Tanganyika drainage basins. The main water sources in the cluster are the two lakes themselves, and their feeder rivers and streams that lie within the cluster boundaries. The latter include the Muze, Nzovwe, Momba, Lwiche and Mfwizi rivers which drain into Lake Rukwa, and another Lwiche River that drains into Lake Tanganyika. It has not been possible to find any flow data for any of these rivers.

The main water uses in the region are for domestic, irrigation and fishing purposes, with irrigated agriculture being main user. According to Lake Rukwa BWB sources, an average of approximately 1.3 Mm³/day of water is abstracted from springs and rivers in the Rukwa Region to irrigate a total area of some 7,700 ha. Most of the irrigation takes place in the Kafufu sub-basin in the Mpanda district to the north of Sumbawamba Cluster. However, there are several schemes situated within the cluster itself, including rice production, which account for approximately 20% of the regional abstraction (0.26 Mm³/day). By comparison, the licensed potable village water supply abstractions in the cluster are approximately 0.01 Mm³/day, i.e. an order of magnitude less than for irrigation.

No water quality data could be found for these two river basins.

The SAGCOT area contains some of Tanzania's most important and ecologically diverse landscapes and protected areas (*Figure 5.12*) and encompasses four of Tanzania's nine major river basins (see *Section 5.2*). The following sections describe the six main ecoregions where the SAGCOT clusters are located, as follows:

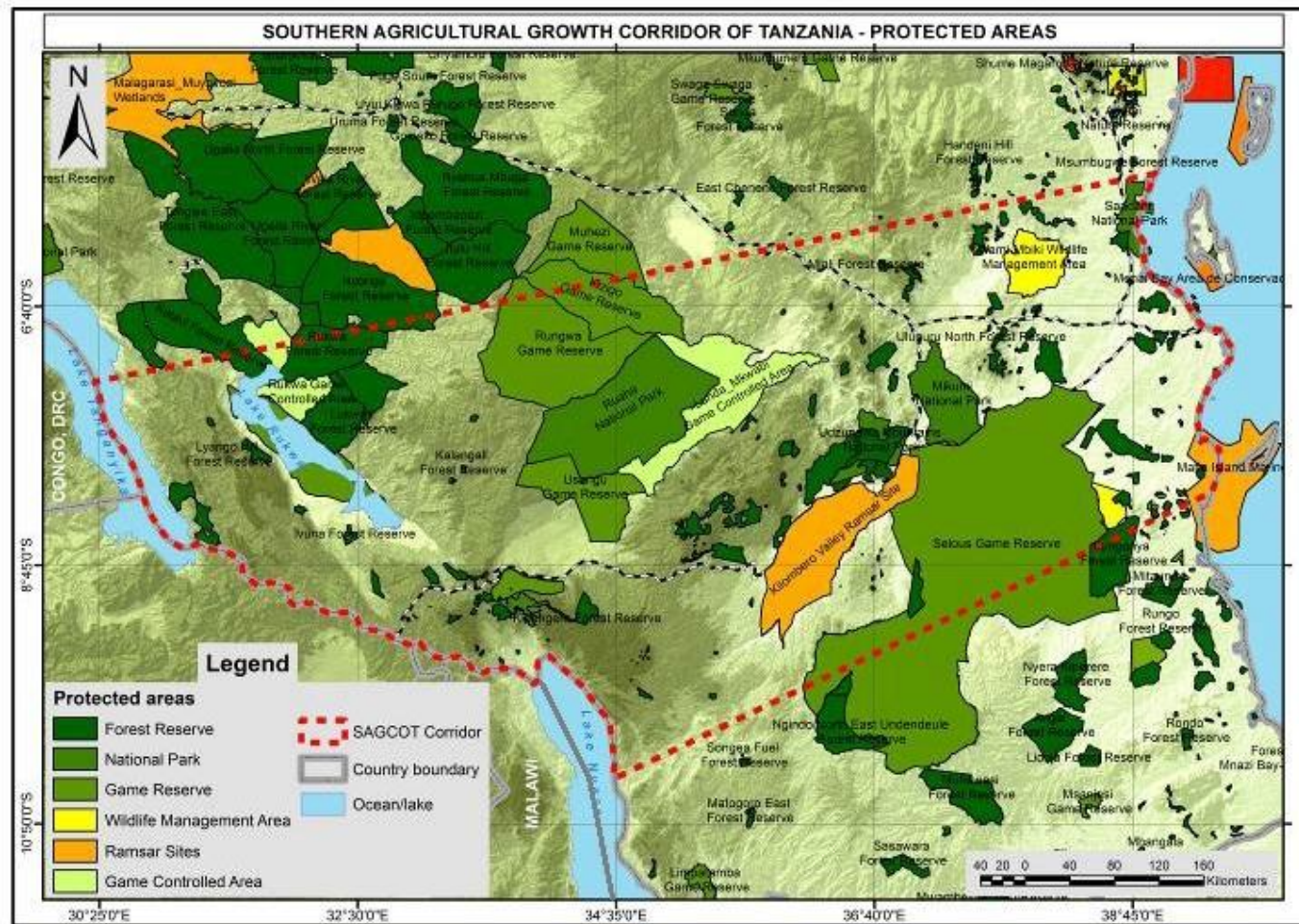
- the Rufiji Floodplain (and Delta), which contains the Rufiji cluster;
- the Eastern Arc Mountains, which contain the Dakawa cluster;
- the Kilombero River Valley, which contains the Kilombero cluster;
- the Ruaha River System, which contains the Mbarali and Ihemi clusters;
- the Lake Katavi-Rukwa-Lukwati Landscape, which contains the Sumbawanga cluster; and
- the Southern Highlands, which contain the Ludewa cluster.

5.3.1 *The Rufiji Floodplain*

The Rufiji floodplain extends to some 1,400 km², of which mangrove forests cover 550 km² (MoW, 2012; MNRT, 2004). The Rufiji Delta is characterised by the following habitats: estuary; inshore and intertidal (45%); swamp and marsh (0.6%); floodplain grassland (14%); bushland, thicket, woodland and forest (12%); mangrove forest (24%); mixed cropping (3%); cultivation with tree crops (2%); and settlements (0.1%) (MoW, 2012).

The wetlands of the delta include important mangrove and seagrass communities, which act to reduce the amount of sediment transported from the Rufiji River onto inshore corals. The Rufiji mangroves are the most extensive and varied in eastern Africa, but the mangrove *Herriteria littoralis* is threatened by clear felling (MNRT, 2004; MoW, 2012). The Rufiji delta is home to five species of globally threatened turtles, two of which are nesting species (MNRT, 2004). The dugong (*Dugong dugon*) population has declined globally and is CITES-listed as "vulnerable to extinction" (MNRT, 2004); dugong habitat requirements and their slow rate of reproduction render them vulnerable to human activities, as they are threatened by hunting, fish net captures, pollution, and diseases (Muir *et al.*, 2003). The delta provides breeding grounds for prawns, shrimps, and fish. The Rufiji Delta is Tanzania's most important prawn producing area, accounting for about 80% of the national industrial catches of which over 90% of the prawns caught are exported (Richmond *et al.*, 2002). Current production from the Rufiji Delta is unknown but in 1981 the potential catch was estimated to be approximately 7,000 t/yr for prawns and 10,000 t/yr for fish (RUBADA, 1981). Conversion of mangroves to rice farms is a threat to this ecosystem, as is the use of pesticides for crop protection. Dynamite and poisons are known to be used in fishing operations in the Rufiji delta and its coastal environment (MNRT, 2004). The planned Stiegler's Gorge hydropower dam will affect the ecology of the Rufiji River downstream (Mwalyosi, 1988; Mwalyosi, 1993). A Ramsar Site has been established that covers the Rufiji Delta, Mafia Island Marine Park and the Kilwa coast (MNRT, 2004).

Figure 5.12 Protected Areas in SAGCOT Corridor



Note: International border shown for Lake Malawi is the median boundary: this is not accepted by all riparian states.

5.3.2

The Eastern Arc Mountains

Thirteen separate mountain blocks comprise the Eastern Arc (Figure 5.13), supporting around 3,300 km² of sub-montane, montane and upper montane forest, which represents less than 30% of the estimated original forest cover for the area (MNRT, 2005a; Burgess et al 2007). Most forest is found within nearly 150 Government Forest Reserves, with 106 of these fully protected for water catchment, biodiversity and soil conservation (Burgess et al, 2007). Eight of the 13 mountains in the Eastern Arc; namely the Nguu, Nguru, Uluguru, Ukaguru, Rubeho, Malundwe, Udzungwa, and Mahenge Highlands are in the SAGCOT area.

Figure 5.13 Eastern Arc Mountains



The Eastern Arc Mountains rank among the most important areas in the world for the conservation of endemic birds, endemic plants, and other taxonomic groups (Burgess *et al.*, 2007), and are considered to be amongst the world's top 25 biodiversity hotspots. At least 800 vascular plant species are endemic to the Eastern Arc, almost 10% of these being trees (MNRT, 2005a; Burgess *et al.*, 2007). The Eastern Arc is home to four endemic or near-endemic species of

primates - the Sanje mangabey (*Cercocebus sanjei*), the Iringa red colobus (*Procolobus gordonorum*), the mountain galago (*Galagoides orinus*) and the newly discovered Kipunji monkey (*Rungwecebus kipunji*) – and most of the known species of African violet (*Saintpaulia* spp) (Burgess *et al.*, 2007). Most Eastern Arc endemics are closed-forest specialists and comprise taxa with an ancient history and those of more recent origin, including some possessing ancient affinities with taxa from West Africa, Madagascar, and even South America and Southeast Asia (MNRT, 2005a).

Assessments of threats and conservation priority have shown that the Eastern Arc is amongst the most threatened regions both in Africa and globally, and one where the extinction risk to fauna and flora is intense and increasing (Burgess *et al.*, 2007). A number of studies have concluded that the Ulugurus and Udzungwas are amongst the three most important blocks in the Eastern Arc (MNRT, 2005a). Two National Parks support Eastern Arc habitats in Tanzania: the first is Udzungwa Mountains National Park (1,900 km²) which contains large areas of mountain forest and grassland and is home to 26 strictly endemic vertebrates including 2 endemic primates as well as 84 globally threatened plants; the second is Mikumi National Park (1,450 km²) that includes a small area (4 km²) of montane forest on Malundwe Hill (Burgess *et al.*, 2007). There are three other areas of Eastern Arc forests gazetted as Nature Reserves, the Kilombero and Uluguru Nature Reserves which are managed by the government, and the private Nature Reserve in the Mufindi Tea Estate in the Udzungwa Mountains (Burgess *et al.*, 2007; Doggart *et al.*, 2008; URT, 2010). The Mufindi escarpment on the north side of the Kilombero Valley contains the southernmost forests in the Eastern Arc Mountains. The Mufindi forests are home to 38 restricted range vertebrates, 5 of which are endemic and 10 of which are restricted range vertebrates in montane grasslands in unprotected village lands (Doggart *et al.*, 2008). The mosaic of forest and grasslands in Mufindi create the so-called Mngeta Corridor, linking northern and southern faunal assemblage in the Eastern Arc Mountains (Doggart *et al.*, 2008). Parts of the Udzungwa Mountains are an Important Bird Area. The grasslands in Idete contain the rare black African duck (*Anas sparsa*) and the African migrant blue swallow (*Hirundo atrocaerulea*), which is listed as vulnerable by IUCN (Doggart *et al.*, 2008; Green Resources Ltd., 2009).

5.3.3 *The Kilombero Valley*

The Kilombero Valley runs southwest to northeast, separating the Udzungwa Mountains with a steep fault scarp on the north side of the valley from the rolling hills and Mahenge Highlands to the south. The Kilombero Valley floodplain (where the cluster is situated) is a natural wetland ecosystem that is fed by several rivers, including the Ruhudji, Mnyera, and Pitu, which then divide into many channels in the central floodplain, making it one of the largest freshwater floodplains in East Africa. As a wetland ecosystem, it regulates the flow of the Rufiji River and is an important source of nutrients and sediment for downstream areas (MoW, 2012).

The valley is roughly divided into the seasonally flooded floodplain, the surrounding alluvial fans, and the surrounding hills. The elevation of valley floor is about 300 m above sea level. Land use and land cover types in the Kilombero Valley, based on Landsat Images taken in 1995 (MNRT, 2009), are noted in *Table 5.7*. Grassland constitutes 43.9% of the floodplain, particularly in the west, whilst swamp habitat is common near the river in the western and eastern reaches.

Table 5.7 *Land Use and Cover Types in the Kilombero Valley Ramsar Site*

Land Use/Cover	Area (km ²)	Proportion (%)
Bushland	531.1	5.1
Cultivated Land	727.4	6.9
Forest	843.0	8.0
Grassland	2,079.8	19.9
Inundated Bushland	1,499.8	14.3
Inundated Grassland	2,516.7	24.0
Inundated Woodland	75.7	0.7
Permanent Swamp	41.6	0.4
Urban Areas	1.0	0.0
Water	16.8	0.2
Woodland	2,140.0	20.4
	10,472.9	100.0

Source: MNRT, 2009

Habitats

The ecology of the Kilombero Valley reflects the hydrological gradient from the centre to the margins of the valley, creating a complex mosaic of habitats and plants supporting a wide range of birds and other animals. The Valley contains a diverse flora of around 350 species of plants, including both endemic and threatened species. Surveys have identified eight different sets of plant communities (Starkey *et al.*, 2002), described briefly in *Table 5.8*. The Kibasira Swamp remains wet even during the dry season, and vegetation in this area represents another community in the floodplain mosaic. Miombo woodland areas on the alluvial fans and low hills edging the floodplain provide habitats for a range of species as well as seasonal habitat when the valley floods (Starkey *et al.*, 2002). Plant communities in the valley's swamps and gallery forests contain many unique and poorly-known species, but are increasingly heavily exploited by residents and incomers (Starkey *et al.*, 2002).

Table 5.8 Plant Communities in the Kilombero Valley

S/N	Plant community type	Vegetation characteristics
1	Papyrus Swamp	This area is dominated by <i>Cyperus papyrus</i> , and is almost permanently flooded.
2	Riverside	This community is found near open water and is flooded over in the wet season, being the last to dry out in dry season. No trees survive. The perennial grass <i>Phragmites mauritianus</i> dominates, occurring with annuals such as <i>Gisekia pharnaceoides</i> , <i>Zaleya pentandra</i> .
3	Low lying valley grassland	The perennial grass <i>Panicum fluviicola</i> is characteristic of the interior of the floodplain occurring with annual grass species such as <i>Oryza longistaminata</i> , <i>Eragrostis aethiopica</i> and <i>Echinochloa colona</i> . Prolonged flooding means that no trees can survive.
4	Tall grass	This community is dominated by the tall grasses <i>Sorghum verticilliflorum</i> , <i>Cymbopogon giganteus</i> and <i>Hyparrhenia collina</i> . It is not flooded as deeply as the low-lying valley. Trees such as <i>Kigelia africana</i> , <i>Acacia xanthophloea</i> and <i>Borassus aethiopum</i> , which are species that can withstand poor drainage, occur infrequently in scattered locations.
5	Marginal grassland	Grasses such as <i>Echinochloa colona</i> , <i>Paspalum scrobiculatum</i> and <i>Panicum coloratum</i> are common. This community occurs towards the margins of the flood plain and experiences shallow flooding in the wet season. It is heavily grazed and burned in the dry season resulting in bare ground. Shrubs such as <i>Grewia bicolor</i> and <i>Ziziphus mucronata</i> occur with occasional trees such as <i>Acacia xanthophloea</i> .
6	Marginal woodland	The grass layer contains species such as <i>Hyparrhenia colina</i> , <i>Echinochloa colona</i> and <i>Digitaria ciliaris</i> although this area is also heavily grazed and burned. Tree species such as <i>Tamarindus indica</i> , <i>Lonchocarpus eriocalyx</i> , <i>Senna singueana</i> and <i>Dalbergia melanoxylon</i> are characteristic of this community, as are the shrubs <i>Grewia bicolor</i> , <i>Fleuggea virosa</i> and <i>Harrisonia abyssinica</i> .
7	Combretaceous wooded grassland	This community is rarely flooded. <i>Combretum fragans</i> is dominant in the tree layer and other trees include <i>Piliostigma thonningii</i> , <i>Terminalia sericea</i> and <i>Vitex cuneata</i> . These trees are small and are not dense. The grass layer is well developed and is characterised by species such as <i>Hyparrhenia anamesa</i> , <i>Sorghastrum bipennatum</i> and <i>Heteropogon melanocarpus</i> .
8	Miombo woodland	The miombo woodland exists on higher ground. <i>Brachystegia spiciformis</i> is the dominant tree species, along with <i>Diplorhynchus condylocarpon</i> , <i>Afzalea quanzensis</i> , <i>Piliostigma thonningii</i> , <i>Uapaca kirkiana</i> , <i>Pterocarpus angolensis</i> and <i>Brachystegia bussei</i> are also found in this area.

Source: Adapted from Starkey *et al.*, 2002 and MNRT, 2009

Wildlife

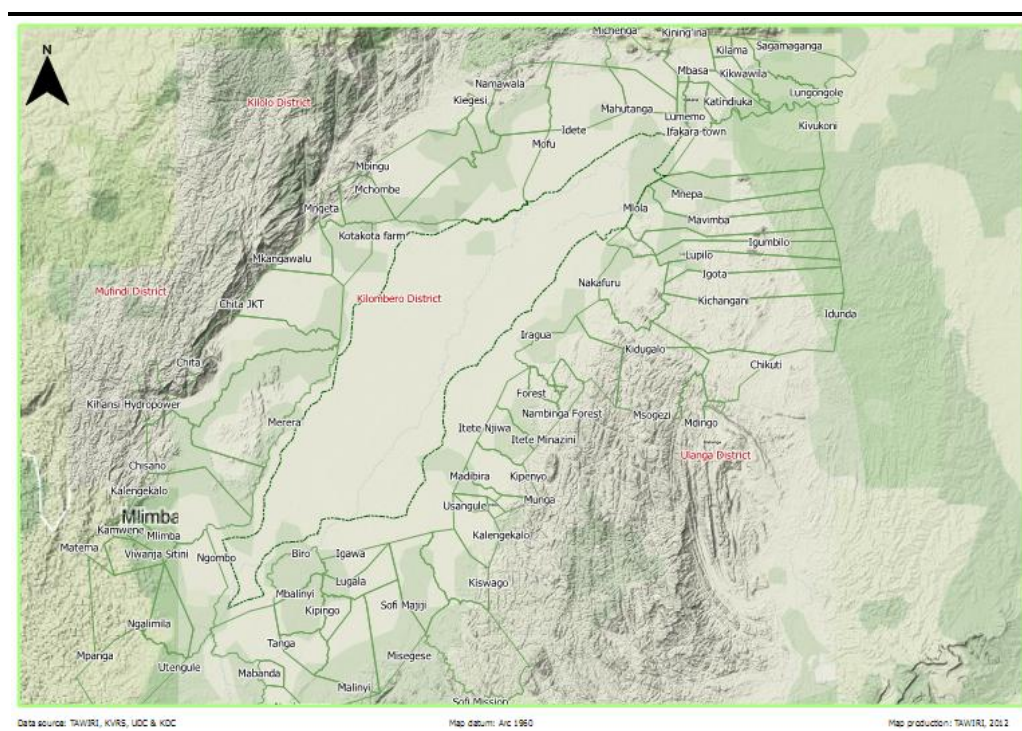
Information on wildlife in the valley can be found in a number of reports but in general the data are preliminary, scattered and incomplete (see in particular: Starkey *et al.*, 2002; UDS, 2009).

The Kilombero Valley is home to at least 64 mammal species, 251 bird species, 51 reptiles, 26 amphibians and 81 butterfly species (MoW, 2012). Critically, the valley recently harboured some 75% of the world's population of the Near Threatened Puku antelope (*Kobus vardonii*). The valley is an Important Bird Area (IBA) with species such as the Kilombero weaver (*Ploceus burnieri*), Kilombero Cisticola and Melodious Cisticola (*Cisticola* sp. nov.), all endemic to

the valley (MNRT, 2002a; MoW, 2012). Two other bird species found in the valley, the Olive-headed weaver (*Ploceus olivaceiceps*) and Pale-billed hornbill (*Tockus pallidirostris*), are near endemic to Tanzania (MNRT, 2002a; MoW, 2012). The valley is a stop-over for Palearctic birds migrating from Europe to southern Africa (MNRT, 2002a; MoW, 2012). Few surveys have been done to identify invertebrate species in the valley, with only limited studies on butterflies in a selected area. Likewise small mammals and other vertebrates have not been thoroughly surveyed (MNRT, 2009).

In April 2002, the Kilombero Valley Flood Plain Ramsar Site was designated and added to the list of Wetlands of International Importance. The Ramsar Site covers 7,967 km² with a catchment area of about 40,000 km² (MNRT, 2002a). Following extensive encroachment, revised boundaries for the Kilombero Game Controlled Area are currently being negotiated with communities using the floodplain (Figure 5.14).

Figure 5.14 *Proposed New Kilombero GCA Boundaries*



Source: TAWIRI, 2012

The Kilombero Valley wetlands are used by wildlife as dry season habitat, moving out to elevated land on the perimeter (formerly miombo woodland) during the wet season when the valley is flooded. Some permanent wetlands in the valley, such as Kibasila swamp, are key dry season habitats for wildlife (MNRT, 2009).

There are wildlife migration routes or corridors across the valley linking the Udzungwa National Park and the Selous Game Reserve while other routes are used by wildlife to move within the valley. Nearly all migration corridors are

reported to be closed due to infrastructure development, encroachment and the establishment of plantations (MNRT, 2009a).

Poaching is a serious problem in the valley with special concern for species such as puku, hippo, crocodile and elephant. The lion population has been destroyed, at least in part through poisoning by livestock herders.

The most consistent monitoring of wildlife in Tanzania is the series of annual aerial counts by Tanzania Wildlife Research Institute (TAWIRI). Since 1994 TAWIRI has conducted aerial censuses in all protected areas providing standardized data of wildlife numbers, density, and distribution. Occasionally the counts also cover areas adjacent to protected areas with wildlife, human activity, and livestock data. Most research studies are conducted *ad hoc*, and not all have monitoring as a requirement. TANAPA has an ecological monitoring department in the Udzungwa National Park for conducting research and monitoring (MoW, 2011). Available data on key species in the Kilombero Valley are summarised in Table 5.9.

Table 5.9 Wildlife in Kilombero Valley: Composite Data 1976-2009

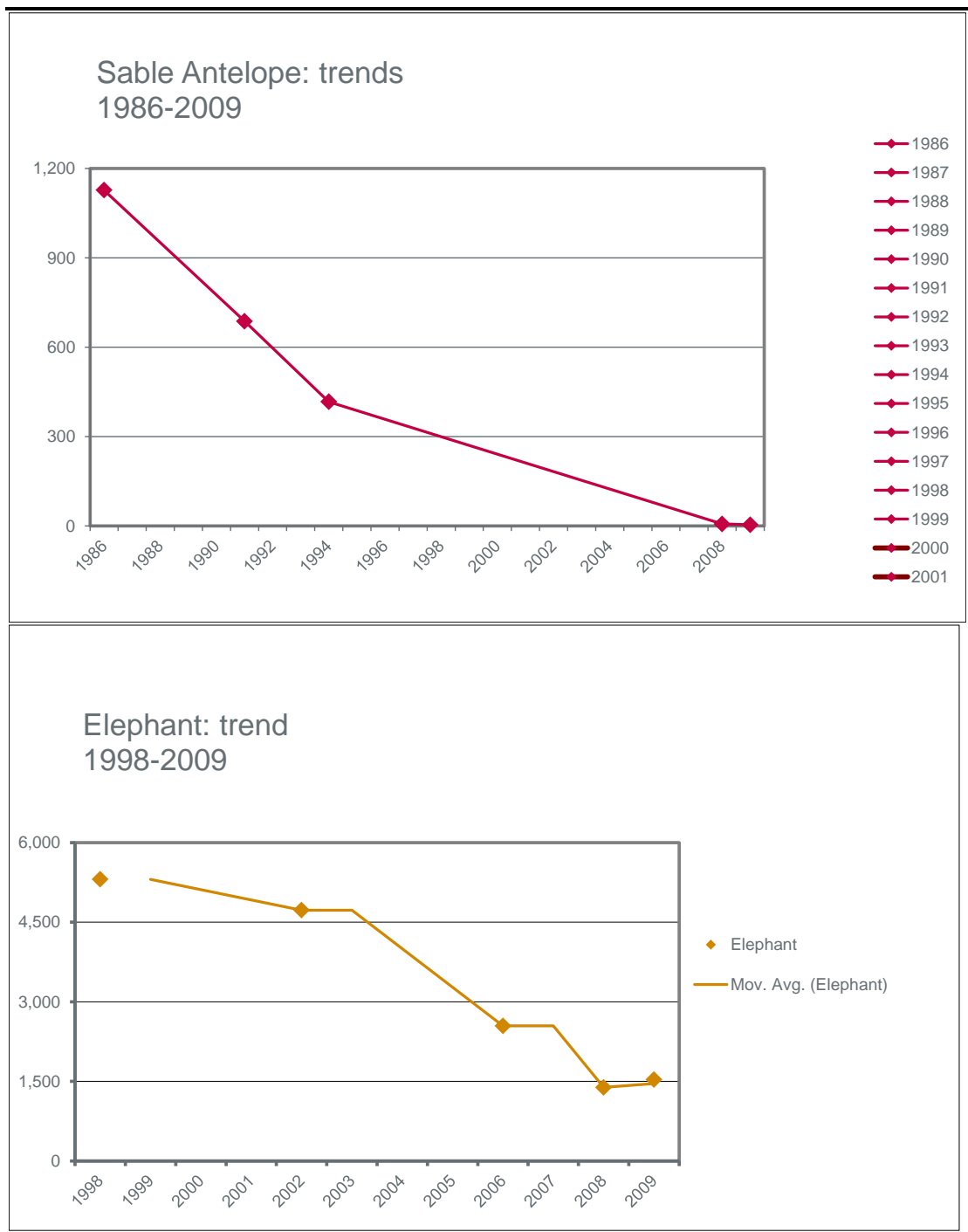
Year	1976	1986	1989	1991	1994	1998	2002	2006	2008	2009
Buffalo	39,380	59,260	30,494	35,301	46,607	16,778	10,449	5,769	1,314	1,462
Elephant	5,848	2,330	995	1,848	1,903	5,308	4,727	2,546	1,387	1,535
Hippo	4,442	6,044	8,414	5,413	3,297	1,262	3,566	1,111	317	514
Puku	26,427	43,670	55,760	36,560	53,020	66,964	23,358	15,546	17,754	18,161
Reedbuck	nd	nd	494	89	31	520	520	nd	7	52
Sable	1,292	1,127	nd	687	417	nd	nd	nd	7	4
Antelope										
Warthog	nd	nd	2,920	1,291	1,207	nd	235	nd	293	290
Zebra	6,107	1,919	976	716	569	631	nd	2,167	nd	nd

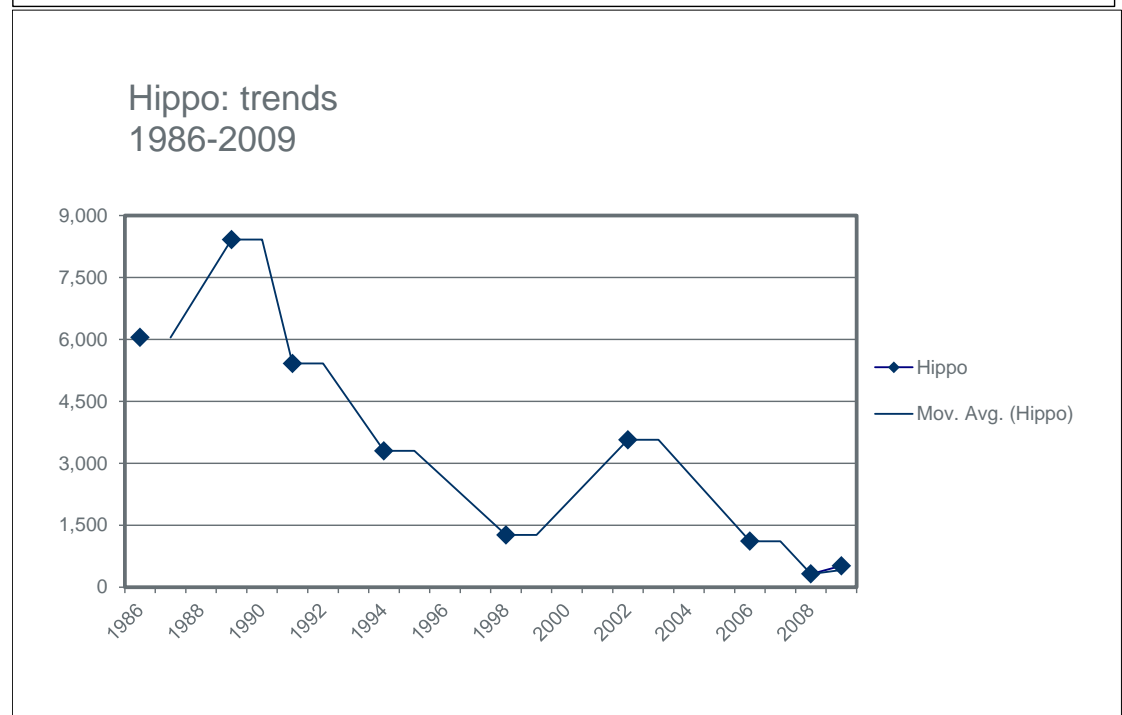
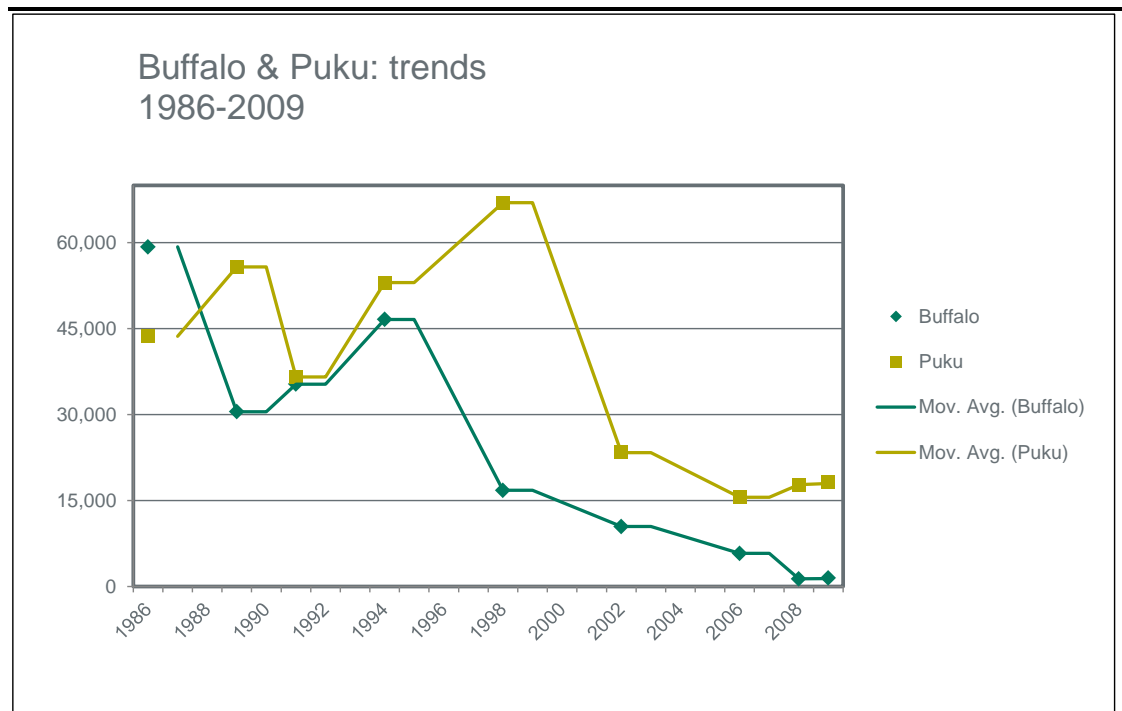
Sources: composite from inconsistent data in Tanzania Conservation Monitoring Centre/Frankfurt Zoological Society, quoted in Starkey *et al.*, 2002; TAWIRI (2008) quoted in WREM Int. (2012); TAWIRI (2002, 2006, 2008) quoted in UDS (2009); and TAWIRI (2011).

Notes: data are for dry season and refer to the GCA; error ranges not given; the data are inconsistent between sources; refer to the original sources for full data.

Although these counts are approximate and have major error ranges, when graphed they reveal dramatic crashes in population numbers over the last two decades (Figure 5.15). Of most concern is the puku since this marsh-dwelling antelope has an extremely restricted range and the Kilombero Valley population is critical to the survival of the species (MoW, 2012). The general trend for most species is that the populations are declining (MNRT, 2009), with at least 194 species at some level of threat in Kilombero valley, including mammals, birds, reptiles and amphibians. Amongst bird species the Kilombero weaver (*Ploceus burnieri*) is a globally threatened species while the Madagascar squacco heron (*Ardeola idae*), Stierling's woodpecker (*Dendropicops stierlingi*), the olive-headed weaver (*Ploceus olivaceiceps*), and Southern-banded snake eagle (*Circaetus fasciolatus*) are all Near Threatened (www.iucnredlist.org).

Figure 5.15 Kilombero Valley: Wildlife Population Trends 1986 – 2009





There are four commercial hunting concessions within the Kilombero Valley Game Controlled Area, but three have recently been abandoned due to the catastrophic decline in wildlife numbers as a result of encroachment by farmers and livestock.

Other Terrestrial Species

The gallery forests in the valley provide cold season habitats for montane and semi-montane bird species. Three bird species in particular are found in significant numbers, namely the African skimmer (*Rynchops flavirostris*), African openbilled Stork (*Anastomus lamelligerus*), and wattled plover (*Vanellus*

senegallus). Large trees in the floodplain provide roosts for many waterbird species (Starkey *et al.*, 2002). The valley is an Important Bird Area, harbouring the globally threatened Kilombero weaver (*Ploceus burnieri*), which is strictly endemic to the valley, and two other birds endemic to the valley, the Kilombero cisticola (*Cisticola* sp. nov.) and the melodious cisticola (*Cisticola* sp. nov.). A number of other threatened species, including some endemic to Tanzania, are also found in the valley. The valley is a stop-over for Palaearctic migratory birds migrating from Europe to southern Africa.

The Magombera chameleon (*Kinyongia magomberae*) has recently been described from Magombera forest and the Udzungwa Mountains National Park. This is possibly endemic to the Kilombero Valley and the Eastern Arc Mountains. A toad endemic to the Kilombero Valley wetlands namely, *Amietophryne reesi*, is known only from the confluence of the Kihansi and Kilombero rivers and the butterfly *Sallya pseudotrimeni*, found in the valley, is endemic to Tanzania (MNRT, 2009).

Fish and Fisheries

The Kilombero Valley is home to one of the most distinctive fish faunas amongst East African Rivers. In all, 37 fish species from 12 different genera have been found in the Kilombero River (MNRT, 2009). At least two species, *Alestes stuhlmannii*, and *Citharinus congicus*, are endemic, being confined to the Kilombero system where they have evolved (MNRT, 2002; MNRT, 2009a). The majority of the river's fish species are shared with the Zambezi River, other east coast rivers, and a few with the Congo basin (MNRT, 2009). Two fish species, *Distichodus petersii* and *Oreochromis pangani*, appear on the 2012 IUCN Red List as “vulnerable” and “critically endangered” respectively (www.iucnredlist.org).

The Rufiji basin is the only eastward flowing river system in Africa to have a *Citharinus* species (*C. congicus*), a genus otherwise confined to West African, westward flowing rivers (Bailey, 1969). The tigerfish, *Hydrocynus vittatus*, is found throughout the Rufiji basin but within Tanzania the giant tigerfish, *Hydrocynus goliath*, is restricted to the Kilombero basin, although it also occurs in Lake Tanganyika and the Congo basin. These taxonomic links between the Kilombero and Congo basins indicate that in geological times the upper Kilombero River drained westwards to the Congo. The faulting which created Lakes Tanganyika and Nyasa also created a new watershed east of the Rift Valley, cutting off the Kilombero headwaters and forcing them to drain eastwards (Bannister & Clark, 1980). The Kilombero retained some species unchanged, but others evolved into new species. The Kilombero freshwater ecosystem reflects this evolutionary shift, and its conservation is important scientifically apart from any other reasons.

The tilapia endemic to the Kilombero-Rufiji system, *Oreochromis urolepis*, appears to have evolved from the east coast species, *O. mossambicus*, a resident of the lower Zambezi (Trewavas, 1983). *O. urolepis* possess a genetic trait that is important in aquaculture: hybridization of female *O. urolepis* and male *O.*

mossambicus results in all-male offspring; the use of monosex hybrids has become widespread in tilapia aquaculture as a method of choice to control over-breeding and hence stunted growth in ponds. Introduced tilapia species, such as *O. niloticus*, could escape and interbreed with the wild population of *O. urolepis*, causing a breakdown to the wild genotype and loss of the monosex trait (MNRT, 2009).

The peak breeding season is November-January (Hopson, 1989), with a secondary peak in March to April (MNRT, 2009). The river begins to rise in November-December with the beginning of the rains, triggering an upstream migration of fish from downstream, some of which then spread laterally across the floodplain. Species involved in this migration include the cyprinid *Labeo* (especially *L. ulangensis*), the catfish *Clarias*, the tiger fish and the large barbel *Barbus macrolepis*. *Distichodus*, *Citharinus*, *Mormyrus*, *Alestes*, the squeaker catfish *Synodontis* and smaller species such as *Brycinus affinis* are also involved in spawning migrations (Atkins Land & Water Management, 1981; Benno & Tamatamah, 2005). These types of fish are all known to be migratory in other African rivers, principally for spawning as well as for feeding (MNRT, 2009).

Resident fish species breed in the network of small rivers feeding into the main Kilombero River, as well as in permanent and seasonally inundated floodplain pools. Important tributaries for breeding and as nursery habitats include the Lumemo, Mofu, and Merera Rivers (MNRT, 2009).

The Kilombero floodplain supports a highly productive commercial fishery. Kilombero District records for 2007/08 show fisheries as the second most important source of revenue (TSh 9,880,847, 5.2%) after agriculture (TSh 172,257,300, 91.1%). In Ulanga District statistics from 2003 show fisheries as providing 13% of district revenue (TSh 17,992,000), compared with 69% (TSh 95,392,000) for agriculture (Tamatamah, 2009; WREM Int., 2012).

Almost 90% of the fishing takes place in the main river, the remaining 10% being in the network of channels and ponds in the floodplain. Species caught in the floodplain ponds and pools are those with wide tolerance of poor environmental conditions such as *Clarias*, *Tilapia* and *Barbus*. Effective fishing in these habitats is difficult due to weeds and to dangerous animals such as crocodiles, hippopotamus and snakes (MNRT, 2009).

April to July is the period of high catches, with another brief peak in November-December as migratory species move upriver to spawn (Atkins Land & water Management, 1981, Benno & Tamatamah, 2005). Low catches in March and April, the peak of the floods, are attributed to the dispersal of fish across the vast watery landscape (MNRT, 2009).

In terms of weight, the catfishes *Bagrus* and *Clarias* dominate the catch, followed by *Distichodus* and tilapia (*Oreochromis* sp.). These species are closely followed by *Hydrocynus*, *Citharinus*, *Schilbe* and *Synodontis*. When catch abundance is considered (number of fishes caught), the smaller species

including *Citharinus*, *Schilbe*, *Synodontis* and *Oreochromis* are the most important (MNRT, 2009).

There has been a general decline in catches in the past two decades. Fishermen have observed a decline in both catch per unit of effort (CPUE) and size of some important species. Increases in fishing effort and the use of illegal methods are thought to be major contributing factors to the declining fishery: the number of fishermen and fishing camps has increased dramatically over the last few decades, migrating fish are captured by blocking smaller watercourses, the use of small mesh nets including mosquito nets has spread, as has the use of pesticides (MNRT, 2009a). In addition, the fisheries authorities in the area believe that large livestock numbers are contributing to the destruction of ponds and side channels, areas which are important for spawning.

5.3.4 *Greater Ruaha System*

The Greater Ruaha System includes Ruaha National Park, Rungwa, Kigizo, and Muhezi Game Reserves and Idodi Pawaga Wildlife Management Area, a contiguous block of protected land that covers 45,000 km² (Williams & Athanas, 2012). In 2008 the Usangu Game Reserve and its wetland area were officially annexed into the Ruaha National Park and thereby doubled the size of the park. The Ruaha National Park is one of Africa's largest national parks at just over 20,000 km² (Williams & Athanas, 2012). Ruaha National Park is renowned for its elephant populations with over 35,000 individuals recorded, the second largest elephant population in Tanzania. A total population of 4,878 lions was recorded in 2002 (Williams & Athanas, 2012).

The heart of the landscape is the Great Ruaha River which flows into the Rufiji River. From Usangu the Ruaha River flows through the Ruaha National Park, providing the main water source of the park, before being joined by the Little Ruaha River. It then joins the Rufiji River just above Stiegler's Gorge, along the way supplying the Mtera reservoir and the power plants at Mtera and Kidatu. The Ruaha landscape is dominated by an escarpment that is part of the Rift Valley. Much of the habitat of the park is combretum, acacia and commiphora woodland, combined with a mosaic of riverine habitats. The Usangu Wetlands have a core permanent swamp with high biodiversity values surrounded by seasonally flooded flats. The Usangu Flats receive waters from a large catchment (20,800 km²), with enough runoff to form a permanent swamp but too shallow to form a lake. The Usangu Wetlands are an Important Bird Area of international importance: 418 bird species have been recorded in the Usangu (MNRT, 2002b). Amongst bird species recorded at Usangu, the wattled crane (*Bugeranus carunculatus*) and lesser kestrel (*Falco naumanni*) are globally threatened. Only a few bird counts have been undertaken in the Usangu due to the difficulty of the task. An aerial survey in 2001 recorded a total of 18,500 waterbirds (MNRT, 2002b). Land use change and poor water resource management have led the Great Ruaha River to dry up in many years since 1993. The area under irrigated rice has increased 13 fold to 45,000 ha in the last four decades (MNRT, 2002b). Increased water

abstractions from rivers flowing into the Usangu wetlands have led to cessation of flow in the Great Ruaha River during dry seasons. As a result, the western Usangu wetlands no longer fully flood except in exceptionally wet years.

5.3.5 *Katavi-Rukwa-Lukwati Landscape*

The Katavi-Rukwa-Lukwati Landscape encompasses an area of about 25,000 km² (Mlengeya *et al.*, 2006), including the Katavi and Mahale National Parks, and the Luafi, Rukwa, Lukwati and Ugalla Game Reserves. With a size of 4,471 km², Katavi is the third largest park in Tanzania (Williams & Athanas, 2012). Katavi contains two seasonal lakes, Chada and Katavi, and a network of floodplains, rivers and wetlands. The River Katuma flows across the floodplains connecting the lakes. Drainage is southward into Lake Rukwa while the Nkamba River in the west drains into Lake Tanganyika. Lakes Chada and Katavi are reduced to grasslands during the dry season. Katavi National Park boasts Tanzania's greatest concentrations of African buffalo (*Syncerus caffer*), Nile crocodile (*Crocodilus niloticus*) and hippopotamus (*Hippopotamus amphibius*). There are confirmed reports of chimpanzees, observed north of the Ugalla Game Reserve (Mlengeya *et al.*, 2006). Chimpanzee is an important and endangered primate species whose status needs to be established in the country. Tanzania is considered one of the important range countries for this species. The Kabenga River, which drains into the Katuma River, is the site of large scale gold mining. Metals and chemicals are washed into the hydrological system. Intensive damming and irrigation in many villages in the catchment are resulting in reduced flows downstream (Manase *et al.*, 2010; Mlengeya *et al.*, 2006). Poor agricultural practices upstream are resulting in increased siltation of the Katuma and other rivers and lakes. Nile cabbage (*Pistia stratiotes*) spreading along rivers and into lakes has recently been a cause for alarm.

5.3.6 *The Southern Highlands*

The Southern Highlands are an eco-region distinguished by unique plateau grasslands, montane and riverine forests, rivers and crater lakes up to 3,000 m above sea level. The Livingstone Mountains are an important catchment area for Lake Nyasa. The Lumeme River drains the eastern side of the Livingstone Mountains into the Ruvuma River (NEMC, 2008). The vegetation is mainly miombo woodlands. The Kitulo-Livingstone area comprises Tanzania's largest montane grassland community. The area is a repository of floristic diversity, with high diversity found in 30 species of endemic orchids (WCS Tanzania, 2010). It is also an Important Bird Area, harbouring populations of endangered blue swallow (*Hirundo atrocaerulea*). The montane forests of Mount Rungwe and Livingstone in Kitulo are home to one of two populations of Africa's rarest monkey, the Kipunji (*Rungwecebus kipunji*) (the other being in the Udzungwa Mountains north of the Kilombero Valley).

Natural habitats across the Southern Highlands are threatened by unsustainable land use practices as natural forests and grasslands are being

cleared for commercially driven agriculture (WCS Tanzania, 2010). Hunting of mammals and birds is common and there is an unsustainable trade in wildlife, reptiles, frogs and orchids. Both the Mount Rungwe and Livingstone forests are heavily degraded and the extent of habitat connection between the different groups of Kipunji is tenuous (WCS Tanzania, 2010; NEMC, 2008). Despite the establishment of the Kitulo National Park there remains limited information on the mountains of southwest Tanzania compared to the Eastern Arc Mountains.

5.3.7 Protected Areas

Wildlife Protected Area Network

The Wildlife Protected Area Network in Tanzania is made up of National Parks, managed by Tanzania National Parks (TANAPA), Game Reserves and Game Controlled Areas (GCA) managed by the Wildlife Division, and Wildlife Management Areas (WMA) managed by Authorized Associations on behalf of their constituent Village Governments.

As shown earlier in *Figure 5.12*, the SAGCOT area contains:

- 5 of Tanzania's 15 National Parks;
- 10 of Tanzania's 34 Game Reserves; and
- 5 Wildlife Management Areas, of an original 16 pilot WMAs (MNRT, 2007a).

Further details are provided in *Table 5.10*, and the protected areas in the Kilombero Valley are shown in *Figure 5.16*.

Table 5.10 National Parks and Game Reserves in SAGCOT Area

Number	Protected Area	Area (ha)	Rangers (no.)	ha/Ranger
1	Kitulo NP	46,540	15	3,103
2	Udzungwa NP	199,000	47	4,234
3	Mikumi NP	323,000	70	4,614
4	Katavi NP	447,100	64	6,986
5	Ruaha NP	2,030,000	121	16,777
Total National Parks		3,045,640	317	
1	Mpanga/Kipengere GR	157,425	19	8,286
2	Kimisi GR	102,623	8	12,828
3	Selous GR	5,000,000	368	13,587
4	Lwafi GR	90,600	5	18,120
5	Rukwa GR	400,000	21	19,048
6	Lukwati GR	314,600	16	19,663
7	Kizigo GR	400,000	17	23,529
8	Muhesi GR	200,000	8	25,000
9	Rungwa GR	900,000	36	25,000
10	Uwanda GR	500,000	5	100,000
Total Game Reserves		8,065,248	503	

Source: Wildlife Division, 2012

Forests

It is estimated that in 2005, Tanzania mainland had 35.3 million ha of forests, representing 39.9% of the total land area (FAO, 2009). Of these forests, 14.3 million ha are found within gazetted Forest Reserves, 2.5 million ha are proposed Forest Reserves and around 2 million ha are in Game Reserves or National Parks (MNRT, 2009b). Thus in addition to the Wildlife Protected Area Network there is a further protected area network comprising 506 Forest Reserves and 8 Nature Reserves (see Kilombero example in *Box 5.2*) managed by the Tanzania Forest Services Agency on behalf of the central government, together with forest reserves managed by Local Government Authorities, Village Governments and private entities. Some 273 of the central government forest reserves, an additional 67 Local Authority forest reserves and 7 private forests are located within the SAGCOT administrative regions.

