INTERACT-Bio:

Integrated sub-national action for Biodiversity: Supporting implementation of National Biodiversity Strategy and Action Plans (NBSAP) through the mainstreaming of biodiversity objectives across City-Regions

C·B·C Cities Biodiversity Center

·I·C·L·E·I Local Governments for Sustainability

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INTERACT-Bio
Integrated action on biodiversity

SCOPING REPORT OUTLINE

JULY 2017

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ACRONYMS

EXECUTIVE SUMMARY

PART A INTRODUCTION AND METHODOLOGY

1. INTRODUCTION AND BACKGROUND

This report is submitted as the result of Work Package 1 and specifically to meet Indicators I.1 and I.2 of Output I which require the delivery of scoping studies and intervention concepts for each of the three project countries respectively. The scoping studies and intervention concepts for Tanzania are consolidated in this Report. The indicator descriptions are captured in Table 1:

Table 1 Output 1 indicators

OUTPUT I: The baseline of the project regarding biodiversity management within the project countries and city-regions is determined by preliminary studies, and intervention concepts are developed. In a scoping study, decisive drivers for the loss of biodiversity in the selected city-regions have been identified and intervention methods are defined.

Indicator I.1: By the end of 2018 in all three (3) project countries (Brazil, India and Tanzania) and the three (3) selected city-regions, scoping studies on the initial situation are completed.		
Unit Number of country and city-region baseline assessment documents (scoping studies)	Baseline (start of project) 0	Target value and planned date of attainment 3 scoping studies for each project country and 3 assessment documents for each target city-region
Means of verification: Scoping studies are submitted by ICLEI to the relevant authorities at the national level and municipalities.		
Indicator I.2: By the end of 2018, four (4) intervention concepts are developed (one (1) concept per city-region, as well as one (1) concept to up-scale on the national level)		
Unit Number of intervention concepts for developing project methodology	Baseline (start of project) 0	Target value and planned date of attainment 4
Means of verification: 4 intervention concepts submitted		

1.1. Outline of the INTERACT Bio Project

INTERACT-Bio is a four-year project designed for improving the utilization and management of nature within fast-growing cities and the regions surrounding them. It aims to provide expanding urban communities in the Global South with nature-based solutions and associated long-term benefits. The project is being implemented in Brazil, India and Tanzania.

The project aims to enable governments at all levels – from local to national – to integrate their efforts for mainstreaming biodiversity and ecosystem services into core subnational government functions such as spatial planning, land-use management, local economic development and infrastructure design. INTERACT Bio supports city-regions to understand and unlock, within their specific local context, the potential of nature to provide essential services and new or enhanced economic opportunities, while simultaneously protecting and enhancing the biodiversity and ecosystems on which these services and opportunities depend. These actions in turn place the participating city-regions on a more resilient and sustainable development path.

The INTERACT-Bio project supports several Aichi Biodiversity Targets as wells as the Sustainable Development Goals and various other international agreements and associated targets. Through the project, city-regions will align their planning with their National Biodiversity Strategy and Action Plans (NBSAPs), which are required by the Convention on Biological Diversity (CBD). Subnational action in support of the NBSAPs will be promoted and enabled through strengthened cooperation between the different levels of government. Such collaborative approaches will ultimately support nations that are signatories to the CBD to accelerate attainment of the Aichi Biodiversity Targets, which are part of the Strategic Plan for Biodiversity 2011-2020, adopted by all CBD Parties.

1.1.1. Project aims and objectives

The overarching project aim or outcome is that *biodiversity and ecosystem management in the three model city-regions in Brazil, India and Tanzania is recognized as a cross-sectoral task (horizontal integration) and as such integrated in their sub-national BSAPs (Biodiversity Strategy and Action Plans). Simultaneously, those sub-national BSAPs contribute to the NBSAPs of their countries, in which the sub-national level is increasingly acknowledged as an actor with own targets, as well as implementation partner for national goals (vertical integration).*

Specifically INTERACT-Bio aims to:

- **Connect** national and subnational government decision-makers to work together towards integrating biodiversity considerations into city-region planning and decisions;
- **Strengthen** the capacity of city-regions to integrate biodiversity and nature-based solutions into land use, infrastructure and development planning, and to develop supporting policy instruments; and
- **Mainstream** biodiversity considerations across sectors at the subnational and national level.

In doing so, INTERACT-Bio will:

- **Promote** nature-based solutions as economically sound and sustainable investment options;
- **Demonstrate** the effectiveness of nature-based city-region development through pilot projects; and
- **Multiply nature-based approaches** by connecting city-regions with one another, and by building capacity and raising awareness that nature offers significant value in an urban context.

1.1.2. Project Work Packages and Outputs

The project will be delivered at three levels, as illustrated in the figure below:

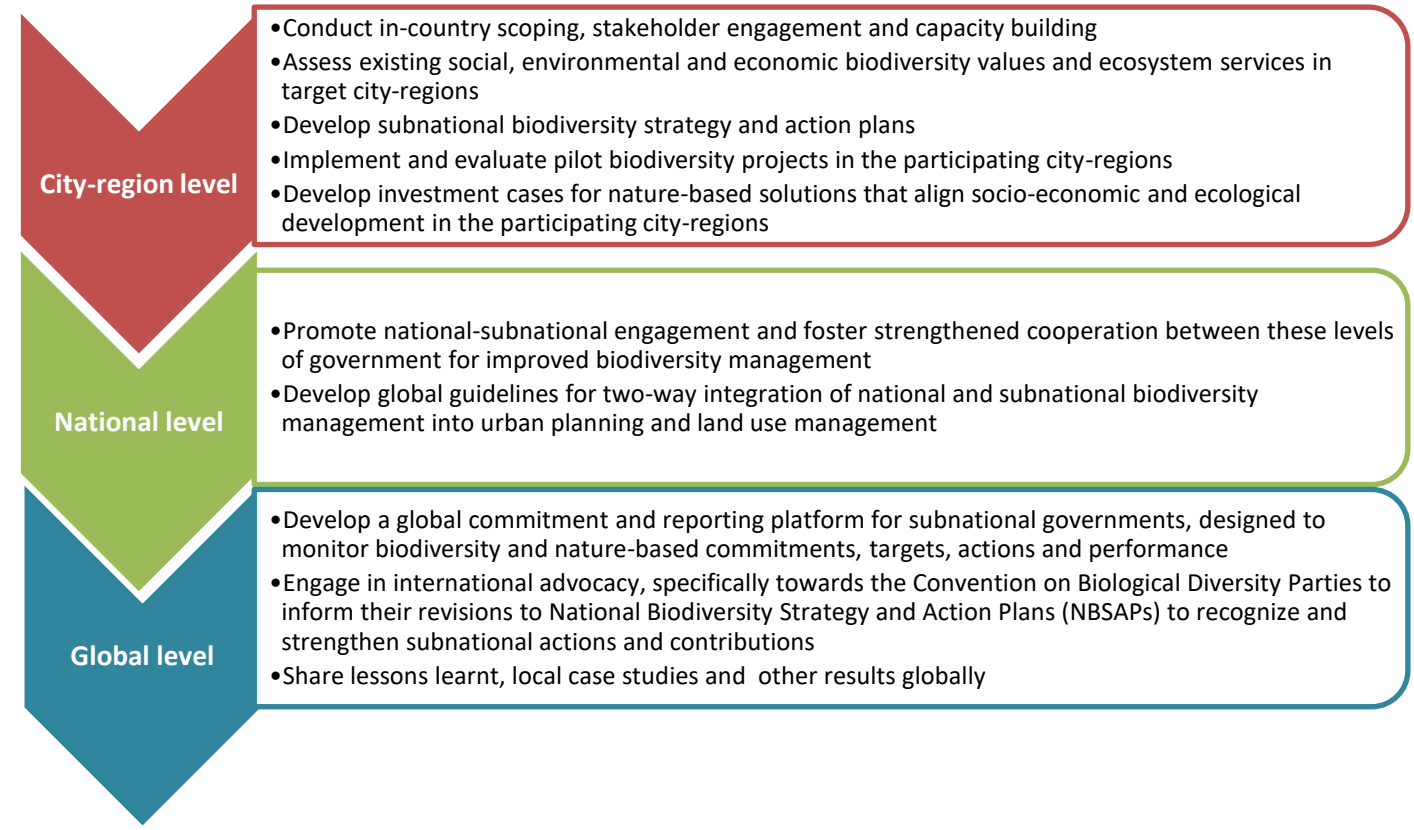

Figure 1 Project activities at city-region, national and global levels

INTERACT Bio comprises five discrete Work Packages, each with its own output, planned activities and indicators. These are summarised in the table below:

Table 2 Summary of Work package outputs and indicators

Output I Baselines, scoping & intervention concepts	**Output II** Sub-national BSAPs & integration into spatial planning	**Output III** Demonstration projects & investment cases	**Output IV** Vertical integration	**Output V** Global awareness of mainstreaming biodiversity
By end 2018	**By end 2020**	**By June 2019 By end 2020**	**By end 2019**	**By end 2020**
I.1 Scoping studies & assessments for each model city & country	**II.1** Multi-sectoral & multi-disciplinary forums setup in each model city	**III.1** 3 Demon-stration projects initiated/ implemented in model cities	**IV.1** At least 8 biodiversity-focused dialogues in each country	**V.1** At least 2 side events & 4 presentations at international conferences

Output I Baselines, scoping & intervention concepts	**Output II** Sub-national BSAPs & integration into spatial planning	**Output III** Demonstration projects & investment cases	**Output IV** Vertical integration	**Output V** Global awareness of mainstreaming biodiversity
By end 2018	**By end 2020**	**By June 2019** **By end 2020**	**By end 2019**	**By end 2020**
I.2 4 intervention concepts – national & 3 city regions	**II.2&3** Model cities have sub-national BSAPs & include 8 NBSAP priorities	**III.2** 1 investment case in each model city	**IV.2** Model cities generate reports from Reporting Platform	**V.2** 3 case studies in each country published

1.2. Selection of city-regions

Within the context of the INTERACT Bio project, a city-region is defined as combinations of several cities, towns, informal settlements, smaller urban settlements, semi-urban and rural surroundings that are linked by functional ties. They can be demarcated by an administrative boundary, such as a metropolitan development area, or topographical features, such as watersheds, and depend on the same ecosystem services and natural assets, like water catchments and biodiversity corridors. A city-region includes the entire functional area under the city government administration, with at least one higher level of subnational government administration.

In each project country the project is implemented in three city-regions: in Brazil, Campinas, São Paulo State and Belo Horizonte and Londrina; in India, Kochi, Kerala State and Manguluru and Panaji; and Dar es Salaam, Arusha and Moshi in Tanzania. All these city-regions are fast-growing cities located within areas of globally unique biodiversity and complex development challenges.

