

The Green Growth Platform



PROMOTING FOREST MANAGEMENT FOR SUSTAINABLE WATER
RESOURCES IN TANZANIA



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Acronyms And Abbreviations

ASDP	- Agriculture Sector Development Program
CBFM	- Community-based forest management
CEO	- Chief Executive Officer
DC	- District Commissioner
EAMCEF	- Eastern Arc Mountains Conservation Endowment Fund
EMA	- Environmental Management Act
FBD	- Forestry and Beekeeping Division (of the Ministry of Natural Resources and Tourism)
FITI	- Forestry Industries Training Institute
FTI	- Forestry Training Institute
FR	- Forest reserve
GEF	- Global Environmental Facility
GGP	- Green Growth Platform
GIS	- Geographic information systems
IWRM	- Integrated water resources management
IWRMD	- Integrated water resources management and development
JFM	- Joint forest management
LGA	- Local government authority
MJUMITA	- Mtandao wa Jamii wa Usimamizi wa Mimitu Tanzania
NAFORMA	- National Forest Resources Monitoring and Assessment
NIMP	- National Irrigation Master Plan
NWP	- National Water Policy
PES	- Payment for ecosystem services
PFM	- Participatory forest management
PO-RALG	- President's Office – Regional Administration and Local Government
PO-PSMGG	- President's Office – Public Service Management and Good Governance
PWS	- Payment for watershed services
RC	- Regional Commissioner
REDD+	- Reducing emissions from deforestation and forest degradation, plus the sustainable management of forests, and the conservation and enhancement of forest carbon stocks
SUA	- Sokoine University of Agriculture
TaFF	- Tanzania Forest Fund
TAFORI	- Tanzania Forestry Research Institute
TAWA	- Tanzania Wildlife Authority
TBL	- Tanzania Breweries Limited
TFS	- Tanzania Forest Services Agency
TZS	- Tanzanian shillings
UNEP	- United Nations Environment Programme
URT	- United Republic of Tanzania
VPO	- Vice President's Office
WCST	- Wildlife Conservation Society of Tanzania
WRM	- Water resource management
WUAs	- Water users' associations



Executive Summary

The contribution of forests to human and ecological well-being cannot be overstated. Forests provide the essential organic infrastructure to sustain the Earth's most diverse collection of life and support an estimated 1.6 billion human livelihoods.

Nearly half of all known species live in forests, including 80% of biodiversity on land. Forests deliver vital long-term ecosystem services, including clean air and fresh water. They act as natural filters to improve water quality, slowing rain as it falls to the earth and helping it soak into the soil.

Additionally, a forest's network of roots stabilizes huge quantities of soil, reduces soil loss and erosion by wind and water, protects against

landslides and dust storms, and lessens flood damage. Forests also play an important role in regulating the world's climate and mitigating global warming. The world's forests act as an enormous carbon sink, absorbing 2.4 billion tonnes of carbon dioxide (CO₂) per year, or one-third of the CO₂ released from burning fossil fuels. Sustainably managed forests significantly contribute to sustainable development, providing essential goods and services for households and for industry.

They play a fundamental role in combating rural poverty, ensuring food security and providing decent livelihoods. However, rapid population growth in Africa is putting intensive pressure on natural forest resources across the continent. In Tanzania, farming, livestock-keeping and household energy demands are driving widespread and unsustainable deforestation, which is estimated at around 470,000 hectares per year. At this rate, if left unchecked, the country's forests will be totally lost within 50 to 80 years.

Encroachment on forest areas, especially water catchment areas, can also negatively affect both the availability and quality of water. Left uncontrolled, water sources are depleted and polluted, adversely affecting the health and livelihoods of people in local communities and those downstream who rely upon those sources for their water supply. Deforestation and degradation of forest areas take place more explicitly in unreserved forests. However, inadequate policy, poor land use practices and inadequate capacity to equitably manage land and forests encourages encroachment on reserved forests and water catchment areas as well.

A number of cross-cutting issues need to be considered to conserve forests and safeguard

the country's water supply. Regulatory and institutional frameworks should be reinforced to control deforestation and preserve catchment areas. Communities should be sensitized to use land and water resources more sustainably.

Rationale And Objectives

Considering the direct relationship between sustainable forest management and the availability and quality of water resources, the sixth Green Growth Platform (GGP) "Promoting Forest Management for Sustainable Water Resource in Tanzania" was held from 31 July – 1 August, 2019, in Dodoma, under the patronage of H.E. Samia Suluhu Hassan, Vice President of the United Republic of Tanzania.

The organization of the event was managed by UONGOZI Institute. The overarching objective of GGP 2019 was to discuss and identify ways to more sustainably manage and utilize Tanzania's forest and water resources. Specifically, the event aimed to address the following key issues:

- Promoting Forest Management for Sustainable Water Resource in Tanzania
- To what extent are existing regulatory frameworks adequate in managing forest and water resources in Tanzania?
- Given the current pace of population growth in Tanzania, what institutional capacities are required for the effective management and utilization of the forest and water resources in the country?
- What principles and practices can be realistically adopted and implemented to effectively and efficiently manage and utilize the forest and water resources in Tanzania?
- What challenges and opportunities exist for the future management of forest and water resources in the country?