The combined area of these forest reserves is 5,839,142 ha. Out of the total forested area in SAGCOT, 1,618,857 ha are strictly protected for their water catchment or biodiversity values, and no harvesting is allowed. Three of the nation's eight Nature Reserves, Uluguru, Kilombero and Chome, are also located within the SAGCOT area. The SAGCOT regions also contain a total of 94 Village Land Forest Reserves with a combined area of 929,332 ha.

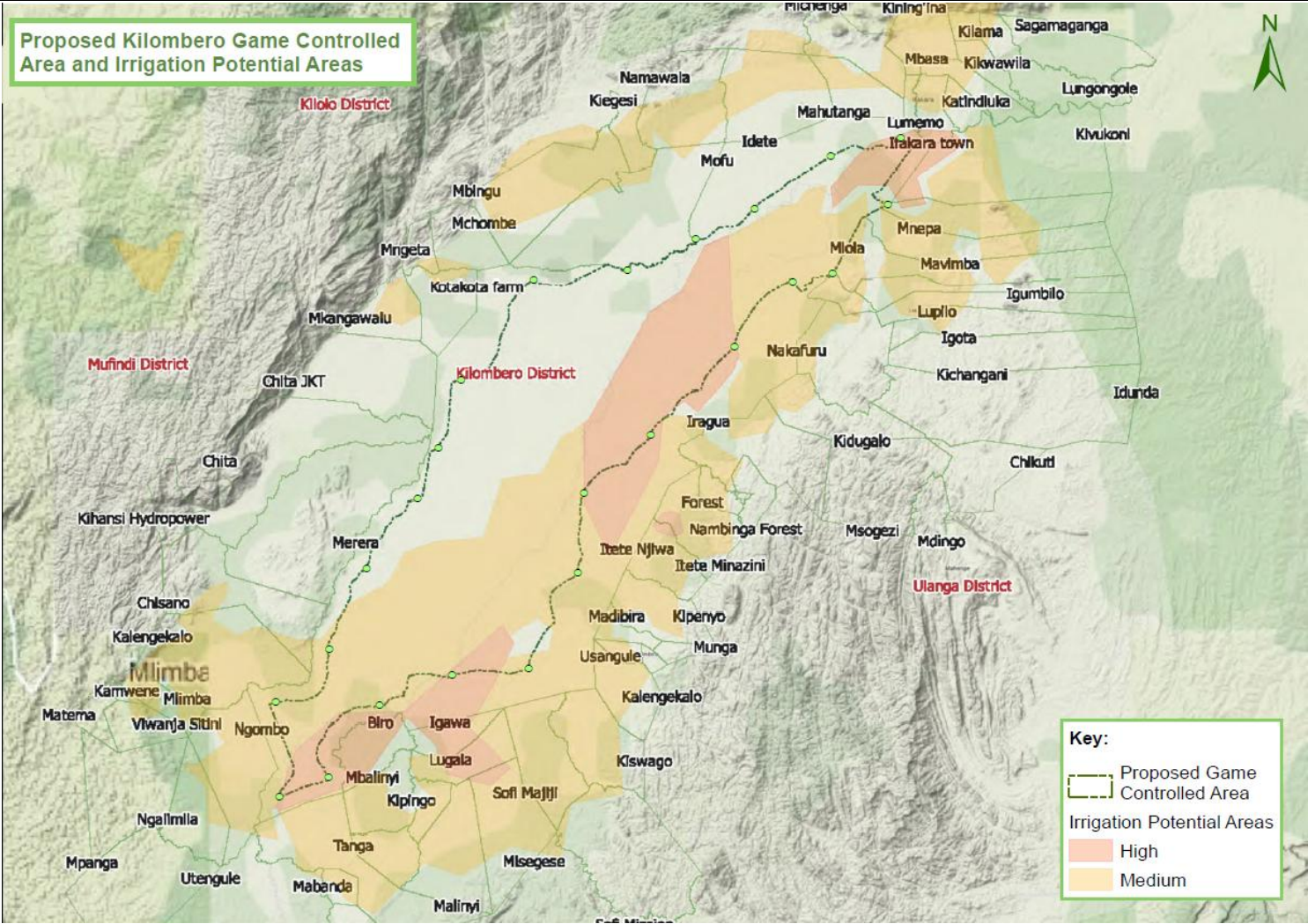
Table 5.11 *Forest Reserves in the SAGCOT area*

PA Category	Iringa	Mbeya	Rukwa	Morogoro	Coast	Total
Central Govt. Forest Reserves	56	56	15	100	46	273
Private Forests	2			1	4	7
Local Authority Forest Reserves	19	28	3	11	6	67
Area of Production Forest (ha)	320,869	407,945	2,789,503	418,998	282,968	4,220,285
Area of Protection Forest (ha)	413,669	111,513	24,606	1,050,875	18,194	1,618,857
Total Forest Area (ha)	734,538	519,458	2,814,109	1,469,873	301,162	5,839,142

Source: United Republic of Tanzania, 2010

In total about 139,000 km² of the SAGCOT area of 307,500 km² (45%) is located on land formally reserved by the central and district governments for the purpose of sustainable utilisation and conservation of natural resources.

Figure 5.16 Protected Areas in Kilombero Valley



Note: International border shown for Lake Malawi is the median boundary: this is not accepted by all riparian states.

The Kilombero Nature Reserve was gazetted in 2007 after amalgamating three former forest reserves. Kilombero is the second largest protected area within the Eastern Arc Mountains, after Udzungwa Mountains National Park. It is the largest forested mountain block of the Udzungwa Mountains, lying at 1,040 – 2,600 m.a.s.l., and borders the Udzungwa National Park to the north-east, with which it is integral. Plans are underway to establish a corridor to link the Nature Reserve with Uzungwa Scarp Forest Reserve to the south-west. Currently, this so-called Mngeta Corridor is used for farming activities by Mhanga, Uluti, Itonya, Mngeta, Mchombe and Mkangawalo villages (MNRT 2010).

The Kilombero Nature Reserve is managed by the Nature Reserves Unit of the Tanzania Forest Services Agency (TFS), formerly the Forestry and Beekeeping Division, of the Ministry of Natural Resources and Tourism. Nature Reserves have been created by re-gazetting, amalgamating a number of national Forest Reserves (MNRT, 2010). The legal provisions that establish nature reserves state that they are to be managed for protection of forest habitat and the species of plants and animals that live within them. No extraction of woody materials is allowed, although agreements for co-management can be negotiated with forest-adjacent communities.

Funding and staffing levels available for the management of core sites within the Eastern Arc Mountains has been increasing over the years, and is currently around four times the allocation in 2004. Even allowing for depreciation of the Tanzanian shilling this is still a major increase in funding commitment to the management of these sites.

Budget and Staffing: Kilombero Nature Reserve

Year	Budget allocated in TSh	Staff numbers
2008/09	70,160,000	10
2009/10	72,560,000	18
2010/11	213,280,000	98

Source: MNRT, 2010

Staffing: Kilombero Nature Reserve, 2010/11

Staff Position	Numbers of Individuals
Manager	1
Technical staff at HQ	39
Accounts/Secretarial	14
Drivers	15
Watchmen	7
Forest Guards	22
Total	98

Source: MNRT, 2010

The 22 Forest Guards available to patrol the nature reserve represent an area covered by each ranger of 6,114 ha, which compares favourably to the 13,587 ha for the Selous Game Reserve and is only twice the ratio of 1 ranger to 2,843 ha for the Udzungwa National Park. Ongoing and past assessments of protected area effectiveness indicate that this level of staff available to conduct regular patrols is sufficient to ensure ecosystem health even in the face of increasing human populations (Rovero, 2007).

Effectiveness of Protected Area Network

A number of studies have attempted to assess the effectiveness of Tanzania's protected area network. In one study that used the World Bank/WWF

management effectiveness tool to assess the conservation status of more than 100 Eastern Arc forests it was found that more than 60% of forests had only average management effectiveness scores, although no forest was in the “very poor” category (World Bank/WWF, 2007; Madoffe & Munishi, 2010: *Table 5.12*). According to these authors the effectiveness of management of forests is based on two major factors: the degree of ownership and control, and the funds available for management activities. Management and control were found to be strongest in private forests and in central government catchment forest reserves (Madoffe & Munishi, 2010). A 2007 study comparing Udzungwa National Park with four forest reserves located to the south of the park found high rates of destruction in the forest reserves. These forests were determined to be in serious danger of suffering irreplaceable losses. In contrast, the National Park appeared to be well protected, with very few signs of violation in spite of being bordered by human populations four times greater than those next to the southern forest reserves (Trento Museum, 2007).

Table 5.12 *Management Effectiveness Scores for Forests in the Eastern Arc*

Forest Category	METT Scores%			
	Poor 15-30	Average 31-45	Good 46-60	Very Good >60
CGFR	15	49	7	
LGFR	3	9	2	1
Proposed	12	4		
Private	1	1		
Village forests		1	1	
Total number of forests	31	64	10	1

Source: Madoffe & Munishi, 2010

CGFR : Central Government Forest Reserve

LGFR : Local Government Forest Reserves

Proposed : forests not yet gazetted

A 2011 study found that Local Authority forest reserves receive the least funding amongst the protected areas, while central government catchment reserves and Nature Reserves receive more and National Parks receive the most (Green *et al.*, 2011; see also Burgess & Rodgers 2004). The median actual spending on management across all forest reserve areas in the Eastern Arc was US\$ 2.3 ha/yr, as compared to the figure of US\$ 7.7 ha/yr that is spent in Tanzanian National Parks (TANAPA, 2009; Green *et al.*, 2011). Actual funding across all forest reserve types is, therefore, around one third of National Park spending. The same study determined that the spending reported by protected area managers to be necessary to be effective was US\$ 8.3 ha/yr (Green *et al.*, 2011). There are differences in actual spending on management costs across National Parks, with some parks having greater numbers of rangers per unit area than others (*Table 5.10*).

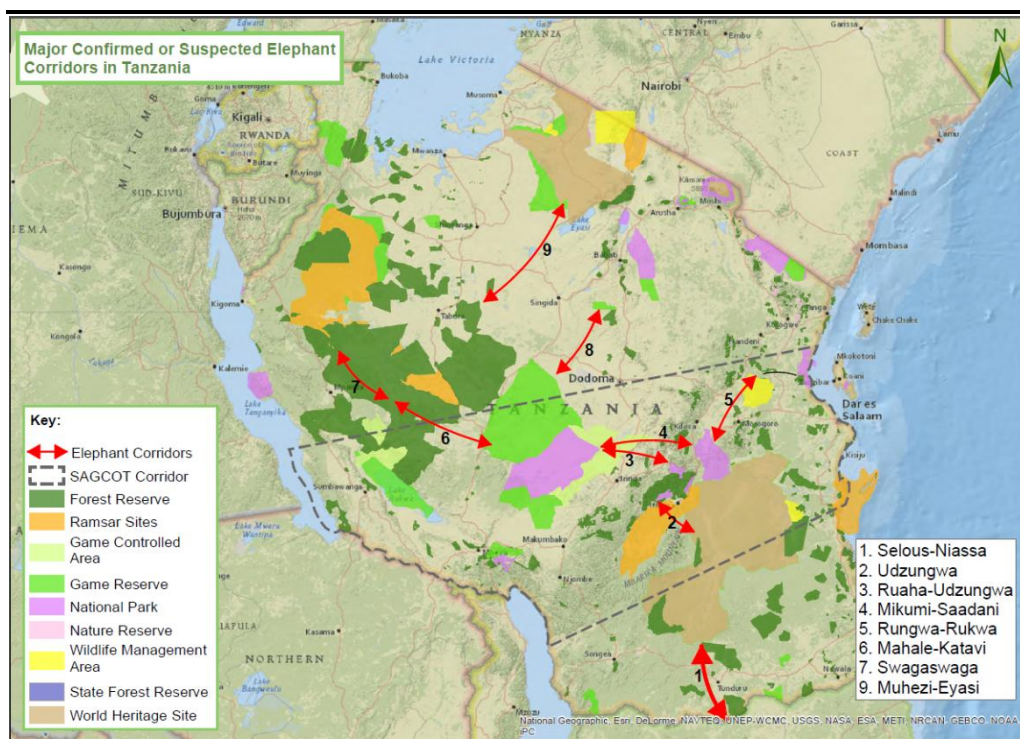
Connectivity

In Tanzania many protected areas are rapidly becoming isolated, yet the long term viability of these protected areas depends on the ability of animals to disperse and return to the area on an annual basis. The increasing isolation of protected areas in Tanzania is due to the growing human population, new settlements in previously unpopulated areas, land use conversion to agriculture and changing infrastructure. Wildlife corridors are critical for ensuring the long term maintenance of biodiversity. Opportunities for maintaining corridors between protected areas are rapidly diminishing, endangering the future of ecosystem services provided by protected areas.

Wildlife corridors are often identified through their use by large charismatic mammals, particularly elephant (*Loxodonta africana*) (see Figure 5.17). However, many smaller animals such as duikers, small carnivores, bats, birds and amphibians also use the corridors. Thus corridors may be important both for maintenance of populations in protected areas linked by corridors, and for populations moving through or living in the corridors.

Summary information on the most important wildlife corridors remaining in mainland Tanzania was presented in a recent TAWIRI report (Jones *et al.*, 2009). Thirteen of these corridors are in the SAGCOT area, and most are in urgent need of protection, including those in the Kilombero Valley (see Box 5.3).

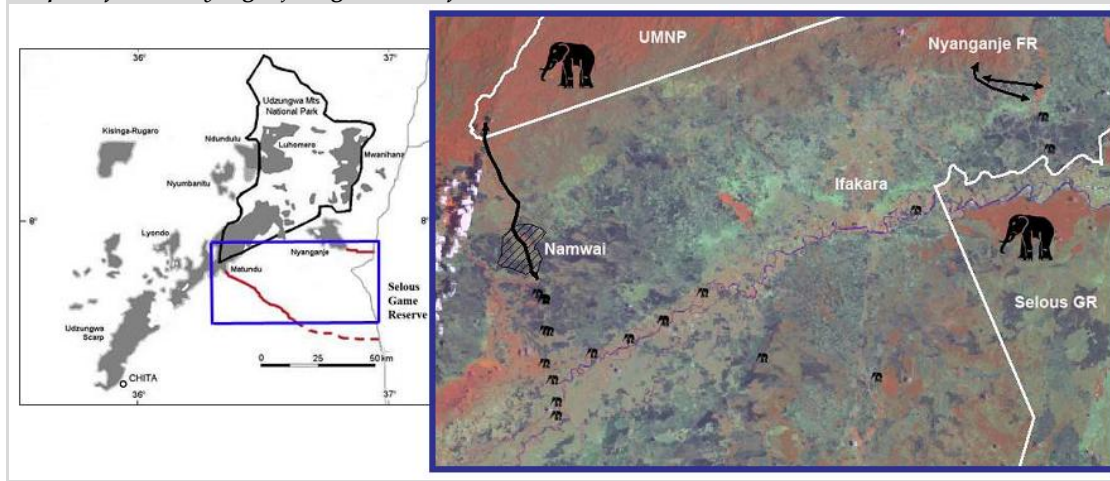
Figure 5.17 Major Confirmed or Suspected Elephant Corridors in Tanzania



Source: Jones *et al.* (2007)

Studies undertaken from 2003 to 2006 into the feasibility of maintaining ecological connectivity between the Udzungwa and Selous landscapes found that two routes in particular remain active for wildlife, the Nyanganje and Ruipa Corridors (Jones *et al.*, 2007). However, all of the studies concluded that without urgent conservation efforts these two corridors would also become blocked within five years (Jones *et al.*, 2007; Rovero, 2007; TAWIRI, 2009), and one (Jones *et al.*, 2007) predicted that "unless urgent interventions are made to protect these two remaining corridors, both corridors will be irreversibly blocked by the end of 2009".

Ruipa (left) and Nyanganje (right) Wildlife Corridors



Source: Jones *et al.* (2007)

5.3.8

Critical Natural Habitats

The World Bank does not support projects that, in the Bank's opinion, involve the significant conversion or degradation of critical natural habitats. The Bank defines *critical natural habitats* as:

- “(i) existing protected areas and areas officially proposed by governments as protected areas (e.g., reserves that meet the criteria of the World Conservation Union [IUCN] classifications), areas initially recognized as protected by traditional local communities (e.g., sacred groves), and sites that maintain conditions vital for the viability of these protected areas (as determined by the environmental assessment process); or
- “(ii) sites identified on supplementary lists prepared by the Bank or an authoritative source determined by the Regional environment sector unit (RESU). Such sites may include areas recognized by traditional local communities (e.g., sacred groves); areas with known high suitability for biodiversity conservation; and sites that are critical for rare, vulnerable, migratory, or endangered species. Listings are based on systematic evaluations of such factors as species richness; the degree of endemism, rarity, and vulnerability of component species; representativeness; and integrity of ecosystem processes.” (OP 4.04 *Natural Habitats*, Annex A – Definitions).

Using this definition, at least 40% of the SAGCOT area of 307, 500 km² is critical natural habitat (the 111,109 km² of National Parks and Game Reserves listed in *Table 5.10* and the 16,189 km² of protection forest from *Table 5.11*).

5.3.9 *Environmental and Ecological Projects*

This section briefly describes some of the key environmental and ecological projects in the SAGCOT area.

Reducing Emissions from Deforestation and Forest Degradation (REDD): in April 2008, the Governments of Norway and Tanzania signed a Letter of Intent on a Climate Change Partnership. The partnership focuses on developing pilot programmes to reduce deforestation; developing methodologies for carbon accounting; and promoting research and capacity building programmes related to climate change challenges. The partnership is also meant to promote Public Private Partnerships (PPP) to enhance investments in sustainable management of forest resources. The Government of Norway had a budget of close to 500 million Norwegian Kroner (around 87 million USD). To date nine pilot projects have been initiated in several parts of the country including in Kilosa and Mount Rungwe in the SAGCOT area. A 17 million Norwegian Kroner (around 3 million USD) research programme is also being assisted from this initiative (www.norway.go.tz).

Sustainable Wetland Management Programme (SWMP): since 2004 the Government of Denmark has been supporting the Sustainable Wetlands Management Programme (SWMP) in the Wildlife Division of the Ministry of Natural Resources and Tourism. A Wetlands Unit was established within the Wildlife Division and field activities included the integration of wetland issues into planning in Iringa and Mbeya Regions with more focused improvement of sustainable wetland management in 3 significant selected wetland sites within the two Regions. Further support was provided for scientific studies and wetlands inventories in the target Regions. National coordination of wetlands issues was enhanced by strengthening the workings of a National Wetlands Working Group (NWWG) and the National Wetlands Steering Committee (NAWESCO). The project budget is 34 million Danish Kroner (around six million USD) and project activities are expected to be finalized by mid-2013 (MNRT, 2003).

Kilombero and Lower Rufiji Wetlands Ecosystem Management Project (KILORWEMP): this 54 month project is in its final preparation stage (it was expected to begin in March 2012; Belgian Technical Cooperation, 2011). The project is supported by the Government of Belgium which has provided € 4 million in financial support. The project aims to support the implementation of Community Based Natural Resource Management (CBNRM). It is designed to consolidate the processes initiated in Kilombero and Ulanga under the previous project (Kilombero Valley Ramsar Site project, KVRSP) and to extend these to Rufiji District. It will also address key policy issues, and will provide a strong component of permanent technical assistance at both district and

central levels. The key implementation partners will be contracted from permanent, Tanzania based conservation NGOs to provide specialized know-how and assistance. The EU has expressed an interest in contributing to the project.

National Forestry Resources Monitoring and Assessment (NAFORMA): this is a project supported by the Government of Finland with Technical Assistance provided by FAO (MNRT, 2007b). The project was designed to last for three years beginning in 2009. The objectives of the project are to develop baseline information on forest and tree resources, assist the forestry authorities to set up a specialized monitoring and inventory unit and to put in place a long term monitoring system of forestry ecosystems in Tanzania. Amongst the outputs of the project are a harmonized forest land use classification system, and maps of the state of forest land and changes based on remote sensing data. A project budget of US\$ 3.8 million was set aside and project outputs are expected towards the end of 2012.

WWF - Integrated Water Resource Management in the Great Ruaha River Catchment, Tanzania: this project began in 2006 and has been supported by the European Commission since 2010. The programme's objective is to restore year round flow to the Great Ruaha River, as it traverses the Usangu wetlands and Ruaha National Park. WWF is employing a collaborative approach at village, district and national levels to improve management of water and natural resources in the Great Ruaha River catchment. Communities are encouraged to establish water user associations, as well as a committee that represents the entire catchment. Water withdrawals for irrigation, especially in the dry season are controlled. Farmers are trained in more efficient water use in rice production. Alternative livelihoods, away from agriculture, such as beekeeping, batik dying, soap making, are supported. WWF has also contributed to the information base by undertaking an environmental flow assessment (EFA) in the river (WWF Tanzania Country Office, 2010).

5.4

SOCIO-ECONOMIC PROFILE

Since an in-depth study of the SAGCOT area was not possible within the timeframe of this study, this socio-economic baseline assessment has been carried out using secondary data and key informant interviews. Reports on the Rufiji Basin provide useful indicative statistics for the corridor as a whole. Where available, specific information is also provided for the Kilombero area.

5.4.1

Population

The Corridor is home to an estimated 11.1 million people⁽¹⁾, roughly 25% of Tanzania's total mainland population⁽²⁾, and is predicted to increase to 16

(1) Calculations by author. Source: <http://www.tanzania.go.tz/populationf.html>

(2) Mainland population projection for 2012 is 45,930,231. Source: <http://www.tanzania.go.tz/populationf.html>

million by 2025 (adjusted projection based on the 2002 census)⁽¹⁾. Data for the Kilombero District are shown in *Box 5.4*.

The male:female ratio in the corridor is 94:100. Iringa and Morogoro are the largest urban centres, with a population of roughly 112,500 and 206,000 respectively. Both are university towns.

The majority of people in the SAGCOT corridor live in rural areas, where population density is low: the mean population density in the Rufiji Basin (excluding Iringa) is 32.6 persons/km². This is not equally distributed - large areas are relatively uninhabited as a result of the topography, remoteness and poor infrastructure, protected areas, and the presence of tsetse fly. Population density is higher in the Great Ruaha sub-basin than in the Kilombero, Luwegu and Lower Rufiji sub-basins.

Analysis of the Rufiji Basin as a whole shows a high birth rate and low life expectancy (*Figure 5.18*) which correspond to the national averages for Tanzania. The median age in Tanzania in 2011 was estimated at 18.5 years (50% of the population are 18.5 years or younger)⁽²⁾, implying high youth dependency on a limited adult workforce, as well as a high need for education services. More specifically, comparing rural and urban populations in Kilombero District in 2002 (*Table 5.13*) reveals a higher age dependency ratio⁽³⁾ in rural areas. This places greater economic and social pressure on rural households, and men and women of working age, who must support a greater number of family members.

(1) Calculations by author. Source: <http://www.tanzania.go.tz/populationf.html>

(2) CIA. World Fact Book. 2012.

(3) Age dependency ratio is defined as the ratio of youths less than 15 years of age plus the persons aged 65 years and above per adults aged 15-64 years (working-age population).

The 2002 National Population and Housing Census gives the total population of Kilombero District as 321,611 (162,214 males, 159,397 female) across a total of 73,393 households. Current population estimates and projections are given in the table below. The average household size in 2002 was listed as 4.4, compared to the Tanzanian average of 4.7 for the same year. However, it should be noted that rural households are larger than their urban counterparts.

Population by Division and Ward, Kilombero District, 2002

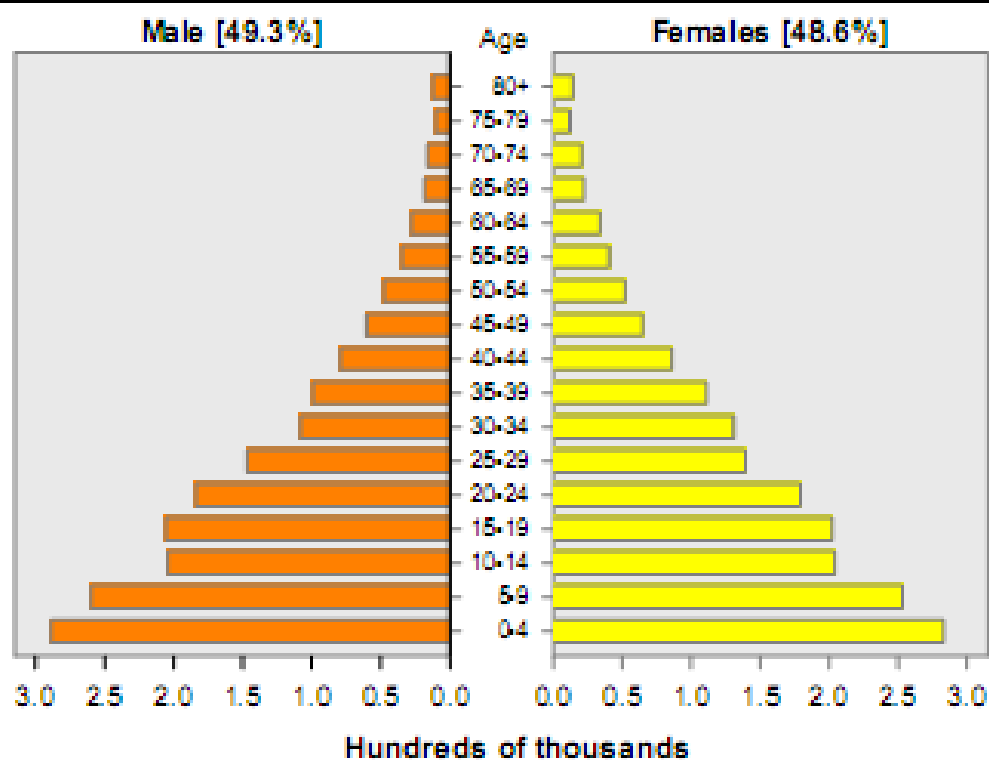
Division	Ward	Population and Housing Census 2002			Population projection 2011	Population projection 2015
		Male	Female	Total		
Ifakara	Ifakara	21,936	23,582	45,518	61,817	74,849
	Kibaoni	10,164	10,708	20,872	28,346	34,321
	Lumemo	8,927	9,425	18,352	24,923	30,178
	Michenga**					
	Idete	7,754	7,128	14,882	20,211	24,472
Total		48,781	50,843	99,624	135,297	163,820
Kidatu	Kidatu	18,227	16,982	35,209	47,817	57,897
	Sanje	4,961	4,748	9,709	13,186	15,965
Total		23,188	21,730	44,918	61,003	73,862
Mang'ula	Mang'ula	14,388	14,414	28,802	39,115	47,361
	Mwaya**					
	Mkula	4,168	4,229	8,397	11,404	13,808
	Kiberege	9,541	8,918	18,459	25,069	30,354
	Kisawasawa	4,565	4,495	9,060	12,304	14,898
Total		32,662	32,056	64,718	87,892	106,421
Mngeta	Mchombe	14,220	12,987	27,207	36,949	44,739
	Mngeta**					
	Mofu	2,485	2,401	4,886	6,636	8,034
	Mbingu	7,152	6,389	13,541	18,390	22,267
	Chita	8,681	8,087	16,768	22,772	27,573
Total		32,538	29,864	62,402	84,747	102,613
Mlimba	Mlimba	16,280	16,519	32,799	44,544	53,934
	Kamwene**					
	Chisano	1,651	1,461	3,112	4,226	5,117
	Masagati	2,922	2,888	5,810	7,890	9,554
	Uchindile	1,005	992	1,997	2,712	3,284
	Utengule	3,187	3,044	6,231	8,462	10,246
Total		25,045	24,904	49,949	67,835	82,135
Total district	23	162,214	159,397	321,611	436,772	528,851

Source: District Planning Office

Note: ** New Wards established in 2010

Mang'ula and Ifakara are the two most populated Divisions in Kilombero, with a population density of 22 persons/km². Ifakara is the district capital, so this is to be expected. However, Mang'ula is not the result of urbanisation. Instead, it is the location of several large sugar cane plantations, and their associated workforce. As well as the presence of small urban centres, Ifakara and Mang'ula also offer trading opportunities, fertile agricultural lands and grazing lands which attracts farmers and pastoralists from other parts of the country such as Arusha, Shinyanga, Manyara and Mwanza. Mlimba Division is the least populated division.

Figure 5.18 2012 Population Pyramid for the Rufiji Basin



Source: WREM Int., 2012 (projection from 2002 Census)

Table 5.13 Age Dependency Ratios in Kilombero District

Age	Total	Rural	Urban
Total	78.15	81.46	70.25
Male	77.36	80.05	70.61
Female	78.95	82.96	69.91

5.4.2 Social Diversity

Ethnicity

The Tanzanian population consists of more than 120 different ethnic groups, with numerous associated languages. The large majority of the tribes are ethnically Bantu. The main ethnic groups in the six SAGCOT crop clusters are listed in Table 5.14, and the situation in the Kilombero District is described in *Kilombero District* has a diverse ethnic population, and it is not uncommon to find several different ethnic groups living together in one community. For example, during the SRESA visit, the team met with 7 members of a farmer’s association in Mbingu Village⁰, each of which came from a different ethnic group. This ethnic heterogeneity can be explained by a combination of the villagisation policy of the 1970s, and in-migration in search of employment and other opportunities. It is likely that the degree of ethnic diversity will be directly correlated with the availability of fertile land and other economic opportunities.

Box 5.5. However, populations are highly mobile, and as a result many more are present within the corridor as a whole. The agro-pastoralist Sukuma tribe

The 2002 Census lists the Pogoro, Ndamba, Bena, and Mbunga as the main ethnic groups in Kilombero District. The groups often referred to as 'indigenous' to Kilombero Valley (the Ndamba, Mbunga and Pogoro) arrived in the early 19th century from Malawi. The Ndamba are closely related to the Pogoro, who can be found in greatest numbers in the western part of the valley basin and the adjacent Mahenge Highlands. Other groups who migrated to the Kilombero Valley include the Sagara (central Tanzania), Hehe (Iringa), Ndedeule (Zambia), Sukuma (Mwanza), Ngoni (Southern Tanzania), Ngindo (Rufiji), Mang'ati (pastoralists?) and Chaga (Kilimanjaro). The construction of the TAZARA railway in 1972 also brought another influx of people from different parts of the country. As a result, there are a great many local languages spoken in the Kilombero Valley, although Swahili remains the most commonly used.

Over the last 10 years, and especially after the 2006 evictions of agro-pastoralists from Ihefu and conflict between Maasai and crop farmers in Kilosa, the number of pastoralist and agro-pastoralist groups such as the Maasai, Sukuma and Barbaigs moving into the valley has increased. They have come in search of grazing land due to pressures on grazing elsewhere. The relationship between pastoralists and villagers is often reported to be poor, due to complaints that their cattle cause damage to crops. Many Sukuma (agro-pastoralists), in comparison to the Maasai and Barabaig, have been more successful in becoming integrated into the communities in which they settle. The SRESA team found several examples where Sukuma had been able to participate in decision making processes. They were renting land, growing crops and even had positions in community governance structures and community based organisations (CBOs). The Maasai and Barabaig, on the other hand, have tended to be more isolated from communities and decision making. This is due in part to cultural traditions.

are the largest ethnic group. Originally from the Mwanza region, they can now be found all over the country. Certain parts of the SAGCOT corridor including the Kilombero Valley have experienced a large influx of Sukuma and also Maasai (semi-nomadic pure pastoralists) in recent years. The Barabaig, a pure pastoralist ethnic group, recognised under World Bank Operational Principles 4.10 as an indigenous people, can be found in several parts of the SAGCOT corridor.

Table 5.14 *Overview of Main Ethnic Groups in the SAGCOT Clusters*

SAGCOT Clusters	Region	Ethnic Groups
Kilombero	Morogoro	Pogoro, Ndamba, Bena, Mbunga Recent in-migration: Maasai, Sukuma, Barabaig
Sumbawanga	Rukwa	Fipa
Ihemi	Iringa	Hehe
Mbarali	Mbeya	Sangu, Hehe, Bena (main); also Sukuma, Barabaig, Maasai
Ludewa	Iringa	Pangwa, Kisi, Manda
Rufiji	Pwani	Ndengereko

Gender

Approximately 98% of Tanzanian rural women classified as economically active are engaged in agriculture. Women farmers are also often casual

labourers and unpaid family workers in both commercial and subsistence agriculture, including livestock and fishing.

Cultural practices vary greatly between the many different tribes in Tanzania, but share some common traits: in crop-farming communities in general, women have primary responsibility for (i) domestic work including food preparation, fetching water, finding and fetching fuel wood, and child care, (ii) subsistence agriculture, especially most of the weeding, harvesting, processing and storage activities relating to food crop production. Men and women participate fairly equally in site clearance, land preparation, sowing and planting, but overall women spend more hours per day than men in both productive and reproductive activities⁽¹⁾.

In most pastoral societies gender roles are strongly marked. Women are typically responsible for milking and dairy processing; they may or may not sell the milk, and they usually have control over the proceeds in order to feed the family. Men are responsible for herding and selling meat animals. In systems in which herds are split, women usually stay at fixed homesteads while men go away with the animals⁽²⁾. This is true of the Maasai, while with the Barabaig the whole family travels together with the herd as they migrate. In many pastoralist cultures a part of the herd (often goats) is considered for 'home consumption' and often stays with the women. The more valuable cattle remain with the men.

(1)FAO. 1997. *Gender and Participation in Agricultural Development Planning. Lessons from Tanzania*. Dar es Salaam and Rome, November 1997.

(2)FAO. 2001. *Pastoralism in the new millennium*. FAO Animal Production and Health Paper 150. <http://www.fao.org/docrep/005/Y2647E/y2647e00.htm#toc> [accessed 09 August 2012]

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Vulnerable Groups

Generally speaking, individuals, households, or communities with high exposure to risks and low capacity to cope are considered to be extremely vulnerable. Particularly vulnerable populations in SAGCOT include female-headed households, children, the elderly, the disabled and those with long-lasting/chronic illnesses, such as HIV/AIDS. Unemployed youth, youth with unreliable income and female youth are also considered vulnerable⁽²⁾, as are refugees (see below) (Table 5.15). However, not all members of the social groups listed are by definition extremely vulnerable, as there are differences with respect to access to livelihood assets (social, financial, human, physical,

(1)Mbingu is also Swahili for 'Heaven', indicating that this village has particularly favourable living environment.

(2) With regard to youth vulnerability and their engagement in agriculture see e.g.: FANRPAN. 2012. Current and Emerging Youth Policies and Initiatives with a Special Focus and Links to Agriculture. Tanzania (mainland) Case Study Draft Report.

natural, political) to mitigate the effects of impoverishing factors⁽¹⁾. In general, the area is characterised by vulnerable people whose well-being depends very strongly on the delivery of ecosystem services by the local environment, and especially the rivers and wetlands (Hamerlynck, 2011).

Refugees

In 2007 the Tanzanian government accepted 162,000 Burundian refugees to become naturalized Tanzanians (referred to as "Newly - Naturalized Tanzanians" (NNTs)). In 2010 the National Strategy for Community Integration Programme was announced, spelling out the modalities for the relocation and integration of the NNTs to 16 selected regions and 52 districts around the regions. The relocation exercise was halted in August 2011. One reason for the suspension given by the GoT was that insufficient consultation had taken place within government, especially with Regional and District authorities in the proposed receiving regions. This, according to media sources (e.g. The East African⁽²⁾), had led to unrest and security issues in the relocation areas. At this point it is not clear if refugee families may be relocated (and allocated land) within the SAGCOT area. The decision to relocate all NNTs and close the former refugee settlements is still being reviewed and other scenarios are being considered such as the local integration of the NNTs in their current place of residence⁽³⁾. Relocation and local integration of the new citizens could lead to social conflict, and their numbers would need to be taken into account with regard to land availability.

(1) Fred Lерisse, Donald Mmari & Mgeni Baruani. 2003. *Vulnerability and Social Protection Programme in Tanzania*. R & AWG.

(2) See for example: The East African. 12 December 2011. *Tanzania: Country Halts Resettlement of Naturalized Burundian Refugees*, by Mike Mande. Available from: <http://allafrica.com/stories/201112120526.html> [accessed 16 August 2012]

(3) UNHCR. 2012. *Press Briefing on the Local Integration Programme*, May 2012

Table 5.15 Vulnerable Groups

Group	Main Characteristics
Women	<p>Just over 50% of women aged 15-49 in SAGCOT have completed primary school; between 10 and 26% (different per region) have no education at all (TDHS, 2010). This is similar to men, although the percentages for no education are lower.</p> <p>Between 60-80% of women aged 15-49 are literate (for men this is between 80 and 90%) (TDHS, 2010). Gender based violence (GBV) is a big problem in Tanzania. In the southern corridor between 40 and 70% of women have experienced physical violence (TDHS 2010). GBV is largely culturally accepted by both men and women.</p>
Vulnerable Groups	
Women headed households	<p>Approx. 20% of Tanzanian women ages 25-50 are either unmarried, divorced, separated or widowed. In 2007 23% of rural households were headed by women, the percentage is higher in urban areas (up to 30%)⁽¹⁾.</p> <p>Women heads of household experience a greater work and time-burden and responsibility, often making them more vulnerable than families with both parents present. Decision-making is (largely) controlled by the women themselves, which often positively influences their choice to join meetings, associations etc.</p>
Youth (15-24) ⁽²⁾ Girls specifically; and unemployed youth and youth with irregular income.	<p>The main vulnerability of girls is early marriage and pregnancies, which often cause school drop-out and limit future life opportunities.</p> <p>The median age of giving birth to a first child is 19 years; close to 20% of girls aged 15-19 have had a live birth or were pregnant with a first child (TDHS, 2010).</p> <p>The rate of unemployment (for a period of at least 12 months) for 20-24 year olds is on average 14 and 13% for men and women in SAGCOT respectively (TDHS, 2010).</p>
Disabled	<p>Approximately 2% of the total Tanzanian population is considered disabled (physically, visually, hearing, intellectually impaired; multiple impaired and albinos; according to 2002 Census definitions). This percentage is slightly higher in Dodoma (2.3), Morogoro (2.5) and Iringa (2.3), while lower in Mbeya (1.3) and Rukwa (1.1) regions.</p> <p>Men are more likely to be disabled than women. Of the total disabled, 54.9% are males, 40.1% females.⁽³⁾</p>
Elderly	<p>Elders who are primary caregivers for young children are more vulnerable to poverty and lack of food security (approx. 10% of the elderly (60+ years) in Tanzania, and 14% of elderly women). Tanzanian elderly women are at times accused of witchcraft. Incidents of physical violence against or murder of such accused elderly women have occurred in the southern corridor area⁽⁴⁾.</p>
Those with long-lasting/ chronic diseases such as HIV/ AIDS	<p>Only roughly half of women and slightly fewer men in the southern corridor have comprehensive knowledge about AIDS⁽⁵⁾</p> <p>Some 60-70% of women and 50-60% of men in the southern corridor have knowledge on prevention of mother to child transmission of HIV.</p> <p>In terms of attitudes, acceptance is high in relation to willingness to take care of an HIV+ family member at home (90%+); however more than 50% of women would want to keep it a secret, versus approximately 40% of men⁽⁶⁾.</p>
Children	<p>Child labour in rural areas is higher than in urban areas. For children aged 5-17 years, 36.1% of boys and 28.2% of girls provide child labour⁽⁷⁾.</p> <p>A majority (between 50 - 60%) of children in the corridor live with their parents; up to 22% live with their mother only, even when father is often still alive (TDHS 2010); single (women) headed households are often more vulnerable to poverty than households where both parents are present.</p>
Refugees	<p>Some 162,000 Burundian refugees are in the process of re-establishing themselves in Tanzania as Newly-Naturalised Tanzanians.</p>

(1) URT.2007. National Household Budget Survey

(2) UN definition of youth

(3) URT. 2006. *Analytical Report of 2002 Population Census*.

(4) HelpAge. 2010 *NGO Submission for the Initial Universal Periodic Review of the Republic of Tanzania*

(5) Comprehensive knowledge means knowing that consistent use of a condom during sexual intercourse and having just one uninfected faithful partner can reduce the chance of getting the AIDS virus, knowing that a healthy-looking person can have the AIDS virus, and rejecting the two most common local misconceptions about AIDS transmission or prevention (transmission of the virus by mosquito bites or by supernatural means)

(6) URT.2010. TDHS;

(7) ILO. 2010. *Decent Work Country Profile Tanzania (Mainland)*.

"Livelihoods" is a term used to describe the strategies which people adopt to 'make ends meet' (the options available to them for producing food, cash crops and livestock; securing a cash income and making best use of the markets), what resources they might draw on should they wish to improve their well-being, and on which they may depend in the face of misfortune. People's livelihood strategies, and how they respond to difficulties, are closely linked to tradition, culture and the physical and institutional environment. In rural areas livelihoods are primarily based on the production of food and cash crops, but livestock are also important. Pastoralists and crop farmers have different measures of what constitutes poor rains and what constitutes a drought, and they have different responses to these hazards. Consequently regional and local agro-ecology dominates livelihood patterns in the SAGCOT. Issues such as isolation from roads and markets, proximity to large cities, irrigated plantations, or mining operations that offer substantial casual employment, local culture and government policy also influence livelihoods.

Livelihood Capital

The resources people draw on for their livelihoods are often described as 'assets'. In livelihood analysis, assets are divided into human capital, social capital, natural capital, physical capital and financial capital (Box 5.6). The diversity of and access to these assets describes a person's or household's level of vulnerability, i.e. their ability to adapt to change, and their resilience to negative events. Analysing the livelihoods of smallholder farmers in the corridor is essential to understanding their ability to mobilize and manage their assets and entitlements in times of change.

Box 5.6

Forms of Livelihood Capital

- **Human capital:** skills, knowledge/education, health and ability to work
- **Social capital:** social resources, including informal networks, membership of formalised groups and relationships of trust that facilitate co-operation
- **Natural capital:** natural resources such as land, soil, water, forests and fisheries
- **Physical capital:** basic infrastructure, such as roads, water & sanitation, schools, ICT; and producer goods, including tools and equipment
- **Financial capital:** financial resources including savings, credit, and income from employment, trade and remittances

Source: www.Eldis.org

Main Livelihood Activities

Labour is a critical asset for all individuals and households in the Corridor. It is strongly correlated with investments in human capital. A person's health status will determine their capacity to work, and the level of skills and educations they possess, will also determine the returns they are able to get from their labour. Most economic activities in the Rufiji Basin are unskilled in terms of the modern economy, but many incorporate high levels of traditional ecological knowledge.

Agriculture is the leading economic activity in the Rufiji Basin, employing between 53% and 93% of the population⁽¹⁾. Employment is also generated through miscellaneous businesses and occupations such as street vending, crafts, charcoal burning, mining, transportation, etc. Almost all occupations are directly or indirectly based on the use and exploitation of natural resources. Fishing and livestock husbandry are important in some districts including Rufiji (fishing) and Chunya, Mbarali, and Manyoni (livestock). Livelihood activities in the Kilombero Valley are described in *Box 5.7*.

Box 5.7

Livelihood Activities in the Kilombero Valley

About 80% of the population of the Kilombero Valley are engaged in agriculture as their main occupation. The majority of this group are subsistence agriculturalists, although agriculture in the area is becoming increasingly commercialised in recent years. The main cash crops are rice, maize, cocoa, sesame and sugar cane. Sugar cane is mostly produced as part of the out-growers programme for the KSC, and tends to be cultivated by wealthier households. Rice is the traditional food crop in the Kilombero valley, and maize and cassava are other common subsistence crops. Households grow a variety of fruits and vegetables for their own consumption, or to sell on the local market. The SRESA team observed papaya, potato, banana, tomato, avocado and okra for sale in the Valley. Banana was also seen being transported by lorry out of the District. Middlemen will often buy produce from Kilombero, and transport it to larger urban markets such as Dar es Salaam, and processors.

The average land holding amongst small holder farmers in the Kilombero Valley is 2 to 5 acres, of which an average of 2 acres is farmed, while the remainder is left fallow – allowing for shifting cultivation. A farm of 20 ha or more is considered 'large', and only approximately 10% of the farms are of this size. Overall, the level of mechanization in farming is very low. Fewer than 5% of farmers own their own machinery, while 60% of farmers are reported to have the means to hire machinery (estimated cost of TZS 45,000/acre). This has consequences on the timing of agricultural activities, as it takes longer to prepare the land, sow and harvest a crop by hand. The owner of rented machinery will prioritise their own use before allowing others to borrow it. Consequently, land preparation or sowing may be delayed. Similarly, a household in which labour is an important income generating activity, may prioritise working on other peoples farms for cash or kind, before working on their own land. This will impact on the yield achieved, as well as the ability of farmers to mitigate against erratic and low rainfall.

According to the 2002 Agricultural Census, agricultural households ranked annual crop farming as their most important source of income, followed by off-farm income (e.g. permanent employment, working on other farmer's farm, temporary employment), tree/forest resources, livestock, permanent crops, remittances and fishing/hunting. The livelihood strategies adopted by different individuals and households are directly related to the agro-ecological environment in which they live, their ethnic traditions and the proximity to urban centres or industrial sites.

Despite the low population density there is high pressure on some key natural resources, particularly forests (and associated wildlife) and wetlands. Unsustainable harvesting practices (whether for bush meat, fish or rare timber), water diversion for dry season irrigation, expansion of cropland, the

⁽¹⁾ WREM, 2012.

incursion of agro-pastoralists, urban demands for charcoal and the demands for fuel wood of increasing populations squeezed between protected areas and commodity crops are all affecting natural capital in the Corridor, thus influencing peoples livelihood strategies and well-being status.

In districts with surplus food production in the Rufiji Basin, surplus produce is sold to neighbouring regions and constitutes an important income source for the rural communities. In 2004/2005 the Iringa region produced about 380,000 surplus tonnes of starch foods⁽¹⁾.

The majority of Tanzanian smallholder farmers use traditional, labour intensive farming techniques, and almost all farms are rain fed with little or no mechanisation. This limits the amount of land that it is possible for a household to cultivate, and the yield that can be achieved. Recent increases in crop production have come more from crop area expansion (involving deforestation) than from a change in practices resulting in higher yields. Similarly, livestock numbers have increased, though there has been no broad-based increase in productivity⁽²⁾. Practices such as shifting cultivation and the use of seasonal fire are widely practised.

In addition, smallholder farmers' access to and use of inputs such as improved seeds and fertilizer is low (especially for women), and there are few agro-processing facilities in rural areas. As a result production is low, post-harvest losses are high and people are unable to add value to their produce. Due to poor infrastructure, and limited access to transport, many farmers in rural areas are restricted in their access to markets. Much of their produce is bought by middle-men who offer a low price, knowing that they can transport it to larger urban markets and processors where prices are higher.

Commercial Farming / Industries

Nearly all industries found in SAGCOT are agriculture-based (see *Box 5.8*). Medium to large scale industries employ a small percentage of the population but are important in adding value to and marketing agricultural produce. They are mainly found in the districts of Mufindi, Njombe, Iringa Urban, Kilombero and Kilosa and include tea processing, sugar milling, saw milling, paper milling, wooden pole and board manufacturing, pyrethrum processing, oil milling, fruit processing, wattle processing, industrial glue manufacturing and cereal milling.

Small-scale industries are more numerous and are found all over the corridor. However they are concentrated in urban areas and trading centres. The dominant small-scale industrial activities are milling/ grinding, storing and packaging foodstuffs (maize, rice, wheat, cassava, groundnuts). Other small

(1) WREM, 2012.