Figure 2 Map of city-regions in the three project countries

The city-selection process differed in each of the project countries. (ADD short description here of the selection process followed in your country)

1.3. Structure of the Report

The Report is divided into four parts. The first three parts capture the scoping analyses and assessments and the last part sets out the proposed interventions concepts. Part A, Introduction and Methodology, introduces the project and city selection and describes the scoping methodology and approach. Part B, Country Scoping, addresses the requirement, of Indicator I.1, to establish a country level baseline. It starts by providing a brief overview of Tanzania's global and national biodiversity status. This is followed by an overview of the institutional landscape and policy framework that is relevant to biodiversity in the country. Part C, City-region Scoping, focuses on establishing the city level baseline as required by Indicator I.1. It first describes the political, socio-economic and developmental context and challenges of the selected city-regions, before elaborating on the status of biodiversity and ecosystem services in the city-regions. Part C concludes with an analysis of the drivers of change and biodiversity loss at the local level. Part D, Project Interventions, pulls everything and sets out a proposed strategy and recommendations for concept project interventions. It concludes by highlighting the key findings and proposing a concrete action plan for implementing project interventions.

2. SCOPING METHODOLOGY AND APPROACH

2.1. Purpose of scoping within the context of the INTERACT Bio Project

Work Package 1 provides for scoping studies on the baseline situation to be undertaken in all three project countries, Brazil, India and Tanzania, and in the three selected model city-regions, Campinas, Kochi and Dar es Salaam respectively. The work package called for scoping to be undertaken at national and city-region level.

The scoping studies are intended to establish the baseline and provide the information and context within which project interventions can be identified and prioritized. As such scoping forms the foundation for developing a strategy for project interventions across all work packages. The key scoping activities are to:

a) assess the *status quo* at national level of the context within which the National Biodiversity Strategy and Action Plan (NBSAP) is interpreted and implemented and sub-national engagement with, and contribution to, the NBSAP in each of the three project countries;
b) assess existing and planned sub-national integration of NBSAPs into local economic development, land use planning and biodiversity management within each of the model city-regions, including an analysis of their existing land-use planning and development strategies to identify optimal entry points for the incorporation of biodiversity and ecosystem service considerations;
c) identify and engage local champions and sub-national government officials, as well as stakeholder groups in the model and observing city-regions to secure local input and commitment to the project and to ground truth the baseline situation analyses; and
d) conduct technical scoping engagements and preliminary investigations into potential project interventions in the model city-regions.

The purpose of **baseline situation scoping**, is to gather and analyse baseline information, to understand better the current (baseline) situation regarding biodiversity mainstreaming and NBSAP implementation. This includes assessing and understanding the legal and policy frameworks; institutional arrangements and governance systems; economic and social priorities, development pressures and challenges that drive change and biodiversity loss; and opportunities for near and long term development and biodiversity gains.

Given the design and overall duration of the INTERACT Bio project, the baseline situation scoping exercise is not intended as a comprehensive full scoping exercise. Instead, a more strategic, focussed and rapid appraisal scoping is appropriate and sufficient.

Baseline situation scoping is key to shaping and informing the technical scoping, which in the context of INTERACT Bio, adopted an ecosystem services perspective. Through the analysis of information gathered during baseline situation scoping, key themes for mainstreaming and nature's benefits emerge which inform and guide the assessments undertaken in the technical scoping exercise.

The justification for focusing on nature's benefits and adopting an ecosystem services perspective in the **technical scoping** exercise is based on the on-going challenge that local government leaders and city managers around the world face in providing municipal services with scarce resources (human, financial and natural), while also having to address issues of rapid urbanisation, poverty, unemployment, and inadequate living conditions. Ecosystem services offer various benefits that can contribute to thriving cities. The benefits of adopting a focus on ecosystem services include:

- **Enhancing citizens' quality of life in urban areas** – a city with a healthy environment provides a higher quality of life for its citizens. Locally generated ecosystem services, such as air filtration, micro-climate regulation, noise reduction, rainwater drainage, sewage treatment, and recreational and cultural services, have a substantial impact on human well-being in urban areas;
- **Reducing public management costs** – local governments work with limited budgets and need to find the most cost effective solutions to provide their municipal services. Some municipal concerns such as water supply, road maintenance and flood regulation, are highly dependent on healthy ecosystems;
- **Fostering economic growth in the area** – a healthy and safe environment is a key factor for attracting business and industry with its commensurate job opportunities and wealth creation;
- **Reducing poverty** – there is a clear connection between livelihoods and ecosystems, which in the case of the poor is even more direct. In rural areas many people rely directly on ecosystems for food, water and fuel. Though less pronounced, the same holds true for many cities;
- **Protecting against environmental disasters** – a range of ecosystems act as important buffers for natural hazards, mitigating the damage caused by extreme events such as floods, droughts and landslides;
- **Alleviation of pressures on the resource base of regions surrounding cities** – degradation of near-urban ecosystems can jeopardize food/water supply and urban resilience. A sound understanding of urban dependency on ecosystem services is indispensable for informing sustainable land use nearby;
- **Becoming a political frontrunner** – local government pioneers get recognition. Cities that have been proactive in protecting their ecosystems and halting biodiversity loss are (inter)nationally renowned;

- **Well-informed choices** - if the likely consequences of a decision (e.g. regarding a land use change) with regard to the full range of ecosystem services are considered, the risk of high (social) costs due to unintended side-effects is reduced; and
- **Convincing arguments** – it is often a challenge to communicate to the public and to specific stakeholders (e.g. the municipal treasury, or the corporate sector) the importance of maintaining healthy ecosystems within and adjacent to urban areas. A focus on ecosystem services provides arguments for maintaining ecosystems as an asset for the local economy, and as a pre-requisite for secure livelihoods.

Adopting a focus on ecosystem services' implies to jointly (re-)consider and (re-)appraise already available environmental knowledge and data (and to complement it with missing data) in light of questions such as:

- Who depends on which functions/aspects from a certain ecosystem? or
- How can a certain problem be better tackled by taking into account the benefits that flow from an ecosystem to one or several groups of people? or
- How can the losses that would be incurred in case of ecosystem degradation, be better addressed by taking into account the ecosystem service benefits?

2.2. Scoping methodology

Typically scoping comprises of the following key iterative steps:

- ✓ Gather data and information and undertake desktop research;
- ✓ Conduct stakeholder mapping exercise;
- ✓ Engage and consult stakeholders to gather further information, compliment missing data gaps, test and verify data and assumptions and jointly involve them in the assessment;
- ✓ Analyse and assess information:
  - mapping the 'landscape' for biodiversity mainstreaming entry points;
  - identify and consider nature's benefits (ecosystem services);
  - clarify and prioritise key themes for mainstreaming biodiversity; and
- ✓ Present scoping results and findings to stakeholders.

Figure 3 Scoping generic methodology

Within this broader framework, the ecosystem services assessment followed a step-wise approach, with the first step, "preparing", dovetailing with the baseline situation scoping process. The step-wise approach adopted for the ecosystem services assessment is illustrated in the figure below:

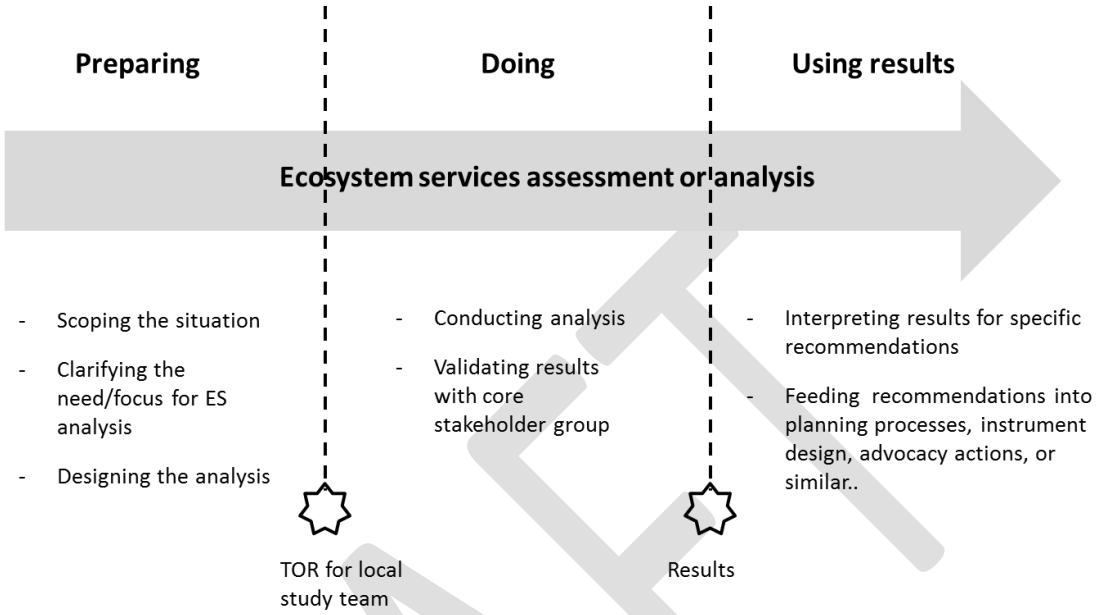

Figure 4 Step-wise approach to ecosystem services assessment

Regular and ongoing engagements with key actors and stakeholders during scoping create opportunities to stimulate and support key relationships that secure local input and commitment to both the INTERACT Bio project as a whole, and specific project interventions; help validate baseline situation analyses; and facilitate biodiversity mainstreaming within the city-region during project implementation and post project closure; and provide opportunities for co-production which further strengthens relations and commitment.

ICLEI Cities Biodiversity Center developed a series of technical guidance notes (TGN) to guide the implementation of scoping studies within the project countries while allowing for country specific circumstances and requirements to shape the nature of the baseline and technical scoping exercises. The TGN provided guidance on how to undertake baseline situation and technical scoping; identifying scoping information needs; and identifying stakeholders and served as basis for designing a scoping intervention suited to the particular circumstances and requirements of the three project countries. INTERACT Bio project staff in each of the project countries were responsible for designing and implementing the country and local scoping studies. Helmholtz - Zentrum fur Umweltforschung (UFZ) supported the technical scoping undertaken in each country.