The two-day event brought together over 90 senior officials and representatives from the government authorities, development partners, private sector, research and academic institutions, and civil society organizations. The first day of the GGP 2019 featured an opening ceremony, expert presentations and discussions among key stakeholders in the forest and water sectors in Tanzania. As patron of the GGP, H.E. Samia Suluhu Hassan officiated and delivered the opening address.

The second day of the event was dedicated to field trips to the Chenene Forest Reserve in Bahi District of Dodoma Region, and Mzakwe Catchment area, which is the principal water source for Dodoma City.

Key messages and Recommendations

Key messages and recommendation that emerged from the discussions and field visits are summarized in the sections below.

The management of Tanzania's forest and water resources will be central to the country's sustainable development.

The forest and water sectors are key to achieving the goals of the Tanzania Development Vision 2025 and the Second Five Year Development Plan 2016/17–2020/21 (FYDP II) to become a middle-income, semi-industrialized country by 2025, as well as achieving the United Nations' Sustainable Development Goals (SDGs) by 2030. The rapid economic growth needed to realize Vision 2025 will depend on the extent to which the adverse trends in the loss and degradation of the country's natural resources are reversed. Conversely, the continued rapid depletion of forest and water resources will have a huge negative impact on Tanzania's long-term growth and prosperity.

Forests provide timber for construction, food crops and medicines and, currently, 90% of household energy is derived from fuel wood and charcoal. Similarly, the water sector is not only the source of clean and safe water for human consumption, but also an essential input for production in other sectors,

including agriculture (through irrigation), livestock raising and fishing, business and industry, energy and mining. Agriculture is the main consumer of water (approximately 80%) followed by industry and renewable natural resource-based activities. Water is the principal source of power generation in the country, and the construction of the new hydroelectricity project in the Rufiji River Basin is expected to contribute up to 70% of the country's total energy requirements. The Great Lakes—Lake Victoria, Lake Nyasa and Lake Tanganyika—and national parks—such as Ngorongoro, Serengeti, Manyara, Selous, Ruaha, Tarangire, Katavi, and Mount Kilimanjaro—are also huge tourist attractions.

These inter-relationships between the forest, water, agriculture, energy, industrial and tourism sectors are vitally important for building Tanzania's economy and supporting the lives and livelihoods of its people. Indeed, sustainable development and sustainable lives are complementary; the two can only be achieved through the proper maintenance and continued improvement of ecosystems and how they function.

Inter-sectoral collaboration and coordination in the management of water and forest resources

Collaboration among and across institutions responsible for forest and water resources will

need to be strengthened and inter-sectoral coordination promoted in the development of sector policies as well as management and utilization plans. In previous years, policy implementation and management of water and forest resources were the responsibility of the national government, but recent changes have devolved authority to local government authorities (LGAs) and communities. Tanzania also cooperates with development partners in implementing international and regional agreements and declarations—for instance, the Southern African Development Community (SADC) and the East African Community (EAC)—to set up strategies and foundations to empower countries to combat climate change and conserve the environment as a whole. Key governmental institutions responsible for the management, conservation and utilization of forests and water resources, include:

- National ministries, particularly the Ministry of Natural Resources and Tourism, Ministry of Water, Ministry of Agriculture, Ministry of Livestock and Fisheries, and Ministry of Energy;
- Regional and local government authorities.
- Water Basin Boards;
- Tanzania Wildlife Management Authority (TAWA); and
- National Parks.

The forest, water, agriculture, livestock and energy sectors are closely linked sectors of the economy. Therefore, it is well past time for them to come together to harmonize activities for the management of forests and water catchments. The adoption of a multi-sectoral approach to environmental management can be coordinated under the Vice President's Office, and increased collaboration between central and local government offices, forest authorities and water basins boards can be facilitated through regular meetings and joint steering committees.

Policy, Regulatory And Legal Frameworks

The completion of the new National Forest Policy, which is currently under review, will be a milestone towards enhancing the governance of forest resources in Tanzania. This process needs to be fast tracked and strategized for implementation. By adhering to core governance principles—including transparency, accountability, participation, recognition of rights and rewards for contributions to forest protection—the new policy and the programs flowing for it can help to create momentum towards fairer and more ecologically sustainable use of forest and water resources. The Forest and Beekeeping Division (FBD) of the MNRT is also setting up an integrated land-use and restoration program for Tanzania's productive forests.

This program emphasizes multisectoral collaboration and coordination. Under the Global Environment Facility, the program has secured funding worth USD 8.7 million.

Similarly, a move towards an Integrated Water Resource Management and Development



(IWRMD) system requires that all relevant actors are involved in water planning and management. However, at present, water management in Tanzania, which involves multiple actors, is largely done based on individual interests. The conflicting functions and uncoordinated investments among the different actors in water resource management have resulted in duplicated efforts and inefficient outcomes. Maintaining a balance (and managing the trade-offs) between the consumption of water for economic



The establishment of Water Basin Boards was an important step in the sustainable management of the environment, as they ensure inter-sectoral coordination of water users. And, at the local level, water users' associations (WUAs) and water use fees help to rationalize the allocation of water resources according to economic returns. The existence of the National Irrigation Policy and National Irrigation Commission are important given that the agriculture sector is the largest user of water.