(2) WREM, Rufiji study

scale activities include oil presses, carpentry and wood workshops, wood carving, tailoring, hand looms, pottery and black-smith/ metal fabrications.

Various minerals are found in the Corridor, but so far exploitation is generally artisanal. There are proposals for commercial copper mines in Iringa Rural District (around Chamdidi) and uranium mines in Ulanga District⁽¹⁾.

Box 5.8

Agricultural Value Chains in the Kilombero Valley

The role of agricultural value chains in improving income and employment opportunities has received more attention over the last 10 years. In 2003, USAID initiated the DAI PESA Project, with the aim of strengthening market links, providing information, creating an enabling policy environment, strengthening associations and improving the business skills of micro-small enterprises (MSE). This was undertaken in six regions including Morogoro, where the Kilombero Valley is located. The project reported positive impacts in terms of increased income through increased sales of core (cash) crops. Kilombero already had a high number of Savings and Credit Cooperative Societies (SACCOS) before the DAI PESA project started, and therefore the increase in members was relatively low compared to other project areas. Access to credit proved easier in Kilombero because the SACCOS and associations had already established themselves for some time, and therefore had the required experience and trust⁽²⁾.

The Warehouse Receipt System was introduced in the valley in 2007 by DAI Pesa (USAID). The SRESA team visited a rice farmers association in Mbingu that had been donated a warehouse through this program. Originally a rice growers association, the committee were considering broadening the focus to include other crops. They would also use the warehouse to store crops, which were harvested at other times of the year, thus maximising its potential. The association is also considering building an additional warehouse in future, to compensate for the limited size of the existing warehouse.

Tourism

In 2009 714,000 foreign tourists entered Tanzania (cf 459,000 in 2000)⁽³⁾. The Northern Circuit and Zanzibar currently receive the majority of tourists. The Southern Circuit with Selous Game Reserve, Udzungwa Mountains, Ruaha and Mikumi National Parks attract a significant number of visitors each year but remain less important economically.

Tourism can serve as a powerful incentive to protect natural resources, as it generates many jobs and has a large multiplier effect, with revenue spreading from hotel accommodation, food and beverages, shopping, entertainment and transport to the livelihoods of hotel staff, taxi operators, shopkeepers and suppliers of goods and services.

Tourism may also have adverse effects on local communities through, for example, exclusion of residents from traditional territories, economic

(1) WREM.2012. Vol. I

(2) USAID. 2005. *Training Impact Assessment of DAI PESA Project*; USAID. 2005. *DAI PESA Project Overview*.

(3) UNdata.2010. World Statistics Pocketbook 2010. UN Statistics Division.

<http://data.un.org/CountryProfile.aspx?crName=United%20Republic%20of%20Tanzania> [Accessed 17 August 2012]

dislocation, breakdown of traditional values and environmental degradation⁽¹⁾.

With increased tourism in Tanzania in general there is likely to be an increase in numbers of tourists on the Southern Circuit, necessitating careful planning for preservation of and access to the various destinations and attractions.

5.4.4 *Education*

Literacy levels are moderate in the Rufiji Basin compared to the rest of Tanzania. The 2002 Population and Housing Census reported rates ranging from 44% to 87% in the various districts, with a mean of 60%. Education levels are also generally low: only 50%-70% of men and women aged 15-49 in the corridor had completed primary education, with men scoring only slightly higher than women - and the quality of primary education is low. Education levels in Kilombero District are discussed in *Box 5.9*.

The Annual Learning Assessment Report by Uwezo '*Are Our Children Learning?*', states that: "Large majorities of children lack the competencies they are expected to have developed. Too many children complete primary schooling unable to read and count at the Class 2 level. We find that children from some districts do much better than others; children of the better off do much better than the less well off"⁽²⁾.

Completion of secondary education is also low but varies more by region. For example, in Rukwa Region, 4% of women and 16% of men completed secondary school (lowest) compared with 18% of women and 28% of men in Iringa (highest).

Primary education is obligatory and attendance is nearly equal for boys and girls, but for secondary education attendance is generally higher for boys. Morogoro is an exception with girls outnumbering boys 1.2:1.

5.4.5 *Health*

Public health services in SAGCOT include dispensaries, health centres, clinics and hospitals, operated by regional administrations, districts and municipalities. This system is supplemented by private providers and mission hospitals and clinics.

Over the years, there has been an increase in the number of health facilities in the Rufiji Basin. This change has been modest for districts in regions such as

(1) [United Nations Environment Programme](#) (Lead Author); [Peter Saundry](#) (Topic Editor) "*Impacts of tourism and recreation in Africa*". In: *Encyclopedia of Earth*. Eds. Cutler J. Cleveland (Washington, DC. Environmental Information Coalition, National Council for Science and the Environment). [First published in the *Encyclopedia of Earth* August 25, 2008; Last revised Date August 15, 2011; Retrieved August 17, 2012

<http://www.eoearth.org/article/Impacts_of_tourism_and_recreation_in_Africa>

(2) Uwezo Tanzania. 2011. *Are Our Children Learning?* Annual Learning Assessment Report

Morogoro and Pwani, but significant for districts in Iringa region. In many of the districts, the change has not been sufficient to cope with the increase in population (see *Box 5.10*), resulting in an increase in the ratio between beds and the number of people⁽¹⁾. The number of doctors per head of population is very low; for example, from 2000 to 2006 in Morogoro region there was only one doctor per 45,185 persons.

Figure 5.19 *Education in Kilombero District*

Kilombero District has 128 Pre- Primary schools with a total number of 9,120 pupils (4,603 boys and 4,517 girls); 166 Primary Schools, of which 162 are Government owned and four under private ownership; and 41 Secondary Schools, of which 31 are Government Schools and ten are private schools. As elsewhere in Tanzania, private schools are considered to be of much higher quality than public schools. Kilombero District has a further six centres providing special education. Five are owned by the government and one is under the Roman Catholic Diocese of Mahenge. Kilombero District has three vocational training centres providing initial vocational training skills in carpentry, masonry, tailoring, welding and cooking. Total enrolment in secondary schools of boys is higher than girls, but more girls than boys attend private schools.

Schools in Kilombero, as in other areas of Tanzania, are often under-resourced. This leads, amongst other things to overcrowded classrooms, a poor learning environment in general, and a poor teaching environment for teachers. District education data also shows that there is a shortage of teachers. Truancy and drop-outs are a significant problem. These challenges are a feature at both primary and secondary school level. There is evidence, based on final primary school examination pass rates provided by the Education Department, that the quality or effectiveness of education is decreasing in the district (see table below).

Table 5.16 *Final examination STD VII passing rates in Kilombero District 2006-2010*

Year	Pupil who sat for examination	Student who passedSteigler	Students selected	Pass rate in (%)
2006	6,585	4,869	4,869	73.9%
2007	8,708	5,253	5,253	60.3%
2008	10,357	7482	7482	72.2%
2009	10,183	6,017	6,017	59.1%
2010	9,197	4,714	4,714	51.26%

Source: Education Dept.

The number of adults not considered to be illiterate in Kilombero District is about 45,013, representing 14% of the District population. Women are more likely to be illiterate than men (19,706 men and 25,307 women). Up to 2011, 9283 adults have joined in various adult education programmes, including in so-called Mukeja centres, providing fast track education for adults.

(1) WREM, Rufiji

Kilombero District's health facilities include: two hospitals (Saint Francis hospital owned by Roman Catholic Church Diocese of Mahenge and ILLOVO hospital- Owned by ILLOVO Sugar Company); four Government run health centres; and 46 Dispensaries (18 are Government owned, nine are privately owned, 11 are religious owned and eight are owned by parastatal organizations). Based on 2010 population estimates, the availability of healthcare, as a ratio of health facilities per number of people in the district, is poor (1: 8,667).

As for Tanzania as a whole, Kilombero District has a serious shortage of appropriately qualified health staff. The number of health staff in 2010/2011 covered only approximately 40% of the necessary staff. The District counted only 1 medical doctor in 2010/2011. Kilombero District has a ratio of approximately one doctor per 30,000 people.

Health and nutrition status in the corridor is poor, with 30% to 50% of children showing signs of stunting (height for age, the indicator for long term poor nutrition), depending on the region. The 2010 Tanzania Demographic and Health Study (TDHS) reported that nearly 50% of rural populations only eat two meals per day. The large majority of rural populations cannot afford to eat meat on a regular basis⁽¹⁾. Droughts are the challenge to livelihoods most often reported by households in rural Tanzania. Between 85% and 100% of the regions in the corridor had experienced a drought in the last year, and at least one drought in the last 5 years. Morogoro and Mbeya have experienced more droughts than other regions in the corridor, while Ruvuma is least vulnerable to droughts⁽²⁾. A 2009/10 comprehensive food security and vulnerability analysis by the WFP indicated that between 80% and 90% of Tanzanian households had experienced income and/or food loss during droughts.

Malaria is the leading cause of morbidity and mortality in all districts in the Rufiji Basin.

HIV prevalence in Tanzania is 5.7%, with the three worst-affected districts being located in the corridor: Iringa (16%), and Dar es Salaam and Morogoro (9% each). Conditions in the Kilombero Valley are described in *Box 5.11*.

HIV prevalence is higher among women than men in both urban and rural areas, and urban residents are almost twice as likely as rural residents to be HIV positive. This is due to a combination of a more transient population in urban areas, increased levels of prostitution and transactional sex, and the difficulty that women experience in negotiating safe sexual practices with their partners.

(1) URT. 2011. TDHS 2010

(2) WFP. 2010. United Republic of Tanzania - Comprehensive Food Security and Vulnerability Analysis.

Certain areas of the Kilombero Valley have been hard hit by HIV-AIDS. Mobility is one factor contributing to the increased risk of HIV infection. The concentration of male migrants isolated from their families, increases the demand for commercial sex. Kilombero attracts traders, migrant farmers, casual/seasonal labourers and truck drivers, all of whom are at a higher risk of HIV infection, and of contributing to its spread. Their comparative 'wealth' enables them to pay for sex, and also makes them a target for transactional sex. Many of the seasonal casual labourers recruited to work in sugar cane plantations come from areas of Tanzania which have a higher HIV/AIDS rate than Kilombero, such as Mbeya and Iringa, which increases the likelihood that they are infected. The direction of infection is not only from mobile men to local women. Culturally, it is difficult for women to negotiate safe sexual practices with their partners. Unprotected sex with multiple partners, increases the risk of HIV infection in both directions. It has been found that among farm and plantation workers in Iringa and Morogoro HIV prevalence was about 30%, compared to the general population which had an average of 7% . Given the importance of the agricultural sector in general and the heavy reliance of the rural poor on agricultural-related livelihoods in particular, the potential impacts of HIV/AIDS on agricultural production and the labour force are of great concern.

Various sources, including GoT overview of HIV infection in the country, GoT health data and Southern Highlands Senility Organization (SHISO)

Less than 10% of rural households have an improved toilet or latrine. The majority use pit latrines without a slab, or simply an open pit. More than 15% have no facility at all⁽¹⁾ . There are no specific cultural sensitivities with regard to sanitation in the Rufiji Basin, with the exception of the Maasai, where fathers and daughters cannot share the same sanitation facility. The main sources of drinking water in rural areas (shallow wells and springs) are more vulnerable to faecal contamination than boreholes, especially if poorly constructed. The high prevalence of sanitation-related diseases also suggests poor hygiene in homes ⁽²⁾.

Less than 50% of rural households in the corridor have an improved source of drinking water. Roughly half of rural water supplies are unprotected wells, while the other half are sourced from surface water. For 50% of the rural population in the corridor, it takes more than 30 minutes (round trip) to collect water each day⁽³⁾.

5.4.6

Finance and Savings

Access to credit is very limited in the agriculture sector in Tanzania. Formal micro-credit institutions are often based in the larger towns and not easily accessible for smallholders in more rural areas.

In many communities, village community banks (VICOBAs) or savings and credit cooperative (SACCOs) have been established (see *Table 5.16*). Members can take short-term loans at low interest rates, after paying a weekly or

(1) URT.2011. TDHS 2010

(2) WREM. Rufiji

(3) URT. 2011. TDHS

monthly contribution or by paying a membership fee up front. These savings structures are considered an invaluable safeguard against unexpected illness, accident or family death. However, most rural SACCOS are very small, weak and lacking in full-time staff and administrative capacity, and they are of questionable sustainability. The requirement of a first time deposit to become a member, and/or the need for collateral make it difficult to access micro-credit in general, especially for women.

Table 5.17 *Active SACCOS in Kilombero District, 2009*

No. of SACCOS	Total membership	Total funds SACCOS A/C		Total loaned to members
		Shares	Savings	
84	11,357	376,964,000	551,458,000	3,826,577,000

Source: Cooperative Office

The Warehouse Receipt System (WRS) has been promoted in Tanzania since 2005⁽¹⁾, with varied success. In WRS, produce is stored in warehouses and used as collateral for financing from formal financial institutions. This allows farmers to pay back debts accrued between harvest seasons while safely storing their harvests until market prices are most competitive, rather than being forced to sell their produce immediately in order to repay debts. Where problems have been encountered, these often relate to members' misunderstanding of ownership, or poor management. WRS has been most successful when associated with cash crops such as coffee and cashews⁽²⁾, ⁽³⁾. The positive outcomes of WRS are that it curtails cheating on weights and measures, eases access to finance at all levels in the marketing chain, moderates seasonal price variability and promote instruments to mitigate price risks.

Some ethnic groups in Tanzania have never traditionally kept livestock. However, amongst those who do they perform a very important role in terms of both culture and livelihoods. Cattle, in particular, are considered a traditional form of 'bank' or 'savings' by the Maasai, Barabaig and Wasukuma. The more cattle a person owns, the wealthier they are and are considered to be. This is reflected in the system of 'bride price' practised by many ethnic groups, where the prospective husband's family are expected to pay in livestock for the hand of the bride. Also, many Tanzanian farmers will invest in livestock first, if their income increases.

5.4.7 *Social Capital, Community Dynamics, Power and Decision-making*

Social capital describes the levels of social organization, such as networks, norms and social trust that facilitate coordination and cooperation for mutual

(1) UNCTAD. 2009. Review of Warehouse Receipt System and Inventory Credit Initiatives in Eastern and Southern Africa
 (2) UNCTAD. 2009. Review of Warehouse Receipt System and Inventory Credit Initiatives in Eastern and Southern Africa
 (3) USAID. 2011. Survey and Mapping of Grain Storage Facilities in Tanzania

benefit within a household, or a community. At community level for example, cohesion, shared community assets, solidarity, conflict resolution, community governance and decision making are important indicators for the level of social capital in a community⁽¹⁾.

Community-level social relations are of great importance in Tanzania. Inclusion in community groups such as churches, mosques, the village burial society, women's groups or a political party are important measures of social inclusion. Generally the higher the level of inclusion in community social networks, the better a person's livelihood outcomes are. Research has shown that purely economic associations such as cooperatives and rotating credit groups are considered much less important⁽²⁾. Communities' links to the outside, such as at the district or regional level, are often weaker, as are relations with private sector actors. There are relatively few farmer associations in Tanzania, and formal representation of farmers in wider fora is limited.

Access to Resources and Household-Level Decision-making

Tanzania's rural services and infrastructure are very poor. Access to quality inputs (improved seeds, fertilizer, pesticides), credit and extension services are often challenging in many rural Tanzanian areas, including the Southern Corridor. Crop farming is generally rain-fed, and mechanisation limited.

Rural women in general have less access to and control over such economic and productive resources than men. Women's participation in decision-making processes that affect them is often low at all levels. Many laws, and especially customary practices, are discriminatory against women. Moreover, men have more access to and control over agricultural income (a consideration in relation to compensation for lost property such as farmland). Women tend to be dependent on their own non-farm activities for income. Women often are dependent on their husband for permission to access medical care, and continue to be more likely than men to be poor and illiterate and to be subject to gender-based violence. Some cultural groups, especially pastoralists, maintain extreme forms of gender inequality.

Social Conflict - (Agro)-Pastoralists in the Southern Corridor

Social relations between newcomers and rural populations are often complicated, especially where the new populations are pastoralists. In-migration by livestock herders into some areas (e.g. Ihefu – Usangu, Mbeya region and Kilosa, Kilombero and Ulanga districts (see *Box 5.11*), Morogoro Region) has had adverse impacts on social relations in these areas, and resulted in (sometimes violent) conflicts over resource use (land, water, grazing) between the newcomers and the local population. In 2006, in the

(1) Krishna, A. & E. Shrader. 1999. *Social Capital Assessment Tool*. World Bank.

(2) Narayan, D. and Pritchett, L. 1997. *Cents and Sociability. Household Income in Rural Tanzania*.

largest eviction of its kind in Tanzania, large numbers of herders were evicted from Ihefu-Usangu (Mbarali Cluster, Mbeya Region), although many of these pastoralists had lived in the area since the 1970s (Walsh, 2012). Many of the evicted people were resettled in Lindi Region. However many others moved south into the Kilombero valley, especially Wasukuma agro-pastoralists. The government was poorly prepared to execute the eviction process and it was associated with negative social and economic impacts on pastoralist communities, including human rights abuses⁽¹⁾, ⁽²⁾. Another well documented example is Kilosa, where violent conflict between the local population and Maasai took place in 2000. Many Maasai have started to adopt agro-pastoralist activities, although their techniques are often rudimentary⁽³⁾.

Pastoralists are often perceived as causing environmental degradation. Traditional migration patterns and free range grazing practices can put them at odds with sedentary farmers, when livestock get into fields and damage crops before they are harvested. Similarly, the increased coverage of wildlife reserves and protected areas which exclude livestock and other natural resource use, increase pressure on existing grazing. However, crop-farming, and in the context of Ihefu, rice growing in particular, and poor planning and management of hydropower reservoirs can have a greater impact on the environment than pastoralists (Walsh, 2012). More often than not it is the difference in culture, and nomadic people's ability to engage with services and the democratic processes of decision making at all levels, which impacts most on resource use and management through lack of dialogue and misconceptions and misunderstanding. Across the globe, there have been very few examples where nomadic peoples have been engaged successfully in the process of managing the resources on which they depend.

(1) PINGOs and Hakiardhi. 2007. *Report on eviction and resettlement of pastoralists from Ihefu and Usangu – Mbarali Districts to Kilwa and Lindi Districts*.

(2) Oxfam. <http://www.oxfam.org/en/programs/development/tanzania-campaigning-save-pastoralists-livelihoods> [accessed 10 August 2012]

(3) REPOA. 2003. *Poverty and Changing Livelihoods of Migrant Maasai Pastoralists in Morogoro and Kilosa Districts, Tanzania*. p29

Box 5.11 *Pastoralism in the Kilombero Valley*

Pastoralism has traditionally not been practiced in the Kilombero valley, and the first to practice this activity arrived in the valley in the 1970s. However, in the last decade the numbers of pastoralist and agro-pastoralist groups in the valley have increased. The in-migration of livestock herders has been most noticeable since 2006, with an influx of thousands of cattle and other livestock. It is reported that the pastoralists come from as far away as the Shinyanga, Arusha and Manyara regions.

The large majority are Sukuma (agro-pastoralists), many of whom arrived after they were evicted from Ihefu in 2006. Others include the Maasai and Barabaig. A total of 557 pastoralist households are currently registered in the district, with a greater but unknown number of unregistered households. Some of the pastoralists practice transhumance, in which they keep their animals in the area only in the dry season, whilst agro-pastoralists remain all year round and have farms in the valley. Today the valley supports a total of about 52,000 animals, comprising cattle, goats and sheep.

The arrival of migrant pastoralists within the Kilombero Valley has caused social upheaval due to the introduction of a new culture and a new way of life. Among the local longer term residents there is often a dislike of cattle, and farmers generally do not invest in cattle even if they have the means to do so. Usage of water points and resources is often a particular cause of conflict. The pastoralists have moved into previously uninhabited areas, and their presence is associated with increasing pressures from deforestation, all of which result in changes to the local ecosystem and to the services it provides. There has been persistent conflict between farmers and pastoralists over land use in the area, with overlap in areas suitable for both activities and limited land availability overall. Expansion for both activities within the Kidatu and Mang'ula divisions will not be possible as the two wards are surrounded by a number of protected areas and plantations.

Following a government directive, an ongoing process is being carried out at a district level to establish the carrying capacity of land in the valley, and to remove livestock where numbers exceed this capacity. Where carrying capacity is exceeded, registered pastoralists are being ordered to reduce the number of their cattle and contain their livestock within allocated areas, while unregistered pastoralists are being evicted. At the time of writing this report, an official deadline of 1st August 2012 had been announced for reduction in the numbers of cattle in Kilombero and Ulunga Districts, followed by a series of grace periods. Under this process unregistered cattle (i.e. cattle that have not been officially branded) will either have to be sold, culled or moved out of the districts. The number of cattle allowed to stay has been calculated based on the carrying capacity of available grazing. Pastoralists with unregistered cattle are to be 'encouraged' to move out of the districts, if necessary by force. However, it appears that no plan has been put in place to facilitate the process, nor has any alternative location been identified for the families to move to.

5.4.8 *Migration*

As discussed earlier in this chapter, the eviction of (agro)pastoralists from Ihefu – Usangu, Mbeya Region and the recent in-migration of (agro)pastoralists to different areas in Morogoro Region have led to conflict with crop-farmers and the government.

At the same time there is a major shift in population towards urban centres. Most rural to urban migrants are younger people, active in both production and reproduction ⁽¹⁾. Rural-to-urban and urban-to-urban mobility are both

(1) Muzzini, E. and Lindeboom, W. 2008. *The urban transition in Tanzania. Building the Empirical Base for Policy Dialogue*. REPOA.

important forces driving migration at the regional level. A breakdown of migratory flows by origin and destination shows that urban-to-urban (49%) and rural-to-urban (51%) mobility are equally important.

5.4.9

Land Issues

Perceptions of the transparency of decisions concerning land and land use will be an important factor affecting success of the Programme. Tanzania is an agricultural country and land is the fundamental resource - not only for cultivation: other key uses are grazing and fuelwood collection. Land governance in Tanzania is exhaustively analysed in numerous documents (see e.g. Deininger *et al.*, 2012), with key features being a strong movement for reform hampered by limited implementation and many ambiguities, resulting in a complex, slow process of formalisation, little certainty of tenure for marginalised groups and limited transferability of land. There is significant public concern over what is perceived to be "land grabbing" by investors and an increasingly vocal civil society willing to speak out on land issues.

Land Tenure and Gender

Customary practices that restrict a woman's property rights are still widespread, but steps are being taken to improve the relevant legislation. The 1999 Land Act gives Tanzanian women the right to obtain access to land, including the right to own, use and sell it, and mandates joint titling of land. The Village Land Act requires women to be represented on land allocation committees and land administration councils ⁽¹⁾. Nevertheless, the National Land Policy (1995) stipulates that inheritance of clan (tribal) land will continue to be governed by custom and tradition provided it is not contrary to the Constitution.

In most patrilineal communities (80% of ethnic groups) men control land and women are sometimes allocated small plots for subsistence farming. Men are generally considered to be the natural heads of household and rightful heirs to clan land, but inheritance customs vary for different groups. In general, in patrilineal communities, widows are entrusted with the land they cultivate or on which they live only until their children become adults or until they re-marry. In all tribes the role of the clan council or council of elders in handling inheritance issues is strong. Members of both customary and statutory institutions that adjudicate land disputes mainly tend to be men; women are under-represented⁽²⁾.

Village land councils, which settle land disputes, comprise seven members, of whom three must be female (Ik Dahl, 2008)⁽³⁾.

(1)FAO: *Women, agriculture and rural development*

(2)FAO: Gender and Land Rights database

(3) FAO. 2011. *The State of Food and Agriculture 2010-2011*. Rome

6 STAKEHOLDER CONCERNS

6.1 INTRODUCTION

This chapter summarises the key concerns arising from stakeholder consultation, mostly during the study's scoping phase. A full list of meetings held and participants is given in *Annex B*.

6.2 KEY STAKEHOLDERS

Key stakeholders and stakeholder categories are listed in *Table 6.1*. Note that the list is not exhaustive: there are many other organisations with an interest in the SAGCOT Programme.

Table 6.1 *Key Project Stakeholders and Stakeholder Categories*

Category & Principal Stakeholders	
Communities	
Indigenous groups	Traders
Pastoralists and agro-pastoralists	Vulnerable and marginalised groups
Small farmers	Women
Government	
Prime Minister's Office – RALG	Ministry of Livestock and Fisheries Development
Vice President's Office – Division of Environment	Ministry of Natural Resources and Tourism
Ministry of Agriculture, Food Security and Cooperatives	Ministry of Water
Ministry of Lands, Housing and Human Settlements Development	
Specialised Government Agencies/Parastatals	
NEMC	TANESCO
NLUPC	TANROADS
RBWB & other Basin Boards	Tanzania Port Authority
Rural Energy Authority	TAZARA
RUBADA	TIC
TANAPA	
Regional/Local Authorities	
Dar es Salaam	Kilombero District
Iringa Region	Kilosa District
Katavi Region	Ludewa District
Mbeya Region	Mbarali District
Morogoro Region	Mpanda District
Njombe Region	Mufundi District
Rukwa Region	Rufiji District
Bagamoyo District	Sumbawanga District
Kibaha District	Ulanga District
Kilolo District	

Category & Principal Stakeholders	
Universities	
Ardhi University	University of Dar es Salaam
Sokoine Agricultural University	
Relevant NGOs & Labour Organisations	
Action Aid	PINGO
ANSAF	Rainforest Alliance
AWF	REPOA
Concern Tanzania	SNV
Frontier	TAGRODE
Foundation for Civil Society	TAWLAE
Hakiardhi	TechnoServe
IUCN	TFCG
MVIWATA	TNRF
Oxfam	Tanzania Plantation & Agricultural Workers Union
Politicians	
Parliamentary Committee on Agriculture	Councillors
Members of Parliament in the SAGCOT area	
Private Sector Companies and Producer Organisations	
ACT	Syngenta
AgDevCo	TAHA
Bakhresa	TAP
BEST-AC	TARIPA
EcoEnergy	TPSF
Katani	Unilever
KPL	Wild Footprints
KSC	Wild Things Safaris
KVTC	Yara
SAGCOT Centre	
International Funding / Development Agencies	
African Development Bank	NORAD
BTC	USAID
DFID	World Bank
EU	
Local Financial Institutions	
BoT	Stanbic Bank
National Microfinance Bank	

6.3 KEY ISSUES OF CONCERN

The following thirteen points summarise key issues of concern, as raised by informants during scoping (Table 6.2).

Table 6.2 Key Issues of Concern raised by Informants

	Topic	Comment
1	Awareness	Most stakeholders have low levels of awareness of the SAGCOT Programme and are interested in learning more about the proposals, and especially about the following issues.
2	Benefits to small scale farmers	Both local communities and NGOs want to know how the Programme will benefit smallholders, especially their capacity (both technical and financial) and skills. There are also questions as to the market competitiveness of smallholders if faced with large commercial growers, and when the programme will be implemented.
3	Land for investment	The main concern was land availability without affecting smallholders and also other land users, who may not have formal titles. Another major issue was how will the Programme deal with existing land use conflicts, especially those between farmers and herders?
4	Water	Concerns included water availability, especially in the Kilombero Valley; impacts on downstream users; impacts on fisheries; and pollution by agrochemicals.
5	Wildlife	Concerns focused on further impacts on wildlife corridors for large mammals; impacts on other wildlife and on fisheries; and ineffective mitigation due to the weakness of institutions likely to be involved.
6	Infrastructure development	Farmers, both large and small, want to know if the Programme will include infrastructure development, especially roads, the railway and storage facilities, since these are major constraints to agricultural development.
7	Finance	Informants want to know who will fund the initiative and how will the funds be managed, given that it is a cross-sectoral Programme. Also, if the Programme does not succeed, who will pay back the loan?
8	Credit	Small farmers want to know how access to credit can be improved.
9	Alternatives	Some stakeholders wanted to know if they have a chance to influence the Programme's design, e.g. by limiting investors to value addition whilst retaining all crop and livestock production in the hands of smallholders?
10	Institutional arrangements	Given that the SAGCOT Programme is cross-sectoral, which central ministry of local government department will have authority to oversee implementation?
11	In-migration	There is concern that the Programme will encourage in-migration, which is already a problem in areas such as Mangula.
12	Tourism	There is concern about the Programme's effects on tourism on the Southern Circuit as a result of further impacts on key remaining wildlife corridors, especially those between the Selous Game Reserve, Mikumi National Park and Udzungwa National Park.
13	Cumulative effects	This concern related to (i) occupational health issues as a result of use of and exposure to pesticides, and (ii) the sustainability of farming if methods are inappropriate.

Building on *Table 6.2*, the following table (*Table 6.3*) highlights major issues of concern in relation to the SAGCOT Programme as a whole, under the four headings physical, biological, social, and policy and administration, as a guide

to study completion. The list is a summary derived from numerous sources including the existing published and grey literature, key informant interviews with SAGCOT stakeholders and cluster officials and communities, and scoping carried out by the SRESA study team in May and June 2012.

The key issues relate to (i) water, (ii) land, (iii) biodiversity and (iv) social acceptability, together with all the associated governance issues such as land use planning and institutional capacity, and in the context of climate change. The proposed solutions noted in the table are generic, but it is clear that most involve significant changes to policies, institutional reform and change, and political leadership. Further details of the proposed mitigation and enhancement measures are provided later in this report.

Table 6.3 *SAGCOT: Key Environmental and Social Issues and Risks*

Topic	Issue or Risk	Possible Solution
<i>Physical</i>		
<i>Water availability / timing</i>	<ul style="list-style-type: none"> • Absolute water availability for dry season irrigation. 	Irrigation investments must be science-based; in the absence of adequate data this requires high standards of professional hydrological judgment.
	<ul style="list-style-type: none"> • Effects of upstream abstraction and consumptive use on downstream needs and users. 	Integrated water resources management (IWRM) including application of environmental flow procedures and strict water allocation mechanisms; needs time, skills and resources, as well as political leadership.
<i>Climate change</i>	<ul style="list-style-type: none"> • Effects of climate change on absolute water availability and timing. 	IWRM integrated with regional climate change modelling to predict and manage hydrological changes using precautionary principles.
	<ul style="list-style-type: none"> • Effects of climate change on rainfed agriculture, especially (a) increased temperatures and evapotranspiration, and (b) increased rainfall variability. 	Greatly strengthen agricultural research and extension systems
	<ul style="list-style-type: none"> • Effects of climate change on pests and diseases. 	As above
<i>Soil</i>	<ul style="list-style-type: none"> • Management of difficult soils, especially black cotton soils, (a) to avoid erosion, (b) to avoid waterlogging and salinisation, and (c) to maintain pH and organic matter in acceptable range. 	(a) ensure investors are fully aware of soil conditions and constraints and/or target investors away from sensitive soils, (b) establish and enforce a system of "Environmental Farm Plans" or similar.

Topic	Issue or Risk	Possible Solution
	<ul style="list-style-type: none"> Erosion from poorly designed / constructed / maintained infrastructure, especially roads / road drainage. 	(a) design roads using best practice, (b) supervise construction, (c) change maintenance methods and enhance maintenance capacity.
Biological		
<i>Habitats (also affects protected areas)</i>	<ul style="list-style-type: none"> Irreversible habitat loss and fragmentation due to conversion to other land uses, especially agriculture. Accelerated habitat degradation due to SAGCOT-related population in-migration and expansion 	<p>Regional, district and village land-use planning to ensure sensitive and high value habitat areas are not targeted for investment.</p> <p>Change in lifestyle of new populations away from natural resource-based subsistence, especially provision of affordable alternatives to wood for cooking - or mandatory growth of fuel wood on proportion of investor's land.</p>
<i>Biodiversity</i>	<ul style="list-style-type: none"> Loss of biodiversity including local extinctions of rare, protected and charismatic wildlife due to (a) habitat degradation, fragmentation and loss (above), and (b) increased hunting and fishing pressure due to population in-migration and expansion. Blocking of wildlife corridors with (a) long-term effects on species survival due to genetic isolation, and (b) increased human-wildlife conflicts in short and medium term. 	<p>(a) regional, district and village land-use planning to ensure sensitive and high value habitat areas are not targeted for investment, (b) target investors away from sensitive and valuable ecosystems, (c) improved participatory natural resource management, (d) improved protection and enforcement.</p> <p>(a) plan investments in full knowledge of importance of corridors, (b) make corridor restoration a condition of investment.</p>
<i>Agro-biodiversity</i>	<ul style="list-style-type: none"> Loss of crop agrobiodiversity due to displacement of land races by improved varieties. Possible impacts of GMOs, both ecological and economic (e.g. loss of organic certification). 	<p>(a) strengthen agricultural research system, (b) create capacity and systems for <i>in situ</i> and <i>ex situ</i> agrobiodiversity conservation.</p> <p>Maintain precautionary ban on GMOs unless/until the evidence for their long-term social and economic benefits and lack of ecological risks becomes overwhelming.</p>

Topic	Issue or Risk	Possible Solution
<i>Pollution</i>	<ul style="list-style-type: none"> • Ecological impacts of agrochemicals, especially persistent pesticides, on ecosystems and food webs; major concerns are (a) the use of toxic formulations by unskilled workers (including occupational health hazards), (b) bio-magnification up food chains, (c) impacts on water quality and aquatic ecosystems, especially of chemicals used in monoculture rice, and (d) increased availability of pesticides for illegal uses in hunting and fishing. • Pollution from agro-industrial facilities, especially to the water environment. 	<p>Follow the IPM programme developed for the ASDP.</p> <p>Ensure all proposed agro-industrial facilities are subject to appropriate planning controls including EIA, and enforce any environmental conditionality attached to development and operation permits.</p>
<i>Social</i>		
<i>Land</i>	<ul style="list-style-type: none"> • Availability of land: there is limited knowledge at any level of the actual availability of land (precise location, suitability) due to lack of land use planning and/or surveys. • Real or perceived "land grabbing" by Tanzanian and/or foreign investors, i.e. take-over of large tracts of land (and/or water rights) for little or no real or perceived short or long-term benefits to local communities. • Displacement of legal or informal land users with inadequate compensation and/or practical resettlement planning and implementation. 	<p>(a) soil and land suitability surveys, taking into account current and predicted physical conditions; (b) coordinated land use planning and zoning, taking into account issues transcending village and district boundaries (e.g. herders, wildlife).</p> <p>Development through consultation with investors, implementing agencies, local communities and civil society of standard operating procedures (SOPs) for land investors, including transparent decision-making mechanisms and standardized forms of agreement and benefit sharing.</p> <p>As part of individual project planning, ensure that all compensation and resettlement issues are thoroughly investigated and solutions planned and implemented according to the agreed SOPs (see above).</p>

Topic	Issue or Risk	Possible Solution
<i>Local communities</i>	<ul style="list-style-type: none"> • Real or perceived inadequate compensation and/or benefits to local residents as a result of lopsided / inequitable negotiation processes. • Corruption of local administrations / councils by inducements offered by investors or their agents. 	<p>(a) see above, (b) as part of the SOPs, ensure technical and administrative support for villages and communities when they are negotiating.</p> <p>Agree and implement transparent SOPs for all negotiations and decision-making.</p>
<i>Smallholders</i>	<ul style="list-style-type: none"> • Limited security of tenure and limited rights and negotiating power concerning land use planning and land transfer. • Lack of inclusion of smallholders in value chains due to lack of agreed mechanisms tied to specific investments / investors. 	<p>Simplify law and enhance property rights for individuals; improve land use planning processes at village level; ensure small farmers' rights are respected in land use decisions.</p> <p>Agree and implement SOPs (see above).</p>
<i>Gender</i>	<ul style="list-style-type: none"> • Lack of inclusion in negotiation and decision-making processes resulting in little or no consideration of gender issues. 	<p>Ensure the SOPs mandate inclusion of women in the negotiation and decision-making mechanisms.</p>
<i>Pastoralism</i>	<ul style="list-style-type: none"> • Marginalisation of livestock herders in most policy and decision-making fora • Increased pastoralist/crop farmer conflicts if pastoralists are displaced or removed from land to facilitate agricultural investments. 	<p>Recognition of livestock as a major economic and cultural sector, including respect for the rights of pastoralists and their inclusion in decision-making mechanisms.</p> <p>Include pastoralists and agro-pastoralists in the land use planning processes which must precede accelerated agricultural investment</p>
<i>Food security</i>	<ul style="list-style-type: none"> • Decreased local or regional food security if non-food commercial crops displace food crops. 	<p>(a) improve infrastructure and remove constraints (e.g. roadblocks) to facilitate inter-regional transfer of food, (b) strategic monitoring of food security changes.</p>
<i>Health and safety</i>	<ul style="list-style-type: none"> • Increased hazards to rural workforce and communities from (a) pesticides, (b) mechanization (if untrained), and (c) work in agro-industries (if unregulated) 	<p>(a) follow the IPM programme developed for the ASDP (b) provide skills training to farmers and agricultural workers, (c) regulate agro-industry conditions</p>

Topic	Issue or Risk	Possible Solution
<i>Policy and administration</i>		
<i>Institutional</i>	<ul style="list-style-type: none"> • Failure to achieve SAGCOT goals due to lack of agreed standard operating practices (SOPs), e.g. standardised agreements with local communities. • Failure to achieve SAGCOT goals due to lack of mechanisms and/or institutional capacity to implement the SOPs. • Failure to achieve SAGCOT goals due to lack of effective monitoring and enforcement mechanisms. • Investor fatigue due to, e.g., (a) lack of a land bank, (b) over-complex and time-consuming administrative procedures (it may take 6-10 years to acquire land and resolve compensation issues), (c) real or perceived government inability to resolve value chain constraints such as port and railway capacity. • Distortion of decision-making and capture of benefits by elites due to non-transparent structural features of the SAGCOT programme such as automatic allocation of equity in investments to government organizations at various levels. • Potential conflict of interest in implementation mechanisms, such as RUBADA. • Reputational risks to GoT and donors in relation to (a) perceived land grabbing, and (b) accelerated degradation and destruction of natural resources such as wetlands. 	<p>Develop and implement SOPs.</p> <p>Design and implement a major institutional capacity development programme to implement the SAGCOT SOPs.</p> <p>Include a significant M&E component in the institutional development programme</p> <p>(a) revisit the land bank issue and design and implement a workable land bank system, (b) remove redundant and conflicting regulations and administrative procedures, clarify policies and develop a "one-stop" shop approach for investors, (c) reassure investors by taking serious, tangible steps towards removal of constraints.</p> <p>Revision of the SAGCOT implementing procedures and mechanisms to ensure transparency and avoid conflicts of interest.</p> <p>See above.</p> <p>(a) participatory development of transparent SOPs for SAGCOT implementation, (b) implementation of the SOPs under independent scrutiny.</p>

7.1 INTRODUCTION

This chapter summarises the findings of three agricultural change scenarios in the Kilombero Valley, which spans Kilombero District and the northern part of Ulanga District. The scenarios illustrate how the agricultural situation in the Valley might change over a 20-year timeframe (2010-2030) under different sets of assumptions. These projections are then used in order to predict and compare environmental and social impacts (*Section 8*). Three scenarios were developed:

- Scenario 1: Without the SAGCOT Programme (the "no-SAGCOT programme" situation);
- Scenario 2: Accelerated Investment (the "with SAGCOT Programme" situation); and
- Scenario 3: Green Growth (accelerated investment with environmental and social conditionality).

The scenario structure and assumptions are given below. Note: Scenarios 1 and 2 were both developed as spreadsheets, giving quantitative predictions. The model is described further in Annex D. Scenario 3 is qualitative.

Scenario 1 presents a view of development that would be expected to occur in the area within the 20 year timeframe if the SAGCOT Programme was not to take place. Under this scenario no high input investor initiatives were considered, but 'normal development', initiated by both the Government of Tanzania and its development partners, is assumed to take place. Two sets of assumptions were considered, resulting in two differing projections, as follows:

- Scenario 1A provides a projection based on the existing baseline taking into account anticipated population growth.
- Scenario 1B considers the additional population growth that may occur in the future due to in-migration, encouraged in part by existing investment plans for the valley.

Scenario 2 takes into account the likely effects of high level investments described in the SAGCOT Blueprint, including investment in both irrigated lands and processing capacity, together with the facilitation of various inputs such as seeds, financial services and business promotion.

Scenario 3 considers accelerated agricultural development planned and managed according to the principles of sustainability, i.e. with the environmentally and socially responsible approaches referred to in the

SAGCOT Blueprint, but which at present are not a binding condition for those investments.

7.2

CONTEXT

Current understanding of the availability and use of agricultural land in the Kilombero Valley is fairly limited. Available data are assembled in Table 7.1. The district profile for Kilombero indicates that it has a large area of arable land, and that there is also land available for future large-scale agricultural development. However, the recent report for a study on land tenure and administration (Tenga & Kironde, 2012) indicates that this is not the case:

“it is often said that there is a large amount of land available for agricultural development. In reality, this is not true. Although there are significant areas of unused and underused land in the Southern Corridor, the assumption that this is available for immediate development may not be correct. Most of the high potential areas have been developed, and many of the areas with less potential require major infrastructure investment if they are to become commercially competitive. Also, many areas of high agricultural potential, especially around wetlands, are also important for biodiversity.”

Table 7.1 *Land Use in Kilombero Valley*

Land Use / Type	Kilombero District	Ulanga District	Total	Source of Info
Total area	14,918 km ²	24,560 km ²	39,478 km ²	District Profiles
Kilombero floodplain			~ 7,000 km ²	Ramsar Info Sheet
Ramsar site			796,735 ha	Ramsar Info Sheet
GCA			6,500 km ²	Haule et al. 2002
Hunting concessions				
• Kilombero S. GCA		2,478 km ²		District Profile
• "Open Areas"		3,814 km ²		District Profile
National Park				
WMA				
"Residential area"	~ 5,786.65 km ²			
Arable	~ 4,458.96 km ²			District Profile
Land under selected crops	756.59 km ²	566.06 km ²	1,322.65 km ²	District Profiles
	(2008-9)			
Grazing	~ 1,200.00 km ²			District Profile
• Actually used for grazing	900 km ²			District Profile
• Tsetse infested	100.00 km ²			District Profile
Water bodies & wetland	~ 1,076.26 km ²			District Profile
Forest				
• Natural forest	~ 1,250.00 km ²	18,420.00 km ²	~ 19,670 km ²	District Profile

Land Use / Type	Kilombero District	Ulanga District	Total	Source of Info
• "Reserved forest"	~ 1,079.15 km ²			District Profile
• Forest Reserves	1,913.30 km ²	7,890 ha	1,992.2 km ²	District Profiles
• Planted forest	6,698 ha			District Profile
• KVTC land	1,434 ha	57,227 "acres"		District Profiles
• Village Forest Reserve		234.85 km ²		District Profile
KPL area (rainfed)	5,818 ha			District Profile
KCY area	180 ha			District Profile
KSC area (all irrigable)	15,021 ha			Kilombero Rice CIP 2011
Land with potential for irrigation	35,238 ha 31,574 ha			District Profile Kilombero Rice CIP 2011 (p2-3, p96)
	or			
	16,924 ha 69,361 ha	8,100 ha	774.61 km ²	Background on Irr. Schemes (from SAGCOT Centre)
Land actually irrigated	9,532 ha			District Profile
• by KSC	8,615 ha			District Profile
• by farmers	665 ha			District Profile
RUBADA irrigation development by 2010-2011	8,200 ha			District Profile
TZ Sugar Board: Ruipa River sugar - "to be developed"	7,000 ha			District Profile
Land planned for irrigation under DADPs		9,470 ha		District Profile
Possible USAID-supported irrigation schemes	43,303 ha			Draft RFP for USAID EA of schemes
Land Bank for investment (Ruipa River + Ngalimila) "Area already invested"	13,923 ha			District Profile
• Syngen	12 ha			District Profile
• Merera Pantation	10,000 ha			District Profile
• KPL	5,818 ha			District Profile

Land Use / Type	Kilombero District	Ulanga District	Total	Source of Info
Surveyed/unsurveyed potential for Agric. Investment	164,459 ha	58,077 ha	2,225.36 km ²	MAFC LUP 2007 quoted in MAFC <i>Investment Opportunities in Agriculture (Crop Sub-Sector)</i> Jan. 2009

Analysis of the existing village land use plans (VLUPs) for Kilombero District, in which little land is reserved for investors, confirms this assessment. The situation in the lowland area of Ulanga District south of the river is similar: VLUPs are a work in progress and there is no clear information on the availability of land.

Land in the valley is heavily utilised, livestock numbers are very high and all available land is grazed. The designation of the floodplain and surrounding areas as a Game Controlled Area, and also as a Ramsar Site, has seemingly had very little deterrent effect on encroachment (*Table 7.2*).

Table 7.2 *Land Use in Kilombero Game Controlled Area, 2009*

Land Use Type	Area (km ²)	Proportion of GCA (%)
<i>Compatible with GCA</i>		
Village areas with Puku sightings (proposed for WMAs)	1,890	27.3
Grazing land	739	10.7
Wetland	307	4.4
Village forest	117	1.7
Grazing land and forest	20	0.3
Water dams (reservoirs)	1	0.01
sub-total	3,074	49.6
<i>Incompatible with GCA</i>		
Cultivation	2,088	30.2
Settlement and cultivation	709	10.3
Settlement	530	7.7
Forest reserve	312	4.5
Institutional areas	109	1.6
Cultivation and grazing	43	0.6
Unclear land use types	40	0.6
Social services	7	0.1
sub-total	3,838	51.4
Total	6,912	

Source: TAWIRI (2011)

Traditionally, production in the valley operated on a fallow system with about 40% of each family's land cultivated in any one year, the remainder being set aside as fallow to maintain soil fertility and control pests and weeds. However, agricultural officers consider this system to have been almost entirely abandoned in Kilombero District. Ulanga District is experiencing

similar stresses on the fallow land system. Remoter areas, especially at higher elevations in Ulanga District around Mahenge, have maintained the fallow system since there is less population pressure.

Normally the move away from a fallow system would be associated with agricultural intensification including new techniques and inputs, such as the use of manure and/or fertilizer to improve and maintain fertility and pesticides to control diseases and manage weeds. However, application of fertilizer remains well under the level required to achieve optimum yields (current applications are estimated at around 7% of the optimum); little information is available on the use of organic fertilizers and pesticides. Increased yields could also be achieved by introducing new crop varieties and applying new cultivation techniques. Some of these changes are anticipated to take place independently from the SAGCOT programme and a small annual yield increase has been assumed in Scenario 1. Other factors that may result in yield increases are more market-related, and therefore fall within the scope of Scenarios 2 and 3.

Some investments in local infrastructure are assumed to occur as part of normal development. These are likely to positively influence agricultural production in the area and contribute to the small annual crop yield increase included in the models. The improvements include paving of the road to Ifakara and the electrification of some villages by linking to the power grid. Another possible transport infrastructure investment is either a bridge over the Kilombero River or improved ferry capacity, either of which would facilitate the transport of rice, charcoal, fuelwood and teak from Ulanga District to Ifakara and then to Dar es Salaam.

7.3 SCENARIO ONE: CURRENT TRENDS WITHOUT SAGCOT PROGRAMMES

7.3.1 Scenario 1A: The 'No Programme Case

Scenario 1A describes the 'No Programme' case. This is the baseline scenario, with no SAGCOT investments, some electrification, and a 3% crop yield penalty due to climate change by 2030. It assumes a continuing population growth based on the trends indicated by census data (most recently, 2012). Given this growth in population, realistic estimates have been made for cropped areas, yields and agricultural production levels. *Table 7.3* sets out the assumptions underlying Scenario 1A.