2.3. Outline of scoping undertaken in Tanzania and Dar es Salaam city-region

2.3.1. Scoping process

In Tanzania scoping was conducted by means of discussions with relevant officials in the cities and national government. In addition, non-governmental stakeholders, such as individuals in universities and non-governmental organisations familiar with the environmental and urban planning sectors were also interviewed. The purpose of the discussions was to start building relationships with key stakeholders, to identify potential local champions for the project and to

gather information to understand the current urban nature and related governance context. These discussions involved introducing the INTERACT-Bio project and engaging in discussions which included specific questions, such as:

- Which are the key departments who play a role in the coordination of the NBSAP and what are their respective roles in coordinating the NBSAP?
- What advances have been made thus far with national and sub-national coordination around the NBSAP?
- What are the governance and collaborative mechanisms (i.e. engagements to enhance vertical and horizontal integration) that drive the coordination of the NBSAP?
- What is working well and what are some of the challenges to coordinating and promoting the implementation of the NBSAP?
- Which are the major environment and development challenges and issues faced by the model city-region?
- What are the major economic and social priorities, drivers of change (in terms of development pressures and biodiversity loss), and opportunities for near term and long term development and biodiversity gains?
- What is the status of biodiversity and development legal and policy frameworks and strategies?
- What are the institutional strengths, capacities and gaps?
- What are the enabling factors and key entry points for biodiversity mainstreaming within land use planning and development processes at city-region level?
- What are potential implementation projects that can be undertaken?

2.3.2. Stakeholder mapping

2.3.3. Assumptions and limitations

PART B COUNTRY SCOPING

3. OVERVIEW OF GLOBAL AND NATIONAL BIODIVERSITY STATUS

3.1. Global biodiversity hotspots and areas of high conservation value

3.2. Country level biodiversity status

3.3. Status of the NBSAP

4. OVERVIEW OF INSTITUTIONAL LANDSCAPE AND POLICY FRAMEWORK

4.1. System of governance and institutional arrangements

4.1.1. System of governance

4.1.2. National authorities

4.1.3. Subnational authorities

4.1.4. City and local authority

4.1.5. Coordinating structures

National Environmental Action Plan (VPO:Env Div) – includes a section on the institutional arrangements that describes the vertical devolution of powers in simple terms (see *2.3 Institutional framework The Environmental Management Act No. 20 of 2004 sets up the Institutional Framework for environmental management in the country (Figure 1). It confers the task of overall coordination and policy articulation of environmental management in the country and provision of the central support functions to the Ministry Responsible for Environment, which is the Vice President's Office. The Act establishes the National Environmental Advisory Committee (NEAC) with the role of advising the Minister responsible for environment,. It confers the role of enforcement to the National Environment Management Council (NEMC). The Act directs establishment of Sector Environment Sections with the role of overseeing environmental management to such respective sectors. It also gives power to the Regional Secretariats to designate Regional Environmental Management Expert (REME) charged with responsibility to advice and oversee implementation and enforcement of EMA. Furthermore, it empowers LGAs (City, Municipal, District, Township) to designate or appoint Environmental Management Officers to oversee implementation of EMA at respective levels. In addition, the Act establishes Environmental Committees at different LGAs levels to advise and oversee the implementation of EMA within their jurisdiction.)*

In addition there is an implementation plan in the last chapter which shows what their priorities are – we should align our project interventions to this. Eg – *1.1 Strengthen enforcement of legislation related to Land use and 1.2 Carry out "environmental mapping" for identifying highly degraded areas/ fragile.* ETC – several of which relate to the types of project interventions that we have started identifying.

4.2. Macro policy frameworks

4.2.1. Growth and development policy frameworks

4.2.2. Climate change and disaster risk management policy frameworks

4.2.3. Environment and biodiversity policy frameworks

4.2.4. Sector policy frameworks

4.3. Key legislation

4.3.1. Environmental and biodiversity law

4.3.2. Land use and spatial planning law

4.3.3. *Disaster management law*

4.3.4. Applicable sector laws

PART C CITY-REGION SCOPING

5. CITY REGION CONTEXT

5.1. Policy frameworks at city-region level

5.2. Socio-economic profile

Sources: Anchor report and DSM Env outlook & see TZ vision (re industrial policy)

Dar es Salaam is a major Tanzanian city and commercial port on the Indian Ocean coast. The City is located in the eastern part of Tanzania mainland between latitudes 6°36′ and 7°0′ South and longitudes 39°0 and 33°33′ East. It is bounded by the Indian Ocean on the east, coastal areas to the north and south and bordered by the inland region to the west. Dar es Salaam City comprises 1,393 km^2 of land mass with eight offshore islands. On the mainland there are four distinct land forms within the city area are (1) shoreline and beach, comprising sand dunes and tidal swamps; (2) coastal plain; (3) onland alluvial plains that consist of valleys, culminating in creeks and mangrove swamps before entering the Indian Ocean and (4) the Upland Plateau which forms the city boundary to the west. The highest point in the City is 330m above sea level. Dar es Salaam City has four major rivers namely Mzinga, Kizinga, Msimbazi and Mbezi.

Dar es Salaam City is the economic, industrial, commercial, trading, educational, cultural and transportation hub of Tanzania. Tanzania's development vision includes a strong focus on industrialization as a mechanism to advance economic development (The Tanzania Development Vision, 2025). There are six Local Government Authorities: the City Council and five Municipal Councils: Ilala, Kinondoni, Kigamboni, Temeke and Ubungo. Industry and trade are the main dominant activities for the livelihoods and economic development in the city. The two sectors contribute over 80 per cent of the city's economy and employ about 90 per cent of the work-force in the city. The major economic activities in Dar es Salaam City include trade, manufacturing industry, tourism, transportation and communication, urban agriculture and livestock, forestry, fishing, mining, utility services, construction, finance and insurance and public administration, which are conducted in both formal and informal manner. The city is the also the leading arrival and departure point for most tourists who visit Tanzania. As a result of these economic activities, the City has experienced rapid urban growth over the past three decades, which has caused a deterioration of the living environment and inefficient and ineffective service delivery to city dwellers.

With a growth rate of 6.5%, it is the fastest growing city in East Africa, with much of the growth attributed to a high migration rate from other parts of the country. The high population is putting considerable pressure on basic services such as education, health and housing. These pressures have far outstripped the development planning process of the city, which includes effective planning for provision of adequate and quality services to residents and other stakeholders.

With limited urban planning and development controls to guide the rapid growth, the city is now characterized by large unplanned and informal settlements that occupy 70% to 80% of all residential land area.

Despite the fact that natural vegetation has significantly declined there are a lot of planted trees which give relatively green scenery of the city. Coastal forests comprise an important natural resource in Dar es Salaam City. They provide a wide range of ecosystem services including medicinal plants, fuel wood and building materials (timber and building poles). However, human activities like charcoal making, cattle grazing, fire ignition, pole and firewood collection, hunting and poaching, honey harvesting and construction activities have led to degradation of the coastal and inland forest resources.

There are limited wildlife resources in Dar es Salaam City due to its high demand for land for settlements and industrial development. The city remains with only one wildlife

protected area which is Mabwe Pande Game Reserve. The Reserve is among the eight national hotspots in the coastal forest sites requiring critical attention for their global biological importance. It contains a high diversity of monkeys, bats and birds, making the city an important bird area.

Hunting of wildlife and demand for bush meat is ever increasing among coastal forest communities. In Mabwe Pande Game Reserve near Dar es Salaam animals have been hunted for household consumption for many years. The population particularly of larger animals has been significantly reduced. This is the case in almost all of the built up areas of the city, with the exception of the University of Dar es Salaam area where small mammals and other primates, as well as reptiles and birds, can be found.

The fisheries sector in Dar es Salaam employs more than 0.5% of the City's population and contributes about 29 per cent of the city GDP. The major environmental problem facing the fishing industry is the deterioration of aquatic systems. Although these resources provide livelihood to a significant number of people in the city, marine resources are increasingly being polluted, depleted and/or misused through environmentally destructive fishing methods, introduction of exotic flora and fauna and discharge of large amounts of urban wastes and affluent materials.

Dar es Salaam Scoping report extract (2017)

- Planners and engineers, both at national and city-region level (city and municipal councils), have limited or no understanding of scope of biodiversity and how to interpret this into land use and spatial planning. Nature-based solutions (NBS), green (ecological) infrastructure, ecosystem services and ecosystem valuation are unfamiliar concepts in Tanzania. There is thus a need to build capacity about biodiversity mainstreaming, natural assets, ecosystem services and valuation and nature-based solutions first, before planners and engineers will be able to engage in the Project in meaningful way;
- Plans are good on paper but implementation and how to actualise plans is a challenge in practice, largely because of the rapid urbanisation and settlement patterns and informality in Dar es Salaam;
- Structures (such as coordination committees and interdepartmental forums) exist, but are not functional, and there is little to no meaningful dialogue between institutions and levels of government to stimulate accountability and action, for example local level environmental action plans and reports should be submitted to NEMC but this does not happen;
- Departments and municipalities work in silos, also departments/divisions within municipalities work in silos (never meet together);
- Line managers and technical staff across sectors and levels of government acknowledge that there is a lack of coordination, and that although coordination

structures exist, these structures are not functional and do not facilitate meaningful engagement and dialogue – this is not the case at top management level in the national environment department;

- Each sector is supposed to produce a sector plan annually that incorporates biodiversity considerations, but this is not happening because coordination platforms are not in place/functional;
- Project interventions and implementation pilot projects cannot be biodiversity focussed, but must be linked to development goals with a strong emphasis on supporting existing/creating new livelihood opportunities, job creation, poverty alleviation and revenue generation for the city and municipal councils. The Director of the Environment Division in the Vice President's Office emphasised this standpoint.
- In light of the current development pressures, urbanisation trajectory and climate change impacts it is imperative that Project interventions and implementation pilot projects also address disaster risk reduction and climate adaptation to strengthen the city-region's resilience and sustainability;
- The city and municipal governments' ability to provide and maintain urban infrastructure and services such as waste management, sanitation, disaster management, road infrastructure etc, has been severely stretched by rapid urbanisation and informality. For example, the projected annual average of new urban dwellers that must be accommodated is around 226,000 people[1]; around 70% of citizens do not have access to sanitation services, untreated sewage is often dumped into rivers because of a lack of infrastructure or the existing infrastructure is unable to cope, and only 40% of the city's waste is collected – around 70% of the city's waste is organic and much of this lands in rivers; [2]
- This is exacerbated by the current national government funding model to subnational levels and political dynamics which are paralysing the city and municipal governments. Transfers from national to city and municipal governments have been reduced. This has resulted in reduced funding and capacity for infrastructure development and maintenance and a decline in service delivery, which in turn reduces the city and municipal councils' ability to generate own revenue through services charges and property taxes. Another factor that affects their ability to generate income is that certain key services such as rapid bus transport, electricity and water are centralised and provided by national or regional utilities. Not only are the city and municipalities not able to generate income from provision of these services, but they have no authority over the location and maintenance of these infrastructure. Poor maintenance and unreliable service delivery negatively impacts on the rates and taxes that the city and municipalities can charge citizens. City and municipal authorities are thus being forced to find alternative ways and sources of generating own income and simultaneously improving infrastructure and service delivery. This has led to competition for donor funding and projects among municipalities;
- There is strong interest in incentivising the utilisation of biodiversity – economic evaluation – to support revenue generation, job creation and livelihoods;
- Awareness and understanding of the NBSAP and LBSAP is very poor at local level;