The current Water Sector Development Programme (WSDP) also encourages an integrated approach and identifies innovative ways to finance the sector. Integrated Water Resources Management and Development (IWRMD) plans provide key solutions on how the efforts of different stakeholders can be mobilized. At the local administrative level, LGAs are in place to promote and enforce laws and by-laws pertaining to water management within their jurisdictions, and at the catchment level, Basin Water Boards are vested with the power to regulate users equitably and sustainably.

activities and environmental needs has also been a challenge. Despite the fact that water management is more critical for water sustainability, greater funding has been directed into improving water supply than water resources management, resulting in ineffective management.

Positively, the policy, regulatory and legal frameworks are in place and the ongoing review of the National Water Policy offers a space to strengthen and harmonize intersectoral activities.

Engagement of local communities in the planning and implementation of forest and water sector interventions

To be sustainable, management solutions in the forest and water sectors must be inclusive. The utilization of forest and water resources is inextricably linked with people's lives and livelihoods; most resource degradation is poverty-centered. Therefore, the management of forests, water sources, catchment areas and wetlands will need to respond to people's practical needs and actively engage local communities in planning for the management and utilization of forest and water resources.

Responsible government authorities—in collaboration with private sector actors, civil society institutions and donors—will need to build the awareness and capacity of grassroot communities to protect their local environment and empower them through the creation of alternative income-generating activities (IGAs). Transparently communicating the nature of a project and specifying opportunities for economic benefits will help to foster community buy-in and support for implementation.

In effect, government authorities and/or private sector actors will need to obtain and maintain a social license for initiatives that will impact on local people.

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Importantly, the principle of Participatory Forest Management (PFM) was introduced in the Forest Act, 2002. This provides a clear

legal basis for communities across Tanzania to own, manage or co-manage forests under a wide range of conditions. The law recognizes two different types of PFM: Community Based Forest Management (CBFM) and Joint Forest Management (JFM). Every forest-owning village can be encouraged to establish a village land forest reserve. Maintaining forest on village land through CBFM can help to retain a mosaic of forest within predominantly agricultural landscapes, which brings multiple benefits.

These include:

- Safeguarding ecosystem services, such as water, local and regional climate, soil and pollinators
- Promoting climate change adaptation and livelihood diversification
- Generating revenues for community development projects
- Supplying biomass energy

In turn, for communities to directly benefit, they need to be supported and facilitated by their local government authorities to develop ecologically viable, long-term activities and enterprises, including eco-tourism. Women and socially marginalized groups should be appropriately involved in the planning, decision making, implementation and management.

Sustainable development centers on inclusiveness, in which everyone irrespective of his or her status, gender included, is involved in the development process.

Ongoing discussions with community members are important for them to understand the process and be able to weigh up the associated costs and/or benefits of any proposed interventions. The publication of guidelines and regulations in user-friendly, popular language is recommended to increase awareness and understanding at the grassroots level. If done successfully, government spending on regular forest patrols or expulsion missions can be reduced.

Land use planning

Land use planning—and its implementation and enforcement—will be critical to the sustainable management of Tanzania's natural resources. In particular, the institutional framework for managing village land will need to be strengthened to reduce environmental degradation due to over-utilization, as deforestation is mainly driven by the demand for land, not the demand for trees. At present, 34.5% of forests and woodlands are under the ownership of the central government, 52.2% under local and village governments, 7.3% in

Rights holders are responsible for all aspects of forest management, including production, conservation and protection. However, currently, only 2.3 million hectares or around 10.5% of the forests on village land are reserved and under effective management.

The remaining 19.67 million ha (89.5%) of forests on village land is unreserved (open access forest areas) and is subjected to unsustainable practices such as agricultural expansion, livestock grazing and illegal harvesting, as well as the increasing threat of wildfires. These data reflect the weak capacity of village governments to effectively manage the country's forests. In addition, the tenure of forest land, especially for villages and private owners, is incomplete and needs to be formalized.

Land and water for agriculture

To reduce the deforestation and protect the environment, interventions in the agricultural sector need to focus on increasing farm efficiency and productivity through intensification rather than expanding the land under cultivation. Farmers should be educated and facilitated to boost productivity within small areas. To do so, not only does farming practice need to be intensified but post-harvest losses from pests and other spoilage must be reduced

through investments in extension programs and storage and transport infrastructure to get produce from farm to markets.

Overall, a shift is needed from subsistence to modern commercial agriculture. Traditional livestock keeping is also very detrimental to the environment. Hence, sensitization of herders is also important. Participants further highlighted the need for land allocation for livestock keepers.

Despite increased water demand, the loss of water due to poor infrastructure remains substantial. Thus, sustained investment in irrigation and water storage infrastructure is needed to curb these avoidable losses. Tanzania needs to harness rainwater harvesting technologies, including multiple small-scale dams in river basins. Water dams for industrial zones will also be important. Experience from road construction activities have shown that water dams excavated during road construction could be improved for use by communities to harvest rainwater for irrigation and livestock. At present, only 2.5% of Tanzania's cultivated land (around 475,000 hectares) is under irrigation.