Table 7.3 Scenario 1A Assumptions

Parameter	Value
Population growth Kilombero	2.41%
Population growth Ulanga	3.2%
Household size Kilombero	4.3
Household size Ulanga	4.9
% Agricultural households (urban areas) Ifakara	65%

% Agricultural households rural areas	80%
% Pastoralist households (urban areas) Ifakara	1%
% Pastoralist households rural areas	2%
Annual livestock unit (LU) growth	0.4%
LU per household in Kilombero	0.253
LU per household in Ulanga	0.89
Carrying capacity LU/ha	0.36
Annual growth rate of area of cropped land	0.3%
Average annual yield increase	0.5%
% of smallholder farms	90%
Average smallholder farm size (ha)	1.2
% of medium and large farms	10%
Average medium large farm size (ha)	10
Cropping intensity (%)	95%
Actual fertilizer use (t/ha)	0.04
Annual fertilizer increase (%)	2%
Percentage of households using fuelwood	92%
Percentage of households using fertilizer	50%

The remainder of this section presents the projections of the baseline scenario in relation to the following seven topics:

- Population growth;
- Livestock and grazing;
- Crops – overview;
- Crops – by District;
- Irrigation and water availability;
- Fertiliser use; and
- Fuelwood.

Scenario 1A: Population Growth

Scenario 1A assumes an average population increase, based on population growth over the last four decades. As illustrated in *Table 7.4*, there is variation in population growth between urban and rural areas, with the figures for Kilombero District incorporating urban growth in and around Ifakara.

Table 7.4 *Population Data for Kilombero and Ulanga Districts*

District	Population			
	1978	1988	2002	2012
Kilombero	133,013	187,608	321,611	407,840
Ulanga	113,510	138,658	193,280	265,045

Source: Morogoro Socio Economic Profile, Ministry of Planning, Economy and Empowerment, December 2007, and 2012 Census

Further analysis of the data on Kilombero District's population increase leads to prediction of a 2.2% annual increase for Ifakara (less than the growth rate of Morogoro Urban district), less than the 2.4% annual increase for rural areas. Considering the district's assessment of average household size (4.4 and 5.6 people per household in urban and rural areas respectively) it was possible to determine the proportion of households by livelihood in different areas. The resulting assumptions incorporated in Scenario 1 are given in *Table 7.5*.

Table 7.5 *Scenario 1: Proportion of Households by Livelihood in Different Locations*

Agricultural HH - Ifakara	65%
Agricultural HH - rural areas	80%
Pastoralist HH - Ifakara	1%
Pastoralist HH - rural areas	2%

Applying these factors leads to the following 20 year predictions for population size in different areas of the valley (*Table 7.6*).

Table 7.6 *Scenario 1A: Population Projections (Number of Households)*

Year	Total Households			Agricultural Households			Pastoralist Households		
	Ifakara	Kilombero	Ulanga	Ifakara	Kilombero	Ulanga	Ifakara	Kilombero	Ulanga
2010	28,316	62,119	50,788	18,406	49,695	40,631	283	1,242	1,016
2011	28,999	63,616	52,414	18,849	50,893	41,931	290	1,272	1,048
2012	29,698	65,149	54,091	19,303	52,119	43,273	297	1,303	1,082
2013	30,413	66,719	55,822	19,769	53,375	44,657	304	1,334	1,116
2014	31,146	68,327	57,608	20,245	54,661	46,086	311	1,367	1,152
2015	31,897	69,973	59,451	20,733	55,979	47,561	319	1,399	1,189
2016	32,666	71,660	61,354	21,233	57,328	49,083	327	1,433	1,227
2017	33,453	73,387	63,317	21,744	58,709	50,654	335	1,468	1,266
2018	34,259	75,155	65,343	22,268	60,124	52,275	343	1,503	1,307
2019	35,085	76,967	67,434	22,805	61,573	53,948	351	1,539	1,349
2020	35,930	78,822	69,592	23,355	63,057	55,674	359	1,576	1,392
2021	36,796	80,721	71,819	23,917	64,577	57,455	368	1,614	1,436
2022	37,683	82,667	74,117	24,494	66,133	59,294	377	1,653	1,482
2023	38,591	84,659	76,489	25,084	67,727	61,191	386	1,693	1,530
2024	39,521	86,699	78,937	25,689	69,359	63,150	395	1,734	1,579
2025	40,474	88,789	81,463	26,308	71,031	65,170	405	1,776	1,629
2026	41,449	90,928	84,070	26,942	72,743	67,256	414	1,819	1,681
2027	42,448	93,120	86,760	27,591	74,496	69,408	424	1,862	1,735
2028	43,471	95,364	89,536	28,256	76,291	71,629	435	1,907	1,791
2029	44,519	97,662	92,401	28,937	78,130	73,921	445	1,953	1,848

Scenario 1A: Livestock Production

Based on the number of animals indicated in the district profiles and applying conversion rates for various types of animal into livestock units (LU), the number of livestock units per pastoralist household was established for the two districts, as shown in *Table 7.7*.

Table 7.7 Conversion Table for Livestock Units

Animal category	Conversion	Number of animals		Livestock Units	
		Kilombero	Ulanga	Kilombero	Ulanga
Cattle	0.5	41,325	124,011	20,663	62,006
Goat	0.1	8,017	29,849	802	2,985
Sheep	0.1	11,427	36,442	1,143	3,644
Pigs	0.2	10,867	2,106	2,173	421
Donkey	0.5	139	251	70	126
Chicken	0.01	711,273	440,567	7,113	4,406
Duck	0.015	13,253	34,082	199	511
Guinea fowl	0.015	2,055	0	31	0
Total				32,192	74,098

Source: Kilombero and Ulanga District Profiles

Based on these figures and discussion with officials it is clear that the number of livestock units is significantly different in Kilombero and Ulanga, with an average of 0.253 and 0.89 LU per household in Kilombero and Ulanga respectively. The livestock carrying capacity of the valley is estimated to be 0.36 LU per agricultural household, which is higher than the national average of 0.27 (equivalent to 1 LU per 2.8 ha). Using these figures the maximum number of LU which the valley has the capacity to support was determined, and this was compared to projections for increases in LU in each district and for the land required in order to support this number (Table 7.8).

Table 7.8 Scenario 1A: Projected Livestock Units and Grazing Land Requirements

Year	Livestock Units		Required grazing land (ha)	
	Kilombero	Ulanga	Kilombero	Ulanga
2010	32,668	63,282	90,744	175,784
2011	33,589	65,569	93,303	182,135
2012	34,398	67,667	95,551	187,963
2013	35,227	69,832	97,854	193,978
2014	36,076	72,067	100,212	200,185
2015	36,946	74,373	102,627	206,591
2016	37,836	76,753	105,101	213,202
2017	38,748	79,209	107,634	220,025
2018	39,682	81,744	110,228	227,065
2019	40,638	84,359	112,884	234,332
2020	41,618	87,059	115,605	241,830
2021	42,621	89,845	118,391	249,569
2022	43,648	92,720	121,244	257,555
2023	44,700	95,687	124,166	265,797
2024	45,777	98,749	127,158	274,302
2025	46,880	101,909	130,223	283,080
2026	48,010	105,170	133,361	292,138
2027	49,167	108,535	136,575	301,487
2028	50,352	112,008	139,867	311,134
2029	51,565	115,593	143,237	321,091
2030	52,808	119,292	146,689	331,366

In the case of Kilombero District, applying a standard annual increase of 2.5% livestock units growth, the carrying capacity limit will be reached in 2020 (intersection of red and green lines in *Figure 7.1*). In Ulanga this limit was reached some time ago and the existing LU require 77,000 ha more grazing land than is currently available (*Figure 7.2*).

Figure 7.1 *Grazing Land Situation, Kilombero District*

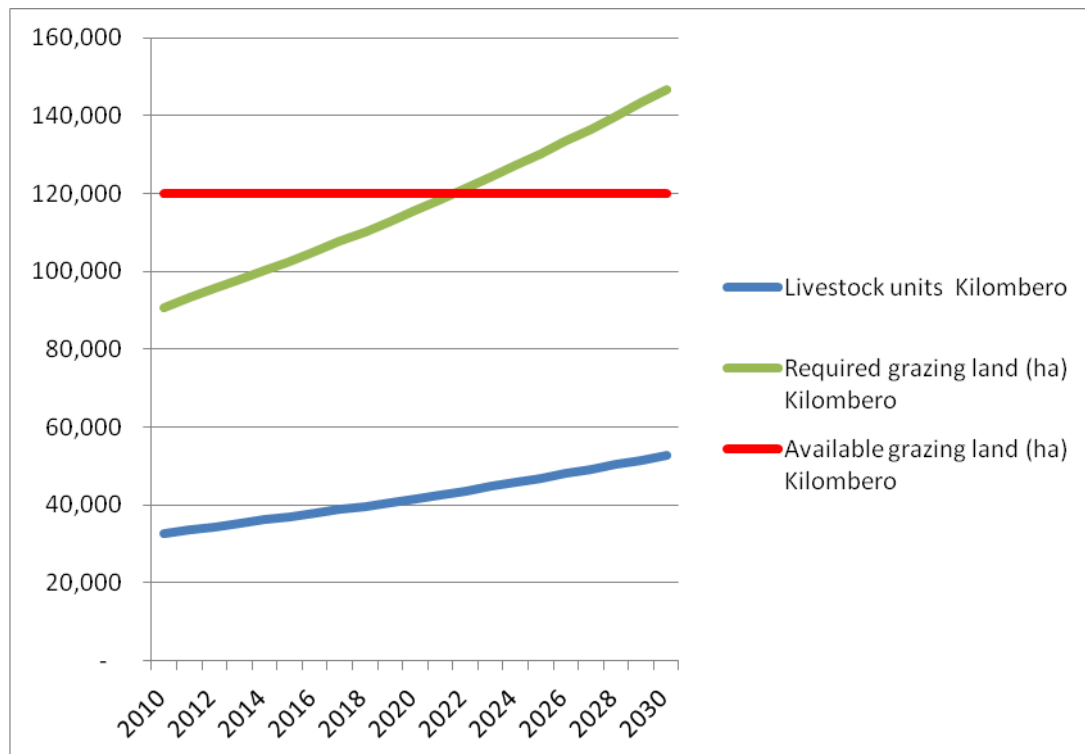
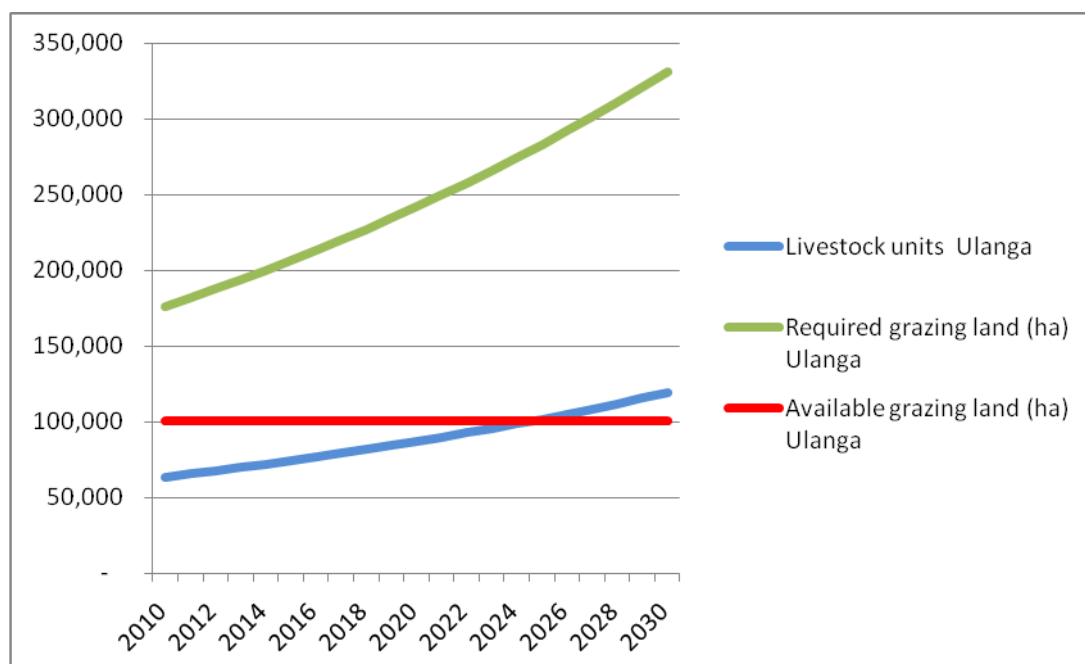


Figure 7.2 *Grazing Land Situation, Ulanga District*



Over-exploitation of available grazing land will increasingly affect the quality of this resource and result in its productivity and therefore carrying capacity being further reduced. Continuing degradation of grazing land through this process will negatively affect the livelihoods of the pastoralists in the area. This aspect has not been integrated into the model.

Scenario 1A: Crop Production - Overview

Figure 7.3 and Figure 7.4 represent the existing cropping patterns in the two districts, and show the relative importance of different crops for each district based on average land-use data derived from the district profiles. As an example, Kilombero District land use statistics are given in Table 7.9 and have been used as start data for modelling.

Table 7.9 *Kilombero District Land Use 2007/7 to 2008/9*

Land-use	Area (hectares)			
	2006/07	2007/08	2008/09	Average
Maize	16,593	25,687	15,972	19,417
Paddy	43,451	69,296	54,650	63,799
Sugarcane	19,987	19,987	19,987	11,372
Cassava	4,000	4,237	1,887	3,375
Legumes				0
Oilseeds	1,271	2,241	2,416	1,976
Sweet Potatoes	1,675	1,479	460	1,205
Banana	2,631	2,506	1,887	2,341
Others	713	1,055	1,147	972
Irrigated Sugarcane				8,615
Irrigated Rice				650
Total	90,321	126,488	98,406	113,722

Source: Kilombero District Profile

Figure 7.3 *Current Relative Crop Importance, Kilombero District*

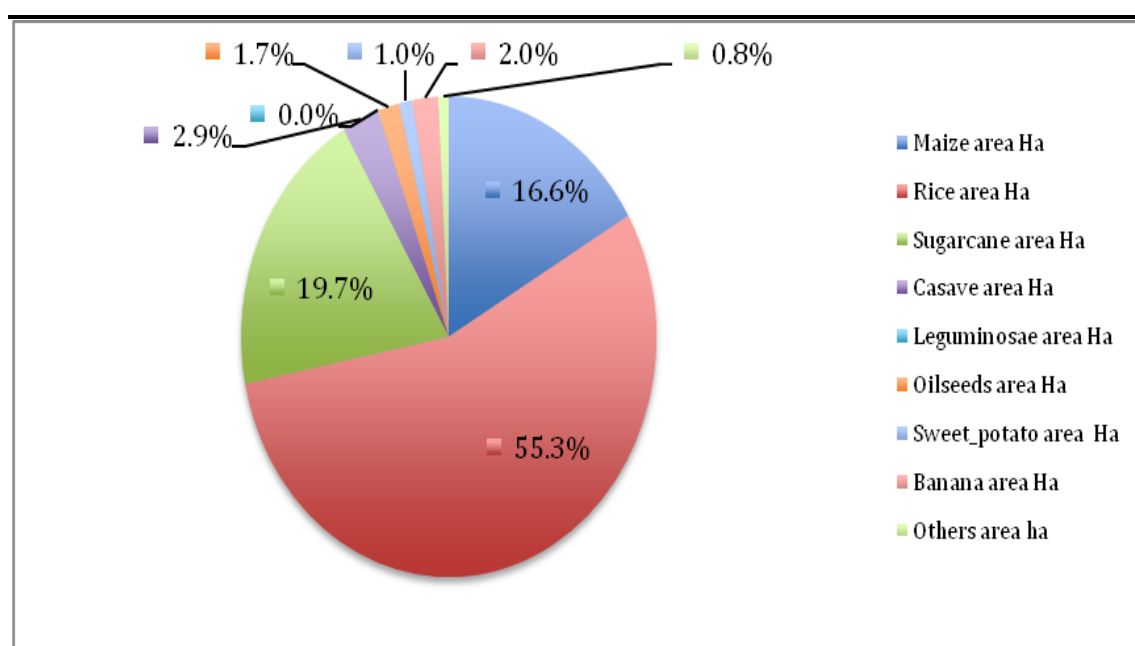
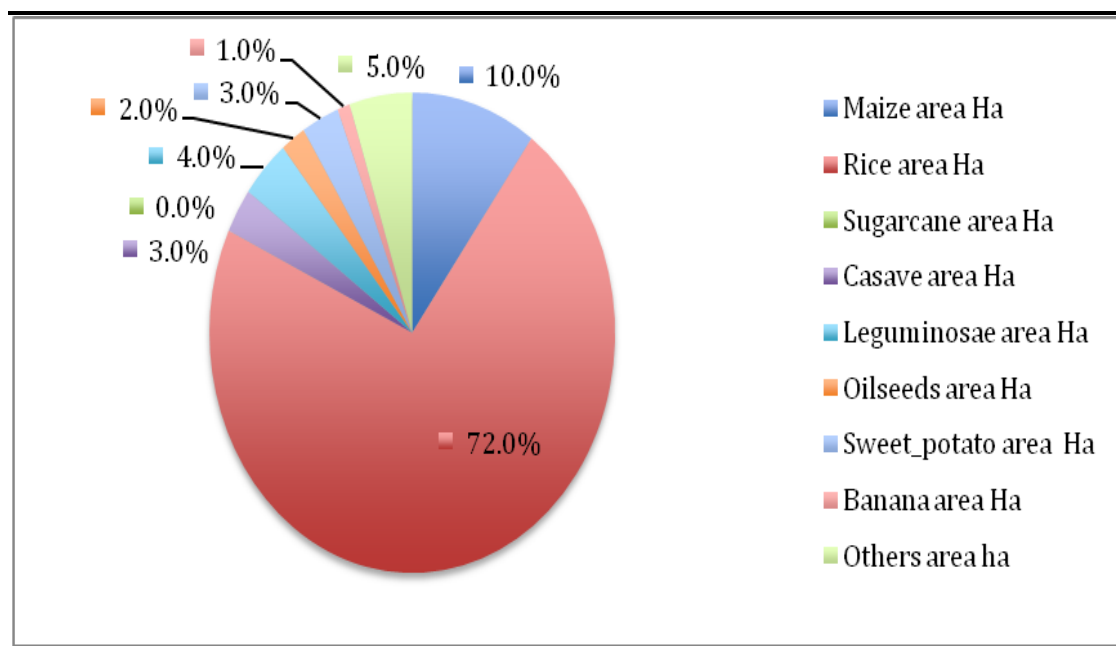


Figure 7.4 Current Relative Crop Importance, Ulanga District



In both districts rice is the dominant crop. The main difference between the two districts is the existence of sugarcane cultivation in Kilombero District; sugarcane is the second most important crop in Kilombero. There is no cane in Ulanga District. The area used for rice production in Ulanga more or less equals the area used for rice and sugarcane combined in Kilombero.

Maize is also an important crop, taking up 16% and 10% of the agricultural land area in Kilombero and Ulanga, respectively. Leguminous vegetables and sweet potato crops are more important in Ulanga than in Kilombero, but have relatively low importance in general. A variety of other crops, including cassava, oilseeds and banana have a similarly low level of importance in both districts.

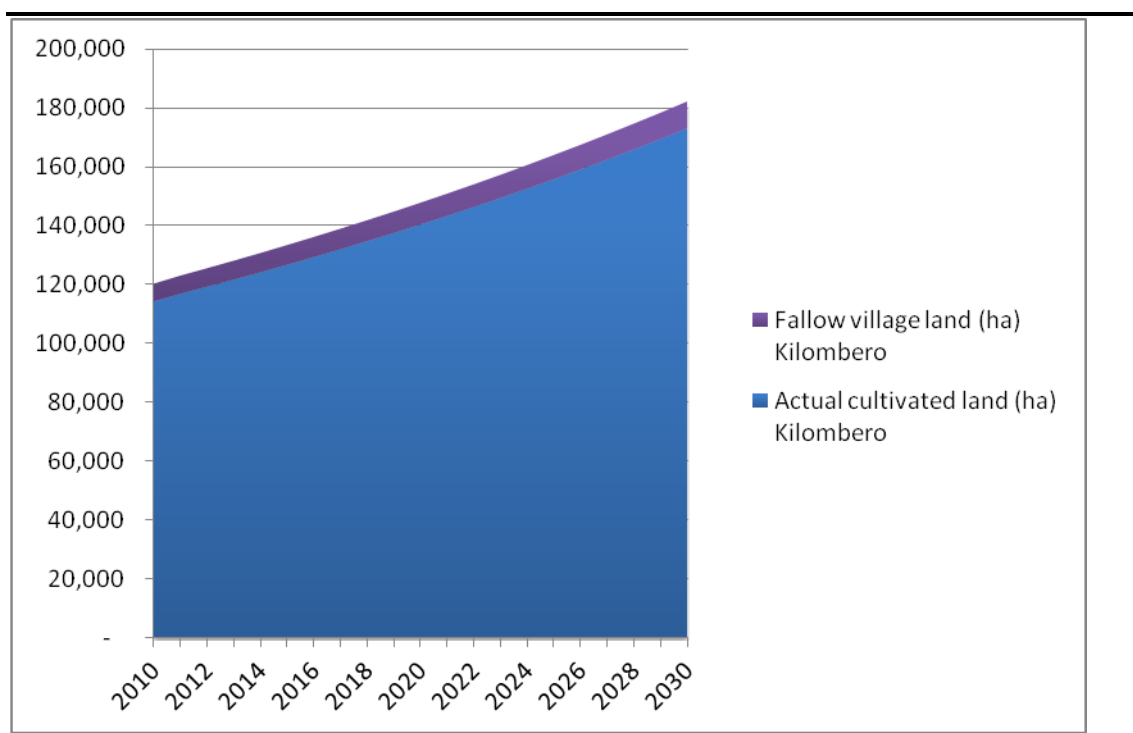
For Scenario 1 no major change is foreseen in existing cropping patterns. However production levels may increase as a consequence of better access to markets once the road network has improved. Oilseeds could continue to gain importance on more marginal soils. Sunflower production is likely to be aimed at a local market with local processing opportunities, while sesame seeds will most likely be targeted towards the export market, as is the case for other main production areas (Dodoma, Lindi, Mtwara and others).

Scenario 1A: Crop Production - District Level Assessments

Kilombero District: in Scenario 1 it is assumed that only 5% of cultivated land remains unused (fallow) every year. This reflects the pressure on land: all suitable areas for agriculture in the valley are likely to already be in production. The average smallholder plot size is around 1.2 ha ⁽¹⁾ and 90% of the farmers are considered to be smallholders. The remaining 10% can be classified as medium to large scale farmers, with an average farm size of 10 ha.

Assuming an average population growth rate it is predicted that the demand for agricultural land will almost double in the coming 20 years, with a large increase for rice and maize and a smaller increase for sugarcane (*Table 7.10, Figure 7.6 and Figure 7.7*). With an increased in cropped area there will also be an increase in crop production. Predicted trends for future crop production are illustrated in *Table 7.11 and Figure 7.7*. As noted above, there is considerable potential for crop yield improvement in the as well, and this has been factored into the estimates of future production.

Figure 7.5 *Kilombero District: Scenario 1A Total Cultivated Area (ha)*

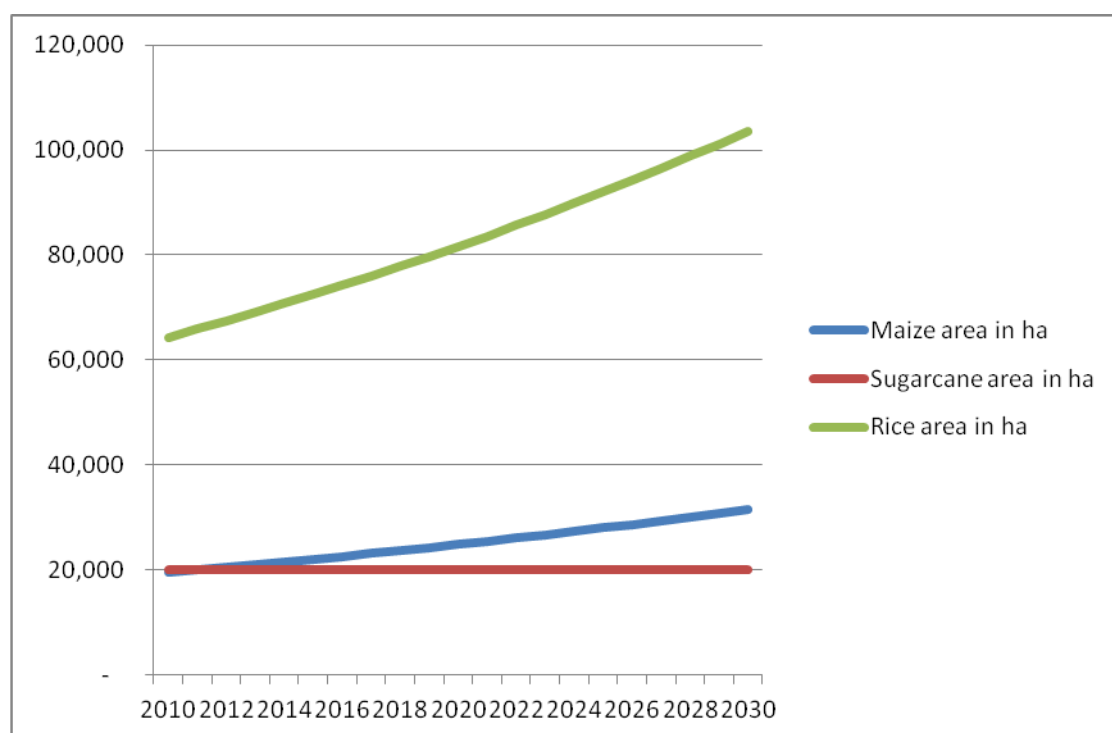


⁽¹⁾ Based on discussions with district staff and analysis of cultivated areas and number of households in the two districts

Table 7.10 Scenario 1A: Kilombero District - Cultivated Area by Main Crops

Year	Cultivated area by main crop (ha)			
	Maize	Rice	Sugarcane Outgrowers	Sugarcane Factory
2010	19,530	64,169	11,372	8,615
2011	20,061	65,913	11,372	8,615
2012	20,544	67,501	11,372	8,615
2013	21,039	69,128	11,372	8,615
2014	21,546	70,794	11,372	8,615
2015	22,066	72,500	11,372	8,615
2016	22,597	74,247	11,372	8,615
2017	23,142	76,037	11,372	8,615
2018	23,700	77,869	11,372	8,615
2019	24,271	79,746	11,372	8,615
2020	24,856	81,668	11,372	8,615
2021	25,455	83,636	11,372	8,615
2022	26,068	85,652	11,372	8,615
2023	26,696	87,716	11,372	8,615
2024	27,340	89,830	11,372	8,615
2025	27,999	91,995	11,372	8,615
2026	28,674	94,212	11,372	8,615
2027	29,365	96,482	11,372	8,615
2028	30,072	98,808	11,372	8,615
2029	30,797	101,189	11,372	8,615
2030	31,539	103,627	11,372	8,615

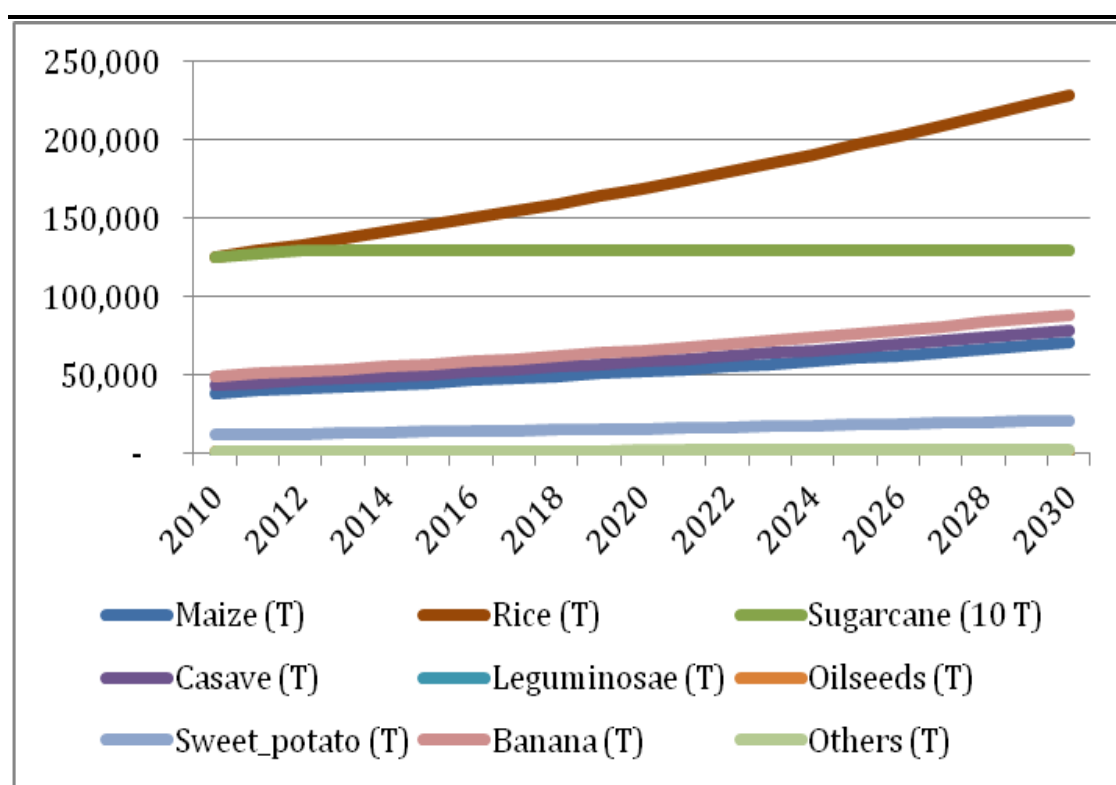
Figure 7.6 Kilombero District: Scenario 1A Cultivated Area by Main Crops



Note: red line indicates limitation on sugarcane area caused by factory processing capacity

The crop production predictions in *Table 7.11* assume that all households within the increased population will acquire agricultural land and contribute to increases in production of all existing crops grown in the area, as shown in *Table 7.11* and *Figure 7.7*. This is likely to hold true for rice and maize. For sugarcane production, continued production increase is hampered by the limited processing capacity of the factory in the area, currently around 1,300,000 tonnes per year. Based on the area under cultivation by the factory (8,615 ha) and assuming an average yield of 89 t/ha, the factory produces around 767,000 tonnes/yr. Therefore outgrowers only have a limited potential to produce the remaining 533,000 tonnes (around an equivalent of 12,400 ha if yields average 43 t/ha). Since the transport costs of the raw cane are high farmers have no alternatives except to rely on the existing cane factory. In contrast, rice milling requires much less investment than sugarcane processing. There are currently at least 163 rice mills in the Kilombero Valley, and this number is likely to increase if more rice is grown.

Figure 7.7 Kilombero District: Scenario 1A Crop Production (tonnes)



Notes:

- Units are tonnes, except for sugarcane, with units of 10 tonnes.
- Horizontal line for sugarcane (green) due to limited processing capacity

Ulanga District: within the lowland area of Ulanga District land is already heavily used, especially for grazing, and very little is set aside as fallow. For these areas, as for Kilombero, it has been assumed that 5% of the agricultural land will remain unused on a yearly basis.

About 60% of the district is forested and/or officially protected (partly as the Selous Game Reserve), leaving a limited area for crop farming. Most of the

cultivated lands are adjacent to the floodplain where there is greater availability of water and rich alluvial soil. However, due to delays in acknowledging village boundaries and producing VLUPs, significant woodland degradation and encroachment towards the floodplain have occurred in recent years. Reports have linked rapid environmental degradation, especially deforestation as well as degradation of water sources, to the high number of livestock in the district.

Assuming an average population growth rate it is predicted that the demand for agricultural land will increase by around 60% in the coming twenty years, with a large increase for rice and a smaller increase for maize (*Table 7.12, Figure 7.8 and Figure 7.9*). With an increased agricultural land area there will also be an increase in the production of crops. Predicted trends for future crop production are illustrated in *Table 7.13*. As noted above, there is considerable potential for crop yield improvements in the area, and this has been factored in to the estimates of future production.

Table 7.11 Scenario 1A: Kilombero District - Crop Production (t)

Crop Production Kilombero									
Year	Maize (t)	Rice (t)	Sugarcane (t)	Cassava (t)	Leguminosae (t)	Oilseeds (t)	Sweet potato (t)	Banana (t)	Others (t)
2010	44,919	143,213	88,528.60	50,390	-	2,363	13,445	56,693	1,470
2011	46,140	147,213	88,528.60	51,760	-	2,427	13,810	58,234	1,510
2012	47,252	150,872	88,528.60	53,007	-	2,486	14,143	59,637	1,547
2013	48,390	154,615	88,528.60	54,285	-	2,545	14,483	61,074	1,584
2014	49,556	158,445	88,528.60	55,593	-	2,607	14,833	62,546	1,622
2015	50,751	162,364	88,528.60	56,933	-	2,670	15,190	64,053	1,661
2016	51,974	166,374	88,528.60	58,305	-	2,734	15,556	65,597	1,701
2017	53,226	170,478	88,528.60	59,710	-	2,800	15,931	67,178	1,742
2018	54,509	174,676	88,528.60	61,149	-	2,867	16,315	68,797	1,784
2019	55,823	178,972	88,528.60	62,622	-	2,936	16,708	70,455	1,827
2020	57,168	183,369	88,528.60	64,132	-	3,007	17,111	72,153	1,871
2021	58,546	187,867	88,528.60	65,677	-	3,080	17,523	73,892	1,917
2022	59,957	192,471	88,528.60	67,260	-	3,154	17,945	75,673	1,963
2023	61,402	197,181	88,528.60	68,881	-	3,230	18,378	77,496	2,010
2024	62,882	202,002	88,528.60	70,541	-	3,308	18,821	79,364	2,059
2025	64,397	206,936	88,528.60	72,241	-	3,387	19,274	81,277	2,108
2026	65,949	211,984	88,528.60	73,982	-	3,469	19,739	83,235	2,159
2027	67,538	217,151	88,528.60	75,765	-	3,553	20,215	85,241	2,211
2028	69,166	222,439	88,528.60	77,591	-	3,638	20,702	87,296	2,264
2029	70,833	227,850	88,528.60	79,461	-	3,726	21,201	89,400	2,319
2030	72,540	233,388	88,528.60	81,376	-	3,816	21,712	91,554	2,375

Figure 7.8 Ulanga District: Scenario 1A Total Cultivated Land Area

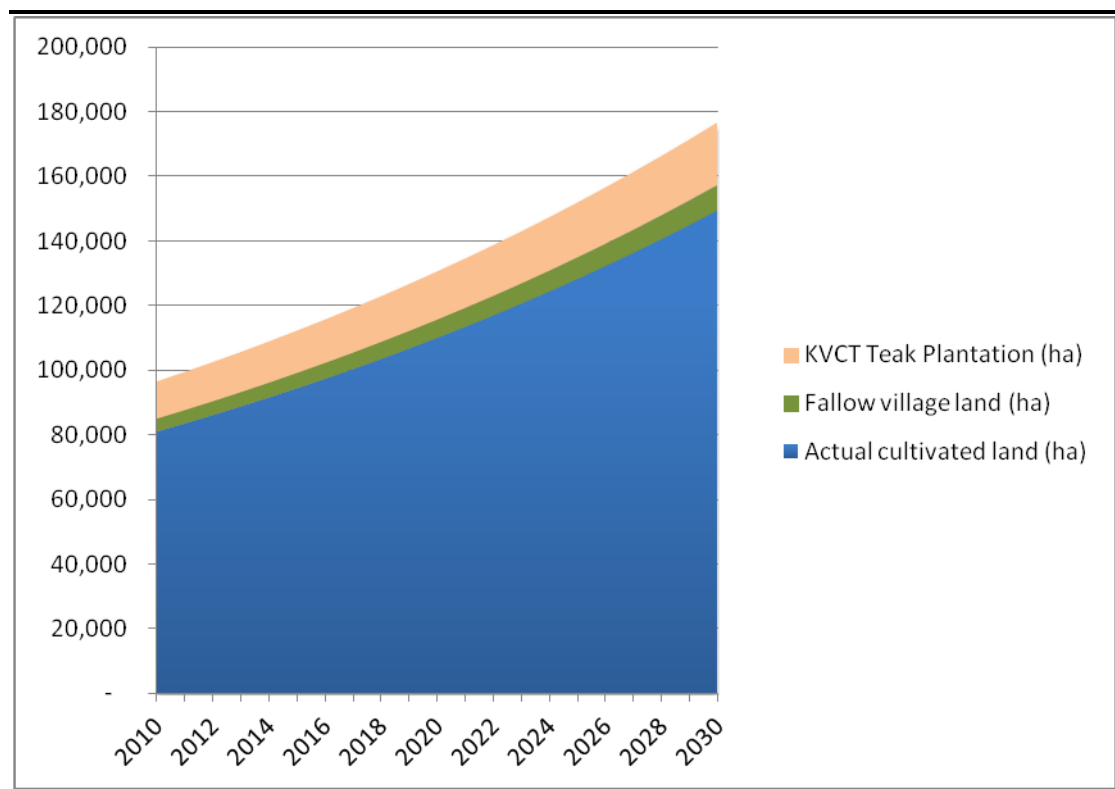


Table 7.12 Scenario 1A: Ulanga District - Cultivated Area by Main Crops

Year	Cultivated area by main crop		
	Maize (ha)	Rice (ha)	KVTC (teak plantation) (ha)
2010	18,931	30,171	11,500
2011	19,536	31,136	11,799
2012	20,162	32,133	12,106
2013	20,807	33,161	12,421
2014	21,473	34,222	12,743
2015	22,160	35,317	13,075
2016	22,869	36,447	13,415
2017	23,601	37,613	13,764
2018	24,356	38,817	14,121
2019	25,135	40,059	14,489
2020	25,940	41,341	14,865
2021	26,770	42,664	15,252
2022	27,626	44,029	15,648
2023	28,510	45,438	16,055
2024	29,423	46,892	16,473
2025	30,364	48,393	16,901
2026	31,336	49,941	17,340
2027	32,339	51,540	17,791
2028	33,373	53,189	18,254
2029	34,441	54,891	18,728
2030	35,543	56,647	19,215

Figure 7.9 Ulanga District: Scenario 1A Cultivated Area by Main Crops

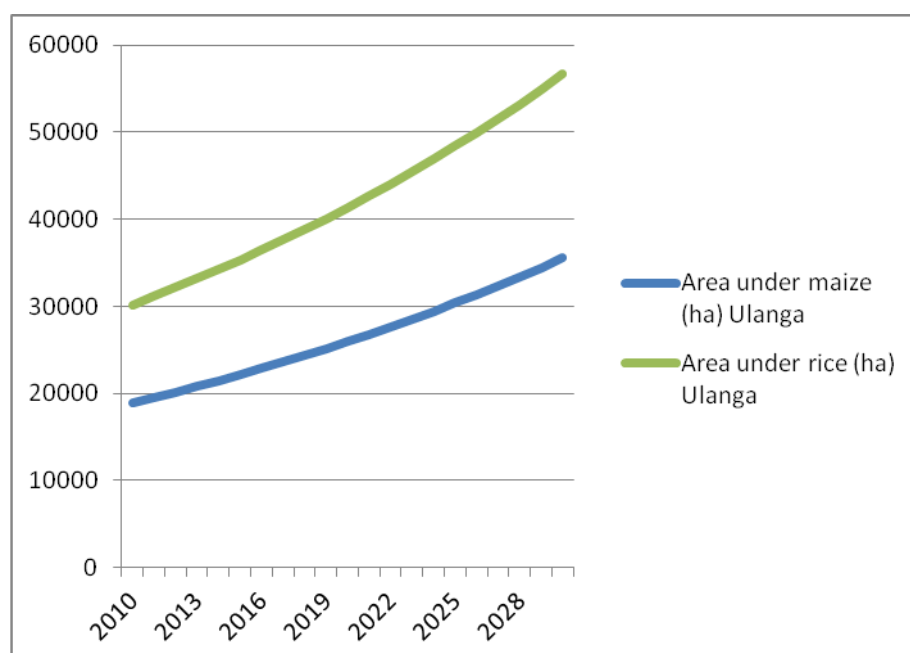


Table 7.13 Scenario 1A: Ulanga District - Crop Production (t)

Year	Maize (t)	Rice (t)	Cane (t)	Cassava (t)	Legumes (t)	Oilseeds (t)	Sweet potato (t)	Banana (t)	Others (t)
2010	43,541	66,925	-	80,050	676	12,170	22,717	16,226	1,014
2011	44,934	69,208	-	82,611	698	12,559	23,444	16,746	1,047
2012	46,372	71,560	-	85,255	720	12,961	24,194	17,281	1,080
2013	47,856	73,982	-	87,983	743	13,376	24,968	17,834	1,115
2014	49,387	76,477	-	90,798	767	13,804	25,767	18,405	1,150
2015	50,967	79,047	-	93,704	791	14,246	26,592	18,994	1,187
2016	52,598	81,695	-	96,702	817	14,701	27,443	19,602	1,225
2017	54,281	84,423	-	99,797	843	15,172	28,321	20,229	1,264
2018	56,018	87,234	-	102,990	870	15,657	29,227	20,876	1,305
2019	57,811	90,129	-	106,286	898	16,158	30,162	21,544	1,347
2020	59,661	93,113	-	109,687	926	16,675	31,127	22,234	1,390
2021	61,570	96,187	-	113,197	956	17,209	32,124	22,945	1,434
2022	63,540	99,355	-	116,820	987	17,760	33,152	23,680	1,480
2023	65,574	102,620	-	120,558	1,018	18,328	34,212	24,437	1,527
2024	67,672	105,984	-	124,416	1,051	18,915	35,307	25,219	1,576
2025	69,838	109,451	-	128,397	1,084	19,520	36,437	26,026	1,627
2026	72,072	113,025	-	132,506	1,119	20,144	37,603	26,859	1,679
2027	74,379	116,707	-	136,746	1,155	20,789	38,806	27,719	1,732
2028	76,759	120,503	-	141,122	1,192	21,454	40,048	28,606	1,788
2029	79,215	124,416	-	145,638	1,230	22,141	41,330	29,521	1,845
2030	81,750	128,448	-	150,298	1,269	22,849	42,652	30,466	1,904

Scenario 1A: Irrigation Water Requirements in Dry Season

A 1961 FAO study identified four major sites that would be suitable for irrigation, two of around 10,000 acres (4,200 ha) on the Ulanga side of the valley, and two sites of 6,500 and 1,850 acres (2,700 ha and 800 ha) respectively on the Kilombero side. A further site was not yet defined, as it depended on

the storage capacity of the proposed Ruipa Dam. To date, there are no important irrigation schemes in Ulanga District. *Table 7.14* provides an overview of existing areas under irrigation in Kilombero District, as recorded by the district administration. Kilombero Sugar Company's (KSC) plantations extend to some 8,615 ha of irrigated land at the north east end of the valley.

Table 7.14 *Kilombero District: Existing Irrigated Areas (excluding commercial sugarcane)*

Name / Location	Area under irrigation (ha)
Msolwa 'A'	50
Mkula	100
Njage	75
Signali	60
Kilama	20
Ikule	180
Makisonjo	60
Udagaji	12
Chita JKT	60
Kisawasawa	38
Kisegese	10
Kihansi valley	0
Total	665

Source: Kilombero District profile (Agricultural Department)

At present the sugarcane plantations are the largest consumer of water for irrigation. Some smaller rice farms are also present, dispersed across the valley. Mngeta Farm, one of the larger rice farms which works with outgrowers, has plans for dry season irrigation but this has not been developed yet.

Under Scenario 1A small-scale investments by farmers are foreseen to gradually increase the area under irrigation, with an annual increase of around 60 to 70 ha. Based on the assessment of irrigation water needs for rice and sugarcane the estimated future demands in Scenario 1A are as shown in *Table 7.15*.

Table 7.16 compares the estimated future irrigation water demands with other potential demands in the basin, using the month of August as a dry season reference point since it coincides with low river flows and a high demand for water. When cultivating two annual rice crops, water demand is highest in August and remains high until November, mainly as a result of the limited rains during the intervening period. A small peak in demand can be observed as well in January/February after the rice is transplanted for the wet season. The estimated irrigation water demands are based on a double rice crop. If farmers decide to grow maize in the dry season rather than rice, water demand will be less.

Table 7.15 Scenario 1A: Dry Season Irrigation Water Requirements

Year	Irrigated area			Water requirement		
	Kilombero Rice (ha)	Ulanga Rice (ha)	Kilombero Sugarcane (ha)	Kilombero m ³ /s in dry season	Ulanga m ³ /s in dry season	Total
2010	650	175	19,987	17.9	0.5	18.4
2011	702	226	19,987	18.0	0.7	18.7
2012	754	277	19,987	18.2	0.8	19.0
2013	807	327	19,987	18.3	1.0	19.3
2014	859	379	19,987	18.5	1.1	19.6
2015	912	430	19,987	18.6	1.3	19.9
2016	965	481	19,987	18.8	1.4	20.2
2017	1,018	533	19,987	19.0	1.6	20.5
2018	1,071	585	19,987	19.1	1.7	20.8
2019	1,125	637	19,987	19.3	1.9	21.1
2020	1,178	689	19,987	19.4	2.0	21.4
2021	1,232	741	19,987	19.6	2.2	21.7
2022	1,286	793	19,987	19.7	2.3	22.0
2023	1,340	846	19,987	19.9	2.5	22.3
2024	1,394	898	19,987	20.0	2.6	22.7
2025	1,448	951	19,987	20.2	2.8	23.0
2026	1,503	1,004	19,987	20.4	2.9	23.3
2027	1,557	1,057	19,987	20.5	3.1	23.6
2028	1,612	1,111	19,987	20.7	3.2	23.9
2029	1,667	1,164	19,987	20.8	3.4	24.2
2030	1,722	1,218	19,987	21.0	3.5	24.5

Table 7.16 Scenario 1A: Total Dry Season Water Requirements, All Sources of Demand

Year	Estimated water requirements (m ³ /s)					Total
	Dry season irrigation	Existing attribution	Livestock	Domestic	Potential hydropower	
2010	18.4	2.5	0.0	0.3	-	21.2
2011	18.7	2.5	0.0	0.3	-	21.5
2012	19.0	2.5	0.0	0.3	-	21.8
2013	19.3	2.5	0.0	0.3	-	22.1
2014	19.6	2.5	0.0	0.3	-	22.4
2015	19.9	2.5	0.0	0.3	-	22.7
2016	20.2	2.5	0.0	0.3	-	23.0
2017	20.5	2.5	0.0	0.3	-	23.3
2018	20.8	2.5	0.0	0.3	-	23.6
2019	21.1	2.5	0.0	0.3	-	24.0
2020	21.4	2.5	0.0	0.3	-	24.3
2021	21.7	2.5	0.0	0.3	-	24.6
2022	22.0	2.5	0.0	0.4	-	24.9
2023	22.3	2.5	0.0	0.4	-	25.2
2024	22.7	2.5	0.0	0.4	-	25.5
2025	23.0	2.5	0.0	0.4	-	25.9
2026	23.3	2.5	0.0	0.4	-	26.2
2027	23.6	2.5	0.0	0.4	-	26.5
2028	23.9	2.5	0.0	0.4	-	26.8

2029	24.2	2.5	0.0	0.4	-	27.2
2030	24.5	2.5	0.0	0.4	-	27.5

Prefeasibility studies of irrigation schemes in the area (project proposals by the Ministry of Water and Irrigation) have usually considered estimated mean annual river flows to determine irrigation potential. However, without storage (for hydro electrical use and/or agricultural use), it is more useful to consider flow in the dry months of August to November, preferably with 80% reliability (i.e. sufficient water for dry season irrigation in 4 years out of 5). Note that at present none of the proposed major hydropower dams have been constructed apart from Kihansi, and therefore under their potential storage aspects have not been taken into consideration in the Scenario.