[1] State of African Cities, 2014, p149

[2] Ibid, p170

- Political tensions result in high turnover of staff (fired on corruption charges or redeployed) – this exacerbates the capacity constraints and leads to weak institutional memory and lack of consistency;
- The World Bank project – Greening Africa's Cities – has produced baseline scoping material that is relevant to this study and provides a comprehensive baseline for the Project;
- The economic value of the Msimbazi River has been determined in a study funded by the World Bank;
- Key environmental issues and development pressures (recurrent themes):
    - Waste – solid and effluent (collection, disposal and recycling)
    - Flooding
    - River quality – impacted by poor agricultural practices along riparian zones, sand mining, 30m and 60m flood lines not being adhered to, i.e. encroachment by illegal structures, food gardens & informality and dumping of waste
    - Mangroves – garbage collects in mangroves and thus seen as flooding hazard
    - Lack of sanitation
    - Water pollution (due to dumping of waste and inadequate sanitation and sewage services) – water quality and waterborne disease in rainy season
    - Virtually no recycling facilities and markets, no buyback centres, only scrap metal and plastics have any economic value (Chinese firms) and the bulk of the waste is organic waste yet there are no composting facilities
    - Terrestrial forest threatened by informal settlement and tree harvesting for charcoal
    - Coastal erosion
    - Dynamite fishing
    - Urban greening
    - Weak enforcement of 20m and 60m flood lines

Presentations at Ardhi University: morning session hosted by Prof Kyessi and session opened by the Director of the Ardhi Institute of Human Settlement Studies, Dr. Makarius Victor Mdemu. Refer to attendance register - about 30 students and staff attended. Ernita van Wyk presented UNA Rivers for Life (as well as the 4 collaboration options with Dept Lands) and introduced the INTERACT-Bio project.

Comments received:

- Summary concepts by Prof Kyessi: implementable design; interactive planning; issue of co-ordination; urban planning is silent on ecosystem services; alternative livelihoods.
- Landscape & catchment issues for the Msimbazi: Jaffar Jongo. The University has done a lot of work on this: 'water landscape urban design'. Will the UNA Rivers guidelines be suitable for, for example flooded sites? Need to link with specific site conditions – but the UNA guideline seems to be a blanket/broad guideline.
- 5-year university survey on the Msimbazi shows that it will be close to impossible to restore but better potential in the headwaters. Guidelines should make provision for more space between buildings and more space for water, etc. (Jaffar)
- Need strategy for the entire Msimbazi watershed
- Legal review should accommodate ecosystem services and should state the watershed as the planning unit.

- Enforcement is a problem > even government transgresses by developing within the rivers
- Catchments need planning authorities
- We should use rivers to structure our cities to emphasise co-existence with rivers and to amplify the benefits from rivers
- Problem: urban planning authorities do not consult with other decision-making structures and other disciplines (e.g. landscape architects). City Master plan is unpopular because there is not much stakeholder engagement.
- In poor countries, rivers are seen as disasters and may not see other opportunities for use. Poor people encroach on rivers because these areas are left unattended. Need to integrate alternative beneficial solutions e.g. recreation, parks.
- Prof. Kyessi > summary comments: keep in mind the 2020 elections > this drives politicians > good time for making an impact and impressing politicians. Rivers are oversubscribed > encroachment a big problem. Please make use of students for field work. Think about the development of parks for people > the university can show where, even in informal settlements. Need project office in the local municipality and to advertise our focal point people.
- Please make information available on project web sites
- Nicholaus M: ecosystem evaluation will be very important. Need to convince local people and have to state what they stand to gain and/or lose.
- Alternative livelihoods and feasibility for communities
- Jaffar: maybe try to link to other water projects and integrate the ideas of watershed management and open space development
- Ensure access to public spaces; e.g. Pugu Forest is limited to people and not used and enjoyed as part of the landscape. Need to integrate the physical connection between city and forest.
- Isolated ponds/lakes (natural) in the city and part of biodiversity. These can be part of a project opportunity for land and water integration. Maybe also use/integrate urban agriculture as part of water/land connection.
- University busy with landscape, storm water research, rain water harvesting
- Also need community behaviour change, e.g. waste into septic tanks > polluted water.
- EfD (Byela's group - UDSM): urban amenities; pollination; water project; urban agriculture

28 July 2017

Meeting with GIZ

Frijtof Behnsen (GIZ Dar es Salaam office)

Points discussed:

- Dar es Salaam and Hamburg have twinning arrangement. Alexander Fecke – solid waste study. Integrated Solid Waste Association – Dutch interested in funding workshop. Project will include collection depots and upgrading of dump/landfill & segregation and composting on-site. 4.5 tonnes per day (Frijtof will send docs). Similar but smaller scale initiatives already happening (Mathew)

- Arusha and Moshi: GIZ focal area. Partnership with Kiliflora ('Usa' River), 40% of products are fair trade and giving to coaisl and conservation and identifying where hotspots are for training. Also working with Serengeti Brewers – helping with crop failure.
- Also working with Water Witness International
- Starting to form partnerships with 4 water user associations: Pangani Basin (4 sub-catchments)
- Kili Water Stewardship platform
- 'Miwalini' Spring in Moshi (increased settlement and encroachment); gazetting and restoration – what can we lose if we don't protect it.
- IC: Environmental evaluation (F): Yes. Moshi relies much on springs and groundwater.
- F: authorities are not so well organised but interested in supporting conservation of spring with rare palms
- Moshi Forest Reserve uses grey water to water the park, but pumps keep malfunctioning. Need standards for environmental use of grey water?
- Coastal? Check with WWF portfolio on marine resources.

28 July 2017

Presentation of INTERACT-Bio project to BORDA

Comments:

(Note from Ernita: didn't get many notes here as I was presenting)

- Temeke: park near Bandari, an example of open space not protected and used by drug addicts
- Need maps of open spaces
- One role of this project is influencing civil society? (Tim Ndezi)
- Stella: concern about long-term objectives.. what happens beyond the project?
- Tania: people in government must know their responsibility and be empowered to act
- Mtaa leaders have legal rights, e.g. peace keeping
- Civil society can be champions for the environment; communities can be proactive and individuals can play an important role;
- Larissa; be careful re working in Kigamboni – there are security issues and issues of access > far to travel
- Lucy Magembe: But if you fix the environment and let people connect with nature they will come
- Tania: In some sense these are good places to target for the project because they still have some nature worth saving.

Moshi scoping 2017

Challenges and needs for Moshi:

- Waste management: have dump site which is now being upgraded to a proper landfill with money from the World Bank; Waste collection a problem because there aren't enough trucks. Request for budget for another truck but probably won't get the funding.

- Council gives limited budget because the overall budget is limited because the central government takes most of the money; Used to get 700 million TZ shillings from property tax; and 400 million TZ shillings per annum from advertising (sign posts). New agency appointed to deal with infrastructure that has also affected income from adverts posted on street lamp posts. Currently securing less than 500 million per year from service levy which might also be taken away. Therefore providing the necessary services will be very difficult.
- Another challenge is the new, outsourced way of collecting revenue. In the new system, it is difficult to source agents because they realise they cannot make a profit as they apply with too low a budget in order to get the contract from government.
- Plastic materials – no recycling plant. Coca-Cola was approached to help but they were not interested.

Projects:

- Current project: Composting project with German twin City: Tubigen – they helped with a feasibility study (ensuring there is enough compostable material, etc., and they will help to fund the project. A site has been identified for implementing the project.
- Current project: Tree planting. Coca-Cola is a big partner. Their target is to plant 20 million trees in 5 years. Council budget is allocated each year for tree planting and NGOs assist for example with tree planting at schools.
- Potential project: Activities or building along the river banks. Law that 60m should be left open on either side of the river bank. But many houses and buildings are too close. What to do? Some buildings were built before the law of 60m was made. Flooding not a problem. Creating awareness and education to protect the river environment and to plant trees/vegetation (to bind soil) might be a better approach than forced removals by the city council.
- Potential project: Moshi would be interested in a Local Biodiversity Strategy and Action Plan

Other points:

- Tree cutting and pruning trees is strictly regulated. The rule and its enforcement works well (large degree of compliance). People need a permit (and approval) before cutting or pruning.
- Moshi population ~ 200 000 and growing

Projects:

- Potential project: Danford confirmed that they have an interest in a Local Biodiversity Strategy and Action Plan for Moshi. Planner and Council and sector departments will be involved, e.g. water etc.
- Potential project: Moshi has an 'environmental profile' which is used on a day-to-day basis for managing the City's environmental affairs [idea: we could integrate the processes for developing the LBSAP and revised Moshi environmental profile]
- Potential project: (capacity gap): making the link between tree planting and conservation (and other benefits). For example can target schools and mtaa executive offices (lowest level governance structures)

- Potential project: Moshi has a long history of tree planting, but of late they are moving from shade benefits from trees to also include fruit trees (nuts, avos, oranges, mangoes) for enhanced nutrition and increased food security in the City.