But, by tapping available water resources, Tanzania has 2 million hectares of land with high potential for irrigation. The second phase of the Agriculture Sector Development Plan (ASDP II) and the National Irrigation Master

Plan (NIMP) are both geared to increase the land under irrigation to one million hectares by 2035. Irrigation schemes are pivotal for transformation of the agriculture sector and can help to mitigate impact of climate change.

All stakeholders need to contribute equitably to the cost of conserving forest and water resources

To ensure the efficient management of forests and water resources, all stakeholders need to contribute to the cost of conserving forest and water resources. To do so, payment for ecosystem services (PES) schemes need to be instituted for all users of forest services, including the protection and improvement of catchment forests. Similarly, water users in the agricultural, industrial and energy sectors as well as domestic consumers need to contribute to water conservation.

Governing laws and guidelines must be applied fairly and transparently, and proper water planning, allocation and use followed. For example, in 2017, about 567.7 megawatts of electricity were harnessed from water sources (equivalent to 40.54% of the total 1400.34 megawatts of electricity produced in the country). However, no portion of this income went back to the conservation sector.

Local people's stewardships of forest and water resources and their contribution to flows of

ecosystem services and goods must also be adequately recognized early in the decision-making process and sufficiently rewarded. Conditional transfers of cash and in-kind resources are one way of achieving this but may need to be augmented by other forms of recognition and rewards. Various pilot initiatives implemented for Payment for Ecosystem Services (PES), such as REDD+ and Payments for Watershed Services (PWS), have shown good prospects for benefit sharing.

Education of the population to practice environmental conservation

Forest and water resources have disappeared as a result of human activities. Therefore, education of the population is needed on how to participate in reducing the emission of greenhouse gases by planting trees (mitigation programmes), how to protect water resources by capturing and storing rainwater, and how to adapt to climate change (including the increased incidence and severity of droughts and floods).

Local people also have poor access to legal information. Most of the documents applicable to forest management, including the National Forest Policy and Act, forest guidelines and regulations, and harvesting guidelines have not been produced as simplified/popular versions that can be more easily understood by communities.

2. The original definition of REDD+ referred to "reducing emissions from deforestation and forest degradation in developing countries" but terminology has been expanded through successive COP meetings to include "the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks in developing countries."

Capacity development

It is not only the local people affected by the use of forest and water resources who may need support to participate in program design and implementation. Program managers themselves often need support and training to build the skills necessary to run an effective, participatory and inclusive process. They need support to be ecologically and socially literate.

Facilitators are needed to steer forest management processes skillfully, which requires knowledge of resource assessment, management and harvesting plans, by-laws, conflict analysis and resolution, and stakeholder analysis. Additionally, user-friendly approaches need be incorporated in policies to ensure their easy understanding at the grassroots level. For example, capacity building on the application and use of Geographic Information Systems and land use management are necessary to ensure all stakeholders can participate in decision making.

At the local level, water users' associations (WUAs) are responsible for the management, distribution and conservation of water from a source, which is used jointly by members of the WUA, including the acquisition and operation of any water permits, and collection of water user fees. The WUA is also responsible for the resolution of conflicts between members, and to represent the special interests and values arising from water used for a public purpose, such as conservation.

However, in practice, WUAs encounter significant challenges in fulfilling their mandated functions. The main setback has been in the selection and inclusion of members. WUAs also lack of financing and human resources. Most WUAs do not have substantial sources of revenue, so they rely on subsidies or levies. The majority of associations are run by community members with limited managerial and organizational skills. Hence, providing training, exposure to study visits and material support will be important to build their capacity. Overlapping mandates between the associations and LGAs has hindered some WUA activities and conflicting legal and regulatory frameworks have contributed to weak enforcement in the conservation and protection of water sources. Mandates and frameworks need to be redefined to prevent conflicts and improve effectiveness and efficiency.

Sustainable practical solutions to encroachment

Participants highlighted the need for sustainable solutions to prevent/discourage encroachment and illegal activities in forest reserves, water catchments and wetland areas. Again, interventions need to address the needs of local people. For example, a proportion of the funds invested to expel people from the reserve could be redirected to expand/scale up the livelihood projects for neighbouring communities.

Since its establishment, the GGP has facilitated six events. Each event combines dialogue on critical issues for environmental protection and sustainable development with field excursions to enable participants to observe and learn first-hand: what the reality is, what is being done, what the results are, the challenges encountered and how they are being solved.

This approach allows participants to more fully understand and internalize the challenges and solutions discussed. Going forward, delegates are tasked to be champions for change in their respective professions, institutions and communities.

Given the far-reaching importance of forests for sustaining the availability and quality of the country's water supply and for supporting the lives and livelihoods of the vast majority of Tanzanians, the theme of this year's GGP was "Promoting Forest Management for Sustainable Water Resources in Tanzania." As in previous Platform events, the first day of the dialogue was dedicated to expert presentations and discussion, and the second day involved field trips to the Chenene Forest Reserve located in Bahi District of Dodoma Region and the Mzakwe Catchment area, which is the principal source of water for Dodoma City.