Scenario 1A: Fertilizer Use in the Valley

Only half of the households in the valley apply fertilizer and the quantity applied is not related to the fertility level of the soils and the need to maintain it. Amounts applied remain well below the levels required to achieve optimum yields. This partly explains the relatively low yields observed for the various crops. The lack of a fallow system, which previously supported partial natural recovery of soil fertility, also contributes to low yields. Projections for future fertilizer requirements and actual future use across both districts are given in Table 7.17.

Table 7.17 *Actual and Optimal Fertilizer Use*

Year	Actual use (t) All districts	Fertilizer requirements (t) All districts
2010	1,930	24,912
2011	2,002	25,609
2012	2,056	26,296
2013	2,112	27,003
2014	2,169	27,730
2015	2,228	28,479
2016	2,289	29,250
2017	2,351	30,043
2018	2,416	30,859
2019	2,482	31,700
2020	2,550	32,565
2021	2,620	33,457
2022	2,692	34,374
2023	2,767	35,319
2024	2,844	36,292
2025	2,923	37,294
2026	3,004	38,326
2027	3,088	39,390
2028	3,175	40,485
2029	3,264	41,614
2030	3,356	42,776

Scenario 1A: Fuelwood

Fuelwood demands are high since it is the main source of energy for cooking in both districts: between 89% and 97% of the population use fuelwood as a

main source of energy (Gorenflo & Orland, in press). Projections for future fuelwood demand, taking into account population growth, are presented in *Table 7.18*, and are set to nearly double. Introduction of improved cooking stoves which are more fuel-efficient could reduce demand for this resource very significantly. *Table 7.18* presents projected demand for fuelwood if improved stoves are used instead of normal stoves.

Table 7.18 *Fuelwood Requirements with Normal and Improved Stoves (both Districts)*

Year	HH not using fuelwood		Reduction in fuelwood use due to assumed electrification	Fuelwood demand (m ³)	
	HH using other sources of energy	% of HH using other sources of energy		If normal stoves	If all HH use improved cooking stoves
2010	11,298	8			
2011	12,095	8	4,509	1,323,110	764,958
2012	12,928	9	9,276	1,354,129	796,737
2013	13,800	9	14,312	1,385,863	813,438
2014	14,711	9	19,629	1,418,327	830,457
2015	15,663	10	25,238	1,451,539	847,798
2016	16,657	10	31,153	1,485,514	865,465
2017	17,697	10	37,386	1,520,269	883,463
2018	18,782	11	43,952	1,555,822	901,797
2019	19,915	11	50,864	1,592,190	920,471
2020	21,098	11	58,137	1,629,392	939,490
2021	22,333	12	65,786	1,667,445	958,859
2022	23,622	12	73,828	1,706,368	978,582
2023	24,967	12	82,278	1,746,180	998,663
2024	26,370	13	91,155	1,786,901	1,019,107
2025	27,834	13	100,475	1,828,550	1,039,919
2026	29,360	14	110,258	1,871,148	1,061,102
2027	30,952	14	120,523	1,914,715	1,082,662
2028	32,612	14	131,289	1,959,272	1,104,601
2029	34,342	15	142,578	2,004,841	1,126,926
2030	36,145	15	154,411	2,051,443	1,149,638

Table 7.19 presents recorded changes in forest and woodland cover in the nearby Udzungwa Mountains National Park, from 1979 to 2000. From 1979 to 1991 a sharp decline in woodlands can be observed (-41%) which becomes less steep and halts over the next decade. More recent data to assess the trends in land cover change in the last decade are not available. However, it is likely that the increasing population is having further impacts on forest cover in the area, a view supported by anecdotal evidence from local residents and resource managers.

Fuelwood collection and charcoal-making are one cause of forest loss in the valley. Other major drivers include land clearance by burning, both for cultivation and to enable hunting of wild animals. Note that to a large extent, people's livelihoods in the basin depend on environmental resources, in particular forests. Major livelihood activities affecting forests are firewood collection, charcoal-making and timber extraction. Wood is used for brewing and for drying and smoking fish.

Table 7.19 Udzungwa National Park: Forest Cover Changes 1979-2002

Mountain Block	Year	Total coverage (Ha)		Total change (Ha)			% change		Rate of change %	
		Forest	Woodland	Years	Forest	Woodland	Forest	Woodland	Forest	Woodland
Udzungwa	1979	102180	468800							
	1991	91640	276430	12	-10540	-192370	-10.3	-41.0	-0.4	-3.4
	2000	91550	269860	9	-90	-6570	≈ 0	-2.3	≈ 0	-0.3
	1979 - 2000			21	-10630	-198940	-10.4	-42.4	-0.2	-2.0

Source:URT, 2005 quoted in UDS (2006)

7.3.2 Scenario 1B: 'Normal' Population Growth with In-migration

Scenario 1B is the same as 1A except for the assumptions on population growth. It models the impacts that may occur if, as a consequence of normal investments which can be expected in the coming years (improved roads, power supply), the Kilombero Valley experiences additional population growth from in-migration. The values for annual population growth assumed for this in-migration scenario are 3.2% in urban areas, and 3.8% in rural areas. This would result in an absolute difference in population in 2030 of some 104,000 people (from 626,000 to 730,000) in Kilombero District, and of some 57,000 (from 467,000 to 524,000) in Ulanga District. People migrating into the areas will almost all require their own small farm and will keep some livestock, since without major investments additional jobs outside the agricultural sector may not be created (apart from seasonal jobs linked to the temporary projects such as road improvement). Applying these factors leads to the following 20 year predictions (Table 7.20).

Livestock ownership and cultivated land area will increase, though total crop production might not change drastically, either because of less suitable soils being cultivated or because the use of fertilizers, pesticides and improved seeds may still be limited.

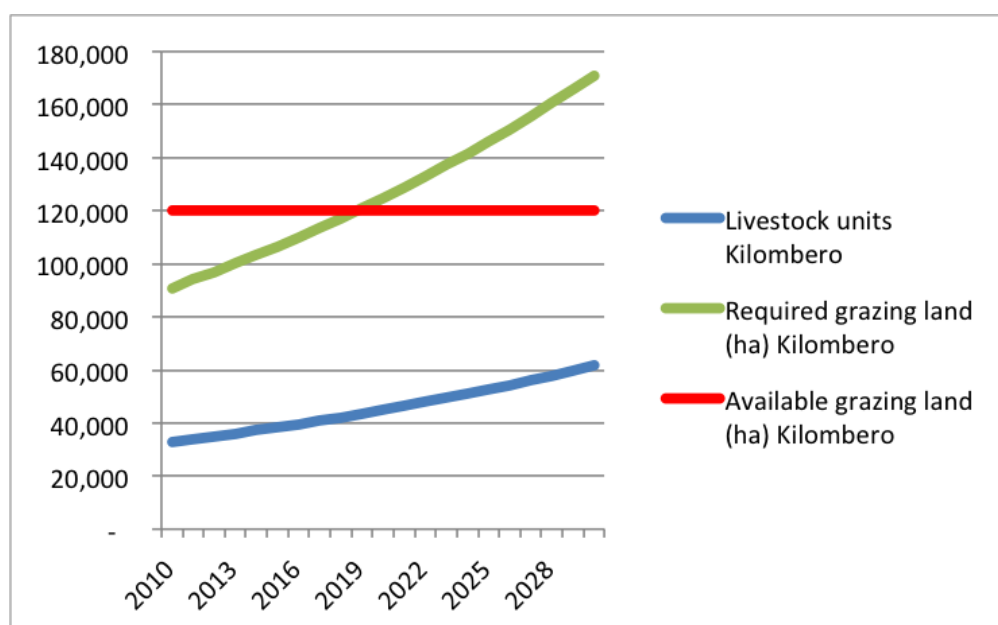
Because of the faster population growth, the critical limit at which livestock require more grazing land than is available will be reached earlier in Scenario 1B in Kilombero District than in Scenario 1A (2018/2019 rather than 2022: Figure 7.10). As previously noted, this limit has already been reached in Ulanga District, and there is a requirement for livestock numbers to be reduced in order to reach a long-term, environmentally sustainable situation.

Under Scenario 1B the total area under cultivation in Kilombero District is projected to reach 235,000 ha in 2030, and 122,400 ha in Ulanga District. This represents an increase over the predictions of Scenario 1A of 23,000 ha and 13,000 ha for Kilombero and Ulanga respectively. The processing capacity for sugarcane will remain a limiting factor for cane outgrowers.

Table 7.20 Scenario 1B: Population Projections (Number of Households)

Year	Total Households			Agricultural Households			Pastoralist Households		
	Ifakara	Kilombero	Ulanga	Ifakara	Kilombero	Ulanga	Ifakara	Kilombero	Ulanga
2010	28,316	62,119	50,788	18,406	49,695	40,631	283	1,242	1,016
2011	29,222	64,106	52,718	18,995	51,285	42,175	292	1,282	1,054
2012	30,158	66,158	54,722	19,602	52,926	43,777	302	1,323	1,094
2013	31,123	68,275	56,801	20,230	54,620	45,441	311	1,365	1,136
2014	32,118	70,460	58,959	20,877	56,368	47,168	321	1,409	1,179
2015	33,146	72,714	61,200	21,545	58,171	48,960	331	1,454	1,224
2016	34,207	75,041	63,526	22,235	60,033	50,820	342	1,501	1,271
2017	35,302	77,443	65,940	22,946	61,954	52,752	353	1,549	1,319
2018	36,431	79,921	68,445	23,680	63,937	54,756	364	1,598	1,369
2019	37,597	82,478	71,046	24,438	65,983	56,837	376	1,650	1,421
2020	38,800	85,117	73,746	25,220	68,094	58,997	388	1,702	1,475
2021	40,042	87,841	76,548	26,027	70,273	61,239	400	1,757	1,531
2022	41,323	90,652	79,457	26,860	72,522	63,566	413	1,813	1,589
2023	42,645	93,553	82,476	27,720	74,842	65,981	426	1,871	1,650
2024	44,010	96,547	85,611	28,607	77,237	68,488	440	1,931	1,712
2025	45,418	99,636	88,864	29,522	79,709	71,091	454	1,993	1,777
2026	46,872	102,825	92,241	30,467	82,260	73,792	469	2,056	1,845
2027	48,372	106,115	95,746	31,442	84,892	76,597	484	2,122	1,915
2028	49,920	109,511	99,384	32,448	87,608	79,507	499	2,190	1,988
2029	51,517	113,015	103,161	33,486	90,412	82,529	515	2,260	2,063
2030	53,166	116,631	107,081	34,558	93,305	85,665	532	2,333	2,142

Figure 7.10 Scenario 1B: Livestock Units and Grazing Land Requirements, Kilombero District



The faster growing population in this scenario is expected to have only a limited effect on water demand for agriculture. However, there would be an increase in the area required for settlements, increased pressure on remaining and surrounding woodlands, and more rapid degradation of remaining wildlife corridors.

7.4 *SCENARIO 2: THE SAGCOT INVESTMENT SCENARIO*

7.4.1 *Overview of SAGCOT Investment Model*

Scenario 2 is based on the same 20 year period as Scenarios 1A and 1B. It assumes the same population growth as the baseline (Scenario 1A) but varies the assumptions relating to production capacity, investment requirements and development outcomes, based on the SAGCOT investment model.

The projections of this Scenario are discussed in relation to pressures on land, water and fuelwood.

Table 7.21 *Scenario 2 Assumptions*

Parameter	Value
Population growth Kilombero	2.41
Population growth Ulanga	3.2
House hold size Kilombero	4.3
Household size Ulanga	4.90
% Agricultural household (urban areas) Ifakara	65
% Agricultural household rural areas	80
% Pastoralist household (urban areas) Ifakara	1
% Pastoralist household rural areas	2
Annual livestock unit (LU) growth	1.004
LU per household in Kilombero	0.253
LU per household in Ulanga	0.89
Carrying capacity LU	0.36
Annual growth rate of cropped land	0.3
Average annual yield increase	0.3
% of small holder farms	90
Average small holder farm size (ha)	1.2
% of medium and large farms	10
Average medium large farm Size (ha)	10
Cropping intensity (%)	95
Actual fertilizer use (t/ha)	0.04
Annual fertilizer increase %	2
Percentage of household using fuelwood (2010)	92
Percentage of household using fertilizer	50

As presented in the SAGCOT Blueprint, the SAGCOT investment model ⁽¹⁾ introduces six hypothetical farm units, each incorporating smallholder commercial farmers and pastoralists. The model determines an appropriate development profile for each of the clusters identified, and uses build-ups of multiples of the identified farm units. As a next step it determines the infrastructure necessary to support the farm units at the on farm, last mile, marketing storage, processing and backbone levels. The six proposed farm units are as follows:

- 2,650 ha mixed crop and livestock farm;
- 2,000 ha rice farm;
- 10,300 ha livestock ranch;
- 10,250 ha sugar estate;
- 600 ha citrus farm; and
- 150 ha banana plantation.

For Scenario 2 it is assumed that as part of the SAGCOT Programme:

- Two rice farm 'units' will be introduced (total area 4,000 ha), which will also attract out-growers around the newly developed farms (estimated total area 3,500 ha).
- A citrus farm will be set up using advanced irrigation techniques.
- An investor will be found to increase the processing capacity for sugarcane. The same investor will establish an irrigated sugar estate after completion of the factory, which could be considered after 2015 and will take another 5 years to be commissioned.

The rice farms will need to produce two crops per year to ensure an adequate return on investment, implying dry season irrigation. Rice production by outgrowers is likely to be partly rainfed and partly irrigated. Improved use of fertilizers and pesticides will result in higher average yields.

The simulation does not consider the proposed very large USAID-funded irrigation schemes (Mpanga-Ngalimila, Udagaji, Sonjo and Kisegese (total 41,375 ha)). However, comments on water availability for these schemes are given in *Section 7.3.3*.

7.4.2

Land Use

The profile developed for the Kilombero cluster ⁽²⁾ foresees that by 2015 an additional smallholder irrigated and rainfed area of 4,150 ha and an additional commercial irrigated and rainfed area of 3,400 ha will have been developed.

(1) Southern Agricultural Growth Corridor of Tanzania, Blueprint: Appendix IX: SAGCOT Production and Investment Model

(2) SAGCOT Blueprint, Appendix V, Indicative Programme of Development to 2015, Kilombero Cluster, p 3

The increase in production of rice, citrus and other crops is indicated below (*Table 7.22*). These additional areas under cultivation and the additional production would result in direct and indirect employment of an estimated 38,500 people.

Table 7.22 *Scenario 2: Incremental Crop Production in 2015 under SAGCOT Investment Model*

Crop	Additional production (t)
Field crops	8,900
Rice	39,200
Citrus	33,000
Banana	18,000
Others	2,500

Under normal conditions and considering the average population growth of 4.2% and 2.6% for urban and rural areas respectively, in this scenario the population is anticipated to increase to 2015 as shown in *Table 7.23*.

Table 7.23 *Scenario 2: Predicted Population and Household Increase, 2010-2015*

Year	Population		
	Ifakara	Kilombero	Ulanga
2010	121,760	267,110	248,863
2011	124,694	273,547	256,827
2012	127,700	280,140	265,045
2013	130,777	286,891	273,527
2014	133,929	293,805	282,279
2015	137,157	300,886	291,312
		Households	
2010	28,316	62,119	50,788
2011	28,999	63,616	52,414
2012	29,698	65,149	54,091
2013	30,413	66,719	55,822
2014	31,146	68,327	57,608
2015	31,897	69,973	59,451

Considering that these additional households will require agricultural land, this scenario would result in an increase of area under cultivation of about 25,000 ha if no other sources of household income existed. However, Scenario 2 estimates that around 38,000 people could find additional income as a result of new investments (either directly or indirectly), possibly easing the pressure on land as compared to Scenario 1A.

7.4.3 *Irrigation Water Requirements and Availability*

Table 7.24 presents an overview of the additional crop areas, yields and water requirements expected as a result of the SAGCOT Programme investment plan. The projections reflect the probable lack of any major investment before 2014.

Table 7.24 Scenario 2: SAGCOT Model Investments and Estimated Water Requirements to 2030

SAGCOT investment planning on irrigated crops	Additional Crop Areas (ha)					Water Requirements (m ³ /s)		Additional Production (t)		
	Rice Kilombero (ha)	Sugarcane Kilombero (ha)	Citrus (ha)	Outgrowers rice (ha)	Outgrowers sugarcane (ha)	Incremental water requirements (m ³ /s)	Total water requirements (m ³ /s)	Additional production rice (t)	Additional production sugarcane (t)	Additional production citrus (t)
2010	0	0	0	0	0					
2011	0	0	0	0	0	0.0	21.2	0	0	0
2012	0	0	0	0	0	0.0	21.5	0	0	0
2013	0	0	0	0	0	0.0	21.8	0	0	0
2014	2,000	0	300	500	0	0.0	22.1	0	0	0
2015	3,000	0	600	1,000	0	7.5	29.9	11,400	0	0
2016	3,000	0	600	1,500	0	12.2	34.9	17,800	0	0
2017	4,000	500	600	2,000	0	13.6	36.6	19,200	0	0
2018	4,000	1,000	600	2,500	500	18.4	41.7	25,600	44,500	0
2019	4,500	2,000	600	2,500	800	20.7	44.7	27,000	114,000	1,800
2020	5,000	2,500	900	2,500	1,000	23.2	47.7	29,500	218,000	5,400
2021	5,500	3,500	900	2,500	1,300	25.4	50.5	32,000	272,500	9,000
2022	6,000	4,000	1,200	2,500	1,600	27.9	53.6	34,500	376,500	12,600
2023	6,000	4,000	1,200	2,500	1,600	30.3	56.5	37,000	436,000	16,200
2024	6,000	4,000	1,200	2,500	1,600	30.3	56.8	37,000	436,000	18,000
2025	6,000	4,000	1,200	2,500	1,600	30.3	57.1	37,000	436,000	19,800
2026	6,000	4,000	1,200	2,500	1,600	30.3	57.4	37,000	436,000	21,600
2027	6,000	4,000	1,200	2,500	1,600	30.3	57.8	37,000	436,000	25,200
2028	6,000	4,000	1,200	2,500	1,600	30.3	58.1	37,000	436,000	28,800
2029	6,000	4,000	1,200	2,500	1,600	30.3	58.4	37,000	436,000	32,400
2030	6,000	4,000	1,200	2,500	1,600	30.3	58.7	37,000	436,000	34,200

The citrus farms would most likely use either sprinkler or drip irrigation depending on the location of the farm (hillside or valley bottom). Intercropping for the first four years and the use of leguminous cover crops after this time could offset costs during the five to eight year period prior to profitable citrus yields. To develop a feasible investment plan, short stem hybrid varieties could be used; these bear fruit earlier than older varieties.

The proposed additional processing capacity at the sugarcane factory will initially be an incentive for existing outgrowers to reinvest in the sugarcane crop and to increase productivity, and possibly also the area under cultivation if land is available. If, after the initial investment, the investor decides to establish a sugar estate to reach the plant's processing capacity, another 4,000 ha or more could be developed. If this occurs, the additional irrigation requirement would be approximately 4 m³/s.

The projected water requirements for Scenario 2 detailed above (Table 7.24) are not particularly large since the development of irrigation as part of the SAGCOT investment model is relatively limited. However, water is a critical resource, and in this situation the absence of reliable data on its availability in the area makes accurate hydrological assessment more important, not least because district officials have indicated that river flows have become less reliable in recent years and the number of perennial rivers has declined drastically.

As discussed in *Section 5.2.5*, the flows in the Kilombero River are markedly seasonal: the highest flows occur in April and May and the lowest in October and November. There is also a marked inter-annual variability in flows. Analysing the RWRB records from 1970 onwards, the mean daily flow is 85 m³/s and the 95 percentile flow (i.e. the flow that is equalled or exceeded 95% of the time) is 32 m³/s.¹ This indicates that although very high flows occur in the sub-basin from time to time, the long-term yield (at least from surface water) is relatively low.

The national Irrigation Master Plan based its assessments of irrigation potential on estimated mean annual river flows. The actual feasibility of irrigation schemes depends on dry season flows, environmental flow requirements and the availability of storage. *Table 7.25* presents a simulation in which the seasonal fluctuation in flows observed at the Swero gauging site on the Kilombero River is applied to five important tributaries discharging into the Kilombero River. (Note that this simulation uses the long-term average flows recorded at the Swero gauging station, which appear to need re-interpretation and may be much too high).

¹ Note, these flow statistics are based upon an analysis of the post 1970 flow record at Swero. As discussed in *Section 5.2.5*, there are significant anomalies in the data record prior to this period.

Table 7.25 Kilombero River Tributaries: Estimated Mean Monthly Flows (m³/s)

Station/ River	Month												Mean Annual
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Main river (at Swero)	40	55	70	1,35	1,40	600	30	25	22	20	20	25	535
Mpanga	0	0	0	0	0		0	0	5	0	0	0	
Udagaji	42	58	73	141	146	63	31	26	24	21	21	26	56
Sonjo	5	7	9	18	18	8	4	3	3	3	3	3	7
Ruipa	5	7	9	18	18	8	4	3	3	3	3	3	7
Chiwachiw	37	51	65	126	131	56	28	23	21	19	19	23	50
a	28	38	48	93	97	41	21	17	16	14	14	17	37

Source: WREM International, 2012

Note: this table is based on the monthly flow distribution at Swero; these records may greatly over-estimate the actual flows in the Kilombero: see discussion in Section 5.2.5 above.

Using the Penman method to estimate crop water requirements for the four large scale irrigation projects proposed in prefeasibility studies, and based on the possibly over-estimated flows in Table 7.24, Table 7.26 compares water availability to water requirements at the proposed sites.

Table 7.26 Dry Season Water Availability at Proposed Large Irrigation Sites

Site	Proposed area (ha)	Crop water requirement (m ³ /s) (based on Penman method for rice)	Estimated average dry season flow (m ³ /s)
Mpanga- Ngalimila	31,500	92	21
Udagaji	1,935	5.7	3
Sonjo	500 rice 100 maize 40 vegetables	1.5	3
Kisegese	7,300	21.5	Ruipa 19 Chiwachiwa 14

As is evident from the table, and even without considering environmental flow requirements, **dry season water availability is likely to be a significant constraint at almost all of the proposed irrigation sites** unless storage dams are built.

7.4.4 Fuelwood

Under Scenario 2 fuelwood requirements increase significantly, but less than in Scenario 1A due to the assumed more rapid electrification brought about by

SAGCOT Programme activities and an assumed switch of some households to electricity for cooking.

Table 7.27 *Projections of Energy use between 2010 and 2013*

Year	% of HH using other sources of energy	Fuelwood requirements (m ³)		Assumed reduction due to SAGCOT electrification efforts (m ³)
		Normal stoves	If all HH use improved stoves	
2010	8			
2011	9	1,314,270	756,119	-8,840
2012	10	1,335,860	778,468	-18,269
2013	11	1,357,545	785,121	-28,318
2014	12	1,379,310	791,440	-39,017
2015	13	1,401,138	797,397	-50,401
2016	14	1,423,012	802,963	-62,502
2017	15	1,444,912	808,106	-75,357
2018	16	1,466,819	812,793	-89,003
2019	17	1,488,710	816,991	-103,480
2020	18	1,510,563	820,661	-118,829
2021	20	1,532,353	823,767	-135,092
2022	21	1,554,054	826,268	-152,314
2023	22	1,575,639	828,122	-170,541
2024	23	1,597,077	829,284	-189,824
2025	24	1,618,339	829,708	-210,211
2026	25	1,639,389	829,344	-231,759
2027	26	1,660,194	828,141	-254,521
2028	28	1,680,716	826,046	-278,556
2029	29	1,700,916	823,001	-303,925
2030	30	1,720,752	818,947	-330,691

7.5 SCENARIO 3: GREEN SCENARIO

The third scenario - Scenario 3 - is a qualitative scenario that assumes incorporation into development of both the sustainability approaches described in the SAGCOT Blueprint and, in addition, elements from the so-called SAGCOT Greenprint (EcoAgriculture Partners, 2012) and other environmental and social conditionality. Key elements in the scenario are:

- Comprehensive land use planning using participatory approaches.
- Integrated water resources management and planning.
- Full recognition of the economic and existence values of ecosystem services.

- Use of environmentally-friendly farming and agricultural processing technologies (e.g. System of Rice Intensification, Integrated Pest Management).
- Establishment and implementation of transparent and equitable mechanisms and standard operating practices for arranging land deals with investors and for ensuring long-term benefits for local communities and smallholders.

Scenario 3 also requires that:

- All farmers accept changes in their production methods (mostly driven by market forces (incentives), but to some degree by regulations).
- Widespread implementation of catchment protection programmes to halt the continuing decline in watershed condition and restore year-round water flows.
- The introduction of integrated water resource management with long-term planning on various water uses and requirements, ensuring that upstream and downstream water needs are inventoried and an effective water extraction licensing system established.
- Installation and operation of additional gauging stations on both the main river and its tributaries to understand seasonal water flows and, eventually, detect long-term trends that might be linked to human activities or climate change.
- Monitoring of groundwater levels and oversight of commercial groundwater extraction.
- Introduction of high-tech irrigation systems such as drip irrigation for small scale vegetable gardens and, if possible, for the Citrus investment. (NB: a proper feasibility study needs to be done to compare a surface water storage strategy using reservoirs versus the use of groundwater).
- Development and implementation of an equitable policy on pastoralism in the Valley, including measures to ensure that livestock remain within designated areas and that livestock numbers remain within the carrying capacity of these areas.

These elements form the basis for the impact assessment described in the next Chapter.

8 KILOMBERO VALLEY: SCENARIO IMPLICATIONS AND SOLUTIONS

8.1 INTRODUCTION

This chapter assesses the scenario predictions in terms of their impact on key environmental and social values, identifies risks and discusses potential solutions (mitigation and/or risk management measures). The issues are discussed under five major headings: Land, Socio-economics, Water, Biodiversity and Governance. A summary is presented at the end of the chapter in *Table 8.1*.

8.2 ISSUES RELATED TO LAND

8.2.1 *Land for Investment*

Issue: The SAGCOT Programme aims to bring 350,000 ha of agricultural land in the Southern Corridor into commercial production. In principle, land for these activities may be acquired through four mechanisms:

- Leasing of land to commercial investors;
- Contract farming;
- Outgrowers, farmer associations and cooperatives; and
- Individual, farmer led investment, indirectly stimulated by SAGCOT.

There are widely differing opinions over how much land is available for commercial farming. It is likely that the majority is currently defined as Village Land. To make it available it will either have to be leased to investors directly by Village or District Councils or reclassified as General Land and allocated on behalf of the State. In the Kilombero Valley there are the additional complications of widespread land purchase by speculators, and the presence of a variety of protected areas - wetlands, game reserves, forest reserves - with boundaries undergoing revision, together with important unprotected habitats. Land category boundaries have yet to be accurately mapped across much of the Kilombero Valley, and although a number of Village Land Use Plans (VLUPs) are in place there is limited awareness of them on the ground. The low level of understanding of land tenure legislation amongst many of the stakeholders involved, incomplete clarity on legal status, and only partial boundary definitions provides an opportunity for decisions to be based on insufficient information and advice, and hence a potential for the system to operate in a sub-optimal manner (which could be inappropriate and unfair if manipulated by those with more power and control). There is concern that in some cases boundaries agreed by local communities are being ignored or overridden by government authorities (see recent media reports

concerning the eviction of farmers and pastoralists from the Kilombero Ramsar site⁽¹⁾ and *Box 8.1*).

Box 8.1

Kilombero Valley: the 2012 Evictions

Recently (November 2012) the MNRT has been implementing its decision to revise the boundaries of the Kilombero Game Controlled Area (KGCA) and place beacons to mark the boundaries of the new, much smaller GCA (see *Figure 5.13* and *Figure 7.1*). This is being done to reconcile the presence of 74 villages within the boundaries of the existing KGCA (that was established in 1974) and to legalise some 400,000 residents whose presence inside a GCA is inconsistent with the *Wildlife Conservation Act 2009*.

With the new beacons in place, the District authorities are implementing the rules and regulations that govern GCAs: no permanent human habitation and no livestock; consequently livestock keepers have been directed to withdraw their cattle from within the new KGCA boundaries. Village residents can keep their cattle, as long as numbers are within the estimated carrying capacity of the grazing areas in their respective VLUPs; the cattle are branded and excess cattle compulsorily sold. Non-resident livestock keepers are being given official permits to move their cattle south to Ruvuma Region.

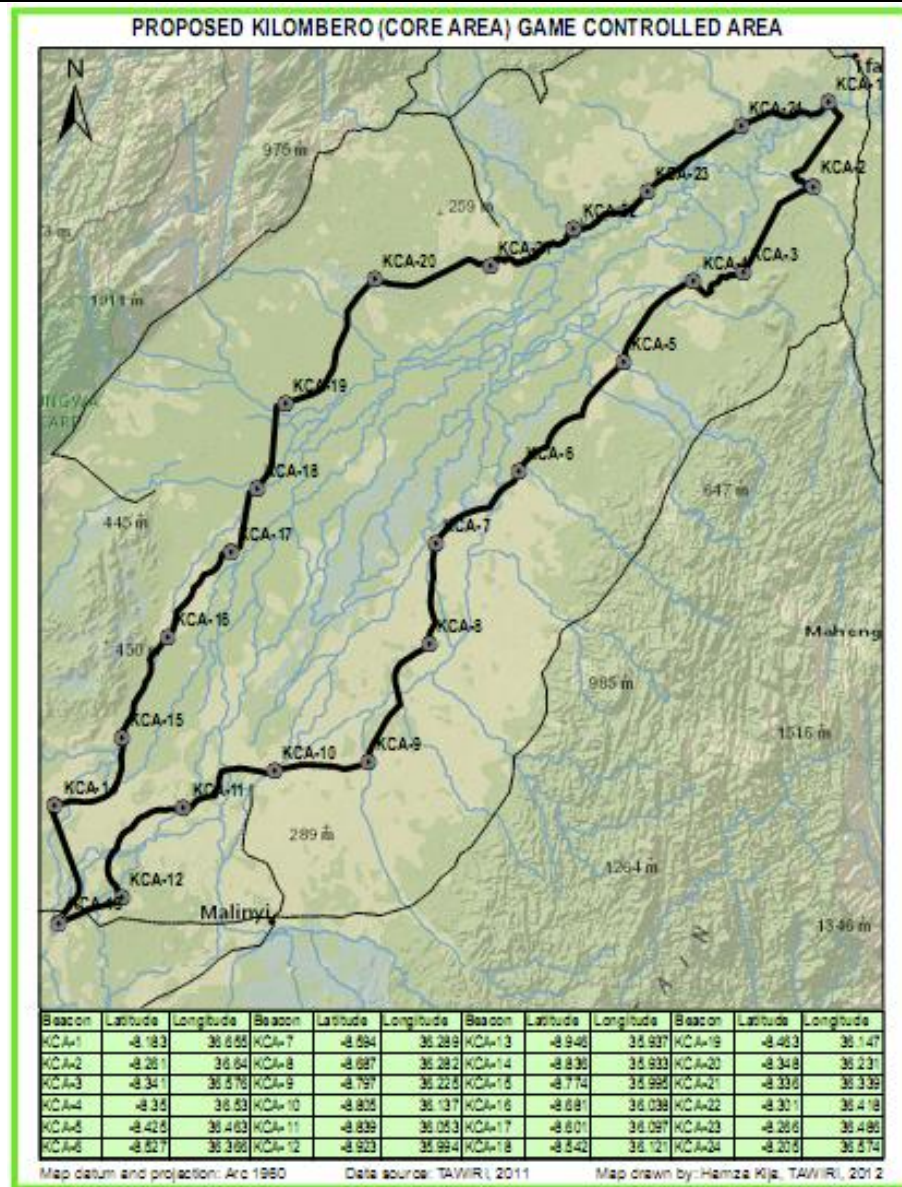
The process has been complicated by the presence of new villages where the boundaries have been established but not officially gazetted, cases where village land use plans extend outside their official boundaries into the Kilombero floodplain (the core of the GCA) such as Mkangawalu, and cases where district administration actions have not been consistent with agreed MNRT plans (such as Ikule in Ulanga District). This has resulted in individual cases of perceived or real hardship due to loss of cultivated land. There is also a perception that the evictions are being carried out to pave the way for foreign investors; this appears unlikely since the new CGA is located in the floodplain and (by definition) is subject to floods, some severe, and does not extend far or at all into the transitional land at slightly higher elevation (the *mbuga* lands) which is of more interest for crop cultivation.

Source: MNRT staff, 2012

The process of negotiating access to land for commercial investment is therefore an area of risk, since in the past it has frequently not been a transparent or participatory process. This, coupled with the high profile failure of some previous foreign direct investments (e.g. in biomass projects) has resulted in low confidence in the system, and mistrust of large scale investors. There is a general perception of investment in commercial farming as 'land grabbing' and 'compulsory purchase'. Negative attitudes towards commercial farming, and increasing conflict over land, could erode public support for the SAGCOT Programme and prevent it from achieving its aims.

⁽¹⁾ (<http://www.ippmedia.com/frontend/index.php?!=47877>)

Figure 8.1 Kilombero Game Controlled Area: Proposed New Boundaries



Source: TAWIRI, 2012

Analysis:

Scenarios 1A and 1B: under these scenarios, there would be continued demand for land use changes within the Kilombero Valley, consistent with continuing population increase and with gradually improving transport infrastructure and therefore market access. Conflicts with foreign investors would be limited by the relatively slow pace of FDI, but the actions of speculators could lead to tensions.

Scenario 2: under this scenario, the following impacts on land are foreseen:

- Increase in the number of foreign and Tanzanian investors attracted into the Valley.
- Change in the percentage of land being farmed commercially (an increase in the number of farms >10 ha in size, currently around 10%).
- Greater pressure on remaining land to meet the needs of local communities and pastoralists.
- Change in cropping patterns – increasing focus on commodity crops such as rice and sugar.
- Increase in agricultural employment opportunities and in-migration.
- Greater pressure to ensure land acquisition process is transparent, participatory and results in equitable distribution of benefits.
- Where commercial production comes from outgrowers, contract farmers, etc., greater pressure to ensure terms of trade are fair and transparent.
- Risk that the acquisition process might be skewed by vested interests.
- Need to ensure synergy with other development activities and potential partners in the Valley.

Scenario 3: under this scenario

- Growth in smallholder yields improves, allowing more farmers to engage with commercial ventures.
- Benefits for women are increased due to gender-sensitive process and programmes.
- Governance and social capital are improved due to transparent and inclusive planning and management processes and increased access to relevant training.

Risk Management/Mitigation Options:

Of most concern is the opportunity for vested interests to manipulate the land acquisition process. Since there are potentially very large financial incentives for identifying and acquiring land for investment, and in view of the previous comments in this section, conflicts of interest can only be avoided by

completely separating the responsibility for identifying land and negotiating investment agreements. At present this separation is not practised.

8.2.2 *Land for Smallholders and Pastoralists*

Issue: Changes in land use and tenure, and an increase in the amount of land cultivated, will result in rural communities losing access to and control over land that they previously depended on for their livelihoods. It will also probably cause encroachment into protected areas and sensitive habitats if needs cannot be met locally. The implications need to be clearly understood in each locality, and strategies developed - in consultation with local communities - to manage extra pressure on remaining resources such as grazing, fire wood, NTFP and fishing rights. This is especially true for pastoralists and other marginalised groups, vulnerable households and women as they frequently do not have a voice during negotiation processes at the local level. The legal rights of women and pastoralists to land, and cultural attitudes towards them, are particularly problematic. Recent events in the Kilombero Valley (described earlier in this report) have highlighted this issue.

Analysis:

Scenario 1: under this scenario, natural population increase and in-migration will lead to greater competition over land resources.

- Reduction in grazing area and potential.
- Increased conflicts between pastoralists and farmers.
- More marginal land brought under cultivation, as farming practices are still inefficient (extensive, low input, manual) without addition of fertilizer to mitigate yield limitations.
- Land holding size per household ultimately decreases, leading to reduced food security and greater vulnerability to drought.

Scenario 2: under this scenario, it is probable that there will be:

- Localised changes in land tenure and use, in the proximity of commercial investors.
- Potential for greater intensification on some land, where inputs are available.
- Continued pressure on land elsewhere, due to removal of productive land from local use, and natural population increase and in-migration.

- Continued conflict between pastoralist and farmer, unless the SAGCOT Programme can support a process of dialogue and inclusion.

Scenario 3: Under this scenario there will be:

- Potential for widespread changes in farming systems, due to spread of inputs and appropriate technologies.
- Greater intensification of smallholder farming systems which will reduce pressure on land (in the short term) as higher yields mitigate reduction in land availability.
- Reduction in the rate of fertility and biodiversity loss.

Risk Management/Mitigation Options: strategies to manage these risks and issues include (i) investment in inclusive local planning processes, especially the participation of women, pastoralists and other marginalised groups in decision making; (ii) strengthening the land tenure system to recognise the rights of women and pastoralists; (iii) investment in non-land based livelihood alternatives, to mitigate for loss of land holding size over time; (iv) community involvement in wildlife and reserve management strategies, promoting local ownership, and (v) investment in education to provide additional opportunities for future generations.

8.3 SOCIO-ECONOMIC ISSUES

8.3.1 *Inclusion of Smallholders in Value Chains*

Issue: the level of mechanisation in the Kilombero Valley is very low and 90% of farmers in Kilombero and Ulanga Districts are considered subsistence smallholders, farming an average of 1.2 ha of land. Subsistence farming practices are limited by household labour capacity, availability of inputs (seeds, fertilizers, pesticides and finance), information, technology transfer and access to markets. The relatively poor infrastructure in Kilombero and Ulanga Districts, and high cost of transport (exacerbated by the formal and informal system of payments incurred during transportation of goods) limit access to markets. The majority of smallholders, who farm on a subsistence basis, will not produce sufficient surplus to sell into the market, and will be unable to take on the risk of specializing at the expense of maintaining livelihood diversity. They may lack sufficient labour capacity within the household (especially female headed households), and engage in short term activities, such as labouring on others farms for payments in cash or kind, rather than make investment in long-term productivity gains. It is hard for smallholders to engage effectively with conventional supply chains and influence their relationship with them. Some factors are beyond the influence

of individual farmers and farmer interest groups, including Government policy, infrastructure and market liberalisation. Particular issues relevant to the valley include:

- Vested interests control access to export markets, at the exclusion of smallholders.
- Investors pass on risks to smallholders so that they are exposed to fluctuations in market prices and required to adopt international standards (quality control, consistency of supply) with which they are unable to cope.
- Not all smallholders are capable of engaging with value chains. This will disadvantage those smallholders who are not.
- There is limited information available on prices.
- Investors and buyers provide very limited support to smallholders to help them engage. The relationship is not proactive and partnering.
- Outgrower schemes, contract farming terms and cooperative arrangements may not provide sufficient return for participants to truly benefit.
- Contractual arrangements with investors do not take into account seasonality (e.g. availability of loans) or risks such as drought.

Analysis:

Scenarios 1A and 1B: Under these scenarios (no additional investment) it is likely that planned improvements in infrastructure would result in an increase in the number of smallholders gaining better access to markets via the paved road to Ifakara, and the bridge over the Kilombero River. Any improvements to electricity supply would provide an opportunity for adding value to goods such as rice, through an increase in the number of small-scale processing plants such as the rice mill in Mbingu village (but note that it nevertheless took the intervention of an external donor to provide the capital to purchase the rice milling machine and warehouse, and to develop the capacity of the farmers group to maintaining it). Under these scenarios there is not likely to be any increase sugarcane processing capacity. As a result, rice will probably become relatively more important, and the increase in population as a whole will increase demand within local markets for a wide range of agricultural produce. Farmers' ability to engage in value chains will be enhanced if they are able to come together to form interest groups, which can collectively mitigate against some of the constraints. Membership fees, subscriptions and the need for other group members to approve of new members self-selects for

dynamic, emergent farmers. There is limited capacity for Government to provide capacity support to farmers and credit groups, so it is likely that few new groups will be created without external support from other donors and NGOs. In addition, there are a number of factors that are beyond the control of farmer organisations, including Government policy, infrastructure development and changes to market systems. This can be seen from the experience of the Association of Kilombero High Quality Rice Growers (AKIRIGO), which was unable to access to an international market for its rice by a change in Government policy.

Scenario 2: Under this scenario (SAGCOT Programme investment model), the level of impact on small-holder farmers in Kilombero Cluster is likely to be very localised and the benefits gained by a relatively small number of individuals. The experience of the current KSC cane outgrower scheme demonstrates that beneficiaries are likely to be limited to farmers in the immediate vicinity of commercial ventures, and who:

- Are already engaged in commercial production, either exclusively or as a significant component of their total output, and see a SAGCOT Programme supported commercial venture in their local area as an opportunity to improve their current business.
- Have the capacity to become involved in higher value commercial production, with a little additional support in the form of finance, inputs, technology and guaranteed price, which has not otherwise been available to them.

Many of the farmers associations encountered during the study have only developed with external support from NGOs, a donor programme or commercial buyers. This has included inputs such as equipment (e.g. rice husking mills and warehousing), business skills development and group formation. The Catalytic Fund requires investors to support local associations, but this may not be the case for SAGCOT as a whole. The level of influence that a farmer has over the trading relationship will depend on the commitment of the company to responsible business behaviour and good practice. There are internationally recognised ethical standards for businesses; these can be used as a benchmark for many potential investors. A range of methods for engaging smallholder farmers already exists within the Valley, and SAGCOT can learn from these experiences.

Scenario 3: Under this scenario (green growth) the benefits for smallholder farmers would be felt much more widely. Although the number of farmers who might be able to engage with value chains might still be limited to those emergent farmers who are able to take the risk and live near investors' activities, other smallholders will also benefit from access to new technology and farming practices, and will be able to increase the yield they obtain from

their farms sufficiently to make an impression on their nutritional status, and potentially also household income.

Risk Management/Mitigation Options: risk management and mitigation options include (i) adoption of international standards for responsible agro-investment across SAGCOT, and ensuring investors adhere to these in their dealings with local communities (*Box 8.2*); (ii) monitoring of cooperative arrangements between smallholder farmers and investors: contracts should be drawn up following guidelines which stipulate a minimum standard of information exchange, transparency, participation and other contractual terms; no contract should bind a farmer in such a way that they become disadvantaged; if the investor does not offer a sufficiently competitive price, the farmer should be able to take his business elsewhere; (iii) capture and publication of the learning from other schemes and arrangements within SAGCOT, and across East Africa; (iv) investors should work closely with NGOs and other development partners to help develop favourable terms; (v) upgrade and expand farmer-to-farmer extension mechanisms to help disseminate new technology and farming practices; (vi) improve smallholder access to agricultural inputs beyond those necessary for commercial production, including improved varieties of subsistence crops, vegetables and fruit for home-growers.

Box 8.2

Principles for Responsible Agro-Investment

Principles for Responsible Agro-Investment

1. **Respecting land and resource rights.** Existing rights to land and associated natural resources are recognised and respected.
2. **Ensuing food security.** Investments do not jeopardize food security but strengthen it.
3. **Ensuring transparency, good governance, and a proper enabling environment.** Processes for acquiring land and other resources and then making associated investments are transparent and monitored, ensuring the accountability of all stakeholders within a proper legal, regulatory and business environment.
4. **Consultation and participation.** All those materially affected are consulted, and the agreements from consultations are recorded and enforced.
5. **Responsible agro-investing.** Investors ensure that projects respect the rule of law, reflect industry best practice, are economically viable, and result in durable shared value.
6. **Social sustainability.** Investments generate desirable social and distributional impacts and so not increase vulnerability.
7. **Environmental sustainability.** Environmental impacts of a project are quantified and measures are taken to encourage sustainable resource use while minimising and mitigating risk and magnitude of negative impacts.

Source: FAO et al. , 2010

Issue: approximately 98% of Tanzanian rural women classified as economically active are engaged in agriculture. Women farmers are also often casual labourers and unpaid family workers in both commercial and subsistence agriculture, including livestock and fishing.

Cultural practices vary greatly between the many different tribes in Tanzania, but with some common traits: in crop-farming communities in general, women have primary responsibility for (i) domestic work including food preparation, fetching water, finding and fetching fuel wood, and child care, (ii) subsistence agriculture, especially most of the weeding, harvesting, processing and storage activities relating to food crop production. Men and women participate fairly equally in site clearance, land preparation, sowing and planting, but overall women spend more hours per day than men in both productive and reproductive activities⁽¹⁾. These traits are repeated in the Kilombero Valley.

In most pastoral societies gender roles are strongly marked. Women are typically responsible for milking and dairy processing; they may or may not sell the milk, and they usually have control over the proceeds in order to feed the family. Men are responsible for herding and selling meat animals. In systems in which herds are split, women usually stay at fixed homesteads while men go away with the animals⁽²⁾. This is true of the Maasai, while with the Barabaig the whole family travels together with the herd as they migrate. In many pastoralist cultures part of the herd (often goats) is considered for 'home consumption' and often stays with the women. The more valuable cattle remain with the men. The Wasukuma (lit. "the northern people"), the dominant incoming agro-pastoralists in the Kilombero Valley, have strong cultural traditions and attitudes including male dominance of decision-making and all the associated gender roles and issues.

Analysis: issues common to all the scenarios include:

- Women have limited access to and control over land and may lose out during allocation and benefit sharing.
- Scarcity and fragmentation of land holdings may result in male absence and increased burdens of work for women.

⁽¹⁾FAO. 1997. *Gender and Participation in Agricultural Development Planning. Lessons from Tanzania*. Dar es Salaam and Rome, November 1997.

⁽²⁾FAO. 2001. *Pastoralism in the new millennium*. FAO Animal Production and Health Paper 150. <http://www.fao.org/docrep/005/Y2647E/y2647e00.htm#toc> [accessed 09 August 2012]

- Employment opportunities typically favour men over women, with unequal pay and conditions.
- Inclusion of women in out-growers/cooperatives/contract farmer agreements may not be gender-balanced.

Risk Management/Mitigation Options: risk management and mitigation options include: (i) investment in the education system, including adult education (there is strong link between adult literacy, and girls education and improved health outcomes and family planning); (ii) reform of the land tenure legislation and traditional practices for areas where women's representation can be improved in land allocation and benefit sharing arrangements; (iii) promotion of fuel-efficient stoves and other improvements to domestic fuel use, in order to reduce the need for charcoal and timber for cooking, etc. - thus reducing the workload of many women and children; (iv) upgrading local health services; (v) continued improvements in the implementation of Tanzania's gender equal policies and legislation: progressive policies are in place, but to date implementation has been limited; SAGCOT should review its own role in the implementation of these policies, and mainstream gender within its own practices; (vi) review small-scale credit and savings activities, to ensure they provide opportunities for both men and women in rural communities.

8.3.3

Health and Safety

Issue: increased population, in-migration, changes in land use, changes in agricultural practices, greater employment opportunities and improvements in transport infrastructure will all have an impact on health outcomes in the Kilombero Valley.

Health Services

- As population increases, there will be greater pressure on existing health services unless they are expanded. Otherwise, the quality of and access to health care will deteriorate resulting in greater incidence of otherwise preventable health problems.
- Development may result in increased inequality in health care: employees and emergent farmers close to commercial investments will have greater physical and financial access to health services.

Nutritional Status

- A gradual reduction in average farm size, without major changes in agricultural practice and yield output, will result in rural households increasingly being unable to meet their subsistence needs from their own

land holdings. Without another way to address the 'gap' (i.e. income generation), a greater incidence of malnutrition and stunting will occur. The majority of smallholder farmers will also become less resilient to shocks, such as drought.

- Changes in local farming systems may affect the price and type of products available in the local markets, with some households no longer being able to access a nutritionally balanced diet.