Other points:

- 'Sustainable Moshi' project funded by the Danish government and which ended in 2012. It focused on tree planting, waste management and the provision of streets and storm water drains. This project seems to have made a big impact on the Council's environmental awareness;
- WWF had a project in Moshi: solar energy (Salanga health centre) and tree planting
- Project nodal person: Benedicta Mtei (responsible for projects). Project must draft a letter (and remember to include mention of dialogues) to the Municipal Director because the council must endorse the project. Always cc Danford when corresponding with Benedicta. Danford will present the project to the Council;
- Urban planners will have maps – to follow up with Benedicta
- No big water supply problems: Karanga and Rau Rivers are perennial
- About 33 NGOS assisting with tree planting; one of them is particularly active in tree planting
- Also there is craft making based on natural resources
- Moshi Master/Strategic Plan (for whole council) that includes biodiversity considerations. Danford to e-mail us a copy.
- Moshi City follows global frameworks because they get money from national government
- Dept of Agriculture: involved in sustainable land management
- Danford's staff of about 37, responsible for: waste, city beautification (parks and gardens), environmental management and planning & enforcement of laws according to the EMA, pollution control & conservation.
- TEEB/economic evaluation training: September suits Danford better – he is on leave during August

Arusha Scoping 2017

Projects:

- Potential project: Revision of Arusha Environmental Profile as part of the concurrent development of an LBSAP for Arusha (same approach as with Moshi)
- Potential project: Biogas and composting (Marco)

Other points:

- Nodal person for project: ICLEI to write to the City Director (copy the Mayor) to request a nomination for the nodal person. (Mention national dialogues in letter). Council endorsement will be necessary.
- ICLEI will send mapping requirements
- Arusha has a City Master Plan, approved and currently awaiting signing of by the Minister. All activities in the City will follow this plan. ICLEI can get copy of this plan.
- Arusha population ~ 500 000 permanent residents but many more migrating in and out daily for work/jobs

- Arusha economy based mainly on: tourism, agriculture (various) and mining (tanzanite)
- Arusha has environmental profile – will send

Quote from Mayor Bukhay: "We welcome this project. We need the skills and capacity building and we look forward to integrating our City's needs with the project."

25 July 2017

Regional Administrative Secretary ('RAS'). Acting Secretary: Mr Hamdouny Z. Mansur

Project introduction (verbal: IC)

Challenges and needs for Arusha:

- Deforestation for charcoal making & identifying alternatives

Projects:

- Potential project: something around deforestation for charcoal. Education, combined with tree planting & composting?

5.3. Urbanisation and informality

5.4. Climate change impacts and challenges

5.5. Growth and development priorities and challenges

6. STATUS OF BIODIVERSITY AND NATURAL ASSETS IN CITY-REGIONS AND ALIGNMENT WITH BIODIVERSITY PRIORITIES

6.1. City-region biodiversity profile

Extracts from: Dar es Salaam City Environmental Outlook (Dec 2011)

Dar es Salaam City contains a variety of aquatic resources of both marine and freshwater ecosystems. The marine ecosystems include coral reefs, sea grass beds, mangrove forests, estuaries and sand beaches. Freshwater ecosystems include both surface water (rivers and streams) and groundwater resources.

The City contains watersheds of four major rivers, namely Mpiji, Msimbazi, Kizinga and Mzinga. Most of these rivers and streams are highly contaminated due to discharge of untreated waste from domestic, commercial and industrial sources, which renders water from these sources unsuitable for domestic and industrial use.

Waste management is a major challenge in many urban centres in Tanzania, whereby, households, commercial activities, industries and markets are the main source of solid and liquid waste. Solid waste generation has been steadily increasing in Dar es Salaam City from less than 2,000 tonnes per day in 1998 to more than 4,000 tonnes per day in 2009. (Pg xii)

In recent years, there has been an increase in industrial and domestic effluents discharged into rivers and streams of Dar es Salaam City, due to inadequate capacity for treatment and disposal. (pg xii).

Groundwater use in the city shows an increasing trend, though such water is threatened by pollution. In close proximity to the coastline, over-pumping of the groundwater has resulted into encroachment of sea water into the coastal aquifers especially in Mikocheni, Oysterbay, Msasani, Masaki and city centre areas (pg xii).

With regard to water resources issues the analysis has shown that, the population will get neither enough nor quality water for various needs as it would have grown far higher than the water supply capacity. This will imply more resources (time, finance and energy) in searching for water and increased incidences of waterborne diseases (Pg xiv).

On energy demand the analysis shows that there will be continued deforestation that reduces ecosystems capacity to sequester carbon and land degradation that would lead to poor land productivity. With regard to waste management the analysis has revealed that more health hazards that would add more load to the health services and the economy. In addition, land, water, coastal and marine resources will continue to be polluted which implies low productivity of these resources that will in turn lead to poor nutrition and low income to the communities and the nation at large (Pg xiv).

The city's population needs clean air, food, water, medicines and shelter, and the industrial sector needs raw materials, most of which include environmental services. On the other hand, wastes generated by people and industries will need the ecosystems to absorb them (pg 1).

Furthermore, the emerging crisis of freshwater supply around the globe is: global climate and atmosphere; biodiversity loss; and the concept of sustainable development need to be adequately addressed to place future human development on a sustainable path (Pg 2).

Water, air and land resources are polluted, forest resources including mangroves and other vegetation are degraded, beaches and other landscapes are eroded as well as polluted, and settlements are mostly not planned. The 'Impacts' of these include a decrease in the quality and quantity of natural resources such as water for domestic and industrial uses, forests such as Pugu and mangroves, fisheries resources, invasion of marginal lands including Msimbazi valley, encroachment of open spaces/green belts and public spaces like beaches for human settlement, business/industrial investments and other uses (pg 9).

The Dar es Salaam City has four main rivers (Figure 7), namely Mzinga, Kizinga, Msimbazi and Mbezi and several seasonal streams. The aquifer contributes to the flow of the main rivers of Mzinga, Kizinga and Msimbazi, keeping them flowing during the dry period (pg 15).

The rapid rate of urbanization and massive growth of slum and squatter settlements in Dar es Salaam have exposed urban centres to increased levels of pollution of land, air and water resources, thus heightening the risks of contamination of urban agricultural products. Madden and Chaplowe (1997) observe that problems with urban agriculture arise from its close proximity to dense human populations sharing air, water and soil resources (pg 26).

Although these resources provide livelihood to a significant number of people in the city, marine resources are increasingly being polluted, depleted and/or misused through environmentally destructive fishing methods, introduction of exotic flora and fauna and discharge of large amounts of urban wastes and affluent materials (pg 27).

The National Environmental Policy, 1997: This policy provides the framework for mainstreaming environmental considerations in decision-making process in Tanzania. The policy identifies six major issues of environmental concerns. They are land degradation, inaccessibility to good quality water for urban and rural inhabitants, environmental pollution, loss of wildlife habitat and biodiversity, deterioration of aquatic systems and deforestation. It stresses the importance of public participation in recognition of the roles of each segment of society in environmental management (Pg 41).

The National Land Policy, 1995: The National Land Policy of 1995 aimed at developing a coherent and comprehensive land policy that would define the land tenure and enable proper management and allocation of land in urban and rural areas and provide a clear position on customary land tenure in the light of profound economic and social reforms that have been undertaken in the country (URT, 1997). Among other things, the policy advocates the protection of land resources from degradation for sustainable development. The policy addresses several environmental issues such as land use planning, which take into consideration the land capability, ensures proper management of land resources, promotes resource sharing and multiple land use techniques in areas of conflicting land use, and lastly involve community in resource management, land use and conflict resolution (Pg 43).

National Forest Policy, 1998: is to enhance the contribution of the forest sector to the sustainable development of Tanzania and the conservation and management of her natural resources for the benefit of present and future generations. The National Forest Policy, among other aspects, recognizes the high value of forests due to the high potential for royalty collection, export and tourism earnings as well as the recycling and sequestering of carbon dioxide and conservation of globally important biodiversity. Furthermore, the policy deals with biodiversity conservation; describes the importance of forest ecosystems for maintaining biodiversity and the threats to biodiversity. One of the main objectives envisaged in the policy (Chapter 3) focuses on ensured ecosystem stability through conservation of forest biodiversity, water catchments, and soil fertility which translate into one of the policy areas relating to ecosystem conservation and management. The policy states that forests reserves of national strategic importance such as critical watersheds and forest areas with high biodiversity or endemism may remain under central government. The long-term goal is to delegate the management of these reserves to executive agencies when they have developed sufficient proven capacity (Pg 44).

Wildlife Conservation Act No. 5 of 2009: The Act is responsible for the conservation of wildlife and ensures protection, management and sustainable utilization of wildlife resources, habitat, ecosystem and the non-living environment supporting such resources, habitat or ecosystem with actual or potential use or value. The objectives of this Act include, to: protect and conserve and administer areas with great biological diversity, including wetlands which are representative of the major wildlife habitats by also giving special conservation status to endemic, rare or endangered wildlife species and to contribute to efforts to protect and enhance global biodiversity; protect and conserve wildlife resources and their habitats; promote and enhance the contribution of the wildlife sector to the sustainable development of Tanzania and the conservation and management of wildlife and natural resources for the benefit of present and future generations; promote and enhance the development of wildlife eco-system as well as development of protected areas network for purposes of enhancing biodiversity conservation; enhance the conservation of wildlife and its habitats outside wildlife protected areas by establishing Wildlife Management Areas for the purposes of effecting community based conservation; encourage, promote and facilitate active involvement and participation of local and traditional communities in the sustainable management, use and conservation of wildlife resources in and outside wildlife protected areas network (Pg 47).

Among the environmental challenges identified in the marine environment include: mangrove degradation, dynamite fishing, disappearance of endangered species and pollution whereas the identified challenges facing lakes, rivers and dams environment are: sedimentation, pollution, use of prohibited fishing nets and, disappearance of satellite lakes. Cross-cutting environmental challenges identified include: poor participation of the public on environmental conservation efforts, communicable disease among communities living around the environs and, low level of public awareness (Pg 56).

There are limited wildlife resources in Dar es Salaam City due to its high demand for land for settlements and industrial development. The city remains with only one wildlife protected area which is Mabwe Pande Game Reserve. The reserve is among the eight national hotspots in the coastal forest sites requiring critical attention for their global biological importance. It contains a high diversity of monkeys, bats and birds, making the city an important bird area (Baker and Baker, 2002) (Pg 61).

In addition to the limited availability of large animals in the city, presence of invasive bird species, particularly the Indian house crow (*Corvus splendens*) has out-competed many small, native African birds. The Indian house crow destroys the habitat of many other birds and as a result in Dar es Salaam City, there are now only a few other common bird species (Pg 61).

Despite the fact that natural vegetation has significantly declined there are a lot of planted trees which give relatively green scenery of the city. Besides being of biological importance, coastal forests of Dar es Salaam City provide a wide range of private and public goods, including medicinal plants, fuel wood, building materials (timber and building poles) and food. However, human activities like charcoal making, cattle grazing, fire ignition, pole and firewood collection, hunting and poaching, honey harvesting, construction activities have led to degradation of the forest resources (Pg 60).

Dar es Salaam City contains a variety of aquatic resources of both marine and freshwater ecosystems. The coastal and marine ecosystems include coral reefs, seagrass beds, mangrove forests, bays, estuaries and sandy beaches. Freshwater ecosystems include both surface waters (rivers and streams) and groundwater resources. In past years, aquatic ecosystems were endowed with a great diversity and abundance of aquatic life. However, during recent decades, these ecosystems have become partially exposed to severe degradation by various human activities such as overexploitation of resources and pollution. These activities have led to loss of habitats, disruption of the ecological balance of ecosystems, reduction in biodiversity, and decrease in available natural resources which are particularly important to human life and socio-economic development (Pg 70).