GGP 2019

This report provides edited highlights of the dialogue and the field trips. It is structured in eight sections. Section 1 provides edited summaries from the conference's opening session, including the address by Vice President Samia Suluhu Hassan. Following the opening session, a series of presentations were made by experts in the forest and water management sectors in Tanzania. The presentations focused on:

- [Basic principles for managing forestry and water resources in Tanzania](#)
- [Policy and institutional frameworks for managing forest and water resources in Tanzania](#)
- [Good practices, experiences and lessons learned in managing forest and water resources in Tanzania](#)

Short question and answer sessions and a moderated panel discussion followed the expert presentations. Key issues emerging from these discussions as well as proceedings from the field excursions on Day 2 are also covered.



Opening Session

The forum's opening session included introductory remarks by Hon. George Simbachawene (MP), Minister of State in the Vice President's Office (Environment and Union Affairs), welcoming remarks by Hon. Dr. Binilith Mahenge, Regional Commissioner for Dodoma, and an opening address by the GGP Patron and the Vice President of the United Republic of Tanzania, H.E. Samia Suluhu Hassan.

A. Remarks by Hon. George Simbachawene (MP), Minister of State in the Vice President's Office (Environment and Union Affairs)

To begin, the Minister commended UONGOZI Institute for organizing the event and acknowledged participants for their attendance to discuss the challenges facing the forest and water sectors in Tanzania, two vitally important sectors not only for the country's economic development but also for the preservation of its biodiversity.

The Minister described that, among its many responsibilities, the Office of the Vice President has the fundamental duty to oversee the environment in Tanzania.

The principle legislative instruments for governing the environment are the National Environmental Policy of 1997 (which the Government is currently revising) and the Environmental Management Act, 2004, which both encourage every Tanzanian to be a protector of his/her local environment and ensure the proper use of available resources, in particular, the sustainable use of water and forest resources. As the mandated Minister, he has the responsibility of supervising and coordinating relations between the national Government and its agencies, local government authorities, non-governmental organizations and all other parties involved in environmental conservation to ensure that they cooperate effectively in promoting the sustainable use of the country's resources for socio-economic development and poverty reduction.

Through the creation of alternative income sources and employment, the government can reduce the activities that are contributing to deforestation and land degradation in the reserve. Field visits for local people to learn conservation approaches in other villages will be very important to change mindsets and behaviour towards management of the resources.

The visits also provide opportunities for participants to acquire direct practical advice and hands-on skills to translate back to their local areas. For example, in Mufindi District (Iringa region), the majority of local people have been inspired to voluntarily plant trees given the economic benefits.

A sufficient number of guards will need to be recruited and suitably equipped to monitor and enforce forest regulations. Expanding the technology used in forest management will also assist to meet monitoring challenges and overcome shortfalls in forestry staff. For example, the Tanzania Forest Service (TFS) is utilizing drones to monitor forest areas and identify illegal activities.

Research for selection of appropriate species for afforestation and reforestation in water catchment areas

The appropriate selection of tree species is essential for promoting sustainability in water catchment areas, as not all species are suitable

for the conservation of water resources. Conflicts have arisen between the water and forest sectors on the tree species to be planted. In several locations, including Lumeme, Ruvuma, Lake Tanganyika, Buhigwe, Kilolo and Mbeya, complaints have been made about land degradation caused by both eucalyptus and pines trees. Evidence-based findings on the right species for specific locations will need to be fed into policy design and implementation. More specifically, research should be conducted on suitable tree species for planting in the arid and semi-arid catchment areas of Dodoma, given failed plantings in Mzakwe Catchment Area.

Conclusion

GGP 2019 identified gaps and opportunities to strengthen the regulatory and institutional frameworks for the management and use of water and forest resources in Tanzania. Most notably, the Platform encourages increased collaboration and harmonization of activities between all responsible Government authorities from national to village level to protect these resources upon which all Tanzanians depend. Regulators and users for both sectors need to sit at the same table to achieve a truly integrated, mutually beneficial approach to water and forest management in Tanzania.

The unfolding calamity of deforestation and environmental degradation in Tanzania demands urgent action to halt the damage and, where possible, restore ecosystems. National policy statements and mutually agreed regional and international conventions will have no impact on the ground if interventions are not appropriately designed, adequately funded and efficiently implemented.



Introduction

The Green Growth Platform (GGP)

What is Green Growth?

Economic growth is needed across Africa to tackle poverty, but countries cannot disregard the adverse impact of growth on the environment. Green growth aims to eliminate the dichotomy that traditionally exists between the economy and the environment. It is a model of economic development that reduces environmental risks by managing natural resources more efficiently and effectively and adopting cleaner production methods. Green growth is also about redistributing wealth and supporting the poor. The aim is to improve quality of life whilst ensuring that production processes and consumption patterns do not further damage the environment.

Green growth is also linked to global governance. In an increasingly interdependent world, national solutions alone will not be sufficient to secure long-term prosperity. A key global task is to proactively shift and adapt to using low-carbon energy sources to mitigate the climate change that threatens the planet's life support systems upon which we all depend. Closely linked to the issue of climate change, forest cover is rapidly decreasing, and water and soil quality are deteriorating. Developing climate-resilient agriculture to ensure food security and reduce rural poverty is a prime example of adaptation that is needed in Africa.