Transmission of Disease

- In-migration and improved transport infrastructure increase the risk of the transmission of infectious diseases. At 19% (2003) the HIV prevalence rate in Kilombero District is already significantly higher than the national average (7%) (Regional Health Office statistics, Morogoro, quoted in Nombo, 2007). Of particular concern is the impact of transient populations coming into the Valley from areas where HIV infection rates are higher. Prevalence is higher among women than men in both urban and rural areas, due to increased levels of prostitution and transactional sex, and the difficulty that women experience in negotiating safe sexual practices with their partners. The same can be applied to other STDs. Commercial centres such as Ifakara and road networks will be high risk areas.
- Changes in land use can create the conditions for (and increase in) transmission of vector-borne diseases such as schistosomiasis, malaria, trachoma and dengue by creating ideal habitats for the vector, and increasing exposure risk to human population, e.g. irrigation schemes, schistosomiasis and increased human:water contact. Also, stall feeding of animals in proximity to dwellings, acts as an attractant for insect populations (flies and mosquitoes) increasing the likelihood of human interaction and disease transmission. The Kilombero Valley has one of the highest malaria infection rates in the world⁽¹⁾, although there has been some success in control in recent years.

Hygiene and Sanitation

- Very few households in the Valley have a pit latrine, and the main sources of drinking water in rural areas (shallow wells and springs) are more vulnerable to faecal contamination than boreholes, especially if poorly constructed. The high prevalence of sanitation-related diseases in the Valley also suggests poor hygiene in homes. Increased population density, and household size, is likely to exacerbate these problems.

⁽¹⁾ Association "Doctors for Ifakara" website <http://www.ifakara.org/en/st-francis-hospital/krankheiten.php>

Occupational Health

- As agrochemicals become more readily available to smallholder farmers (Scenarios 1 and 2), there will be a significant risk to both agricultural workers and local residents through inappropriate use of pesticides, poor storage, handling and disposal practices, lack of protective equipment and contamination of the wider environment. Under Scenario 3 agrochemicals will be used within an IPM framework and would then present a significantly lower risk.
- Increased agricultural mechanisation, industrial processing machinery and improved transport corridors, will increase the risk of accidents amongst workers and residents under all scenarios.

Working Conditions

- Conditions of employment on commercial farms, and industrial processing plants, will increase the risk of accidents and other health and safety issues in the workplace.

Risk Management/Mitigation Options: *Health Services:* SAGCOT investors could be encouraged to contribute to improved availability of health care, either provision of private health care for workers, creation of clinics for workers and their families or contributing to development of health care services in the area; care should be taken that this does not replace Government's own responsibilities for provision of healthcare.

Transmission of Disease: (i) proposed investments should include a health impact assessment as part of the project-specific EIA required by law (this is already defined in the legislation, but to date infrequently applied in practice) (ii) where investor activity has a direct impact on disease transmission through land use change, SAGCOT should ensure project design and management includes (a) effective environmental and health management plans (for example: irrigation designed to reduce snail breeding sites, and other environmental management strategies), and (b) awareness and health education campaigns, aimed at increasing understanding of disease transmission and appropriate behaviours, such as sexual health, sanitation and hygiene practices, avoiding contact with water bodies, etc. as part of their social management plans; (iii) SAGCOT activities should be tied into Government campaigns to promote the use of prophylactics, such as bed nets and condoms.

Nutritional Status: (i) in relation to food security for vulnerable groups, careful monitoring of variations in market availability the price of staples, combined with surveillance of nutrition and health via indicators such as stunting in children (this would also identify positive impacts from the SAGCOT

Programme); Tanzania is already using a food security early warning system, so linking monitoring into this system may be possible; (ii) integration of nutritional information into health awareness campaigns, to raise awareness of importance of diversity in the diet for micronutrients, as a mitigation measure against drought, and to prevent the displacement of subsistence crops by commercial crops; (iii) encourage investors to include the promotion of small, 'back yard' type gardens amongst women's groups as part of their input/extension system for outgrowers; surpluses could be sold locally, to increase income for women (although this may also increase workload, so care would need to be taken to understand the impact of such a promotional campaign).

Hygiene and Sanitation: (i) promotion of boreholes and deep, concrete lined wells in the proximity of investors' activities, as part of their social responsibilities, would have the benefit of reducing worker absenteeism due to ill health; it would also reduce women's workloads, freeing time for other tasks; (ii) promotion of pit latrines, in conjunction with hygiene and sanitation promotion, amongst adjacent communities for similar reasons to (i) above; (iii) public awareness campaigns in schools and through women's groups on WATSAN topics including hygiene promotion, hand washing, dish washing, water sources, etc.; (iv) investors could set up a small grants scheme to encourage local communities to construct pit latrines and wells, as part of their social responsibilities; grants could be 'matching' funds, and encourage the use of local labour.

Occupational Health: (i) SAGCOT investors should provide adequate training for their workers and outgrowers in the use of any new machinery or industrial equipment, to reduce the risk of accidents in the workplace; this should be carried out as part of implementation of clear corporate health and safety policies, subject to external monitoring; (ii) traffic safety awareness campaign in the vicinity of investor activity (funded by investors) and along transport corridors (funded by Government); (iii) provision of private health care cover for employees of commercial investors, covering the cost of transportation to hospitals for them and their family members, in the event of emergency medical treatment.

Working conditions: (i) SAGCOT could provide guidelines on employment conditions and grievance processes, so that investors can develop standard employee contracts; (ii) assess investor plans for health and safety concerns, and ensure corporate plans address these; (iii) processing, handling, etc. should be carried out according to best management practices.

Water Availability, Seasonality and Environmental Flows

Issue: the Kilombero River and its tributaries support both an abundance of biodiversity and wetland-based ecosystems that rely on the annual and seasonal variation of flows in the basin's many rivers and streams. However, the rivers are also exploited for irrigated agriculture (in particular rice and sugarcane), domestic water supply and (at the Kihansi Reservoir) for hydropower. These resource pressures have been increasing in recent years as the population in the basin has grown, to the extent that district officials report that river flows are much less reliable than in previous years, and that the number of perennial rivers in the basin has declined drastically. Large-scale irrigation associated with the SAGCOT Programme could greatly increase water demands, particularly during the dry season, leading to further pressure on wetland and other aquatic ecosystems, and competition with other water users in the basin (downstream). The processes affecting flows may also affect water quality, as discussed in the next section.

Analysis:

Scenario 1: The “no programme situation: without the SAGCOT Programme, agricultural production in the Kilombero Valley looks set to steadily increase over the next 20 years, broadly in line with the predicted increase in population. There is unlikely to be any significant further expansion of large-scale commercial agriculture (there is little land reserved for commercial agriculture under the present VLUPs), although there may be some intensification due to planned investments such as paving of the road to Ifakara, the electrification of some villages, a bridge over the Kilombero River or improved ferry capacity etc.

Rice will continue to be the dominant crop throughout the basin (probably doubling over this period), closely followed by sugarcane in Kilombero district, with cropping patterns and irrigation demands following a similar pattern as at present, although steadily growing. It is estimated that the total water demand in the sub-basin will rise over the next 20 years from about 0.8 to 1.4 Mm³/day during the dry season. This compares to a current monthly average dry season flow in the downstream extents of the basin of around 17.3 Mm³/day (although this figure is somewhat uncertain, as discussed below). This would indicate that, in overall terms, the “no project” scenario should not lead to unsustainable exploitation of water resources, largely due to the facts that (a) the lack of available agricultural land will serve to constrain further irrigation water demands, and (b) the lack of commercial investment will limit the potential for the intensification of production on existing land. However, this is a very broad-level basin analysis, and the situation within individual catchments may vary considerably where local seasonal water balances will

prevail and if small-scale dry-season irrigation diversions become widespread, as happened in the Usangu Flats.

Scenario 2: Accelerated agricultural investment in line with SAGCOT model: from a water resources perspective, the SAGCOT Programme as currently planned will introduce a further 14,000 ha of irrigated rice and sugar production to the Valley over the next 20 years, in addition to diversification into other irrigated crops such as citrus (1,200 ha). It is estimated that the resulting increase in total irrigation water demand in the basin will be around 1.5 Mm³/day during the dry season. This is against a background of increasing non-commercial production and water demand as described above, resulting in a total projected demand (for all users) of approximately 3 Mm³/day (as discussed in *Section 7* earlier, the potable and other water uses in the basin are a small fraction of this amount, and so are not considered in this analysis.)

Based upon existing, unreliable river flow records at Swero (see *Section 7.3.4*), the average flow in the main river during the dry season is approximately 200 m³/s (or 17.3 Mm³/day). On this basis, the total projected agricultural water demand in the basin is less than 20% of the dry season flow, and is therefore unlikely to significantly affect environmental conditions or compete with other water users at the basin level. However, average dry season flows may very well be significantly lower than this (see *Section 5.2.5*); furthermore, conditions within individual sub-catchments may be somewhat different. For example, the estimated crop water requirements for the planned schemes within the Mpanga and Udagaji catchments are well in excess of the estimated dry season flows in these tributaries. Therefore, without the addition of significant water storage measures upstream (with associated infrastructure costs), the demand will not be met and the rivers will dry up in the dry season, repeating the problems experienced on the Great Ruaha but potentially on a larger scale. The development of large scale irrigated agriculture without compromising environmental requirements and downstream users will only be possible with significant wet season water capture, storage and dry season release.

Scenario 3: The SAGCOT Programme with environmental and social conditionality: under this scenario all irrigation developments would be based on the outcome of IWRM plans, applied at both basin and sub-basin levels. In addition, agricultural technologies would focus on maximising water use efficiency and minimising additional demand through the use of approaches such as the System of Rice Intensification (SRI).

Risk Management/Mitigation Options: Options to respond to these issues, that could be incorporated in the SAGCOT Programme, include: (i) the existing river gauging network within the basin needs to be re-instated/upgraded to monitor flows in all major tributaries (focusing initially

on those that are targeted for commercial agricultural development) and the flow records routinely quality controlled; this includes a systematic analysis and (if necessary) correction of the Swero flow record prior to 1970; (ii) rainfall/runoff modelling should be used to infill/extend historical flow records for the major tributaries where significant abstractions are planned, in order to more accurately estimate water availability and environmental flow conditions at these locations (e.g. through the development of flow-duration curves); the sensitivity of these estimates should be tested with respect to future climate change scenarios as described in the IPCC 4th Assessment Report (2007) and the upcoming 5th Report (2014); (iii) the above flow gauging data should be used to develop a dynamic (ie computational) basin-level water resources allocation model that can be used to test the feasibility of planned agricultural abstractions in combination with any other socio-economic development plans for the basin and environmental flow requirements at key points throughout the basin; this model could also be used to test the requirement for/feasibility of water storage measures within the basin; the analysis would be linked to the assessment of river water quality conditions in the Valley, as discussed in the next section.

It should be noted that much of the above work is already ongoing as part of the development of the *Rufiji Decision Support System* (Rufiji DSS) within the *Rufiji Integrated Water Resources Management and Development Plan* (IWRMD) project being undertaken by WREM International.

8.4.2

Water Quality

Issue: In common with much of the Rufiji basin, surface water in the Kilombero generally has relatively good chemical quality, but physical and bacteriological quality is often affected by anthropogenic sources. In particular, turbidity, colour and total suspended solids are often high (in comparison to natural conditions) mainly due to soil erosion and runoff induced by poor land-use practices and deforestation, and bacteriological contamination from untreated domestic and livestock wastes is widespread. These resource pressures have been increasing in recent years as the population centres in the basin have grown, and also as livestock numbers and overgrazing has become apparent in some parts of the basin. In addition, there has also been a gradual intensification of farming practices in many areas as agricultural demand has increased, and a move away from the more traditional fallow farming systems towards the application of manure and/or fertilizer to improve and maintain fertility, and the use of pesticides to control diseases and manage weeds. There has been consequently been an increase in nutrient and agro-chemical runoff and a gradual deterioration in water quality in some heavily farmed areas. In addition, there are also localised issues with pollution from organic waste by-products from agro-processing facilities, in particular from sugar refinery wastes in the Kilombero district. In this context, the introduction of the SAGCOT Programme may induce further

agricultural intensification that, if not well managed from an environmental standpoint, may increase diffuse water pollution from agro-chemical runoff and/or soil erosion, or pollution from enhanced agro-processing facilities. There may also be significant secondary impacts on water quality from induced economic in-migration coupled with a lack of effective wastewater controls or treatment.

Analysis:

Scenario 1: The “no programme situation: as discussed in the previous section, even without the SAGCOT Programme, agricultural production in the Kilombero basin looks set to steadily increase over the next 20 years, and there may be some further intensification in farming practices due to already planned infrastructure developments. In all, it is estimated that fertiliser consumption under the “do nothing” scenario will increase by around 30%. Although this still falls significantly short of optimal application levels for agricultural production, it is certainly enough to cause a significant increase in nutrient runoff into watercourses and groundwater in the basin. All the more so if the institutional controls and agricultural extension programmes that would be facilitated by the SAGCOT Programme are not yet sufficiently developed, and agro-chemical application is poorly managed as a result. In addition, the ongoing growth in population (coupled with absence of formal wastewater treatment) and livestock numbers will continue to put pressure on water quality in the basin. In short, the “no project” situation will most likely result in a continued and gradual deterioration in water quality conditions in those parts of the basin that are heavily populated and/or farmed.

Scenario 2: Accelerated agricultural investment through SAGCOT: from a water quality perspective, the principal risk introduced by the SAGCOT Programme is that it will support and stimulate agricultural intensification in the basin without achieving the necessary controls on agro-chemical use and soil conservation practices that will prevent further degradation of water quality. Likewise, the agro-processing industry is currently poorly regulated and can be a significant source of untreated organic effluent; the expansion of production capacity in the basin may serve to increase pollution levels from this industry. There are also risks of secondary impacts from the enhanced economic in-migration and development that SAGCOT may stimulate, coupled with a lack of effective wastewater controls or treatment in most populated areas.

However, the Programme also offers opportunities to enhance the environmental performance of the agricultural sector within the basin, through the training of outgrowers in best practices for fertiliser and pesticide application etc, and support to agricultural extension initiatives more widely.

Scenario 3: SAGCOT Programme with environmental and social conditionality: under this scenario all pesticides would be used within an Integrated Pest

Management (IPM) framework, with significantly lower potential hazards to water quality and freshwater resources.

Risk Management/Mitigation Options: Options to manage the water quality risks identified above, and that could be incorporated in the SAGCOT programme, include: (i) development of SAGCOT-specific guidelines on best practices for fertiliser and nutrient application and management, pesticide/herbicide application, on-farm soil and water conservation techniques and practices etc.; these could be developed from a wide array of existing materials that are available internationally, but basic farmer guidance materials need to be developed in the local language; (ii) dissemination of guidelines through planned investor and outgrower training and capacity building programmes; this process needs to clearly draw the linkages that exist between improved environmental performance and enhanced productivity/cost efficiency for farmers; (iii) development of sector-specific guidelines (and ultimately regulations) for the management and control of agro-processing wastes and wastewaters; (iv) the existing water quality monitoring network within the basin needs to be re-instated/upgraded to monitor key parameters (relating to the main anthropogenic sources in basin) in all major tributaries (focussing initially on those that are targeted for commercial agricultural development); ideally routine monitoring should take place on a monthly basis, and at least on a seasonal basis; (v) the aforementioned dynamic (i.e. computational) basin-level water resources allocation model should be developed to include basic water quality analyses using the above data; the model could then be used to define the links between water quality and flow conditions in the basin, and to thereafter target specific water quality control measures more effectively in future (e.g. through land-use controls, regulation of point-source discharges, wastewater treatment or controls etc).

8.5 *ISSUES RELATED TO BIODIVERSITY*

8.5.1 *Loss of Habitats and Connectivity*

Issue: The Kilombero River, floodplain, surrounding alluvial fans and forested mountains are habitat for a range of rare and unusual plants and animals, some of which are threatened, endangered and/or migratory. Recognising this, much but not all of the landscape has been formally designated as one or another type of protected area - National Park, Nature Reserve, Forest Reserve, Game Controlled Area, Ramsar Site, World Heritage Site. These habitats constitute "critical natural habitat" within the definitions of the Bank's OP 4.04 *Natural Habitats*, but have been subject to significant degradation and conversion which is ongoing. The most serious threat to the Valley's habitats is the growing human population (through both natural increase and in-migration) which seeks land for farming and grazing, wood

resources for fuel, and fish and wildlife for protein and sale. Further details of the situation concerning habitat degradation, fragmentation and loss of connectivity are given in *Section 5.3.3*.

Analysis:

Scenario 1: Under this scenario existing pressures will continue and increase, with further significant impacts on habitats and therefore on wildlife and ecosystem productivity. The Kilombero floodplain will experience further degradation as the hydrology changes, responding to declines in watershed quality, the diversion of summer flows by informal dams and weirs, trampling by livestock, and fire. The Ruipa corridor, one of the last two north-south corridors connecting the Udzungwa mountains with the Selous, will be definitively destroyed (not just blocked: the habitat will no longer exist; it is already probably not viable for large mammals), a process including further severe degradation of the unprotected Nawai forest. The Nyanganje corridor east of Ifakara will be severely compromised, if not irreversibly blocked. Population pressure will threaten the east-west Mngeta corridor which connects Udzungwa National Park with the Uzungwa Scarp Forest Reserve (see Rovero *et al.*, 2010). Other forests and remaining miombo woodland will come under extreme pressure for fuelwood and poles, especially those east of Ifakara and adjacent to the well-protected Udzungwa National Park, including Magombera Forest. Impacts will extend as far as the forests in the Mahenge Mountains to the south of the valley, affecting, e.g., Mselezi Forest Reserve where human disturbance is already intense and widespread.

Scenario 2: The additional investments foreseen under this scenario would exacerbate the existing pressures, with the addition of greater threats to freshwater and other wildlife from pesticides.

Scenario 3: Agricultural development under this scenario implies investment within an agreed and enforced land and water management framework that takes into account ecosystem values, hydrological constraints and social development requirements. The valley's remaining biodiversity would be protected and north-south ecological connectivity restored.

Risk Management/Mitigation Options: Measures to avoid and/or mitigate the serious negative environmental (and eventually economic) consequences of continuing uncontrolled development include (i) development of a strategic land use plan for the region (from the Selous to the Udzungwas that takes into account ecosystem constraints and the requirements for ecosystem sustainability by protecting critical habitats and both protecting and restoring connectivity; note that the current government and donor interest in the area provides an excellent opportunity for creating and funding the necessary coordinated planning processes; specifically, (ii) establish, demarcate and enforce the regulations concerning the new, smaller GCA; (iii) the GCA will not function to preserve wildlife especially of puku unless wet-season refugia

and escape areas are re-established and protected on the higher ground around the floodplain (which is prime land for settlements, crops and grazing); (iv) actively protect and restore the Nyanganje, Ruipa and Mngeta wildlife corridors; and (v) campaigns to change attitudes towards nature including when, how and when not to use fire as an agricultural management tool.

8.5.2 *Impacts on Wildlife*

Issue: The Kilombero Valley is the habitat of three species of endemic birds (found nowhere else), harbours the largest population in Africa of the Near-Threatened wetland antelope, the Puku, and until recently supported major populations of buffalo, elephant and other large mammals including the highest density of lion in Africa. This wildlife is dependent on the seasonally-flooded grasslands and the surrounding non-flooded hills, formerly miombo woodland. The wooded areas to the south and east of the valley (especially the Selous Game Reserve) and the forests to the north in the Udzungwa Mountains support many other endangered and endemic species such as the monkeys Sanje Mangabey, Udzungwa Red Colobus and the newly-discovered and Critically Endangered Kipunji or Highland Mangabey. The Valley formerly linked these two woodland and highland areas but now divides them, with the last wildlife corridors closed or closing fast. Further degradation and loss of habitat and increased hunting pressure is likely to result in further drops in populations of wildlife (see *Figure 5.1.4*) and may cause localised extinction of endangered species.

Analysis:

Scenarios 1 and 2: Under both these scenarios (no action and accelerated agricultural development), wildlife habitats will be further degraded and lost and hunting pressures will increase. Specific concerns are noted below:

- **Birds:** Habitat loss is the greatest threat to many bird species in the valley. The Kilombero Weaver and the two newly identified cisticolas will probably not be affected by loss of reeds or tall grasses as these are common throughout the floodplain. However, a change in the flooding regime could alter the habitat used by these species, allowing the Golden Weaver to out-compete the endemic Kilombero Weaver in the central floodplain (Starkey *et al.*, 2002). The expansion of sugarcane near Ifakara and rice west of Ifakara are potential threats to some bird species due to land conversion and loss of habitats, especially grassland which is essential for birds such as Wattled and White-crowned Plovers. Intensive grazing by cattle provides an additional threat due to the degradation of grassland, fire, and loss of trees in grazing areas. In addition, some birds could be affected by pesticides through direct poisoning, bio-accumulation and veterinary medicines, but there are no local data on this issue.

- **Puku:** Aerial surveys during the 1989, 1994 and 1998 dry seasons showed the puku population to be stable at around 50,000-60,000 animals, but a survey in December 2008 showed a dramatic downward turn with less than 20,000 animals recorded (MNRT, 2010a). Puku move to the edges of the floodplain during the wet season when large areas of grassland are flooded. Threats to the puku population include further habitat degradation through over-grazing by domestic herbivores, fire, conversion to farmland, the expansion of human settlements and unregulated hunting for bushmeat, especially near settlements during the wet season and in the more accessible parts of the floodplain during the dry season (MNRT, 2010a). The remaining puku population is likely to be severely affected by the changes in habitat and population increases associated with both Scenarios 1 and 2.
- **Sanje Mangabey:** So far, the endemic Sanje Mangabey has been found in only two forests: Mwanihana within Udzungwa National Park, and the Uzungwa Scarp Forest Reserve. Estimates indicate that less than 1,500 individuals of this species remain. At present, only the Mwanihana population is protected effectively: studies using disturbance transects have found that the Uzungwa Scarp Forest Reserve is not protected very effectively. The increasing human population in the Kilombero Valley, in combination with cultural preferences of certain groups for monkeys as bushmeat, is likely to severely threaten the Uzungwa Scarp Forest Reserve population of the Sanje Mangabey (50% of the entire world population: CEPF 2007a).
- **Red Colobus:** The endemic Udzungwa Red Colobus monkey is found in many of the forests of the southern Udzungwa Mountains. Most of the red colobus populations exist in relatively small forest patches, which may not be effectively protected. Consequently their vulnerability to extinction is relatively high (CEPF, 2007a). At 1,002 individuals, the population of red colobus in the Magombera forest has the highest density anywhere in the world, but its conservation status in this degazetted Forest Reserve¹ is unclear (Marshall, 2007). The species is more adapted to lowland semi-deciduous forests than the higher elevation evergreen forests in other locations. However, the colobus' abundance in Magombera may be a result of compression by forest clearance in surrounding areas. If this is true, the population is probably unstable and a decline can be expected (Marshall, 2007).
- **Kipunji:** One of the only two known populations of the new monkey species, the kipunji or highland mangabey (*Rungwecebus kipunji*) was

(¹) The forest was degazetted in 1982 in preparation for annexation to Selous Game Reserve. This is still pending, partly due to the complications of providing ILLOVO - with claims to 10 km² of land needed for conservation, some in Magombera - with alternative land at Ruipa.

discovered in the poorly protected Ndundulu Forest Reserve adjacent to Udzungwa NP in 2004 (Jones, 2006; CEPF, 2007a). The combined area of occupancy of the two populations is only 13.97 km² (www.iucnredlist.org/details/136791/0), and the kipunji is classified as Critically Endangered. Any further increase in population in the Kilombero Valley and associated demand for forest products and bushmeat has the potential for accelerated local extinction of this species.

- **Elephant:** Elephant were formerly frequent users of the valley, but since construction of the railway, then the road, and more recently the massive encroachment by farmers and herders, numbers seen in the valley have greatly diminished (*Figure 5.1.4*). Following the rebuilding of poaching networks in East Africa, there are now reports of elephant poaching at various locations in the valley including within KVTC's plantations (pers. comm., Hans Lemm). There is also anecdotal evidence that as a result of improved protection by TANAPA following the establishment of Udzungwa National Park, elephant numbers in the Udzungwa forests are rising. Some still cross between the Udzungwas and the Selous in the area of the Nyanganje corridor (pers. comm., Joram Ponjoli). Human-wildlife conflict is likely in this area, especially due to paving the road, increased heavy vehicle traffic and speeds, improved access and disturbance, and further habitat conversion to farms.

Scenario 3: As noted above, under this scenario agricultural development implies investment within an agreed and enforced land and water management framework that takes into account ecosystem values such as value for wildlife (and tourism and hunting), hydrological constraints and social development requirements.

Risk Management/Mitigation Options: management of risks to wildlife requires two fundamentals: protection of habitat and protection from unsustainable hunting and other forms of human predation (e.g. poisoning of lions by herders). Protection (and restoration) of habitat is considered in *Section 8.5.1* above. Protection from unsustainable hunting requires changes in both attitudes and practices, e.g. (i) enforcement of hunting regulations and control of poaching (currently problematic due to lack of wildlife management data, low capacity and corruption); and (ii) changes in deep-seated cultural practices and traditions (e.g. Wasukuma attitudes towards predators, or Hehe preferences for monkeys as bushmeat). Another critical requirement (iii) is better data on both charismatic and endangered wildlife (elephant, puku) and on other taxa such as birds (more research and monitoring is required since very little is known about the ecology of the endemic bird species beyond the northern boundaries of the valley (Starkey *et al.*, 2002)).

Issue: The Kilombero River and its tributaries support a large, diverse and little-understood fishery and aquatic ecosystem. Until recently the fishery was a major economic sector in the Valley. The freshwater habitats are already under threat from hydrological changes resulting from land use change and water abstraction, and there is some evidence of recent declines in catches as a result of intensified fishing pressure and high-impact fishing methods (netting of spawning runs, use of poisons, use of small-mesh nets). Acceleration of land use change, agricultural intensification, water abstraction for irrigation, land drainage, use of pesticides, and improved fish markets due to population increase and improved access are likely to have severe negative impacts on habitats, fish diversity and the sustainability of the catch. Additional threats are the various hydropower dams proposed for several tributaries and for the main stem of the Rufiji river (Steigler's Gorge) since these, like all other major dams, have the potential to irreversibly interrupt existing but little-documented upstream-downstream fish movement.

Analysis:

Scenarios 1 and 2: Under both these scenarios (no action and accelerated agricultural development), the fisheries sector is likely to experience continued decline due to a combination of reduced permanent and seasonal freshwater habitat extent and quality, reduced dry season flows, reduced water quality (including possible pesticide contamination), and increased fishing pressure.

Scenario 3: Under this scenario (green growth) there is likely to be some reduction in habitat extent and quality but not as much as with unmitigated growth, there will be increased use of pesticides but these will be better managed through IPM approaches, and therefore impacts on water quality will be less, and resources will be directed towards improved fishery management, thereby encouraging sustainability in the fishery sector.

Risk Management/Mitigation Options: The following measures are recommended to mitigate the potential impacts of Scenarios 1 and 2, and would be necessary components of Scenario 3: (i) applied research to understand the freshwater ecosystem, focusing on diversity, population sizes and behaviour in relation to hydrology and habitats, (ii) applied research to understand the fishery, focusing on its importance in terms of livelihoods, methods, social aspects and sustainability, (iii) inclusion of fisheries as a major economic sector in all land use and economic planning mechanisms affecting the Valley, (iv) establishment of close ties between the fisheries sector and water planning, i.e. integrated water resources management (IWRM) planning at basin and sub-basin levels, particularly in relation to flood management and environmental flows, (v) ensure that the fisheries sector is closely involved with planning for pesticide management and approval of IPM plans for use in

the Valley, (vi) establish a water quality monitoring system including pesticides and well as more basic parameters, and (vii) significantly increase the capacity of the two District administrations to monitor, regulate and capture revenue from the fishery sector as well as provide technical support for fishing technologies, processing and marketing.

8.6 *ISSUES RELATED TO GOVERNANCE*

8.6.1 *Social Capital and Cohesion*

Issue: The SAGCOT Programme's success depends on it operating within a wider, enabling environment both in terms of services and infrastructure, but also public support. Many issues of infrastructure and services have been addressed in previous sections (e.g. health and transport). In addition to these, it will be important for SAGCOT to maintain good relations with neighbouring communities, not contribute to (or be seen to contribute to) increasing social tensions, and maintain a positive image in the eyes of the public. To this end, a number of issues will be important:

Local Relationships

- The support of local communities will depend on maintaining good relationships. This starts with the process of land allocation and benefit sharing, the basis for out-growers/cooperative schemes, employment conditions and support for local initiatives such as education & health care. Lack of performance, either real or perceived, will lose investors their social licence to operate in the area.

Social Tensions

- Investment under the SAGCOT Programme has the potential (both perceived and real) to contribute to tensions arising from increased pressure on land. This is manifest in conflicts between pastoralists and sedentary farmers and encroachment on protected areas. Although their part in these issues may be indirect, investors may become the focus of unrest as they are not currently popular amongst some stakeholders.

Public Image and Awareness

- There appear to be mixed feelings about the role that foreign investors are playing in agricultural development in Tanzania. Perceptions include support being given to foreign investors at the expense of Tanzanian entrepreneurs, land allocation being seen as 'land grabbing', mistrust of the system as a result of media reports of previous agreements being reneged on, the perception that investors get preference over support to small-scale farmers (e.g. recent changes to the rice export policy), and a

general suspicion of Government initiatives that involve investment due to perceived inherent corruption.

Analysis:

Scenario 1: Many of the issues surrounding potential social tensions, local relationships and awareness will continue under Scenario 1, since they relate to wider issues to do with land use, competition for land, population growth and the high dependency of rural populations on agriculture for household income. Improvements in infrastructure, inputs and technology will lead to increased yields, while population increase will contribute to pressure on land. As different development projects and investors interact with this environment, they will elicit various levels of public response, depending on who they are, how well they engage and operate.

Scenario 2: Under this scenario, impacts on social capital will depend on the nature and robustness of the arrangements made by investors with residents, smallholders and outgrowers. Good communication will be essential to achieving positive outcomes, as will good monitoring of performance.

Risk Management/Mitigation Options:

Local relationships: Possible mitigation measures include (i) fair and transparent employment conditions; (ii) fair and transparent arrangements for outgrowers, contract farming and other engagements with local producers (clear information about prices, market value, distribution of profits, etc.) and support to build capacity of local groups, transfer technology and extension; (iii) fair and transparent arrangements for land allocation and benefit sharing; (iv) support for local services such as education and healthcare (with care taken not to subvert Government responsibility for these activities); (v) good communications between investor and local community/pastoralists, with clear grievance mechanisms; (vi) awareness campaigns, local development initiatives and other initiatives; (vii) gender sensitivity in all aspects of operation, with clear gender policy in place to prevent unequal distribution of benefits, or unintentional increase in burden of work.

Social tensions: Possible risk management measures include (i) ensuring pastoralists are involved in any allocation and benefit sharing arrangements; (ii) good communications and awareness with stakeholders, making best use of all tools to do so – media, radio, posters, campaigns, meetings, etc.; (iii) support and funding for research by independent bodies into the impact of commercial agriculture on issues of social concern, in order to better understand impacts (both positive and negative) and communicate these impartially to wider stakeholders; (iv) investors take ownership of their contributions to tensions in their area, through support to local grievance/conflict resolution systems, as well as setting up their own systems so that local communities can communicate directly with them.

Public image and awareness: (i) further development and implementation of the SAGCOT Programme communications strategy, which aims to improve stakeholders' understanding of the initiative; there is a real need to help stakeholders at all levels, from Government (local, district and national) as well as civil society and private sector, understand the SAGCOT Programme and what it is trying to achieve; this should link in very closely with the wider Kilimo Kwanza initiative, so that it is clear SAGCOT is not stand-alone; (ii) transparency in decisions and decision-making processes, including investment (publishing the amount of funding, who it goes to and what the expected returns will be); (iii) investment in proactive communications campaigns, including public meetings in the SAGCOT cluster, and with local officials, etc.; production of easy to digest literature on the initiative, such as posters, leaflets, radio announcements, etc.; (iv) plan for SAGCOT to produce regular updates on progress – promoting positive stories of out-grower beneficiaries, employees, promotion of technology, etc., on a quarterly basis, at a national and regional/district levels.

8.7

CONCLUSIONS

Continuation of the existing situation - the business as usual approach - is likely to result in further rapid loss of habitat quality and biodiversity with associated declines in ecosystem functioning and ability to support livelihoods (water, grazing, wood etc.). Accelerated development in the absence of strategic land use and water planning is likely to intensify the existing negative trends, with (eventually) potentially severe negative economic consequences if investments do not take into account natural constraints - especially hydrology - and if they do not strive for local social acceptability.

In contrast, the current interest in rapid development provides a major opportunity to "do it right by doing it differently", i.e. by stepping back, obtaining full information on critical resources - water and land - and creating a comprehensive planning framework that will result in a win-win situation. The Kilombero Valley has lost much of its natural heritage, but there is still much to be preserved, and this would have significant economic benefits for the valley's residents.

Table 8.1 *Potential Environmental and Social Issues Arising from Scenarios*

Ref.	Activity / Topic	Receptor	Positive / Negative	Potential Impact/Risk	Risk Management / Mitigation Options
<i>Land</i>					
	Land for investment	Local communities smallholder farmers (emergent farmers) Pastoralists Investors	+/- - +	Vested interests may skew acquisition process; lack of participation, lack of transparency, increased pressure on remaining land	Creation of an independent Land Bank, separated from investment allocation and negotiation; effective participation & transparency in identification & allocation process; strong linkages into local planning priorities
	Land for smallholders and pastoralists	Local communities Migrants Biodiversity/Protected areas/wildlife Pastoralists Smallholders Women	- - - - - -	Reduced land availability, shorter/no fallow, soil degradation; increased pressure on grazing areas, reduced productivity; knock-on effects on remaining habitats and wildlife; increasing poverty	Investment in inclusive local planning processes; participation of women & pastoralists in decision making; strengthening land tenure system in relation to women & pastoralists; investment in non-land based alternatives; community involvement in wildlife management; investment in education
<i>Socio-economics</i>					
	Inclusion of smallholders in value chains	Local communities Emergent farmers Smallholder farmers Subsistence farmers Investors Pre-existing farmer groups	+/- + in proximity to investors +/- - +/- +/-	Greater employment opportunities; shift away from subsistence crops; change in local market prices & food crop availability; inclusion limited to proximity; most farmers unable to take risk; capacity of local groups built; pre-existing groups may lose members; investors extend production; investors have to invest in capacity building & other support activities.	Adopt international standards for responsible agro-investment; investment in agricultural extension, group capacity building and broader subsistence activities (e.g. vegetables) to ensure participating smallholders gain; investment in farmer-to-farmer extension and support services so that lessons from out-growers can spread; adoption and monitoring of appropriate outgrower/contract agreements; regulation of formal and informal transport taxation/charges; improvement of market related information exchange; investors encouraged to work in partnership with NGOs to support engagement activities
	Gender	Rural women Female headed	+/- -	Increased workload on women, while benefits captured by men;	Investment in education for boys and girls; investment in adult education; review of land

Ref.	Activity / Topic	Receptor	Positive / Negative	Potential Impact/Risk	Risk Management / Mitigation Options
		households Rural households	+/-	lack of adequate representation in decision making; loss of land through lack of recognition of rights; greater employment opportunities; unequal pay & conditions;	tenure legislation and traditional practices to identify areas where women's representation can be improved; promotion of labour saving technologies such as fuel efficient stoves; investment in wells & boreholes to reduce transport of water; continued implementation of Tanzania's gender equality policies; incorporation of gender in SAGCOT practices
	Health & Safety	Rural communities	+/-	<i>Healthcare system:</i> Pressure on existing health services;	Upgrade Government healthcare systems;
		Migrant workers	-/+	inequalities in healthcare; changes in ability to pay; <i>Nutrition:</i> changes to food availability; localised	ensure investors' commitment to health provision for both workers (including insurance schemes) and local communities; Health Impact Assessment of projects; monitoring local food security, the price of staples and health indicators, especially of children; promote backyard food crops (vegetables, fruits); invest in domestic water supplies; promote latrines and WatSan knowledge; establish safe workplaces and provide training and safety equipment to workers
		Sex workers (full-time & transactional)	-	change in incidence of malnutrition; less resilience to drought; loss of crop diversity; change in farming systems;	
		Employees	+/-	<i>Transmission of disease:</i> increased incidence of HIV amongst some groups; increased incidence of vector borne diseases associated with changes in land use and intensification of agriculture;	
		Rural households	+/-	<i>Hygiene & sanitation:</i> increased pressure on sanitation & water resources; pollution with faecal matter & pesticides; <i>Occupational health:</i> exposure to pesticides & other agrochemicals; increase in accidents at work or on roads;	
		Children	-/+	<i>Working conditions:</i> increased accidents and exposure at work.	
		Elderly	-/+		

Ref.	Activity / Topic	Receptor	Positive / Negative	Potential Impact/Risk	Risk Management / Mitigation Options
<i>Water</i>					
	Water availability, seasonality & environmental flows	Aquatic ecosystems Other water users (local communities, smallholder farmers)	- -	<p>Increased irrigation demand from SAGCOT against background of increasing non-commercial production and potable water demand, poorly quantified resource and valuable wetland based ecosystems.</p> <p>Opportunity to enhance water resources planning processes through support to ongoing initiatives (eg Rufiji Basin)</p>	<ul style="list-style-type: none"> - Re-instate/upgrade flow monitoring network in all major tributaries, and quality control data - Rainfall/runoff analysis to infill/extend datasets and more accurately estimate water availability and environmental flow conditions at key planned abstraction sites - Use data for dynamic (ie computational) basin-level water resources allocation model to test agricultural abstractions against other socio-economic development plans for basin and environmental flow requirements - Ensure Rufiji Basin and sub-basin water resource plans are based on reliable data and fully integrated with agricultural development, energy development and other development plans, and <i>vice versa</i>
	Water quality	Aquatic ecosystems Other water users (local communities, smallholder farmers)	-/+	<ul style="list-style-type: none"> - Agricultural intensification may increase water pollution from agrochemical runoff and/or soil erosion, or pollution from agroprocessing facilities (pesticides, nitrogen, phosphorus and wastes with high BOD are all potential issues). - Potential for secondary WQ impacts from induced economic in-migration coupled with lack of wastewater treatment. - Opportunity to enhance environmental performance of agricultural sector by training outgrowers in best practices, 	<ul style="list-style-type: none"> - Develop and disseminate SAGCOT-specific guidelines on best practices for fertiliser/nutrient use, pesticide/herbicides, soil and water conservation etc - Develop sector-specific guidelines (and ultimately regulations) for the management and control of agro-processing wastes, both solid and liquid, emphasising waste minimisation, re-use and energy recovery - Re-instate/upgrade WQ monitoring system in all major tributaries - Incorporate WQ analyses in basin model, and use to define linkages with flow conditions and to target WQ control measures more effectively

Ref.	Activity / Topic	Receptor	Positive / Negative	Potential Impact/Risk	Risk Management / Mitigation Options
				support to agricultural extension initiatives etc.	
Biodiversity					
	Habitats and connectivity	All terrestrial and freshwater habitats in Kilombero Valley	- + if planned and enforced	Continued rapid degradation of all natural resources and habitats - land, vegetation, water (both physically and potentially by agrochemicals); final and permanent closure of last remaining wildlife corridors across Valley (Ruipa, Nyanganje); degradation of forest habitats especially in Udzungwas. Opportunity for habitat protection and restoration of connectivity.	Develop strategic land use plan for region based on comprehensive surveys of wildlife, habitats, hydrology, existing land use, land tenure and VLUPs, and focusing on protecting critical habitats and restoring connectivity. Enforce regulations concerning the new, smaller Kilombero Game Controlled Area. Re-establish wet-season refugia for puku. Protect and restore the Nyanganje and Ruipa wildlife corridors. Design and implement conservation and wildlife awareness campaigns. In agricultural sector, establish, implement and enforce an IPM approach for all crop protection and also for livestock health management.
	Wildlife	All large wildlife in Kilombero Valley and surrounding forests, especially endangered Puku (antelope); some endemic birds	- + if planned and enforced	Further loss and possible local extinction of a variety of endangered animals and birds, some of which are endemic (found nowhere else); of main concern: Puku (wetland antelope); Sanje Mangabey, Udzungwa Red Colobus and Kipunji (monkeys); and the Kilombero weaver; loss of associated existence values and tourism potential; increased elephant-human conflict. Opportunity for protection and restoration of wildlife and re-establishment of tourism and commercial hunting.	Requires protection and restoration of habitat, and protection of wildlife from unsustainable predation (by humans). For habitat protection see above. For protection from humans: enforce the hunting regulations (requires significant upgrade in capacity, reduced corruption and better information); change residents' attitudes (a long-term process) requiring targetted campaigns. A further requirement is much better data on both charismatic and endangered wildlife (e.g. puku, elephant) and other taxa (such as birds), implying wildlife surveys.

Ref.	Activity / Topic	Receptor	Positive / Negative	Potential Impact/Risk	Risk Management / Mitigation Options
	Fish	Fish and the fishery	- (+ if managed)	Reduced dry season flows, drainage of ponds, interruption of spawning movements, reduced water quality (pesticides), increased fishing pressure, loss of fish diversity and productivity of fishery, loss of associated employment and economic benefits	Applied research to fully understand the aquatic ecosystem and fishery (including social aspects); Inclusion of the fishery in all Valley planning fora and mechanisms; Establishment of close links between fishery sector and IWRM planning; Ensure fisheries sector is involved in development of IPM approaches and plans; Establish water quality baseline and monitoring system, focusing on pesticides; Upgrade the capacity of Kilombero and Ulanga district administrations to manage the fishery
	Pesticides	Local residents and communities Pastoralists Local administrations	Scenario 1: - Scenario 2: - Scenario 3: =/-	Intensive use of pesticides in effectively unregulated conditions with inadequate operator training, especially but not only on rice, likely to result in runoff into waterways and effects on aquatic organisms, with biomagnification up the food chain; also direct risks to operators and indirect risks to operators' families.	Development and implementation of integrated pest management (IPM) measures, combined with training and awareness and enforcement; also requires upgrading of national crop protection administration.
Governance					
	Social capital and cohesion	Local residents and communities Pastoralists Local administrations	-/+ - -/+	Lack of perceived fairness in land acquisition and lack of perceived benefits during project operation may jeopardise local acceptability; large-scale investments may directly or indirectly marginalise some residents / land-users Improving local economy provides opportunity for growth of social capital	Fair and transparent procedures for land allocation, acquisition and benefit-sharing; fair and transparent employment conditions; fair and transparent arrangements for outgrowers; support for local services such as education and health care; inclusive planning mechanisms (with participation of, e.g. pastoralists, women); gender sensitivity in all plans and programmes; upgraded SAGCOT communications programme, especially at local level.

9 CONCLUSIONS AND RECOMMENDATIONS

9.1 INTRODUCTION

This chapter provides a summary of the key risks identified by the assessment, and also the key opportunities provided by the SAGCOT Programme. This includes a list of recommendations. Both the risks and the recommendations are broken down into three categories: the proposed World Bank-supported SAGCOT Investment Project, the Kilombero Valley, and the SAGCOT Programme as a whole.

9.2 RISKS AND OPPORTUNITIES

9.2.1 Key Risks

On the basis of the significance of negative environmental and/or social impacts and their likelihood of occurrence, the following key risks have been identified:

World Bank-supported SAGCOT Investment Project

World Bank project Component 1: Strengthening Agribusiness Support

Institutions: moderate risk as a result of enhanced capacity to attract investment and the difficulty of developing, applying and enforcing appropriate environmental and social safeguards to the institutions' activities and associated investment operations.

World Bank project Component 2: SAGCOT Catalytic Fund: low to no risk due to the small scale of the proposed investments under the Matching Grants Fund and feasibility of mitigation, and **low risk** as a result of operation of the Catalytic Fund as a whole, assuming environmentally and socially responsible operation of the Social Venture Capital Fund.

Kilombero Valley

Kilombero Valley: high risk from accelerated agribusiness investment due to the very high biodiversity values at risk, the presence of vulnerable groups and indigenous people, the absence of regional land use planning and lack of awareness/ recognition of village land use plans (and the associated risk of social conflict arising from this), the requirements for strengthening government institutions and a need for more, and more accurate, data, especially on hydrology. The highest concerns relate to potential implications of SAGCOT investments for natural habitats and pest management, including (in the case of investment under the Bank-supported SAGCOT Investment Project) compliance with the Bank's OP 4.04 on *Natural Habitats* and OP 4.09 on *Pest Management*. Effective implementation of the ongoing village land use planning (VLUP) programme, provided it adheres to principals of inclusion, informed choice, participation and transparency,

should help to mitigate possible risks of involuntary displacement or resettlement.

SAGCOT Programme as a Whole

SAGCOT Programme as a whole: high risk from accelerated agribusiness investment for the same reasons as given above for the Kilombero Valley, especially if SAGCOT cannot adequately resolve existing and intensifying competition for environmental resources and services. In particular, by attracting people to land adjacent to Eastern Arc Mountain forests, SAGCOT-related investments risk increasing pressure on the forests and their biodiversity as a result of fuel wood collection, hunting, charcoal production and timber harvesting. Adequate mitigation measures to avoid this will be essential.

Reputational risk: the possibility of negative public perception of government policy and development partners is considered **high** due to the potential for significant negative environmental and social impacts arising from some SAGCOT Programme activities.

9.2.2 *Key Opportunities*

It is clear that the existing situation is untenable both socio-economically and environmentally, with lack of widespread success in creating exits from poverty and ongoing unmanaged and unsustainable natural resource exploitation and degradation. Despite the risks noted above, the SAGCOT Programme provides an opportunity to turn this situation by:

- (i) providing resources for resolving resource tenure issues;
- (ii) building natural resource management capacity; and
- (iii) creating mechanisms to bring sustainable benefits to rural residents.

To achieve this it will be necessary to increase the focus of approaches to both policy and practice in relation to land tenure and land use planning, resource management, environmental and social conditionality, consultation and transparency, and institutional mandates and capacity for ensuring compliance and monitoring.

9.3 *RECOMMENDATIONS*

Taken together, the following 11 sets of recommendations and 32 sub-recommendations address both the key risks and the key opportunities identified above. The recommendations have been grouped in relation to (1) World Bank supported SAGCOT Investment Project, (2) the Kilombero Valley, and (3) SAGCOT Programme as a whole. Proposed responsible lead organisations are noted in **bold**.

The recommendations are summarised in *Table 9.1*.

It should be noted that it would be possible to make many further recommendations concerning agricultural development, resource management, economic development, social issues and governance in Tanzania. However this level of detail is more appropriate for programme or project design. The main recommendations made here focus on management of key risks and impacts at a strategic level.

9.3.1 *World Bank-Supported SAGCOT Investment Project*

The following recommendations are intended to cover the safeguard issues associated with the proposed World Bank-supported SAGCOT Investment Project.

1. *Catalytic Fund*

The logical lead agency for implementation of these recommendations is **Catalytic Fund management**.

1.1 *Resettlement Policy Framework*: apply the measures described in the RPF to all sub-projects under the Catalytic Fund where these involve land acquisition, including agreeing a common approach between the Matching Grants Fund and the Social Venture Capital Fund. The RPF is designed to fill the gaps between Tanzanian law and practice and the requirements of the Bank's *OP 4.12 Involuntary Resettlement*, most importantly in relation to:

- Extent of coverage (to include persons with non-formal property rights).
- Timing of payments (to be done before not after loss of assets).
- Relocation and resettlement (assistance with resettlement to be provided).
- Livelihood restoration (measures to ensure effective livelihood restoration to be provided).
- Consultation (to be more inclusive and to be used in planning).
- Grievance redress mechanisms (to be created and/or improved).