Mangrove forests are recognised as critical coastal habitats offering a variety of ecosystem goods and services. They serve as valuable nursery, feeding and breeding areas for a variety of animals, including the commercially important shrimp, crab and fish species hence very important in the maintenance of fisheries resources. Mangroves are buffers between the land and the sea; they protect shorelines from destructive storm and hurricane winds, waves, and floods. Mangroves also help prevent erosion by stabilizing sediments with their tangled root systems. They maintain water quality and clarity, filtering pollutants and trapping sediments originating from land (Pg 72).

Generally, mangroves are a source of fuel wood, charcoal, fishing stakes, building materials and traditional medicines. However, according to the Mangrove Management Plan of 1992, the mangroves of Dar es Salaam City are strictly conserved for ecosystem services. Besides decrease in the area covered by mangroves, there is also a considerable decrease in the density, height

and canopy cover of the mangroves within the forests. However, during the past decade the mangroves of Dar es Salaam experienced some increase as evidenced by NEMC 2008 surveys which showed that the density of mangrove trees of Kinondoni increased (NEMC, 2010). This improvement was due to some government's initiatives and other stakeholders towards sustainable conservation of mangrove ecosystems (Pg 72).

The major pressures that cause loss and modification of mangrove ecosystems in Dar es Salaam include harvesting for firewood, charcoal-making, salt and lime production, building poles and clearing for building sites for urban expansion, and for agriculture, road construction and hotel construction (Pg 72).

Coral reefs are critical habitats due to their ecological and socio-economic importance. There are about 88 species of hard coral species belonging to 34 genera in the Dar es Salaam City coastal area. Ecosystem services offered by coral reefs include breeding, nursery, feeding and shelter areas for animals such as fish, crabs, lobsters and clams, which support important fisheries. Coral reefs also produce calcareous sediments that contribute to the substrate and beach formation. They act as natural barriers that protect shoreline against wave action and storms and as net sinks for carbon in the form of calcium carbonate (Pg 73).

The major pressure causing coral reef degradation in Dar es Salaam coast is dragging of seine nets and dynamite fishing. Other causes of coral degradation include higher than normal seawater temperatures that induces coral bleaching and invasion of Crown of Thorn Starfish (*Acanthaster planci*) (Pg 74).

There are about 12 species of seagrasses in the coastal waters of Dar es Salaam of which *Thalassodendron ciliatum* and *Syringodium isoetifolium* are most widely distributed. Other dominant species found include *Cymodocea rotundata*, *C. serrulata*, *Thalassia hemprichii, Halodule uninervis* and *H. wrightii*. Seagrasses are considered to be critical coastal habitats as they serve as valuable nursery, feeding, breeding and sheltering areas for commercially important species of fish, shrimp, crab and mollusc. Seagrasses are also famed for their ecological function of trapping and stabilizing sediments with their complex root systems thereby maintaining water clarity, a critical condition for coral establishment (Pg 75).

The coast beach of Dar es Salaam City is famed for being nesting grounds for the endangered species such as marine turtles, hawksbill (*Eretmochely imbricata*) and green turtle (*Chelonia mydas*). Other endangered species include dolphins, Sea Turtle (Plate 6.7), humpback whales and whale sharks, the latter two utilise Tanzanian coastline as an important migrating route. The major threats to these endangered species include subsistence harvesting of turtles and their eggs; disturbance of turtle nesting beaches from tourism development and seasonal fisher camps; incidental capture in gillnets, ring nets and commercial prawn trawlers; and lack of adequate protection and enforcement (Pg 75).

Dar es Salaam City has four major rivers of Mpiji, Msimbazi, Kizinga and Mzinga. The city is also endowed with a number of small and seasonal rivers and streams including Tegeta, Mbezi, Mlalakuwa, Kijitonyama, Sinza and Tabata. Dar Es Salaam Rivers and streams are used as a source of water for different types of human activities. Tegeta, Mbezi, Mlalakuwa, Kijitonyama, Sinza and Tabata are occasionally used as last resort water sources by poor families in unplanned settlements who cannot afford to purchase water commercially. Rivers and streams are also used for irrigation of vegetable farms. Other uses include sand mining in valley bottoms common in Mpiji and Mbezi rivers, onsite washing of cars, bathing and swimming. Fishing is not among the main activities done in these rivers due to limited water. Ecologically, the rivers and streams of Dar es Salaam City collect and drain storm water to the wetlands and the ocean, thus,

protecting the built-up areas from flooding hazards. Most rivers in Dar es Salaam are polluted (Pg 79).

6.2. Ecosystem service appraisal

Motivation for technical scoping for Ecosystem Services Appraisal

In INTERACT-Bio, work with the ES concept is closely aligned with the needs, interests and planned actions in each city. A fix ES assessment scheme would unlikely respond to site-specific information needs. Furthermore, the project does not have resources for commissioning any ES related research or any full ES assessment. Instead, UFZ will support national ICLEI teams and their partners in the development of needs-driven ES appraisals.

An ES appraisal is defined here as the re-organisation of already available environmental data and knowledge, and its interpretation through an 'ecosystem services lens'.

ES appraisals are flexible inputs, or knowledge products, geared to support local purposes in model city regions. Such purposes can include e.g. advocating for/against a policy option, or designing environmental policy instruments, or incentives. The knowledge products can be policy briefs, maps, specific inputs to policy or planning processes, or similar.

UFZ's role is to provide guidance on the development of such knowledge products. Where appropriate, UFZ can also lead the development of a knowledge product, in close exchange with the project team. A first step is technical scoping. It serves to find a good 'niche' or 'gap' for project work with the ES concept in the cities.

Guiding Questions for Technical Scoping

During technical scoping, UFZ will support local project teams in specifying where adopting an ES perspective may be useful in the local context. The following questions will be jointly explored. Relevance of questions will differ across the three model city regions. The reports will vary accordingly.

1. What exactly is the issue or **practical problem** to be addressed in the project?
2. **Objectives**: What do we want to achieve within the frame of the project (e.g. have project inputs effectively considered in an urban planning process)?
3. What is our **theory of change**? How do we want to achieve our objective? How do we think that project activities achieve the objective and what other conditions are necessary for project activities to lead to desired outcomes?
4. Who are our **key partners**/target audience and what motivates them?
5. **Which arguments** will be **useful** to help achieve the objective?
6. Which **questions** should an ES appraisal focus on?
7. Format: What are appropriate **knowledge products** (e.g. maps, quantitative estimates, story lines in brochures, specific inputs, presentations, policy briefs, etc)
8. Process: **Who should be involved** in the ES analysis for ensuring credibility and legitimacy of the ES analysis? When, how and by whom?
9. **Study team**: Who has which responsibility in the ES analysis? (project staff, local project partners, national consultants/experts, UFZ)
10. Roadmap: what are our concrete **next steps**?

6.3. Approaches to land use and spatial planning, biodiversity mainstreaming and promoting ecosystem resilience

6.4. Alignment with international and national biodiversity policy frameworks (NBSAP)

7. DRIVERS OF CHANGE

7.1. Rapid urbanisation

7.2. Informality

7.3. Environmental pollution: Solid waste and effluent

7.4. Extraction of water and water quality

7.5. Extraction / over exploitation of natural resources

7.6. ……

This section provides information on some of the underlying mechanisms responsible for current trends in the loss of biodiversity and nature from three fast-growing cities in Tanzania: Moshi, Arusha and Dar es Salaam. An understanding of drivers of the loss of urban nature ensures systems approach to framing the current state of urban nature in the selected cities of Tanzania.

Dar es Salaam

1. *Rapid Urbanisation* - From Jane Turpie (World Bank, 2016)

- Dar es Salaam is the fastest growing city in East Africa. It has sustained a growth rate of at least 5% for the past three decades. The rapid growth in population has been due to both high rural-urban migration and natural birth rate of about 4.5 % per annum. It is anticipated that this trend will continue.
- The 2012 Census identified the population of Dar es Salaam at approximately 4.36 million people, at a density of 3,133 per km2 (URT, 2013).

Road networks have largely driven the peripheral growth (pattern of urbanisation) as well as the lower cost land and housing outside of the city center.

The land and soil cover have been severely degraded by the large spatial footprint of informal settlements. Between 1982 and 2002, more than 15,500 ha of formerly vacant agricultural lands had been converted to urban development. Seventy-five percent of new development has been classified as informal development; 15% converted into planned residential development; and 8 - 10% developed for commercial and industrial, public and other uses (Hill and Linder, 2010). Both commercial development and informal settlements have resulted in areas of impervious or disturbed land area that prevent vegetation growth and inhibit infiltration of storm water (URT, 2014c TSCP) (See photos).

Cholera was found to have a high incidence of transmission in informal settlement areas due to population density which promotes direct transmission from person to person. Hospital and dispensary health statistics indicate the prevalence of water borne disease, vector borne disease and parasites, infections, and malnutrition in informal settlements. The high incidence of diarrhea, intestinal worms and gastroenteritis are indicators of poor sanitation conditions and contamination of food and soil with human excrement. Poor personal hygiene is also evident from the fact that water-washed diseases (e.g., infectious skin and eye diseases) are widespread, as are fecal-oral diseases such as diarrhea and dysentery.

Dar es Salaam's landscape of woodland and coastal shrub lands has since become fragmented, deforested and settled following decades of development footprint expansion and infill. As a result, the areas of extensive, contiguous terrestrial habitats that remain are generally limited to the periphery of the city.

2. Economic Growth

Dar es Salaam is the fastest growing city in East Africa, with much of the growth attributed to a high migration rate from other parts of the country. Focus on industrialization as a mechanism to advance economic development (The Tanzania Development Vision, 2025).

While the majority of the population of Dar es Salaam travels by non-motorized modes, such as by bicycle and by walking, the trend is shifting toward motor vehicles. The increase in emissions from motor vehicles is degrading the air quality of the city. The number of cars in the city has increased from 24,600 in 1979 to 605,000 - 705,000 in 2011. The increasing use of vehicles (Figure 32) has been driven by the rapid increase in population and urban sprawl.

Inadequate roadway infrastructure has led to inadequate capacity of roads to cope with increased number of cars due to three main factors: 1) low spatial road coverage of only 2.5% of land in the city compared to Tanzania physical planning guidelines of 15 to 20% coverage; 2) poor road conditions due to lack of regular maintenance; 3) lack of overpasses or underpasses at main intersections to facilitate smooth flow of traffic and limited parking, especially in the CBD, that results in road side parking that further reduces road capacity (Kiunsi, 2013).