A core component of the activities of the UONGOZI Institute to support sustainable development is the Green Growth Platform (GGP). Launched in 2010, GGP aims to increase awareness and understanding of issues related to green growth and its potential for Tanzania's development.

The Platform brings together diverse stakeholders from Government, the private

sector, civil society, academia and development partners to discuss common challenges facing Tanzania and identify mutually beneficial solutions. In this way, the GGP is a proactive tool for creating cross-sectoral linkages, building long-term social capital and promoting economic and social wellbeing, while safeguarding the ecosystems and environment that sustain us all.

He said:

“Environmental destruction is one of reasons contributing to increases in poverty and the reduction of clean water sources, soil fertility, crops and other important ecosystem services for human life. Furthermore, poverty also causes environmental destruction by weakening the efforts and ability of humans to oversee and utilize resources in a sustainable manner. Hence, it is everyone’s responsibility to emphasize the importance to protect our environment and the proper management of water and forest resources for present and future development”

He added that the National Environmental Policy identifies a series of challenges that need to be addressed. These include:

- Land degradation;
- Deforestation;
- Habitat destruction for wildlife and biodiversity;
- Lack of safe water in urban and rural areas;
- Decrease in quality of water infrastructure; and
- The increase of environmental pollution in rural and urban areas.

These challenges impede poverty reduction, hence, they affect the lives and welfare of Tanzania’s citizens. He said that the 5th phase Government of Tanzania, led by H.E. President Dr. John Pombe Magufuli and Vice President Hassan, will continue to prioritize environmental issues and cooperate with development stakeholders, the private sector and NGOs to offer solutions to these challenges and ensure that the country’s resources are well used for the betterment of current and future generations.

Likewise, he tasked forum delegates to discuss the issues in detail with the aim of strengthening the Government’s policy and strategies in managing Tanzania’s environment and resources for the country’s development.

B. Welcoming remarks by Hon. Dr. Binilith Mahenge, Regional Commissioner for Dodoma

In his brief remarks, Hon. Mahenge highlighted the context of peace and stability in Dodoma and congratulated the UONGOZI Institute for its efforts in facilitating the GGP 2019 on forest and water resources management. He mentioned a number of key challenges facing African countries, including Tanzania, such as education, science and technology, hunger, environmental degradation, and inefficient financial management systems.



Minister George Boniface Simbachawene

He believed that poverty will be addressed if these challenges are viewed as opportunities to capitalize upon. He reminded the audience, based on the experience in Dodoma, that tree planting, the sustainable use of wood fuel (including charcoal), and a paradigm shift from biomass energy to alternative energy sources all need to be high on the environmental agenda and go along with the change of mindset.





Vice President of the United Republic of Tanzania, Samia Suluhu Hassan, articulating issues of serious concern regarding forestry and water resources.

C. Opening address by H.E. Samia Suluhu Hassan, Vice President of the United Republic of Tanzania

To commence her address, the Vice President thanked the UONGOZI Institute for the honour of being the patron of the Green Growth Platform (GGP) and also the Guest of Honour for this year's dialogue. She extended her gratitude to the Government of Finland for continuously supporting the Platform as well as activities of the Tanzanian Government with regard to resources management.

She commended the Institute for their organization of the event and their decision to host the dialogue in the Government capital of Dodoma. On behalf of H.E. Dr. John Pombe Magufuli, President of the United Republic of Tanzania, she welcomed delegates to the city. She briefly explained that the Green Growth Platform is part of the Institute's Sustainable Development Programme.

As described by Prof. Semboja, UONGOZI's Chief Executive Officer, the goal of the platform is to promote inclusive and sustainable development that emphasizes the importance of environmental protection and the proper use of resources for the benefit of present and future generations. Therefore, the GGP is important for all Tanzanians because it provides the opportunity to exchange information, knowledge and experience about the best use of the country's resources.

The GGP meets once a year to deliberate on different issues that are important to the national economy. This year's theme—The Effective Management of Forests for the Availability of Sustainable Water Resources—seeks to explore the relationship between forest and water resources and to identify the best methods of improving the conservation and management of these resources for the sustainable development of Tanzania.

The myriad benefits of conserving forest and water resources

Vice President Hassan observed that forests have singular importance in the conservation of the environment and water resources. They act as water catchments, store rainfall, prevent soil erosion and landslides, host the greatest concentrations of wildlife and biodiversity, mitigate the impacts of climate change, and produce timber, energy, food and medicines.

Similarly, water resources provide the clean and safe water for our own lives and for all living organisms. The water sector is also important for the development of other sectors such as agriculture (through irrigation), livestock raising and fishing, business and industry, energy production and mining. All of these sectors and activities depend on forests and water for their sustainability.

In addition, the Great Lakes—Lake Victoria, Lake Nyasa and Lake Tanganyika—and national parks—such as Ngorongoro, Serengeti, Manyara, Selous, Ruaha, Tarangire, Katavi and Mount Kilimanjaro—are huge tourist attractions in Tanzania. Tourism contributes significantly to Tanzania’s gross domestic product (GDP).