1.2 *Environmental and Social Management Framework*: apply the measures in the ESMF to all sub-projects under the Catalytic Fund, including agreeing a common approach between the Matching Grants Fund and the Social Venture Capital Fund. The ESMF is designed to ensure the compliance of sub-projects with both Tanzanian law on EIA and World Bank safeguard policies.

1.3 *Other Safeguards*: as part of RPF and ESMF implementation, it will be important to screen the proposed sub-projects against the requirements of the *Indigenous Peoples Planning Framework* (IPPF, currently in draft) and *Pest Management Plan* (see (4.3) below) and to ensure compliance with the World Bank's Operational Policy 4.04 on *Natural Habitats* with regard to addressing potential issues of forest degradation associated with agricultural development. The Catalytic Fund should also require recipients to avoid activities that would result in a net increase in emissions of greenhouse gases due to the clearance of natural forest and woodlands, in alignment with the National REDD Strategy.

1.4 *Eastern Arc Mountains*: linked to the above, the Catalytic Fund should exclude any initiatives that do not adequately address (through effective implementation of regulatory EIA and participatory planning processes) the potential direct or indirect risks of clearance or degradation of the Eastern Arc Mountain forests as a globally important Critical Natural Habitat.

1.5 *Catalytic Fund capacity*: provide Catalytic Fund management with the staff, training and budgets necessary for implementation of recommendations (1.1) and (1.2).

2. PMO

The logical lead agency for implementation of this recommendation is the **Prime Minister's Office** (PMO).

2.1 *Investment Principles and Guidelines*: foreign direct investment should be accompanied by effective environmental and social safeguards on the ground. Therefore it is recommended that GOT not only ensure that investors subscribe to the *Principles for Responsible Agricultural Investment that Respects Rights, Livelihoods and Resources* (PRAI) but also commit to following the *Voluntary Guidelines for Land Tenure, Forestry and Fisheries* or the equivalent Tanzanian guidelines (currently under development through an FAO-assisted initiative)¹, together with the establishment of effective monitoring and compliance mechanisms (see also (2.3) above). This will require strengthening of responsible line agencies and LGAs, the creation of a SAGCOT environmental and social monitoring system, and the inclusion of environmental and social conditionality in licensing mechanisms such as the Certificate of Incentives issued to investors by the TIC.

3. Environmental and Social Safeguards and Monitoring

3.1 *World Bank-supported SAGCOT Investment Project*: confirm the institutional location for environmental and social safeguards monitoring and reporting in relation to the World Bank project: either (i) the Project Coordinating Unit (PCU), or (ii) the SAGCOT Centre, and provide the responsible organisation with the necessary staffing, training and budget.

3.2 *Monitoring of the Wider SAGCOT Programme*: the purpose and mandate of the core SAGCOT institutions has yet to be defined with respect to environmental and social policy coordination, implementation and monitoring. Therefore World Bank institutional support could usefully be directed towards a review of the mechanisms for implementing the investment guidelines now under development (see recommendation (3.1)), and to associated institutional adjustments. Note that the basic biophysical indicators requiring measurement in order to monitor programme impacts fall naturally into three categories, and the Bank could usefully extend support to the concerned agencies:

¹ "Corporate Social Responsibility Guidelines for Responsible Agriculture Investments"

- Land: (i) forest and grassland cover and condition, and (ii) extent of cropland. Both of these can be generated by analysis of satellite imagery with limited ground-truthing.
- Water: (i) flows, and (ii) water quality. Flows require physical measurement at gauging stations, water quality requires sampling and analysis – or, preferably, application of biomonitoring approaches which are much cheaper (and have already been pioneered in the Kilombero Valley by KVTC).
- Biodiversity: (i) mammals, specifically endangered species such as puku, (ii) birds, especially endangered endemic and migratory species, and (iii) fish. Biodiversity monitoring requires regular repeat surveys on the ground (or for large mammals, from the air) using an identical procedure each time.

3.3 *Integrated Pest Management*: implementation of integrated pest management (IPM) approaches to crop protection (and also to livestock husbandry) would have many ecological, social and economic benefits, as well as ensuring compliance with the World Bank's Operational Policy 4.09 for any Bank-supported sub-projects. Pest management is a major subject requiring further support. It is recommended that World Bank institutional support to SAGCOT include formulation of a project for significant technical assistance in the promotion of IPM as standard practice for SAGCOT investors and associated smallholder/outgrower operations. This initiative would logically be lead by the **Ministry of Agriculture, Food Security and Cooperatives** (MAFC).

9.3.2

Kilombero Valley

These recommendations are intended to be taken up by the **PMO, SAGCOT Centre and partners** as part of urgent development of the planning framework necessary for sustainable accelerated agricultural development of the Kilombero Valley.

4. Water

The logical lead agency for these actions is the **Ministry of Water**.

4.1 *Water for Irrigation*: because of the risks of significant irreversible negative impacts to critical habitats, ecosystem services and downstream users as already demonstrated on the Great Ruaha River, large-scale irrigation developments in the Kilombero Valley should be temporarily postponed until there is (i) a better understanding of water availability, (ii) a full understanding of the water requirements of the floodplain ecosystem and downstream users, and (iii) an effective sub-basin water management organisation.

4.2 *Water Information:* given the momentum behind accelerated agricultural development of the Valley and therefore the urgent need to answer the questions above, there is a need to (i) accelerate re-establishment of the hydrometeorological instrumentation of the Valley, (ii) commission a comprehensive hydrological review of the Valley based on available data, (iii) undertake an environmental flow assessment (EFA) based on the full range of ecosystem and livelihood services provided by the Kilombero River and its tributaries (see also (6.3) below), and (iv) establish a water quality baseline in view of the future intensive use of agrochemicals.

4.3 *Water Management:* water is a critical resource for accelerated agricultural development and requires appropriate management. Therefore it is recommended that the Rufiji Basin Water Board is assisted to set up a sub-basin (catchment) organisation as a priority. In addition, the ongoing Rufiji Integrated Water Resources Management and Development (IWRMD) Plan needs to be completed and implemented as a priority (see also 'SAGCOT as a Whole' recommendation below).

5. Ecology and Wildlife

The logical lead agency for these actions is the **Ministry of Natural Resources and Tourism (MNRT)**.

5.1 *Protection of Endangered Habitat and Wildlife:* agree a strategic plan to both maintain the Valley's flagship wetland-dependent mammal, the puku, and restore wildlife connectivity for large mammals across the Valley between the Selous and Udzungwa ecosystems. (Note: organised tourism and hunting (including sport-fishing) can provide significant financial returns to communities and act as major deterrents to illegal activities, so restoration of wildlife populations to the point where they can sustain hunting and are attractive to tourism should be a key aim of Valley planning).

5.2 *Information for Wildlife Management and Planning:* the strategic plan for wildlife requires better data on basic parameters such as wildlife population numbers and mapping of key habitats, so a major ecological survey with a spatial component is essential for effective planning and as an accurate baseline (**MNRT, KILORWEMP, TAWIRI and partner conservation research organisations and NGOs**).

5.3 *Information for Environmental Flow Assessment:* the environmental flow assessment recommended at (5.2) above will require a more reliable description of the aquatic ecosystem including the fishery, so the ecological survey (see (6.2) above) should include a significant freshwater component including the social and economic aspects of the fishery - subsistence, commercial and sport fishing - together with a better description of the river system's upstream-downstream linkages (**MAFC, MNRT, KILORWEMP and partner research organisations**).

5.4 *Development Partner Support:* a number of development agencies (e.g. BTC, DFID, EU, USAID) and large conservation organisations (e.g. AWF) are interested in supporting SAGCOT and/or managing the impacts of accelerated development. This provides an opportunity to focus their interest

on providing resources and skills for ecosystem restoration and conservation in the Valley (**KILORWEMP** as lead agency or platform).

5.5 *The Importance of Public Attitudes:* improved land and resource management in the Kilombero Valley depends in part on a major increase in public awareness and education, so as part of the planning exercise and its follow-up interested organisations could design and establish awareness-raising programmes. Early targets could be, for example: (a) restoration of the Nyanganje wildlife corridor; or (b) promotion of attitudinal change towards the colobus monkey as bushmeat (**KILORWEMP, LGAs and conservation/development partners**).

6. Land

The logical lead agency for these actions is the **Ministry of Lands, Housing and Human Settlements Development (MLHHSD)**.

6.1 *Mapping:* land use planning requires accurate maps of existing and planned land use and administrative boundaries. Therefore creation and dissemination to users (e.g. district, ward and village administrations) of comprehensive land use and administrative boundary maps of the Kilombero Valley should be undertaken urgently (**MLHHSD, NLUPC, MNRT, KILORWEMP**).

6.2 *Strategic Land Use Plan:* as soon as the new data, information (on water and wildlife) and maps have been assembled, stakeholders should be brought together to develop and confirm the strategic land use plan and establish firm limits on land conversion and irrigation in the Valley, to ensure the continuing hydrological, ecological and economic functioning of the floodplain and river system (**MLHHSD, NLUPC, MNRT, KILORWEMP**).

6.3 *Participation in Planning:* the planning exercise must ensure effective participation by all land users, including crop farmers, (agro)-pastoralists and fishing communities, to ensure that all community concerns and needs are considered (**MAFC, LGAs, KILORWEMP or other planning lead agency**).

6.4 *Gender Inclusivity:* the planning exercise should also be pro-active in relation to gender issues since key issues such as the division of labour, access to and control over resources and decision-making at household and community level all have gender aspects (**MCDGC, MAFC gender focal point, planning lead agency**).

6.5 *Livestock and Herders:* although new to the Valley, cattle herding is a major economic activity and cultural feature that must be included in land use planning, so the establishment of transparent mechanisms for agreeing and enforcing grazing areas and rights is critical for avoiding future farmer-pastoralist conflicts and resource degradation (**MAFC, LGAs, KILORWEMP or other planning lead agency**).

7. Land

This recommendation is intended to be taken up by the **PMO, SAGCOT Centre and partners** as they continue to develop the strategic planning framework for the SAGCOT Programme.

7.1 Land Bank: Strengthen MLHHSD/NLUPC capacity for land administration and participatory land use planning including framework land use plans and clear identification of land for agricultural investment. The key to both investor and public confidence in SAGCOT is uncontested access to land. To achieve this GoT must establish an effective, fully functional "land bank" and streamline the land leasing process. This will require comprehensive attention to land administration, accelerated, transparent, informed and participatory land use planning at both regional and village levels, and transparent, effective, gender-sensitive compensation procedures and mechanisms that deal fairly with the issue of informal land users (**MLHHSD, NLUPC, TIC**).

7.2 Participation in Planning: At the outset of planning and implementation, multi-scale, participatory, multi-sectoral land use planning should take place to ensure alignment of land uses with other initiatives and policies and necessary stakeholder buy-in. Local scale land use planning should be coordinated with other sectors and account for tradeoffs among ecosystem services, particularly between agriculture/irrigation and other societal and ecological needs, identifying "winners" and "losers" of interventions. These land use planning processes should also address sustainable management of biodiversity and ecosystems services outside of the existing protected area network. Relevant data are available, for instance, through the World Conservation Monitoring Center's recent biological assessments (**MLHHSD, NLUPC**).

7.3 Resettlement Policy: develop a national Resettlement Policy with implementing regulations and mechanisms to supplement and extend the existing legal framework governing compulsory land purchase, bringing national land acquisition and compensation practice into line with international best practice (and taking advantage of current Ministerial support for development of such a policy) (**MLHHSD, NLUPC**).

7.4 Standard Operating Procedures: the social acceptability and success of SAGCOT will depend on its ability to provide long-term benefits for smallholders and rural communities. The development of standard practices for both land acquisition and the provision of sustained benefits (benefit types, contracts, forms of agreement etc.), and their establishment as legally-binding procedures, should be a key element of operationalisation of the new agricultural investment guidelines. Note that all such procedures should mainstream best practice in relation to key policies on gender and health (**PMO, SAGCOT Centre and partners**).

7.5 Mapping: improved mapping services are essential for effective land use planning and administration, and especially their provision to end users at

district level. Therefore support should be provided to enhance the Ministry's capacity to create land-related maps and supply them to users (building on the Integrated Land Information Management System, ILIMS) (see also recommendation (7.1)).

8. Water

The logical lead agency for these actions is the **Ministry of Water, in coordination with MNRT**.

8.1 Environmental Flow Assessment: water is a very real limiting factor for irrigation development. To avoid a repeat of the water management issues that have arisen in the Usangu Flats and Great Ruaha River it is essential that all irrigation proposals are considered in the context of the needs of downstream users including wildlife, fisheries, irrigated and flood-dependent agriculture, hydropower and urban and industrial users. This implies the development and application of an environmental flow assessment capability in every SAGCOT river basin, with the necessary links to downscaled climate change models and hydrological forecasts (**Ministry of Water, MNRT, WSDP, development partners**).

8.2 Protection of Wetlands: within the SAGCOT area wetlands are being targeted for irrigation development, largely due to their lack of effective formal protection and the absence of inclusion of wetland values into strategic plans such as the National Irrigation Master Plan. This risks the loss of critical hydrological functions such as flood control and dry season baseflow, economic services such as fisheries and dry-season grazing, and globally important ecological values (endemic and internationally migratory wildlife). It is recommended that SAGCOT partners re-consider this approach in the light of the strategic value of wetlands to the nation, and instead direct investors away from wetlands (**MNRT, MAFC, MLD, MoW, NAWESCO, NWWG, SAGCOT Centre, TIC, NLUPC**).

8.3 Rice, Water Use Efficiency and Public Subsidies: proposed rice irrigation schemes receiving public subsidies should be subject to cost-benefit analysis comparing the cost of the developments versus the benefits from a similar public investment in the system of rice intensification (SRI), which has much lower infrastructure costs and water requirements (**MAFC, TIC**).

8.4 Hydropower and Maintaining River Ecosystems: given the importance of the Rufiji River as a linked upstream-downstream hydrological, ecological and economic system, it is recommended that major hydropower projects initially be developed in the headwaters of the river rather than on the main stem (i.e. the Mpanga and Ruhudji projects, not Stiegler's Gorge) (**TANESCO, RUBADA**).

8.5 Water Management: The ongoing development of integrated water resources management plans for Tanzania's major river basins should be prioritised and completed, in particular for those basins that overlap the SAGCOT corridor. These IWRM plans should address the suite of hydrological characteristics, including water flow and quality, and should identify sustainable yields and mechanisms for water allocation for economic

development and environmental protection. Planning should not only consider climate change, but evaluate actions in a variety of climate change scenarios. Moreover, the distribution of water rights should always take account of ongoing/existing IWRM processes and plans (**Ministry of Water, development partners**).

9. Communication

The logical lead agencies for this recommendation are the **SAGCOT Centre and TIC**.

9.1 Public Perceptions and Social Acceptability of SAGCOT: negative perception of the SAGCOT Programme by some communities, NGOs and the media (especially regarding fears of land-grabbing) jeopardize the successful take-off of the programme. SAGCOT needs to expand its communications to local levels on the basis of genuinely equitable and beneficial investment policies and procedures (**SAGCOT Centre, TIC**).

10. RUBADA

The logical agency to initiate and lead this review is the **PMO**.

10.1 Role of RUBADA: the SAGCOT Programme provides an opportunity for review of the role of the Rufiji Basin Development Authority (RUBADA) to ensure optimal programme implementation and institutional oversight, especially with respect to land use planning, land ownership and water resources management.

Table 9.1 Key Recommendations

No.	Topic	Summary of Recommendation	Lead Agency
<i>World Bank Support for SAGCOT</i>			
1	Catalytic Fund		
1.1	<i>Resettlement Policy Framework</i>	Apply the RPF to all sub-projects.	Catalytic Fund management
1.2	<i>Environmental and Social Management Framework</i>	Apply the ESMF to all sub-projects.	Catalytic Fund management
1.3	<i>Other Safeguards</i>	Screen all sub-projects against the Indigenous Peoples Planning Framework (IPPF), Integrated Pest Management (IPM) and Natural Habitats (NH) requirements.	Catalytic Fund management
1.4	<i>Eastern Arc Mountains</i>	Exclude initiatives that do not adequately address the potential direct or indirect risks of clearance or degradation of the Eastern Arc Mountain forests.	Catalytic Fund management
1.5	<i>Catalytic Fund capacity</i>	Provide Catalytic Fund management with adequate resources for implementing safeguard policies.	Catalytic Fund management
2	PMO		
2.1	<i>Investment Principles and Guidelines</i>	Ensure agricultural investors comply with international best practice principles and with Tanzanian guidelines, when these are ready.	PMO
3	Environmental & Social Safeguards & Monitoring		
3.1	<i>World Bank SAGCOT Investment Project</i>	Decide whether the Project Coordinating Unit or the SAGCOT Centre will have responsibility for safeguards monitoring and reporting, and provide the necessary resources.	PMO
3.2	<i>Monitoring in the Wider SAGCOT Programme</i>	Review mechanisms for implementing the principles and guidelines for responsible agricultural investment, and strengthen institutions as necessary. In addition, support technical aspects of monitoring – land, water, biodiversity.	PMO, World Bank

No.	Topic	Summary of Recommendation	Lead Agency
3.3	<i>Integrated Pest Management</i>	Formulate a project of technical assistance to strengthen IPM approaches and capability.	MAFC
<i>Kilombero Valley</i>			
4 Water			
4.1	<i>Water for Irrigation</i>	Temporarily postpone large-scale irrigation development in the Kilombero Valley pending reliable assessment of (i) available water resources and (ii) the needs of downstream users, as well as (iii) the establishment of an effective sub-basin water management organisation.	Ministry of Water
4.2	<i>Water Information</i>	(i) accelerate re-establishment of the hydrometeorological data collection network in the Valley, (ii) carry out a comprehensive hydrological review, (iii) undertake a comprehensive Environmental Flow Assessment, and (iv) establish a water quality baseline focusing on pesticides.	Ministry of Water
4.3	<i>Water Management</i>	Support and accelerate establishment of a sub-basin water management organisation for the Kilombero Valley, and finalise /implement Rufiji IWRMD Plan.	Ministry of Water
5 Ecology and Wildlife			
5.1	<i>Protection of Endangered Habitats and Wildlife</i>	Develop a strategic plan for protection of the puku and other key wildlife, and to restore wildlife connectivity for large mammals across the Valley.	MNRT
5.2	<i>Information for Wildlife Management and Planning</i>	Carry out a comprehensive wildlife survey to provide the information necessary for strategic habitat and wildlife planning.	MNRT
5.3	<i>Information for Environmental Flow Assessment</i>	Carry out a comprehensive freshwater resources survey including its social and economic aspects, to provide information for strategic planning and environmental flow assessment.	MNRT, MoW

No.	Topic	Summary of Recommendation	Lead Agency
5.4	<i>Development Partner Support</i>	Use development partner interest in the Valley as an opportunity to provide resources for essential surveys, consultation and planning.	MNRT - KILORWEMP
5.5	<i>The Importance of Public Attitudes</i>	Undertake awareness-raising programmes to influence public knowledge, attitudes and practice on key conservation and resource management topics.	MNRT - KILORWEMP
6	Land		
6.1	<i>Mapping</i>	Create accurate administrative boundary and land use maps of the Valley and provide these to users at local level.	MLHHSD - NLUPC
6.2	<i>Strategic Land Use Plan</i>	When adequate water, land and wildlife information is available, develop and confirm a strategic land use plan firmly based on sustainability.	MLHHSD - NLUPC, MNRT
6.3	<i>Participation in Planning</i>	Ensure that the planning exercise is fully participatory.	MLHHSD
6.4	<i>Gender Inclusivity</i>	Ensure that the planning exercise is fully gender-aware and inclusive.	MCDGC
6.5	<i>Livestock and Herders</i>	Ensure that the planning mechanism - and any subsequent VLUPs - includes transparent mechanisms for determining and enforcing grazing areas and rights.	MAFC, MLHHSD, LGAs, KILORWEMP
SAGCOT as a Whole			
7	Land		
7.1	<i>LUP and Land Bank</i>	Strengthen MLHHSD/NLUPC capacity for land administration and participatory and informed land use planning including framework land use plans and clear identification of land for agricultural investment. Establish a fully functional "land bank" and streamline the land leasing process, to provide both investor and public confidence in SAGCOT.	PMO, MLHHSD

No.	Topic	Summary of Recommendation	Lead Agency
7.2	<i>Participation in Planning</i>	Implement multi-scale, participatory, multi-sectoral land use planning to ensure alignment of land uses with other initiatives and policies and necessary stakeholder buy-in.	MLHHSD/NLUPC
7.3	<i>Resettlement policy</i>	Develop a national Resettlement Policy to supplement and extend existing land acquisition and compensation legislation.	MLHHSD/NLUPC
7.4	<i>Standard operating procedures</i>	Develop standard practices and procedures for both land acquisition and the provision of benefits to smallholders and local communities, including mainstreaming of gender and health best practices.	PMO/SAGCOT Centre
7.5	<i>Mapping</i>	Strengthen MLHHSD/NLUPC capacity to create land-related maps and to disseminate these to users (especially LGAs - districts, wards, villages).	PMO, MLHHSD
8	Water		
8.1	<i>Environmental Flow Assessment</i>	Develop an environmental flow assessment capacity in all river basin organisations and apply EFAs to all irrigation proposals, taking into account climate change predictions.	MoW, MNRT
8.2	<i>Protection of Wetlands</i>	In view of the strategic national benefits of healthy wetlands, consider actively directing investors away from wetlands to less strategically important land.	MNRT – NAWESCO & SAGCOT partners
8.3	<i>Rice, Water Use Efficiency and Public Subsidies</i>	Compare the costs and benefits of public subsidies in irrigated rice infrastructure with alternative investments, specifically the System of Rice Intensification (SRI).	MoW, MAFC, TIC
8.4	<i>Hydropower and Maintaining River Ecosystems</i>	Undertake hydropower projects in the Rufiji Basin on the tributaries (e.g. Mpanga, Ruhudji), not the main river.	TANESCO

No.	Topic	Summary of Recommendation	Lead Agency
8.5	<i>Water Management</i>	Ongoing development of integrated water resources management plans should be prioritised and completed, in particular for those basins that overlap the SAGCOT corridor.	MoW
9	Communication		
9.1	<i>Public Perceptions and Social Acceptability of SAGCOT</i>	Upgrade SAGCOT's communications programme at local level - on the basis of genuinely equitable and beneficial policies and procedures.	SAGCOT Centre, TIC
10	RUBADA		
10.1	<i>Role of RUBADA</i>	Review the strategic purpose and mandate of RUBADA in relation to SAGCOT implementation.	PMO

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ANNEXES

Annex A Terms of Reference

Annex B Record of Consultation

Annex C Backup Data for the Assessment
(various topics)

Annex D Scenario Model Explanation

Annex E Study Team

Annex A

Terms of Reference

TERMS OF REFERENCE

Strategic Regional Environmental Assessment (SREA) Southern Agricultural Growth Corridor of Tanzania (SAGCOT)

1. The SAGCOT Program

The Southern Agricultural Growth Corridor of Tanzania (SAGCOT) is a partnership between private and public sectors aiming to expand and strengthen agribusiness investment in Tanzania's Southern Corridor in order to achieve income growth, food security and poverty alleviation. (see www.sagcot.com for further details). SAGCOT aims to develop the Southern Corridor as a cohesive, modern commercial agricultural area over the next twenty years. SAGCOT will improve the linkages for both large and small-scale farmers to local and export markets based around a central 'spine' of existing – and improved- road and rail infrastructure.. SAGCOT encourages investment in set of investment areas, the clusters, which are identified on the basis of commercial development potential for agriculture. In addition, agribusiness investments are also being encouraged in the corridor outside of these clusters.

The SAGCOT Program will be implemented in the geographic area of the Southern Agricultural Growth Corridor that covers approximately one-third of mainland Tanzania (287,000 km²). It extends north and south of the central rail, road and power 'backbone' that runs from Dar es Salaam to the southern borders with Zambia, DRC and Malawi. The planning and implementation of the SAGCOT Program will include many stakeholders across the region including key central and local government agencies, but SAGCOT will maintain an integrated corridor planning perspective rather than relying on local government administration.

SAGCOT is committed to ensuring that activities are planned in an integrated fashion to maintain the Corridor's ecosystem functions and rich natural resource base. A number of protected areas and critical ecosystems are located within the Program area, including Selous Game Reserve, Ruaha and Mikumi National Parks, Udzungwa National Park, Kitulo National Park forest reserves and wetlands, the RAMSAR site at Kilombero and several other essential Wildlife Management Areas. SAGCOT has begun to address these environmental and social concerns through its "Green Corridor" approach.

This integrated sustainable planning approach for the SAGCOT Program will assess proposed development schemes with a view to understanding how these proposals might impact sensitive wetlands, biodiversity and ecosystem services. Well-designed development could avoid these impacts, for example, by minimizing over-clearing of natural vegetation, reduce impediments to wildlife movements and balance water extraction with maintaining hydrological flows. SAGCOT partners are expected to cooperate with ongoing environmental management activities and comply with regulations specified in Tanzania's 2004 Environmental Management Act.

The SAGCOT Program is also committed to integrating sustainability across its planning and implementation focusing on six pillars (i) balancing agricultural production and expansion

with wise water use, (ii) developing land use and land capability across the Corridor with attention to continued ecosystem services, (iii) maintaining and enhancing the important protected areas in the region, (iv) improving soil and water management, (v) incorporating low-greenhouse-gas emission investments and other climate mitigation and adaptation management options whenever possible, and (vi) ensuring investments are undertaken in a manner that minimizes environmental impacts through the application of several environmental assessment tools. SAGCOT sponsored partners will also comply with regulations specified in Tanzania's 2004 Environmental Management Act

2. The World Bank Project

This Terms of Reference addresses the activities to be undertaken by consultants for the proposed World Bank investments to support the SAGCOT "Program" referred to throughout this document as the "Project". The World-Bank Project will be supporting three administrative organizations (i) the SAGCOT Secretariat, (ii) the Rufiji Basin Development Authority (being reorganized as this ToR is written to the SAGCOT Basin Development Authority), and (iii) the SAGCOT Catalytic Fund. The expectation is that the GoT will establish a Project Implementation Unit within the Ministry of Finance.

2a: Technical and operational support for SAGCOT Centre and RUBADA

The SAGCOT Centre provides an institutionally neutral, professionally competent platform for SAGCOT planning, coordination, facilitation and monitoring and evaluation. The project will support the SAGCOT Centre with financial support for (i) administrative and management costs, (ii) diagnostic studies, (iii) technical assistance; (iv) training, and (v) monitoring and evaluation.

RUBADA will be the national agency that coordinates and facilitates policy and infrastructure issues across the Corridor. The agency is expected to work closely with targeted line Ministries resource constraints identified by the Secretariat as limiting the expansion of agribusiness investment. The Project will also provide support for RUBADA capacity building .

2b: Support to SAGCOT Catalytic Fund

The SAGCOT Catalytic Fund, established as an independent Trust, will provide capital to support the establishment and expansion of commercially viable agribusinesses in the Southern Corridor – particularly those building commercial relationships with smallholder out growers. It is envisioned that there will be two modalities for funding, a matching grants program and an equity funding program. The World Bank financing will support the matching grants window of the Catalytic Fund.

3. The Objective of this consultancy

An overarching objective of this consultancy is to improve investment decisions all the different stakeholders, by identifying environmental and social issues (both opportunities and constraints) into the development planning process with a collection of safeguard products and tools The consultancy will include, but not be limited to, preparing:(i) a Scoping Report; (ii) Stakeholder Analysis, Participation and Consultation Plan; (iii) Strategic Regional

Environmental Assessment; (iv) Environmental and Social Management Framework; and (v) a Resettlement Policy Framework.

The core task is the Strategic Regional Environmental Assessment (SREA) of the SAGCOT Program that will integrate the baseline environmental and social circumstances in the southern corridor region and then assess the potential environmental and social impacts associated with the World Bank Project. The SREA will also satisfy the requirements of the Bank's Operational Policy 4.01 (Environmental Assessment) for Category A projects.

As outlined in the detailed tasks below, the SREA. Will include a scenario analysis of more detailed environmental and social issues in one prominent Cluster in order to: 1) identify potential project impacts, including a without-project scenario given the current issues in the region regarding environmental degradation; 2) define a monitoring strategy methodology and develop an initial associated database for on-going monitoring of project-related agribusiness investment impacts in the Corridor. This scenario assessment strategy, and database, may be applied to a broader range of investment clusters by the SAGCOT Centre, and related government authorities.

For all SAGCOT-supported investments an Environmental and Social Management Framework (ESMF) will also be developed to lay out the due diligence procedures to: (i) ensure they minimize the adverse effects of the development on the environment and people, and to make this development 'sustainable'; (ii) comply with international good practices for environmental and social sustainability; and (iii) meet the requirements of the World Bank's Safeguard Policies and Tanzania's related environmental regulations

4. Scope of Work

These services will be provided directly to the SAGCOT CENTRE in coordination with the World Bank and GoT partners, specifically the Vice President's Environment Division and the National Environmental Management Council. It will also be essential that the consultant links with the work – including data collection and analysis – being undertaken under the SAGCOT Green Economy Investment Vision initiative.

The consultant will undertake the tasks described below.

Task 1: Scoping Study

The Consultant will undertake a comprehensive scoping exercise comprising the following activities:

1.1 *Understand the regional¹⁰⁷ planning framework*: Identify and assess the existing institutional and policy setting for the project, and identify how the SREA is linked with existing planning frameworks for national and corridor environmental management and for the SAGCOT program. Undertake preliminary assessment of policy, governance, financial and decision-making mechanisms in the Corridor. Provide an overview of the current stakeholders in the agriculture sector in the corridor.

¹⁰⁷ Regional refers to national and local planning

1.2 *Review information on project area:* Explore the existing knowledge base. Identify the major ecosystems of the region to understand the broader ecological context. Assess demographic patterns and migration trends to understand the population dynamics likely to influence the region's development. Identify the topography, landuse/landcover, major watersheds/basins, ecosystems, populated areas, key occupations, key infrastructure, foundational activities of the local economy. Assess the social, environmental and natural resources context of the project area. Review the resource base to understand the spatial context of the environmental and social challenges and opportunities. This assessment should include an mapping and analysis of threats from the status quo.

1.3 *Determine appropriate multi-sectoral focus:* So as to ensure the SREA has a sufficiently broad technical focus, determine sectors that may be affected through project implementation, including agriculture, energy, water and transportation. This should include a realistic assessment of past problems with achieving effective mulit-sectoral cooperation at national and district levels.

1.4 *Identify and consult key stakeholders:* Identify key stakeholders whose input is critical to project success (e.g. in various levels and sectors of government, farmers, private sector, academia, NGOs, etc.). Conduct discussions with representative stakeholders.

1.5 *Identify the environmental and social issues to be considered* in more detail for the remainder of the assignment. Items to be considered include, but are not limited to: (i) competition for land use and water, (ii) land use planning, (iii) protected areas, (iv) improved soil and water management, (v) climate change, and (vi) environmental assessment. It is important that both the potential short term conflicts between social and environmental interests - as well as longer term benefits - are considered.

1.6 *Set up appropriate institutional arrangements:* In association with the VPO-E and the SAGCOT Centre, identify the optimal arrangements to oversee the study. Such an arrangement may include setting up an ad-hoc task force of relevant agencies.

1.7 *Ensure engagement with SAGCOT's Consultants*

Consultancy firm Eco-Agriculture Partners has been engaged to collaborate with SAGCOT leadership and stakeholders to facilitate better understanding about ways that a Green Economy Investment Vision might be integrated into the SAGCOT initiative and the future of local landscapes and ecosystems. Given overlap in research activities it is important to develop an information exchange and alignment system between the two REA and Eco-Agriculture team.

1.8 *Produce a draft scoping report, disseminate and consult with key stakeholders:* Develop a draft scoping report and conduct consultation event(s)with key stakeholders to refine these elements.

Task 1 Deliverables:

Draft Scoping Report

end month 2

Consultation of Scoping Report

end month 2

Task 2: Stakeholder Analysis, Participation and Consultation Plan

The consultant will undertake a stakeholder analysis, and design a participation and consultation plan accordingly.

Task 2a: Stakeholder Analysis:

The consultants shall undertake a stakeholder analysis outlining the key stakeholders likely to be affected, either positively or negatively, directly or indirectly, through project implementation. For each stakeholder group identified, the analysis shall: 1) outline the specific ways in which the project may positively or negatively affect them; 2) recommend ways to enhance positive benefits, or mitigate negative impacts; and 3) recommend measures to encourage their participation in project consultation and implementation, as appropriate.

Task 2b: Design a Participation and Consultation Plan

Public consultation is an integral part of the EA process, as reflected in the requirements of the Bank's OP 4.01 and relevant national legislation. As such, the Consultant will design a participatory consultation plan that will include:

- Awareness raising seminars at the time of launching the SREA in Dar and Kilombero. In these seminars, the Consultants in collaboration with the SAGCOT Centre, World Bank and GoT environmental agency staff will explain objectives, approach and expected outcome and how stakeholders will participate in the assessment.
- Adequate awareness-raising, consultation and participation of key stakeholders in the development of the SREA. Such key stakeholders will be defined through Task 3, but are preliminarily expected to include NGOs that are active in the region, scientific experts, relevant agencies from all levels of government, development partners, and other industrial, commercial and labor interests as relevant.
- Regular dissemination events to update SAGCOT Centre, relevant SAGCOT partners and development partners (World Bank, DFID, Norway, DPG-E) as to the progress of the SREA.
- Strong collaboration with the Green Economy Investment Vision work to ensure coordination of messages and consultation events, so as to avoid overburdening the target population.

Task 2 Deliverables:

Stakeholder Analysis	end month 1
Participation and Consultation Plan	end month 1

Task 3: Strategic Regional Environmental Assessment

The consultant will prepare a Strategic Regional Environmental Assessment comprising the following tasks: (a) establish baseline conditions; (b) assess the legal and institutional framework; and (c) conduct a scenario analysis in one SAGCOT cluster.

Task 3a: Establish Baseline Conditions

- The consultant shall identify and quantitatively describe the key physical, biological, cultural and socio-economic characteristics of the project area. Given the size of the project area, the consultant should propose an appropriate subdivision for analytical purposes. Such a subdivision may be done according to ecosystem/landscape, basin/catchment wide scenarios and conduct environmental and social assessments in the respective areas as appropriate.¹⁰⁸ Describe, to the extent possible, the past trends in distribution, quantity and/or quality of the important environmental components, and how such trends might change with and without the expected investment program. Describe key environmental issues of concern in the Corridor (e.g., competing demands for water resources, tourism, pressures on protected areas, biodiversity hotspots and other areas qualifying as Critical Natural Habitats (per OP 4.04), settlement expansion, potential conflicts between settled agriculture – especially irrigated agriculture – and pastoralists). Assess which areas and types of land use will be more or less resilient to long-term climate changes. Identify the specific areas most well-suited for achieving project objectives from an environmental and social perspective. Identify the primary environmental and social concerns for project development and on-going monitoring.

- Identify a sub-set of core social and environmental indicators that need to be tracked in on-going SAGCOT related monitoring systems. Using existing data, identify baseline levels for these indicators. Identify database gaps. This may include, but is not limited to, information on:
 - Environment:
 - Landuse/landcover
 - Erosion/siltation
 - Mining (uranium, coal, etc)
 - Biodiversity including all areas supporting Critical Natural Habitats (per OP 4.04)
 - Water use
 - Social:
 - Population distribution
 - Access to basic services
 - HIV/Aids
 - Land tenure
 - Economic:
 - Existing and proposed hydropower projects

Understand the threats (e.g. pollution, surface and groundwater scarcity, etc.) and opportunities (e.g. improved service provision) in the project area based on recent trends and future outlook especially with the SAGCOT Corridor concept. Identify how best to monitor these trends and threats.

Task 3b: Assess Legal and Institutional Framework

¹⁰⁸ Possible examples include the Lake Rukwa Basin, Kilombero Basin, Usangu Plains, Coastal zone, Ruvuma Valley and water catchment areas in the highlands.

Assess and describe the existing Tanzanian legal and institutional framework for project implementation from an environmental perspective. Are existing environmental regulations and policies sufficient to promote sustainable development in the project context? Is the current set up sufficient to ensure the project meets its objectives without yielding environmental damage? Is the set up adequate for the encouragement of the multi-sectoral planning and implementation necessary for sustainable regional development? What improvements could be made to enhance project implementation from a legal, policy and institutional perspective? What changes are necessary in order to manage the environmental aspects/impacts of SAGCOT? What capacity building needs exist? How can/should they be addressed? Additionally, identify any World Bank environmental and social safeguard policies which might be applicable,¹⁰⁹ and which types of project actions might trigger them.

Assess the existing capacity of GOT and SAGCOT Centre to ensure compliance with the legal and policy framework for environmental and social management in the Project context.

Task 3c: Conduct a Scenario Analysis of the Potential Environmental and Social Impacts (including no action) in one prominent SAGCOT Cluster¹¹⁰.

The development of the Environmental and Social Management Framework (discussed below), and associated monitoring systems of the SAGCOT Centre, need to be informed by a closer look at alternative scenarios for agribusiness investment and development in the Corridor. This will be based, for the purposes of this SREA, on a more detailed investment scenario analysis for one key SAGCOT Cluster. The consultant will detail the methods of this scenario analysis, and the associated baseline database, so these may be applied to the assessment of potential environmental and social impacts in other SAGCOT Clusters.

The consultant will:

- Establish the scenario analysis framework to analyze environmental and social impacts over a 20-year timeframe in one pilot cluster (Kilombero). Identify key environmental, social, and economic indicators that can be used to compare alternative development/investment scenarios across the Clusters.
- Working with the client, and on the input from other key stakeholders, the consultant will identify at least three development growth scenarios within a 20 year time frame (including the no project alternative, and based on possible investment outcomes) related to the cluster area and activities. These should include scenarios relating to agricultural investments potentially supported by the SAGCOT program and possible related investments in cluster socio-economic development (e.g. infrastructure, mining and tourism). They should also include proposed hydropower projects in the Cluster.

¹⁰⁹At the project concept stage, the following Safeguard Policies were preliminarily triggered: (1) Environmental Assessment; (2) Pest Management; (3) Natural Habitats; (4) Forests; and (5) Involuntary Resettlement. Several other policies – including Physical Cultural Resources, Safety of Dams, and Indigenous Peoples were classified as “TBD”, based upon the findings of the project Environmental and Social Assessments.

¹¹⁰Tentatively chosen to be Kilombero Cluster.

- Analyze the scenarios based on impacts on the indicators developed. Develop a consequence table to summarize, visualize, and compare the impacts of the scenarios on the indicators.
- Assess potential impacts of the SAGCOT Program's development – biophysical and socioeconomic positive and negative, direct and indirect, and cumulative. Review the balance and mechanisms for achieving viable trade-offs between growth and environmental protection. What are the key environmental and social considerations that should be taken into consideration to ensure that project development does not have unintended negative environmental consequences? Can rapid agricultural development be environmentally sustainable? If so, what is needed, both politically and technically to make this a reality in the project context? For each scenario, what are specific measures that should be undertaken and/or policies that should be implemented to avoid, minimize, or mitigate identified negative impacts? What are specific measures that can enhance positive impacts?

Create a database with GIS maps (proposed at a scale of 1:150,000) for key variables underlying the scenario analysis including (depending on the levels of data readily available in national databases):

- Land Resources: - Climate, hydrology, geology, landforms, soils, forests, protected areas, Critical Natural Habitats and other important natural habitats. Expected sources include, but are not limited to, topographic base maps, air photographs and satellite imagery, existing surveys and departmental records
- Land Ownership/Use/Tenure - land use, land titling and administration, farming systems, commercial and village forestry, production levels and trends. Legal and traditional ownership and user rights for land, trees and grazing; forest reserves, national parks
- Infrastructure - Transport, energy, communication and extension services for agriculture, livestock management, forestry and tourism.
- Population - Numbers, demographic trends, location of settlements, the role of women, ethnic groups, class structure, leadership.
- Employment and Training opportunities directed at agricultural, natural resource and environmental management, and related services
- Existing Economic Framework – what are the current employment and livelihood opportunities presently in place, average income
- Social Structures –leadership at village level, decision making structures, political structure
- Government & Legislation- Administrative structure and key authorities; services provided and demands placed upon them. Laws and regulations that affect land use; traditional law and custom; local district development plans; whether and how laws are enforced
- NGOs – social development NGOs in the area, out-grower associations, marketing cooperatives that may have roles in planning or implementing land-use plans.
- Commercial/Private sector organizations – lending processes, commercial and development banks, agro-industry, input suppliers, small and large scale traders, SME organizations, etc.
- Key Ecosystem Services linked to various natural resources such as water sustainability, watershed management, climate change and ecosystem vulnerability as discussed by various studies (e.g., WWF, Birdlife International, IUCN).

- Summarize how this database and scenario analysis can be extended to other clusters in the SAGCOT region under the management of the SAGCOT Centre.

Task 3 Deliverables:

Executive Summary	end month 3
Draft Report, including results of Tasks 3a-3c	month 4
Final Report	end month 5

Task 4: Prepare an Environmental and Social Management Framework:

Develop an Environmental and Social Management Framework (ESMF) outlining mandatory procedures to ensure SAGCOT Project-supported investments identify, assess and avoid, minimize and/or mitigate potential negative environmental and social impacts. The framework should meet all requirements for a Category A investment in accordance with OP 4.01. The ESMF is intended for use by investors, project proponents and resource management agencies, and can feed into the SAGCOT Green Economy Investment Vision.

The ESMF will:

- Include a typology of potential project investments with a screening process that identifies those investments requiring further environmental assessment and associated mitigation provisions
- Contain specific environmental and social due diligence provisions necessary to avoid, minimize or mitigate subprojects with potential risks, and monitor their outcomes. These provisions will be designed for both the matching grants and equity fund windows of the SAGCOT Catalytic Fund. This process will also include identification of institutional responsibilities, timing of actions, how these provisions will be monitored, and identify budget requirements. This framework will comply with relevant Bank safeguard policies (including Involuntary Resettlement, see Task 5) and national/local legislation.
- Will be developed from the implementers' perspective, emphasizing practicality and avoiding replicating generic background discussions about laws, regulations, and World Bank safeguard policies. Instead, the consultant will utilize summary tables to summarize key safeguard related regulations and their implication(s) for project implementation, including a clear concise reference table across all Bank safeguards and Tanzanian environmental and social regulations and mandates. Any gaps should be clearly identified with corresponding measures outlined to address these gaps.
- Identify specific capacity building actions and activities to mitigate potential project impacts and enhance positive externalities. The ESMF should include recommendations for potential policy amendments, as necessary, to improve the project environmental and social outcomes. Such a capacity training program should be based on the specific SAGCOT delivery modalities. It will identify the mechanism for guiding the use of these tools and methods for enhancing the understanding and use of these provisions across the program. The consultant will review the application of the Framework approach of ADSP showing lessons learned from the National

Facilitation Team. The consultant will list key activities needed and target audience built into the SAGCOT delivery modalities.

- Include a Monitoring and Evaluation process of project environmental and social issues, including key indicators, baseline values, ways of measurement and possible ways to enhance the use of these indicators. Proposed indicators should be assessed for their cost-effectiveness and utility. Such a framework should include a “safeguard” verification process based on a sampling of SAGCOT projects. It should also consider including participation of civil society organizations in monitoring project implementation.
- Identify knowledge gaps and, research areas that could improve SAGCOT sustainability and delivery of viable investments.

The development of the ESMF should take into account the following:

- (i) Review of ESMFs for the key projects in the World Bank country portfolio covering the last 5 years.** This effort will be based on reviewing background summaries of projects in an earlier Africa Region Frameworks Study¹¹¹ (to be sent separately to the consultants) and the list of country projects provided in annex 1. This consultant will assimilate and organize key checklists and associated screening provisions from these projects for subprojects and sectors that will be supported by SAGCOT Centre. The consultant will discuss with Bank staff and GOT counterparts lessons learned through the application of these ESMFs by implementing agencies at the national, regional and local planning levels.
- (ii) Review of relevant technical material, including guidelines and checklists in other projects and programs in the Africa Region.** In this component, the review will assess successful Framework products developed by similar decentralized and rural programs in the region addressing similar subprojects to be supported by SAGCOT (e.g., Ethiopia PSNP, LIG).
- (iii) Review of capacity building addressing environmental and social safeguards undertaken under in ASDP, MACEMP, WSDP and the Accelerated Food Security Project in national level lead agencies, regions and districts.** In this component, the review will assess progress made in developing capability in addressing environmental and social safeguards with the mentioned Bank-supported projects. This should include an assessment of the evolving capacity to manage the environment and natural resources in a sustainable manner as part of their responsibilities, including Regional and District Environmental Management Committees, and as required by the NEMC and World Bank. Progress made in establishing appropriate practical environmental assessment regulations and procedures, equipping lead agencies with required skills, knowledge, and logistical support to enable them to integrate environmental concerns in their policies, plans and programmes, and performance of these agencies in environmental screening, assessments and monitoring will be reviewed. This will be based, to a large extent, on the results of the National Facilitation Team efforts over the

¹¹¹ Green, K. C. Pizarro and M.Pajazetovic Assessing the Use of Environmental and Social Frameworks in Africa, World Bank 2011

last several years to incorporate safeguards into the DADPs process. For understanding differences in capacity at the district level, it is suggested that the consultant review the roll out of the ASDP and Accelerated Food Security Project safeguards program in Kilombero (the prototype cluster) and another district (to be chosen in consultation with the SAGCOT Centre and World Bank ASDP TTL).

(iv) **Review of other projects with Pest Management Frameworks.** What types of SAGCOT-supported activities are likely to lead to an increase in pesticide use? What specific actions should be included to ensure that such an increase is done in accordance with OP 4.09? To ensure SAGCOT pest and pesticide management issues are properly managed and comply with the World Bank’s Policy on Pest Management (OP 4.09), good IPM practices and approved pesticide use and registration in Tanzania, proposed agriculture schemes will be reviewed following the principals and practices documented in the 2009 Integrated Pest Management Plan completed for ASDP¹¹² and taking into account results from the Africa Stockpiles Programme currently under implementation in Tanzania. This should also be closely linked to the work to be developed by the SAGCOT Green Economy Investment Vision team.

(v) **Emphasis on Innovative, Practical and Implementable Measures:**

The consultant – working in partnership with Bank and project staff, and the SAGCOT Centre – is encouraged to create innovative tools, technical planning guides, checklists etc. with a view to think outside the box regarding past Framework approaches. An innovative addition to this product is identifying screening and/or technical guidance processes for opportunities across the project types for addressing climate change mitigation and adaptation. There are a number of tools recently promoted by IFC and the Tanzanian Clean Production Centre that can be adapted for this purpose. The resulting framework should provide a mechanism to facilitate upstream subproject screening, based on the type of intervention to be supported. The results of such screening may be supplemented by field verifications for “riskier” subprojects.

Task 4 Deliverables:

Draft Framework
Final Draft ESMF

month 4
end month 5

Task 5. Prepare a Resettlement Policy Framework.

These activities in this task are to be complimented with the preparatory work by the Land Tenure Study (separate contract) and the findings in the SREA. The Resettlement Policy Framework needs to be prepared to establish resettlement objectives and principals, organizational arrangements, and funding mechanisms for any resettlement operation as part of direct World Bank financing of SAGCOT project activities. This Framework will be prepared since the extent and location of resettlement is not known at this time and will be detailed during the early project assessments. When the extent of resettlement is identified for any project component, a Resettlement Action plan is subsequently prepared.

¹¹² Nyambo, B. Integrated Pest Management Plan, ASDP Revised Version 2009

The Framework ensures that any Resettlement Action Plan protects affected parties and physical structures, and livelihoods are restored to their previous standard and preferably exceed their current status. The RPF will include the process for valuation of all associated impacts on people's property and livelihoods and address mitigation of the impacts of resettlement based on international standards. The Framework shall include the following contents:

Legal Framework: a) Reviews of relevant laws, policies, legal and administrative procedures of the Government of Tanzania, relevant customary and traditional laws and laws and regulations relating to the agencies responsible for implementing resettlement activities; b) to identify gaps and, c) suggest the mechanisms to bridge such gaps to ensure the effective implementation of resettlement activities.