2.1 Energy requirements of a growing city

A driver of deforestation has been the increasing use and preference for using charcoal and household fuel. Mangroves are also harvested for firewood and charcoal-making, salt and lime production, building poles, and clearing for building sites for urban expansion and agriculture, road construction and hotel construction, as is evident at Kunduchi, Mbweni and Ununio areas (UNEP, 2011). Various types of pollution such as municipal sewage, garbage and oil pollution are also a threat. (URT, 2009d).

3. Natural resource over-exploitation and waste

The dependence of urban-based livelihoods on extraction of the city's natural resource base continues to drive both decline and depletion of the environmental assets. Extractive activities include fishing, harvesting of trees, sand mining, quarrying, and, to a lesser extent, the harvesting of medicinal plants. Dynamite fishing, coral and sand mining, mangrove cutting, and seaweed farming have a marked effect on degradation of the coastal environment (URT, 2009). The major pressure causing coral reef degradation in Dar es Salaam coast is dragging of seine nets and dynamite fishing. Countrywide, the number of fresh and marine fishermen has more than doubled between 1993 and 2006, placing further pressure on marine resources.

The rapid growth of the population and economic activities in Dar es Salaam city are driving the demand for new buildings and infrastructure construction requiring sand, limestone, and clay. Due to the scarcity of sand, there has been an expansion of illegal sand mining. While mining activities are regulated by the Government, including government-designation of mining areas and issuance of licenses, enforcement is inadequate.

Upstream land degradation in the Ruvu River Basin, growing water demand of the present-day city region far exceeding supply, and the growing amount of water extraction from limited groundwater sources threatens the sustainability of Dar es Salaam's water assets. Since the 1950s, Dar es Salaam has relied on large-scale water transfers from the Ruvu River. However, the extraction of 264 million liters each day from the Ruvu River and an additional 6 million liters extracted per day from the Kizinga River are likely contributing to downstream degradation of Dar es Salaam's aquatic resources by reducing the quantity and quality of river flows (DAWASCO, 2012). Over pumping of the groundwater has resulted in encroachment of sea water into the coastal aquifers (Mitoni, 2010). Based on the current surface water supply, only 31.9% of the demand will be met in 2015, and use of groundwater boreholes will increase to cover this gap between demand and supply (Mato, 2002, Ghent, 2012). Subsistent urban agriculture is also heavily impacted by water shortages and at times it becomes limited to rainy season cultivation (World Bank, 2011). An environmental impact assessment reveals that the increased extraction of water from the Ruvu River reduces flows and quality of water, and may affect the mangrove communities in the lower Ruvu estuary. It may also increase sea water intrusion into the river, increasing water salinity at the estuary and mangrove forest, affecting the habitat of fish, prawns, crocodiles and the marine environment in general.

About 60% of waste generated in Dar es Salaam remains uncollected and may end up in storm water drains, contributing to pollution of runoff water, rivers and coastal waters and exacerbating annual flooding events and the spread of disease.

Inadequate facility management at Pugu Landfill has compounded environmental problems as the leachates from the existing dumpsites discharge directly into the existing watercourses.

4. *Governance challenges*

4.1 Weak regulatory guidance e.g. Lack of urban planning and development controls & informal development

From Jane Turpie (World Bank, 2016 and UN-Habitat, 2014))

- Without urban planning and development controls to guide its rapid growth, the city is now characterized by a vast area of unplanned and informal settlement areas. (Master Plan not updated)
- Decades of rapid and unplanned urbanization have resulted in the proliferation of informal settlements and slums, a housing shortage, and inadequate infrastructure and services
- The public sector has not been able to keep up with the resulting demand for housing or provide a positive environment for housing development due to scarce resources, diminished capabilities to raise revenue, limited institutional capacity and the absence of a responsive policy framework (Moss and Happold, 2013).
- It is estimated that approximately 80% of all buildings within Dar es Salaam are located in unplanned areas

- The majority of urban spatial expansion of Dar es Salaam has occurred without guidance and has manifested as informal settlements throughout the city. Approximately 70%-80% of the population now resides in the dense, unplanned areas that are typically located in environmentally vulnerable areas such as those prone to flooding.
- The key drivers of degradation in Dar es Salaam include informal settlement, leading to secondary drivers such as: over-exploitation of natural resources, solid waste management, effluent, the extraction of water, and emissions.

Combination of rapid urbanization and weak regulatory guidance has been the decline in the quality of the urban natural environment.

4.2 Institutional fragmentation within each government level and across levels

Overlapping mandates, weak integration and coordination. Tackling environmental degradation issues involves multiple sectors, such as environment, urban planning, infrastructure and services provision, as well as requires clear lines of responsibility and accountability.

For example, local coordination is hampered by the fact that DCC, the lead coordinating body, is not empowered. Without proper coordination, especially at the local Dar es Salaam metropolitan level, it is difficult to address cross-jurisdictional issues, phasing or set priorities to achieve more efficient use of resources and produce positive impacts.

The division in roles and mandates between levels of governments are often ineffective and unclear.

In addition to the sometimes unclear and overlapping roles across levels, coordination between national and local-level agencies are weak,

4.3 Weak enforcement

The rivers have been degraded due to the impacts of encroachment, erosion and sedimentation, effluents from waste water and runoff, and solid waste.

The coral reefs within Dar es Salaam's island and bay areas, established within the broader 26km2 Marine Protected Areas designation in 1975, were found to have high diversity in the 1960s and 1970s. However, surveys in the 1980s and 1990s described general degradation due to destructive fishing techniques and tourism

Temeke District has the most extensive coverage of mangrove forest (see Table 7) with 7 distinct forests covering more than 2,000 km2. However, mangrove forests in Dar es Salaam face considerable threats to forest decline due to exploitation and uncontrolled use (Samaki, 2015).

Locally, Ilala's coastal waters face considerable sewage pollution from Aga Khan Hospital; coastal effluents in Temeke are from KTM Textile industry, Dar es Salaam port and Kigamboni refinery plant; while Kinandoni's coastal assets are degraded by wastes from tourist hotels (Samaki, 2015). Periods of heavy rainfall (March to May) bring the largest volume of pollution into Dar es Salaam's coastal waters, and resources from oil, heavy metals, industrial and sewage pollution have been ranked among the most severe threat according to the 2015 Coastal Rapid Impact Assessment (Samaki, 2015).

4.4 Weak regulatory guidance, and lack of regulatory frameworks and tools, especially at the local level.

the city is ill-equipped with the necessary regulatory guidance and tools to direct growth and to provide affordable housing and basic services. As such, the majority of the city's residential area – 70% to 80% - is considered unplanned and informal settlements. Further, the fastest-growing areas continue to occur in the informal areas, especially on the periphery of the city. The rapid urbanization without strategic guidance also resulted in the loss of urban ecosystems such as forest reserves, increased disturbance to land and aquatic systems, and unregulated stone and sand extraction for building material – all contributing to environmental degradation.

The overall legal tools and mechanisms (e.g., local policies, guidelines, by-laws etc.) to guide urban development and environmental protection actions are largely missing, and, if present, apply only to specific Districts within the city or are outdated and thus impractical. Urban development regulation and environmental protection efforts are largely carried out through projects,

Further, especially at the local level, the DLAs do not have an integrated information database to serve different agencies and for different sectors;

4.5 Loose adherence to prescribed regulatory processes.

the ability of both national and local-level agencies to carry out their necessary mandates according to procedures is largely lacking in practice. Often, national level Acts would lay down the coordination and execution processes, from the national-level to the local levels. However, these formal procedures may not be followed in practice.

5. *Insufficient data and information sources*

The lack of comprehensive, baseline data documenting an inventory of terrestrial assets in Dar es Salaam, such as an urban natural areas inventory or a tree canopy survey, makes it challenging to understand the current state of terrestrial assets and to identify locations of significant change.

TANBIF?

Also mention the Environmental Profiles which do not adequately address urban nature and insufficient capacity to update them.

6. *Lack of current capacity, resources and technical expertise; and competing priorities for resource allocation.*

The lack in both financial and staff capacity and resources is a common challenge highlighted by all institutions.
Ineffective enforcement of environmental protection actions is a key challenge, and this occurs due to lack in capacity, dedicated resources and also insufficient regulatory backing or protracted judicial procedures. Further, with the central government having played (and in various aspects, still playing) the main role for many years, in most cases Local Government Authorities lack the experience, skills and resources to undertake their new roles.

7. *Climate Change*

- The impacts of climate change have exacerbated the rate and extent of environmental degradation and have made the city's efforts toward environmental management all the more challenging.

- Climate change is projected to affect precipitation variability, storm frequency and temperature, resulting in droughts and rivers flooding, sea level rise and storm surges; coastal and beach erosion; submergence of some nearby islands; intrusion of salt water in fresh water bodies (wells and boreholes); and erosion and destruction of lifelines (i.e. roads, bridges and coastline).
- Heavy rainfall frequently causes flooding in the city, particularly in low-lying, flood-prone informal settlement areas, which positions the poor with heightened vulnerability to flooding. In addition to property loss and occasional loss of life, widespread health risks result from overflow of onsite sanitation, sewers and drains, contamination of wells and springs and the spread of diseases such as malaria, lymphatic filariasis, and diarrhea. The city's poor are challenged by current conditions and their situation is likely to worsen without interventions that address the impacts of climate change.
- A rise in temperature, coupled with an increase in precipitation, could have wide-ranging effects. By 2100, mean annual temperature for Tanzania is expected to increase by 1.7°C, including areas around Dar es Salaam (Matari et al., 2008). This rise in temperature could also trigger an increase in the urban heat island effect, which would bring a gradient of higher temperatures where densities of people and the built environment are greatest. These higher temperatures could impact urban agriculture (evapotranspiration, heat stress), disease incidence (direct effects of extreme heat on humans, as well as on disease vectors, e.g., by increasing humidity), hydropower generation (increased evaporation in reservoirs), and household electricity requirements. Models also anticipate a projected increase in the number of days exceeding 32°C by 2050 (Watkiss et al., 2011).

PART D PROJECT INTERVENTIONS

8. RECOMMENDATIONS FOR CONCEPT PROJECT INTERVENTIONS

8.1. Policy instruments

National policy instrument - Outcome Indicator 0.1:

By the end of 2020, in all three (3) project countries, targets and issues of biodiversity and ecosystem management are included in a national urban development strategy and/or plan.