In particular, she expressed concerns regarding the critical situation of water scarcity in Ruaha National Park. During a visit to the park, she saw a long queue of wild animals drinking at a water source within the park. This striking incident led the Vice President to initiate a micro-conservation campaign in the area to protect the catchments that feed these downstream areas. As a result of the initiative, a follow-up visit a year later revealed promising recovery of the natural ecosystems and water sources.

She also mentioned the huge investments directed towards the Rufiji Hydropower Project, which is located in the forests and catchments of the Rufiji basin. She emphasized that ongoing and future project activities should technically adhere to the efficient management and protection of forests and water catchments. This three-way relationship between the forest, water and energy sectors is vitally important for building Tanzania’s economy and supporting the lives and livelihoods of its people. She noted that sustainable development and sustainable lives are complementary; the two can only be achieved through the proper maintenance and continued improvement of ecosystems and how they function.

The need for action and coordination

The Vice President stressed the need for action. She said that the ongoing scenarios of environmental degradation in Tanzania should give every participant a sense of urgency and a reason to work tirelessly. All responsible institutions and actors in the environment and related sectors should implement directives coming out of this Platform with a great sense of urgency. She tasked the UONGOZI Institute to follow-up on the resolutions and recommended actions made by the Platform to make sure that they are successfully implemented.

The forest and water sectors are key to realizing the goals of the Tanzania Development Vision 2025 and the Second Five Year Development Plan 2016/17–2020/21 (FYDP II) to become a middle-income country by 2025, as well as achieving the United Nations’ Sustainable Development Goals (SDGs) by 2030. But national policy statements and regulations and mutually agreed regional and international conventions will have no impact on the ground if appropriate actions are not be put in practice and recommendations implemented.

In planning for the management and use of resources, the Vice President called upon stakeholders to prioritize future generations, so they will realize the legacy of the resources that their ancestors maintained for them.

To do so, financial resources for forest and water management need to be appropriately invested. Despite promising progress, the outcomes of conservation initiatives to date do not match the financial resources that have been invested. Responsible authorities are, therefore, tasked to manage these resources more effectively.

The Vice President also emphasized the need for better coordination among and across institutions responsible for forest and water resources management. Due to the lack of coordination, efforts have been duplicated resulting in poor outcomes.

Institutions responsible for the management, conservation and utilization of forests and water resources, including national ministries (Ministry of Natural Resources and Tourism, Ministry of Energy, Ministry of Water, Ministry of Agriculture, Ministry of Livestock and Fisheries), regional and local government authorities, Tanzania Forestry Services Agency (TFS), Tanzania Wildlife Management Authority (TAWA), National Parks, Water Basin Authorities, non-state actors and the private sector, are urged to effectively coordinate their activities to promote sustainable management of forests and water catchments. The forest, water, agriculture, livestock and energy sectors are all very important and closely linked sectors of the economy. It is high time for them to get rid of the ‘silos syndrome’ (i.e. operating in isolation) and come together to harmonize their activities.

The alarming magnitude of deforestation, loss of biodiversity and invasion of alien species

Vice President Hassan cautioned that, if not adequately protected and used wisely, forest and water resources can be quickly depleted or lost altogether. Tanzania has a total of 48 million hectares of forest. However, statistics show that the rate of deforestation and depletion of natural vegetation is alarmingly high. Without immediate measures, the country may be left without any forests. This is mainly due to the influx of human activities around forests that are not managed under any legal framework. Data published by the Sokoine University of Agriculture in 2017 found that the rate of deforestation had reached 469,420 hectares annually.

This is an increase of almost 100,000 hectares per annum within two years. In turn, the rapid depletion of forests can have a huge impact on Tanzania’s economy. Official figures show that the contribution of these resources to GDP is between 4 and 5 per cent annually. However, this figure is still relatively low and does not show the full contribution of these resources to the development and lives of Tanzanians.

She said that the GGP should pay attention to the challenge of species under threat of extinction and the increasing disaster of invasive alien species. Among other factors, ongoing anthropogenic disturbances,

including deforestation and forest degradation, contribute towards the invasion of the country's ecosystems by foreign organisms. She described that detrimental incidences of invasive species in both terrestrial and aquatic environments are more prominent and increasing than at any time in the past.

For example, severe invasions are observed within protected areas, such as Ngorongoro Crater and national ranches, particularly the Kongwa Ranch in Dodoma. Invasive plant species tend to outcompete, dominate and eliminate native species. They also obstruct the movement of animals and sometimes cause deaths. Despite their abundance, they are either poisonous or not palatable to game animals and livestock. Consequently, more wild animals are moving into areas inhabited by local communities. In the case of aquatic environments, the incidence of invasive water weeds, such as water hyacinth, and invasive fish species, such as Nile Perch, are the result of unsustainable management of the environment.

In efforts towards addressing environmental degradation, Vice President Hassan advised that the voices of livestock keepers and farmers should feature in future GGP events. Their activities are a major concern to the conservation of the environment, particularly forests and water resources. Traditional livestock practices, which entail the unsustainable conversion of forest land

for agriculture and livestock keeping, has intensified desertification in many parts of the country. Shinyanga is just one example.