Institutional Framework: Assessment of institutional capacity of local institutions and relevant agencies and suggest an organizational structure responsible for resettlement activities and, propose mechanism to enhance its institutional capacity.

Methods for Valuation of Assets: Identification of methodology to be used in valuing losses to determine their replacement cost; and a description of the proposed types and levels of compensation under local law and such supplementary measures as are necessary to achieve replacement cost for lost assets.

Resettlement measures: A description of the technically and economically feasible packages of compensation and other Resettlement measures. The resettlement packages should be compatible with the cultural preferences of the displaced persons, and prepared in consultation with them.

Site selection, site preparation, and relocation. Identification of (a) institutional and technical arrangements for identifying and preparing relocation sites, (b) any measures necessary to prevent land speculation or influx of ineligible persons at the selected sites; (c) procedures for physical relocation under the project, (d) legal arrangements for regularizing tenure and transferring titles to re-settlers.

Methods for Valuation of Assets: To establish principles, basis and methods to be used in valuing losses and, a description of a) eligibility for compensation, b) types and levels of compensation under relevant law and, c) such supplementary measures as are necessary to achieve replacement cost for lost assets.

Implementation Arrangements: To develop a) an implementation schedule covering all resettlement activities and, b) grievance redress mechanism that provide local communities with a means of raising concerns relating to the project's operations, and dealing with these in ways that are considered to be fair, by both the community and the project management.

Monitoring and Evaluation Arrangements: To develop principles, strategy and plan for monitoring of resettlement activities, and to set frame work for project evaluation and impact assessment.

Cost and Budget and identifying possible Source of Funding: Estimation of a) budget to cover expropriation and compensation costs for loss of properties, operational arrangements as well as for necessary studies. b) Identification of possible funding sources c) institutional mechanisms for the payment of compensation.

Task 5 Deliverables:

Scoping and Identification of Methodology	end month 1
Draft RPF	month 4
Final Draft RPF	end month 5

5. Approach, Overall Management and Coordination

The Consultant shall report to the designated officer in the SAGCOT Centre, and consult regularly with other SAGCOT CENTRE partners. A monthly meeting and briefing shall be required between the Consultant and the SAGCOT CENTRE staff and other GOT stakeholders. All required reports will be submitted to the designated SAGCOT Centre Officer, and appropriate GOT environment authorities (Vice President's Office Environment Division and NEMC) and in parallel to the World Bank. The Consultant will coordinate closely with the SAGCOT Centre in executing all aspects of this work and in doing so, will engage in active knowledge transfer of methods and procedures for the relevant activities' planning and design for key stakeholders to be agreed upon at the beginning of the contract. This function, while not necessarily involving formal training sessions, is considered an important element of the Consultant's work. In addition, the Consultant will engage in the following:

Documentation. The Consultant will establish and maintain a comprehensive inventory of all relevant documents and data collected. Any confidential material provided to the consultants will be returned in an organized fashion to the SAGCOT Centre at the end of the contract.

Personnel. The Consultant must provide and maintain all key personnel proposed. Any changes are subject to approvals from the contracting authority and the World Bank.

Logistics. The Consultant will be responsible for all their logistical need in-country including workspace, office support, communications and transportation. The proposed work involves significant interrelated activities and subcontracting and consistent coordination with SAGCOT. As such, there will be a need for general project administration and technical coordination including:

- Project Supervision
- Regular Progress Meetings and Reporting
- Contract Management
- Subcontracting Plan and Management
- Scheduling and Logistics
- Report Oversight, Quality Control and Coordination

All deliverables shall be submitted in electronic form and in hardcopy (3 copies each deliverable) in English. All hardcopy documents shall be two sided printed with full margins to conserve paper. All deliverables will be considered draft upon initial receipt. Draft documents will be reviewed and accepted or comments will be provided within two weeks of receipt. The Consultant shall appropriately address concerns and provide final deliverables within two weeks of receiving comments unless a mutually-agreed upon arrangement stipulates otherwise. It is anticipated that the duration of this contract will be for 5 months.

6. Contents of the Technical Proposal

To ensure that appropriate information addressing the scope of work is provided in the offer, the consultant is requested to follow the instructions below.

Past Performance

The Proposal must highlight (in no more than 8 pages, excluding project summary sheets in the annex) the Consultant's experiences that relate to the work described by the SOW – in Tanzania and Sub Sahara Africa and internationally -- specifically to the tasks requested. Prior experience of carrying out similar assignments will be essential. This section may include the past performance of proposed subcontractors. The Consultant must include reference to specific agriculture, water resource, and natural resource projects. Specifically the Consultant must demonstrate its overall and proven track record acting as environmental and social technical consultants including policy analysis and strategic environmental assessments in the support of large regional (in country) and national infrastructure and planning projects, including the names and descriptions of the specific project that the Consultant has worked on. An overview summary table of these experiences is required with sufficient details.

Management and Implementation Plan

The Consultant must submit a management and implementation plan (no more than 10 pages excluding graphics and figures). The management plan will include a description of the Consultant's proposed management structure for implementing the work under the Contract; how it plans to ensure the quality of its performance in each activity; and its capability to quickly mobilize required experts to guide and execute the various assignments in this proposal. The implementation plan will contain a description of proposed activities and products for each task demonstrating a solid technical grasp of the requirements. The Consultant must identify Key Personnel in addition to the Project Manager and must provide a summary of specific experiences and times for performance with each task. The consultant will provide a proposed work plan showing all tasks, schedule of activities, deliverables and dates for drafts, reviews and revisions.

Capabilities and Experience of Staff

The Consultant is expected to assemble and describe (no more than 10 pages excluding graphs and figures) a team with a mix of senior and mid-level specialists. The anticipated duration of the assignment will be approximately five months from notice to proceed. Knowledge of local conditions, social and cultural practices, and Tanzanian laws and regulations will be essential to accomplish these tasks. Prior experience conducting ESMF,

RPFs, SEAs or sector-based environmental assessments, social impact assessments and impact management tools, particularly within the agricultural sector, is highly desirable.

The Consultant will be required to identify **KEY PERSONNEL** and provide sufficient qualified personnel to ensure achievement of all objectives of these tasks. A Project Manager and Deputy Project Manager must be designated. It is expected that the following categories of key professional personnel will be required:

Key Personnel - Senior Specialists (minimum 15 years relevant experience)

Mid-Level Specialists (minimum 7-10 years relevant experience)

The following minimum Key Personnel will be required for the contract:

- 1) **Team Leader** preferably with at least 15 years of international experience, having an advanced degree, English language capacity and broad knowledge in environmental and social impact assessment and mitigation, long term impact planning and carrying capacity and/or limits of acceptable change methodologies, and institutional strengthening. The Team Leader should have significant experience in undertaking environmental assessments, reporting, capacity building, and environmental advisory services. (anticipated 4 person months)
- 2) **Participatory Planning and Consultation Specialist** with at least 10 years experience in developing and implementing participatory planning strategies, preferably for infrastructure development context. Experience must include extensive field consultations with a range of stakeholders. The Specialist should be knowledgeable about the local institutional and social structures and be proficient in Swahili. (anticipated 6 person weeks)
- 3) **Regional Development Planner**, with at least 15 years of experience, having English language capacity and broad knowledge in regional and agricultural development planning, mapping and spatial analysis skills. (Anticipated 3 person months)
- 4) **Social/Gender Impact Assessment Specialist(s)** preferably with at least 15 years of international experience at senior level, including operational experience with rural Experience working with gender and institutions essential. Knowledge of Swahili is advantageous. (Anticipated two person-months) The Consultant may combine specialists so long as the required expertise capabilities are met.

In addition, the Consultant may need to solicit additional, short term international and local assistance from senior, mid-level and junior technical professionals with the following qualities, as needed:

- Agricultural Specialist (e.g. irrigation, crop production, crop protection)
- Civil Engineers (e.g. water resources, hydrology, hydrogeologist)
- Environmental Impact Assessment Specialists (e.g. ecology, wetlands, zoology, geology)
- Social/Gender Impact Assessment Specialists (e.g. community specialist, sociologist, resettlement)
- Participatory Planning and Consultation specialist
- Regional Planner
- Institutional specialist (especially district government agencies)
- Communications specialist, graphic designer

- Agricultural/Macro economist
- Computer aided design and Geographical Information System Expert

The Consultant may wish to propose alternative staffing configurations to ensure achievement of all objectives. The availability of each proposed staff person must be identified as well as whether they are full-time staff persons of the Consultants firm or subcontractors or consultants. It is expected that the Project Manager or Deputy Project Manager, if not costed full time for the project, will be available throughout the duration of the contract to address all management and administrative matters.

7. Outputs and deliverables

- (i) Scoping Study
- (ii) Stakeholder Analysis, Participation and Consultation Plan
- (iii) Strategic Regional Environmental Assessment Executive Summary
- (iv) Strategic Regional Environmental Assessment
- (v) Environmental and Social Management Framework.
- (vi) Resettlement Policy Framework

The work will be completed over a five (5) calendar month period with deliverables submitted directly to the SAGCOT CENTRE, BOT and the World Bank.

8. Payment Schedule

- 10% at the time of the signing of the contract
- 30% after submission of Scoping report.
- 30 % after submission of draft report
- 30% after submission of final report ,

Annex B

Record of Consultation

List of Meetings to mid-August, 2012

Date	Organization	Contacts
<i>March</i>		
26	World Bank	David Rohrbach
28	World Bank	David Rohrbach Ann Jeannette Glauber Tobias von Platen-Hallermund Ken Green
29	Bank of Tanzania	Andrew Kapilima
30	British Council - Policy Forum Breakfast Debate - Village Land Act Bank of Tanzania SAGCOT Working Group	- Andrew Kapilima Peniel Lyimo Barney Laseko Sophia Kaduma Dr. Mary Shetto Dan Mrutu Jennifer Baarn Tom Hopgood David Rohrbach
<i>April</i>		
02	World Bank	David Rohrbach Helen Shahriari Agnieszka Lyniewska Ken Green
03	Vice President's Office SAGCOT Centre	Dr. Julius Ningu Dan Mrutu Jennifer Baarn
04	Belgian Technical Cooperation Ministry of Natural Resources & Tourism Wild Things Safaris	Vincent Vercruysse Piet Oosterom Roy Hinde
05	World Bank	David Rohrbach Ken Green
<i>May</i>		
03	World Bank DfID Concern Worldwide BEST-AC	David Rohrbach Adrian Stone James Davey Hans Determeyer
04	ANSAF	Regina Mongi Audax Rukonge George Mboje
07	World Bank NEMC Ministry of Infrastructure Development	Helen Shahriari David Rohrbach Dr. Robert Ntakamalenga Melania Sangeu
08	RUBADA MNRT	Aloyce Masanja Piet Oosterom
09	Bagamoyo District Administration	Samweli Sarianga M.S.E. Mlyambongo Fidelica Myovella
10	Bagamoyo Irrigation Development Project VPO - Division of Environment	Dr. Constantine Shayo
14	SAGCOT Centre, ACT	Salum Shamte

Date	Organization	Contacts
17, 18	EcoAgriculture - Green Growth Workshop, Dar es Salaam	54 participants
21	SAGCOT Green Reference Group	Ngosi Mwiha 11 other participants
22	DfID	Georgina Cashmore
23	MAFSC	D. Mary Shetto
	MLFD	Sospeter Mtemi Samuel Leshongo Grace Mwaigomole
24	Wild Footprints IUCN Bakhresa MNRT	Ryan Shallom Abdalla Shah Said Muhammad Said Abeid Piet Oosterom
29	Morogoro Regional Administration	E.F. Lauwo L.G. Noah Evanca Gambishi Eulalia Minya Zainabu Godi Godi
	Sokoine University of Agriculture	Dr. Damian Gabagambi 16 MSc students
30	Kilombero District Administration	Fredeni Malambeko Elia Shemtoi 9 District Technical Officers
31	TechnoServe Kilombero Plantations Ltd.	Heaven Mosha Murray Dempsey David Lukindo
	NAFAKA - small rice growers (SRI), Mkangawalo village Pastoralists, Mkangawalo village Mbingu Ward Office	36 farmers 6 pastoralists (Maasai) Aidan Mbingi
<i>June</i>		
01	Kilombero Valley Teak Company Udzungwa Ecological Monitoring Centre	Hans Lemm Arafat Mtui Emanuel Martin
	Udzungwa National Park Pennsylvania State University	Joram Ponjoli Prof. Brian Orland Dr. Larry Orenflo
	Rufiji Basin Water Office	Willie Mwaruvanda
	Sokoine University of Agriculture	Prof. A.Z. Mattee
04	USAID	Dr. Mary Hobbs
05	MAFSC, Gender Focal Point	
06	Hakiardhi	Joseph Chiombola
07	SRESA Scoping Workshop, Dar es Salaam	34 participants
	EcoEnergy	Per Carstedt Per Renman William Burstrom Anders Bergfors
08	Ministry of Community Development, Gender & Children	Judy Kizenga Constansia Gabu
09	ALAT	Karin Fogelberg

Date	Organization	Contacts
11	SAGCOT National Technical Committee TAWLAE	Mary Liwa
<i>July</i>		
23	Kilombero District Office: Agriculture, Livestock & Cooperatives	Mary Kitua Justus Barashishwa Annet Kitambi Mr. Shemtoe
24	Ulanga District Office: Land Ulanga District Office: Agriculture Ulanga District Office: Livestock Ulanga District Office: Community, Gender & Children Gombe Village, Mwaya Division	Samora Silvano Mr. Kisebo Jackson Jaconia Eliawadhi Msangi Absalom Gipson Joseph Balele Fidelius Kisusi Men's and women's discussions
25	Ulanga District Office: Planning KVTC mill, Mavimba Village Farmers compensated for land by KVTC, Mavimba Village Women, Mavimba Village	Benedict Mabula Kennedy Haule Habibu Mora
26	World Bank Kilombero District Office: Lands Kilombero District Office: Legal Affairs Kilombero District Office: Natural Resources Kilombero District Office: Community Development, Gender & Children Plan International, Ifakara Association of Kilombero High Quality Rice Growers (AKIRIGO) NAFAKA	Student tailor/farmer David Rohrbach Huruma Valency Faraja Nakua Mary Massawe Loyce Mnemmelwa Ludfried Singumlangi Mr. Ntimi Hosea Mwaisaka
27	Mbingu Rice Farmers Association, Mbingu Village Association of Mangula Cane Outgrowers (AMCO)	2 women, 5 men Amale Gebege Soloum Nyembe Joseph Mbawe Avalyn Barunda
30	World Bank	David Rohrbach
<i>August</i>		
1	NLUPC	Gerald Mango
2	TIC SAGCOT Centre FeverTree Consulting	Martin Masula Latiffa Kigoda D. Narwango Jennifer Baarn Julien Haarman Duncan Harrison
3	World Bank	Tobias von Platen
13	World Bank	AJ Glauber David Rohrbach
14	FAO	Nora Kokanova Francesca Dalla Valle
15	SAGCOT Centre	Jennifer Baarn

SAGCOT INVESTEMENT PROJECT
SAGCOT STAKEHOLDER'S WORKSHOP ON SAFEGUARDS
DAR ES SALAAM, SERENA HOTEL, WEDNESDAY, 2ND OCTOBER 2013
LIST OF PARTICIPANTS

S/ N	NAME	INSTITUTION	TELEPHONE	EMAIL
1	Catherine joseph	Ministry of Livestock &fishers Dvt	0754691846	dangat@hotmail.com
2	Almas Kashindye	WWF-TCU	0786134199	kashindye@wwftz.org.com
3	Shakwaanande Natai	MAFC-HQ	0754893346	aikaruwa@gmail.com
4	Doris Passous	MMC Consultants	0784965286	doris@mambomakubwa.co.tz
5	Iku Lazaro	MMC/PNP Consultants	0767927927	Iku.lazaro@pnp.co.tz
6	G.Kirenga	SAGCOT CENTRE	0756480069	geofreykirenga@gmail.com
7	Juma Kayonko	PMO-Consultants	0754616700	kayonkoj@gmail.com
8	Zaninabu Sheuya	MAFC-EMU	0712310648	zayshey@yahoo.com
9	Evarist Nashanda	MNRT/TFS	0789333168	Evarist.mashanda@gmail.com
10	Kwilasa Lushanga	NEMC	0756539468	lushanga@yahoo.com
11	Prof.Raphael Mwalyosi	UDSM	0754270196	mwalyosir@yahoo.com
12	Mr.Hamis Fintan	TCCIA	0655055640	amiyfintan@gmail.com
13	Jamungu Kayandabila	MAFC-HQ	0713438186	ykayandabila@kilimo.go.tz
14	Lucia Chacha	MLFD	0752157651	Gaticha2006@yahoo.com
15	Redempta Samweli	NEMC	0784508062	Rsamweli2001@yahoo.com
16	John Kaaya	MNRT	0717606090	Kaayaje12@yahoo.com
17	Pellage F.Kauzeni	MNRT-KILORWEMP	0786485415	pellagek@yahoo.co.uk
18	Christina Jam	WWF	0757028422	ctam@wwfcsarpo.org
19	Helen Shahriari	WB	0786211232	hshahriari@worldbank.org
20	John Salehe	AWF	0785666700	jsalehe@awf africa.org

S/ N	NAME	INSTITUTION	TELEPHONE	EMAIL
21	Eamonn Barrett	E.R.M	+44777586110 1	Eamonn.barett@erm.com
22	Libby Schroenn	E.R.M	+27827885903	lschroenn@gmail.com
23	Mponda Malozo	MAFC	0784338272	Mponda.malozo@gmail.com
24	Frances Sabuni	EAMCEF	0787996277	
25	Gerhard G.Haule	RAS-Morogoro	0716122993	Gerhard@yahoo.com
26	Oliver Braedt	WB	0222163284	obraedt@worldbank.or.tz
27	Anna Lyimo Kessy	TIC	0754442286	alyimo@tic.co.tz
28	Fred	AGRA	0776000702	
29	Haezel Barber	UNEP	0786955529	Haezel.barber@unep.org
30	Nike Doggart	TFCG	0754380609	ndoggart@tfcg.cr.tz
31	Davio Rohrbach	WB	0686591332	
32	Mary Hobbs	USAID	0789335305	mhobbs@usaid.org
33	Aj.Glauber	WB	0784411163	aglauber@worldbank.org
34	Rashid Kindindindi	RAS- Morogoro(driver)	0784159535	
35	Daniel Sagata	VPO-DOE	0688431391	Dsagata1@gmail.com
36	Abdi Kagomba	TIC	0784118202	kagomba@tic.co.tz
37	Aloyce Masanja	RUBADA	0783274392, 0754274392	almasanja@gmail.com
38	Dr.C.M Shayo	VPO	0754403356	cmshayo@yahoo.com
39	Eng.L.A Simkanga	MAFC-Irrigation	0754271175	lsimkanga@gmail.com
40	Mwamini Mkwizu	PMO	0789383373	Mwamini33@yahoo.com
41	Dr.Mary Shetto	MAFC	0754372889	Mcshetto2007@yahoo.co.uk
42	Dr.S.D Mayunga	MLHHSD	0689654580	Magese22@yahoo.com
43	Peter Hveen	NOWW.EMBAS SY	0787631786	phv@mfa.com

S/ N	NAME	INSTITUTION	TELEPHONE	EMAIL
44	Peniel Lyimo	BRN		
45	Florens Turuka	PMO		
46	Regina Kakuli	PMO		
47	V.Mwainyekule	PMO		
48	Barney Laseko	PMO		
49	Rajab Rajab	PMO		
50	Violet Moshi	PMO	2122215	Jv.moshi@yahoo.com
51	Angela Makene	PMO	0714747863	a.makene@yahoo.com
52	Caprile Anna	DPGE	0756977757	dpge.tanzania@gmail.com
53	Hanif Said	PMO/ENV	0714526114	Hans_chriss@yahoo.com
54	Ramadhan Mtonga	PMO		
55	Patrick John	PMO		
56	Magdalena Banasiak	DFID		m-banasiak@dfid.gov
57	Amy Faust	WB		afaust@worldbank.com
58	Amir Nyoni	PMO		

Annex C

Backup Data for the Assessment (various topics)

Annex C1

Tanzania Investment Bank Agricultural Financing Window

Under this Window interest is charged at maximum 5% per annum. Funds are disbursed to on-lenders (wholesale) and also on a retail basis. Pricing for wholesale is at 4% (5% - 1%) per annum, while retail price is 5% per annum. With respect to wholesale borrowers (on-lenders), the price charged to final consumer/borrower/ farmer does not exceed 8% per annum. These rates are subject to periodic reviews. The repayment period for credit facilities under this programme ranges between six months and 15 years depending on the nature of the agricultural activity being financed and related financial projections, and also the seasonality of the crop under production. The grace period is granted based on the maturity period of the crop and projected cash flow. The maximum grace period is 3 years for perennial crops and 1 year for annual crops. The borrower is liable to pay interest during the grace period, though the payment is structured to be in line with the seasonality of earnings.

The following security structure applies:

- Advances under this credit Window are secured by debenture and mortgage over landed property, as well as pledges of agricultural machinery, equipment and implements, produce held in warehouses, processing equipment and machinery, motor vehicles and credit portfolios of on-lending institutions.
- When the project or its promoters do not legally own the project land, alternative landed property may be taken as the primary security, provided that the project or its promoters legally own the alternative land. Third party security is not be accepted as the primary security.
- In addition, the assets financed under the Window count towards security cover after discounting by 20%.
- Whenever feasible, sound insurance cover is taken against loss by fire, flooding, etc; the costs of which are borne by the borrower. However, the at present insurance schemes cover produce in warehouses and other storage facilities, as well as assets other than crops in the field.
- In case of financing of goods in warehouses, there is strict control by a reputable collateral manager, under a formal Collateral Management Agreement, who ensures that TIB interests are protected. The borrower bears the cost of collateral management.
- In all, the security cover requirement is a minimum of 1.25 times (regulatory requirement) as opposed to the standard TIB requirement of at least 1.50 times. The legal documentation cost is to be borne by the borrower.

Annex C2

Export Processing Zone Incentives

In an EPZ, both fiscal and non-fiscal incentives are offered.

Fiscal incentives include: exemption from corporate tax for ten (10) years; exemption from withholding tax on rent, dividends and interests for 10 years; remission of customs duty, VAT and other taxes on raw materials and goods of a capital nature related to production in EPZs; exemption from taxes and levies imposed by Local Government Authorities on products produced in EPZs; and exemption from VAT on utility and wharfage charges.

Non-fiscal incentives are: exemption from pre-shipment or destination inspection requirements; unconditional transferability of profits, dividends, royalties, etc; lower port charges compared to other cargo box rate (transit cargo); accessing the export credit guarantee scheme; and allowance to sell 20% of goods to the domestic market.

To be eligible for operating in an EPZ an investment must be new, export at least 80% of goods produced or processed, and annual export turnover should not be less than US\$ 100,000.

Identified locations for EPZ development include: Dar es Salaam, Coast Region, Tanga, Mwanza, Kilimanjaro, Arusha, Manyara, Kagera, Shinyanga, Mtwara, and Kigoma.

Textile and garments is one of the sectors targeted by EPZ investment. Out of 10 companies licensed as EPZ Operators by 2006, 5 were in the textiles and garments sector. However, stakeholders in the textile sector complain of unfavourable investment condition in the EPZ: they argue that the EPZ policy of Tanzania has failed to deliver the expected results. NIDA has withdrawn from the EPZ and Star Apparel has closed shop. There are currently only two garment factories operating in an EPZ.

Annex C3

General Tax Incentives for Agriculture

Under the Income Tax Act, 2004:

- Full deduction in the first year of costs incurred in course of clearing of farming land, excavation of irrigation canals, cultivation of perennial crops and planting trees for farming land to prevent soil erosion. Under normal arrangements these are capital expenditures and would be subject to long term deductions, but in the Income Tax Act 2004 they are immediately deductible.
- Costs incurred in the course of farming land for environmental conservation, animal husbandry, fish farming or restoration of land to normalcy after use are immediately deductible in assessing taxable income.
- Research and farming land development expenditures are also immediately deductible for income tax purposes.
- Irrigation tools and machinery are categorized as class II assets to qualify for a high depreciation rate of 25%.
- Tractors and other plants and machinery used for agricultural purposes are subject to high depreciation rates of 50% in the first year and 25% for subsequent years.
- Businesses producing agricultural produce are not subject to equal quarterly instalment payment requirement for income tax purposes but are required to pay their taxes during the third quarter after harvest.

Under the Customs Tariff Act, 1976:

- Agricultural inputs and implements are subject to zero import duty rates.

Under the Value Added Tax Act, 1977:

- Unprocessed agriculture and livestock, including unprocessed meat, unprocessed fish and all unprocessed agricultural produce is VAT exempt.
- Inputs to agriculture and fishing, such as pesticide and fertilizers, as well as agricultural implements are VAT exempt.
- VAT zero rating is granted to crop farmers under co-operatives and producer associations registered for VAT for agricultural produce intended for export.

Under the Stamp Duty Ordinance (CAP 332):

- Agriculture, livestock and fishery produce are exempt from Stamp Duty on receipt. In addition, Stamp Duty on markets for agricultural produce is remitted.

Under Local Government Finances Act, 1982:

- Multiple charges on agricultural and livestock produce were rationalised and reduced including the requirements to limit Produce Cess to 5% of farm gate price.

Annex C4

NGOs / CBOs active in Kilombero District, 2009

Name	Sector	Base Location	Activities
Vijana na Ukimwi	Health, Community development	Kibaoni-Ifakara	<ul style="list-style-type: none"> • Mobilization and sensitization of youth group on HIV/AIDS prevention and control
St. Magdalena Ifakara Women Group	Health, Community development	Ifakara	<ul style="list-style-type: none"> • Mobilization and sensitization of youth group on HIV/AIDS prevention and control
HABITAT for Humanity Tanzania	Health, Community development	Ifakara	<ul style="list-style-type: none"> • Mobilization and sensitization of youth group on HIV/AIDS prevention and control • Construction of the houses
Kilombero Foundation for Environment and Development Activities	Natural resources, Community development	Ifakara	<ul style="list-style-type: none"> • Providing knowledge on agriculture • Mobilization and sensitization of youth group on HIV/AIDS prevention and control
Chama cha Walemavu Ifakara	Health	Ifakara	<ul style="list-style-type: none"> • Providing initial vocational skills • Providing entrepreneurship skills
Kikundi cha sanaa za maonyeshoCha Upogoro	Community development	Upogoro - Ifakara	<ul style="list-style-type: none"> • Mobilization and sensitization of youth group on HIV/AIDS prevention and control
Kikundi cha Wakulima Lipangalala	Agriculture Health	Ifakara	<ul style="list-style-type: none"> • Mobilization and sensitization of youth group on HIV/AIDS prevention and control • Provision of agriculture skills
Kilombero Group for Community Development	Health Community development	Ifakara	<ul style="list-style-type: none"> • Mobilization and sensitization of youth group on HIV/AIDS prevention and control
Blue cross society Tanzania	Health Education Community development	Ifakara	<ul style="list-style-type: none"> • Provisional of Health and Education to Vulnerable groups
AFNET Groups	Health Community development	Idete and Lumemo	Provide awareness concerning girls' female genital mutilation
Upendo group	Trade Community development	Jongo-Ifakara	<ul style="list-style-type: none"> • To empower entrepreneurship groups

Name	Sector	Base Location	Activities
Kikundi cha akina Mama Mnelemele	Education Health Community development	Viwanja Ifakara	<ul style="list-style-type: none"> • Provide education and Health services to orphans
EFFORT	Health Agriculture	Viwanja Ifakara	<ul style="list-style-type: none"> • Mobilization and sensitization of youth group on HIV/AIDS prevention and control • Providing modern agriculture skills
Ifakara Women's Weaving Association (IWWA)	Trade	Ifakara	<ul style="list-style-type: none"> • Supporting weaving activities.
St Laurent Orphans Center	Health Education Community development	Ifakara	<ul style="list-style-type: none"> • Providing care to Orphans • Mobilization and sensitization of youth group on HIV/AIDS prevention and control
Nuru Orphans Center	Health Education Community development	Mlimba	<ul style="list-style-type: none"> • Providing care to Orphans • Mobilization and sensitization of youth group on HIV/AIDS prevention and control
Mazingira ni Uhai (MAU)	Natural resources Health Community development	Ifakara	<ul style="list-style-type: none"> • Providing environment care awareness • Mobilization and sensitization of youth group on HIV/AIDS prevention and control
Mazingira Institute Tanzania(MAI)	Natural resources Health Community development	Kidatu	<ul style="list-style-type: none"> • Providing environment care awareness • Mobilization and sensitization of youth group on HIV/AIDS prevention and control
Lumemo Garden Growers	Agriculture Health Community development.	Lumemo	<ul style="list-style-type: none"> • Running of fruits and timber gardens • Mobilization and sensitization of youth group on HIV/AIDS prevention and control
Ifakara Cultural Group	Health Community development	Ifakara	<ul style="list-style-type: none"> • Mobilization and sensitization of youth group on HIV/AIDS prevention and control
CHASAJAKI	Health Community development	Ifakara	<ul style="list-style-type: none"> • Providing environment care awareness • Mobilization and sensitization of youth group on HIV/AIDS prevention and control
KILOFEDA	Environment Health Community development	Ifakara	<ul style="list-style-type: none"> • Providing environment care awareness • Mobilization and sensitization of youth group on HIV/AIDS prevention and control
AMUA	Health Community development	Chita	<ul style="list-style-type: none"> • Mobilization and sensitization of youth group on HIV/AIDS prevention and control

Name	Sector	Base Location	Activities
YOSEFO	Trade Health Community development	Ifakara	<ul style="list-style-type: none"> • Providing soft loans • Mobilization and sensitization of youth group on HIV/AIDS prevention and control
Kikundi cha Vijana na Ukimwi (KIVIJAUKI)	Health Community development	Ifakara	<ul style="list-style-type: none"> • Care to Orphans • Mobilization and sensitization of youth group on HIV/AIDS prevention and control
MATUMAINI-PLHAs GROUPS	Health Community development	Lumemo, Chita	<ul style="list-style-type: none"> • Mobilization and sensitization of youth group on HIV/AIDS prevention and control
KIKUNDI CHA VIJANA (MBAKI)	Health Community development	Kibaoni	<ul style="list-style-type: none"> • Mobilization and sensitization of youth group on HIV/AIDS and drug abuse prevention and control
Community Supporting Group	Trade Community development	Kibaoni	<ul style="list-style-type: none"> • Providing entrepreneurship skills • Supporting Most Vulnerable Children
Waelimisha rika Idete	Health Trade Community development	Idete	<ul style="list-style-type: none"> • Providing entrepreneurship skills to the youth
Shirika la Hifadhi mazingira Mofu (SHIMAMO)	Natural resources Community development	Mofu	<ul style="list-style-type: none"> • Providing environment care awareness
Kikundi Cha Sanaa za Maonyesho Mofu	Community development	Mofu	<ul style="list-style-type: none"> • Providing life skills through arts
Kikundi cha Walemavu (PLHAs)	Health Community development	Msolwa ujamaa	<ul style="list-style-type: none"> • Mobilization and sensitization of youth group on HIV/AIDS prevention and control
Chekechea Kidatu	Education Health Community development	Kidatu	<ul style="list-style-type: none"> • Care of children • Mobilization and sensitization of youth group on HIV/AIDS prevention and control
Kilombero Community Group	Health Community development	Ifakara	<ul style="list-style-type: none"> • Support PLWHAs • Supporting Elders and Orphans
KIKUMUI	Health Community development	Ifakara	<ul style="list-style-type: none"> • Mobilization and sensitization of youth group on HIV/AIDS prevention and control
IPHA Group	Health Community development	Kibaoni	<ul style="list-style-type: none"> • Support PLWHAs • Mobilization and sensitization of youth group on HIV/AIDS prevention and control

Annex D

Scenario Model Explanation

Explanation of SAGCOT Scenario Model

1. Overview

The Kilombero Valley scenarios are projections of change based on (i) a set of initial data, (ii) a set of interactions between parameters, such as livestock numbers and grazing area requirements, and (iii) a set of assumptions on rates of change, such as population growth and crop area expansion.

The set of data is the best available data for Kilombero and Ulanga districts. Population statistics – numbers and growth rates – are derived from the 2002 and 2012 GoT Census. Crop and livestock data have been derived from recent district profiles. This data is often minimal or inconsistent, and in these cases the consultant contacted relevant district staff to verify data or request additional information to fine-tune the model. Data on fuelwood is derived from recent research papers (see main text).

Interactions between parameters are based on best available information, for example on crop water consumption.

The assumptions on rates of change are based on (i) historic values (such as population growth between censuses), (ii) idealised projections (such as SAGCOT investment plans), and (iii) values set by the consultants to reflect possible actual scenarios.

The scenarios are modelled in Excel as interactive spreadsheets, using the “scenario” option which is integral to Excel.

A combination of scenarios can be used since the changeable cells are not identical in each situation:

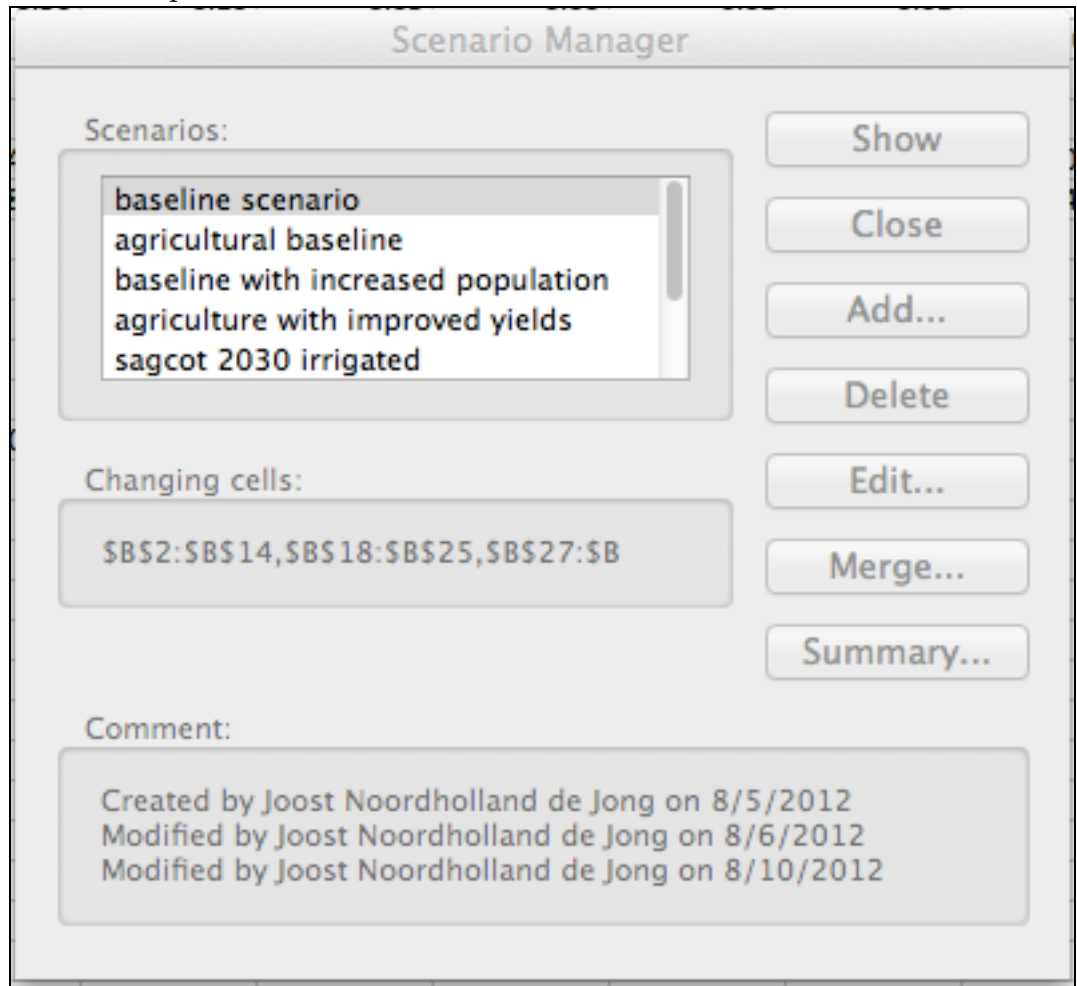
- The scenarios called *Baseline Scenario* and *Baseline Scenario with Increased Population* use the same set of cells and allow changes to population data, for example annual population growth rates.
- The scenarios called *Agricultural Baseline* and *Agriculture with Increased Yields* use the same set of changeable cells allowing changes to average crop yields.

Combining these scenarios gives four options:

- Option I: baseline scenario + agricultural baseline.
- Option II: baseline scenario + agriculture with increased yields.
- Option III: agricultural baseline + increased population.

- Option IV: agriculture with increased yields + increased population. Additionally, there is a set of options which represent the proposed *SAGCOT investment scenario*. These include 600 ha of citrus, 6,000 ha of rice and 4,000 ha of sugarcane investment which, over the years, will attract additional outgrowers.

The scenarios can be reviewed and adjusted by opening the sheet called “Variables” and clicking: Tools> Scenarios. A screen similar to that shown below will open.



Using the edit option, each of the changeable (“changing”) cells can be modified.

If one selects a specific scenario and chooses the option “Show”, followed by “Close”, and pressing Cmd+ the values will be adjusted and this will change all the values in the main data sheet and the associated graphics sheet.

An overview of the changed set of variables is given in the sheet “Scenario Summary”.

2. How to Use the Model

The starting point is the population growth data, from the 2002 and 2012 Census. Using a new Excel sheet one can derive the annual growth over the last 10 years in the following way:
Open a new spreadsheet.

In the case of Kilombero the 2002 data was 321,611, so enter the following formula in cell A1: $=321611*b1^{10}$

Open the "Solver" option and fill in the following parameters, whereby the "Value Of" equals the 2012 census data (407,840)

Solver Parameters

Set Objective:

To: Max Min Value Of:

By Changing Variable Cells:

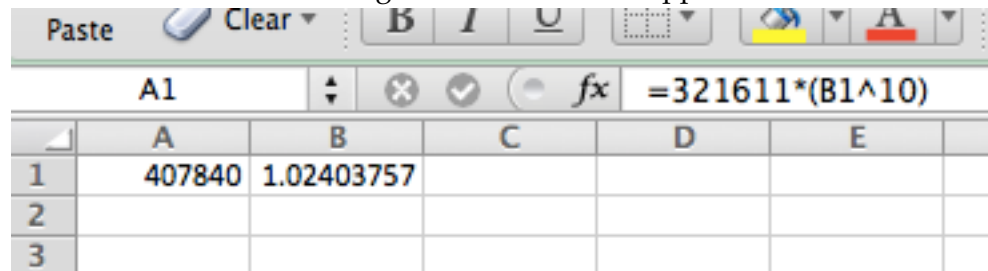
Subject to the Constraints:

Make Unconstrained Variables Non-Negative

Select a Solving Method:

Solving Method
Select the GRG Nonlinear engine for Solver Problems that are smooth nonlinear. Select the LP Simplex engine for linear Solver Problems, and select the Evolutionary engine for Solver problems that are non-smooth.

Click solve and the following answer screen will appear:



The screenshot shows an Excel spreadsheet with the following data:

	A	B	C	D	E
1	407840	1.02403757			
2					
3					

The formula bar for cell A1 shows: $=321611*(B1^{10})$

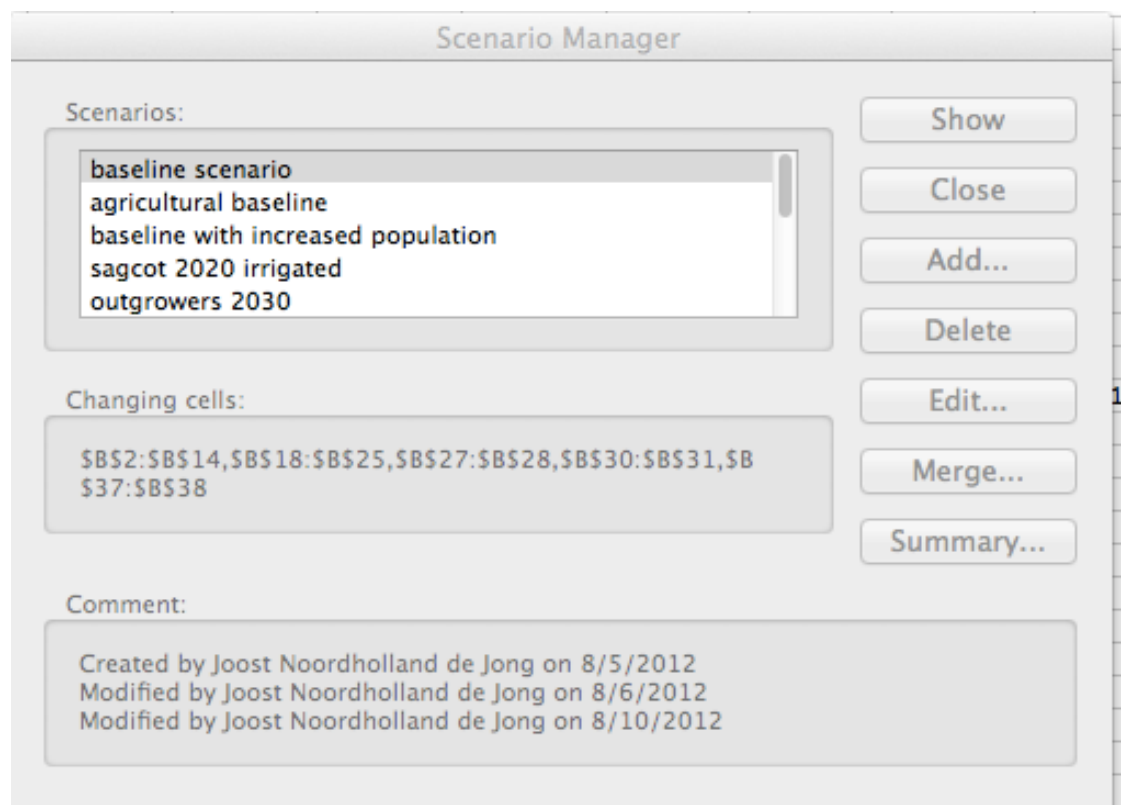
The number in cell A1 is equal to the value introduced in the former solver screen capture, and the value of cell B1 equals the annual growth of 2.403 % per year.

Fill in cell A2 with the following formula: $= 321611*b1^8$ This will provide the 2010 start data for the scenario building.

Make sure that the sheet called "Variables" is selected and click: Tools> Scenarios. A screen similar to that shown below will open.

Now select the scenario that requires adjustment, e.g. "baseline scenario".

Open the option "Scenarios":




Click on the baseline scenario. Select the option "edit".

The following screen will appear which indicates which cells are changing and the name of the scenario.

Edit Scenario

Scenario name:

Changing cells: 

Cmd+click cells to select non-adjacent changing cells.

Comment:

Protection Prevent changes Hide

Click OK and this will lead to the following screen:

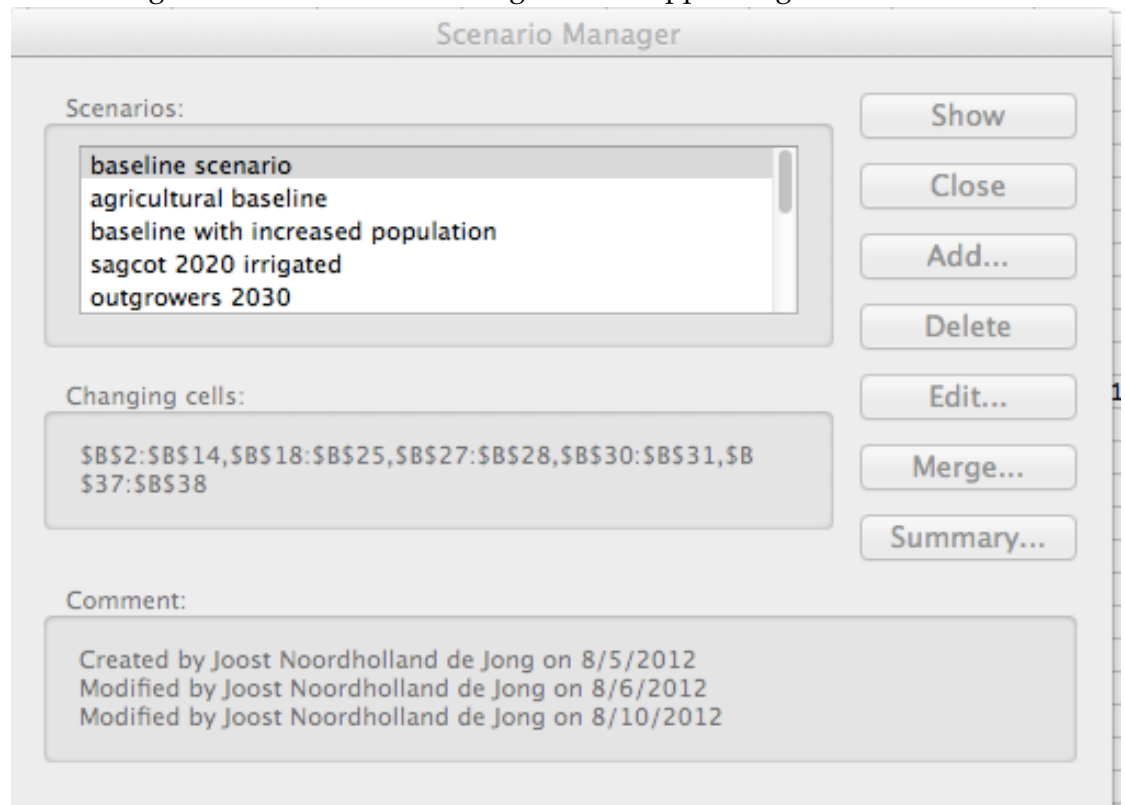
Scenario Values

Enter values for each of the changing cells.

1:	\$B\$2	<input type="text" value="1.0241"/>
2:	\$B\$3	<input type="text" value="1.032"/>
3:	\$B\$4	<input type="text" value="4.3"/>
4:	\$B\$5	<input type="text" value="4.9"/>
5:	\$B\$6	<input type="text" value="0.65"/>

For each of the cells one can indicate the value one would like to change. The scroll bar on the right gives access to the hidden cells.

Once changed, click OK and the Manager Screen appears again.



Choose the right scenario (baseline scenario), choose option “show”, followed by option “close”. Click “cmd+” to make Excel calculate all the values in all the sheets based on the new set of parameters.

If one wants to make a new scenario option, select “add”, provide a name for the scenario, indicate the changing set of variables and give them new values.

Annex E: Study Team

SAGCOT Strategic Regional Environmental and Social Assessment

Study Team

Project Director	Eamonn Barrett
Project Manager & Water Resources	Tim Smith
Team Leader	James Ramsay
Stakeholder Engagement Task Leader	Beatrice Mchome
ESMF Task Leader	Tania Choufani
RPF Task Leader	Libby Schroenn
ESMF Specialist	Godfrey Kamukala
Social Expert	Catherine Allen
Social & Gender Specialist	Vera den Otter
Social & Gender Specialist	Halima Chande
Valuation Expert	Zaina Kijazi
Local Coordinator & Agricultural Expert	Joost Noordholland
Ecologist	Kahana Lukumbuzya
Agricultural Economist	Damian Gabagambi
Institutional Specialist	Maureen Roell
Water Resources Specialist	William Mwaruvanda
GIS Specialist	Edwin Mugerezi
GIS Technician	Elizabeth Mavula