Amendment of by-laws

Arusha Master Plan

8.2. Vertical and horizontal integration

Dialogues

LBSAPs

8.3. Capacity building interventions

Ecosystem services (TEEB) training

8.4. Pilot implementation projects

Coastal

Waste

Greening

8.5. Awareness creation

Outreach programme

8.6. Tools for decision-making

Thematic Atlas

Multi-sector forums for decision-making

8.7. Investment case

Investment case

8.8. Urban Nature and Biodiversity reporting platform

Registry

Table summarising proposed interventions

Proposed intervention	Intervention category	Relevant Work Package
Model bylaw that all municipalities can adopt	Policy instrument	Outcome Indicator 0.2 By the end of 2020, in all three (3) model city-regions, targets and issues of biodiversity and ecosystem management are integrated in relevant spatial planning policies and development strategies.
Arusha Master Plan	Policy instrument	Outcome Indicator 0.2 By the end of 2020, in all three (3) model city-regions, targets and issues of biodiversity and ecosystem management are integrated in relevant spatial planning policies and development strategies.
Influence National Urban Development Strategies/Plans	Policy instrument	Outcome Indicator 0.1: By the end of 2020, in all three (3) project countries, targets and issues of biodiversity and ecosystem management are included in a national urban development strategy and/or plan.
LBSAPs: Ilala, Arusha & Moshi	Vertical and horizontal integration	Indicator II.2: By the end of 2020, at least 8 priority areas of the NBSAPs of Brazil, India and Tanzania are included in the sub-national BSAP of each respective model city-region. Indicator II.3: By the end of 2020 all three (3) model city-regions have developed or improved their sub-national Biodiversity Strategies and Action Plans (BSAPs) to directly affect sub-national spatial and technical planning and its implementation.
Dialogues	Vertical and horizontal integration	Indicator IV.1: By end 2019, at least 8 biodiversity-focused dialogues between national and local/regional actors have occurred in each project country.
Ecosystem Services (TEEB) training	Capacity Building	Activity I.4. Stakeholder and partner training: Building the relevant expertise of all partners including national and sub-national project partners and their identified key stakeholders to enact the project in each project country.
Demonstration project: coastal participatory management plan and	Pilot implementation	Indicator III.1: By June 2019, in each model city-region, three (3) specific projects that support or clarify the issues of biodiversity and ecosystem services will be initiated/implemented.

ecotourism job security		These projects will practically demonstrate the value of systematically integrating biodiversity management into spatial and technical planning, also for public visibility.
Demonstration project: composting-indigenous nurseries-job creation	Pilot implementation	Indicator III.1: By June 2019, in each model city-region, three (3) specific projects that support or clarify the issues of biodiversity and ecosystem services will be initiated/implemented. These projects will practically demonstrate the value of systematically integrating biodiversity management into spatial and technical planning, also for public visibility.
Demonstration project: greening – food gardens, heat reduction, claiming urban green space (managing informal encroachment)	Pilot implementation	Indicator III.1: By June 2019, in each model city-region, three (3) specific projects that support or clarify the issues of biodiversity and ecosystem services will be initiated/implemented. These projects will practically demonstrate the value of systematically integrating biodiversity management into spatial and technical planning, also for public visibility.
Outreach	Awareness creation	Activity IV.2. Conduct a targeted biodiversity mainstreaming awareness program in each project country, focused on vertical integration and horizontal alignment of biodiversity management at the city-region level for government officials and decision-makers.
Thematic Atlas	Tools for decision-making	Activities as part of Output II Work Package (WP II) : Demand-driven assessments of green infrastructure and ecosystem services in the model city-regions, as well as development of regional strategy and action plans
Multi-sectoral stakeholder forum (regional and district consultative committees)	Tools for decision-making	Indicator II.1: By the end of 2019, all three (3) model city-regions have established multi-disciplinary and multi-sectoral forums, which assist in decision-making processes regarding the coordination and integration of spatial and land-use planning.
Investment case	Investment case	Indicator III.2: By the end of 2020, in each model city-region, one (1) investment case that profiles the value of both the socio-economic and ecological benefits (e.g. creating jobs) and supports the implementation of the projects, mentioned under III.1 or in addition to these, is developed and promoted.
Registry	Reporting Platform	Indicator IV.2:

		By the end of 2019, for all three (3) model city-regions, a report generated from the biodiversity reporting platform, which includes the commitments, goals and results of the achievement of biodiversity targets, will be available.

9. CONCLUSIONS AND ACTION PLAN FOR WAY FORWARD

9.1. Key findings

9.2. Way forward action plan

APPENDICES

MOSHI

District	Significant nature places	Ecosystem services/benefits
Moshi	1. Mount Kilimanjaro National Park	• Water • Leisure • Maintain ecosystem • Medicinal plants
	2. Kinuka Mori waterfall	• Tourist attraction • Water for irrigation • Maintain ecosystem • Cultural services
	1. Kibosho Wildlife Area	• Tourism
	2. Zara Area (In Mawenzi ward)	• Tourism
	1. River Karanga	• Irrigation and domestic water • Habitat for some organisms like birds • Water for irrigation • Recreation • Water filtration • Fire wood • Water for irrigation • Food forest • Recreational grounds
	2. Trees	• Provides oxygen • Makes the environment look beautiful and attractive
	1. Nyumba ya Mungu Dam	• Fish and water for irrigation
	2. Njoro Forest	• Medicinal trees • Maintain ecosystem
	1. Kinuka Mori Waterfall	• Leisure • Fresh water • Medicinal plants • Maintain ecosystem • Tourist attraction • Water for irrigation • Cultural services • Regulating air (quality?)
	1. Materuni Waterfalls (in Uru)	• Recreation
	2. Uhuru Park Garden	• Recreation • Relaxation
	1. Rau Forest	• Hydrological system • Recreation site • Soil conservation • Water for irrigation
	1. Njoro Spring	• Community water supply (natural) for domestic (use) and irrigation • Natural waterway for storms/drainage • Irrigation
	1. Moshi waste water	• Help to oxidise anaerobic microbes in

	treatment ponds	waste water • Reservoir for fisheries • Water source for domestic use • Source for ecological niche
	2. Mshiri water source (Spring)	• Act as water source for domestic use • Source for ecological niche
	1. Lake Chala	• Tourism • Fishing • Picnic
	2. Nyumba ya Mungu Dam	• Hydro-electric power • Fishing • Picnic • Irrigation
	1. Marangu Waterfalls	• Site for tourism • Recreational • Bee keeping • Source of water (springs) • Fresh air – reduce pollution
	1. Marangu Falls	• Attraction of tourism • Source of water • Irrigation • Recreational area

ARUSHA

District	Natural Place	Benefits
Arusha City	Suye Hill	• Good views of the Suye Hill • Suye Hill is a source of water • Acts as a lung of the City as it cleans air • Animal habitat • Place for tourists to visit • Attracts ecotourism • Living area for small mammals • City urban attraction (symbol)
	Themi River	• Themi River is a good source of water to the people who are living around it • Some fish ponds are constructed downstream • The river is used for irrigation • Minimise carbon dioxide • Biodiversity • Source of water • Provide enough oxygen due to plenty number of trees planted • Reduces air pollution • Reduces storm during rainy season • Water purification

		• Regulate city climate • Shelter for microorganisms or small animals
	Muriet Land fill	• Environment protection
	Olacity Garden	
	TANAPA Conservation Area	• Promote urban eco-tourism (urban attraction) • City carbon sink area
	Arusha edible botanical garden	• Recreational areas, mental and physical health • Aesthetic place • Conserve nature
	Themi Living Gardens	• People earn income from natural resources – through tourism • People inhale clean oxygen • Local medicine • Purify water • Fresh air
	Arusha City Dump Site	• People get enough water because the hills attract water cycle • People have access to an environment conducive for resting • All solid waste can be safely collected and buried in the dump site
Arusha Administrative Secretary	Mt Meru	• Carbon sinks • Source of biodiversity • Regulating services (fresh air, water, climate) • Cultural services (tourism, spiritual services)
	Rivers	• Provide services (drinking water, irrigation, industrial use • Regulating services (climate) • Provide home for living things • Provide life (animals and humans, plants)
Arusha District	Bangata Ward	• Good climatical conditions • Areas where is suitable for agriculture due to presence of streams which are used for irrigation
	Mollela	• Provide beauty • Less air pollution due to environmental conservation
	Arusha Tembo Club	• They are stress free zones

		• You can take children to learn how to conserve the environment and let them enjoy fresh air
	TGT Area	• You can use such areas for prayers
	Mateves	
	Kiutu Hill Forest Reserve	• Source of firewood • Ecotourism earn revenue to the local community
	Olglai Falls	• Source of water
	Arusha National Park	• Offer employment opportunities • Provide natural worldviews and balance of ecosystem • Tourism • Source of income/revenue • Fresh Air (clean air) • Protect biodiversity • Touring • Source of income to government • Animal/wildlife there • The park has full of animals as well as good greenish • Habitat for wild animal recreation • Create microclimate • Wild fruits (children use to pick for eat)
	Olmotonyi Forest Reserve	
	Oldadai or Olgiai Nature Reserve	• Natural appearance of the area which is covered by natural resources • Fresh water from the national springs found at the area
	Tembo Club	• Conducive environment for refreshment and relaxation • Free from pollution
	Mount Meru	• There are lots of springs that provide water to citizen around and natural vegetation that regulation the atmosphere • Provide natural habitats for wildlife Rain source • Best arable land for cash and food crops growing • Best place for living • Source of water for domestic and favours irrigation livestock • Tourism mountain climbers
	Kives Mountain	
Meru District	Mliwa	• Its contains a lot of attraction, like

		waterfalls, cultural vegetation and trees
	Mliwa Meru	• Provides water income identification and fresh air
	Arusha National Park	
	Ngurudoto Hotel	• Recreational • Wildlife management
	Sabo Square	• Beautiful gardens
	Mount Meru Slopes	
	Present of natural	
	Flort/Liti Tengen	• Recreation • Sources of water for domestic uses • Sources of water for agricultural (activities irrigation)
	Nduruma River	• Source of water in large area covering Mlanganini and other nearby areas • Many people around this area are self-employed in horticulture especially fruits and vegetable
	Olmotony Forest	• It is the source of revenue due to flower companies established around this area • It is a source of timber and other forest products such as charcoal and firewood • It provides employment
	Sekei Area	• Support in agricultural and irrigation
	Bangata Area	• Support refreshment to the people
	Otrito/Ologenuro Area	• Support refreshment to the people
	Lake Duluti	• Support agriculture irrigation
	Present of natural	• Clean air • Availability of rains
Meru	Arusha City	• Tourism • Air quality maintenance and climate regulation • Water purification
	Meru	• Product from ecosystem • Healthy benefits • Agriculture

REFERENCES