The depletion of water resources

Water resources are also being depleted very quickly. Unsustainable agriculture, unplanned construction, the cutting down of trees for firewood and charcoal, illegal logging of forests, and uncontrolled livestock movements are all having detrimental impacts on the quantity and quality of water resources. For instance, the water flowing in the Great Ruaha River—which is a relied upon heavily by wildlife in national parks and for the production of hydroelectricity at the Mtera and Kidatu dams—has been greatly affected by human activity upstream. Power production has fallen significantly due to low water levels.

Therefore, it is very important for respective institutions and authorities to cooperate with all development stakeholders to bolster efforts to manage these vital resources. In addition, despite increased water demand, the loss of water due to poor infrastructure remains substantial. Thus, relevant authorities need to take immediate measures to curb these avoidable losses. The GGP is an ideal platform to discuss these issues in depth and arrive at collective solutions.

She also called for feedback from responsible institutions on the progress of the Regrowth Project being implemented within the Ruaha River Basin ecosystem. She stressed the need for coordination of all activities and resources throughout the implementation of the project. Effective results will not be achieved if responsible entities are working in isolation. Thus, organizations involved in the implementation of the project should harmonize their activities.

The impact of climate change

Population growth, urbanization and the need of land and forests for different uses, such as farming and herding, space and materials for construction, and firewood and charcoal for cooking, all have serious consequences on forest and water resources. On top of these pressures, global warming is threatening their sustainability.

And despite the increase in flood events due to climate change, the water has continued to end up in the ocean without concerted efforts to capture and store it. Hence, strategies must be put in place for the use and conservation of forest and water resources along with strong institutions with sufficient capacity to manage them.

The Vice President urged the audience to devise efficient mechanisms for rainwater harvesting.

She pointed out that the water lost annually from surface runoff and flooding would be invaluable to feed and water livestock and promote broader agricultural industry, e.g., through irrigation. Considering that the GGP is inclusive of policy makers, decision makers and other practitioners, she suggested a proper way forward would be to bring together all responsible entities to seize the untapped opportunities in the rainwater harvesting industry.

Existing institutions and policies for managing forest and water resources

Vice President Hassan explained that, in previous years, policy implementation and management of water and forest resources were the responsibility of the national Government, but recent changes have devolved authority to local government authorities (LGAs) and communities. Tanzania also cooperates with development partners in implementing international and regional agreements and declarations—for instance, the Southern African Development Community (SADC) and the East African Community (EAC)—to set up strategies and foundations to empower countries to combat climate change and conserve the environment as a whole. These initiatives include the education of citizens on how to adapt to climate change (including the increased incidence and severity of droughts and floods), how to participate in reducing the emission of greenhouse gases by planting trees

(mitigation programmes), and how to protect water resources by capturing and storing rainwater.

She called upon the UONGOZI Institute to undertake an evaluation to assess the extent to which Tanzania has implemented regional resolutions pertaining to forests and water catchments, given that the local degradation of water and forest resources may negatively impact upon the management efforts of neighbouring countries.

Numerous efforts are underway by different authorities to improve the protection and use of forest and water resources in Tanzania. Of note, institutions and infrastructure to oversee catchment forests and water resources have been strengthened. For example, the establishment of the Tanzania Forest Service Agency (TFS) has increased the pace of protecting and managing catchment forests through a participatory approach, thus increasing the availability of water through springs, rivers, dams and wetlands. Similarly, the establishment of Water Basin Authorities have improved the accountability in the use of water resources.

She related that the Tanzanian Government is directing substantial efforts at significant expense to ensure the sufficiency of water by 2022 through the development of water supply infrastructure from the Great Lakes to Dodoma City.

This is partly because most of the traditional water sources have disappeared as a result of human activities. She said that local communities should be made aware of the extent of the impacts and efforts being undertaken at higher levels, and through platforms, such as the GGP, in order for them to be part of the management process.

H.E. Vice President Hassan painfully recalled several unsuccessful tree planting initiatives in Mzakwe Catchment area. The area together with Chenene forest reserve is the heart of water supply and climate amelioration for the growing capital in Dodoma. Despite its importance, previous human activities resulted in the loss of native species.

She called upon the UONGOZI Institute and participants of the GGP to conduct an in-depth study to identify the reasons for poor performance of the tree species planted in the area and recommend alternative tree species to be suitably planted in the area for water conservation. Careful, scientifically proven tree-planting approaches are needed for the sensitive area in Mzakwe.

The participation of women in forest and water management

The Vice President also emphasized that women should be appropriately involved in the planning, decision making, implementation and management of forest and water resources. Sustainable development centers on inclusiveness, in which everyone irrespective of his or her status, gender included, is involved in the development process.

Data from the National Bureau of Statistics show an increase in access to water in rural areas from 40% to 50% during the last 10 years, which is a great achievement. However, more efforts are required to meet the goal of universal access. The Government is committed to ‘Kumtua mama ndoo kichwani’, i.e., interventions to “take the water bucket down from a mother’s head”.

Vice President Hassan said:

“I am also a mother and I understand the burden which mothers bear when fetching water and wood so that baba and the family can eat. The 5th Phase Government is committed to reducing this challenge.”

“We welcome all stakeholders to partner with us so that we can reduce and completely eradicate this problem.”

In addition, the Government supports continuous public education on forest and water resources so that every stakeholder understands his/her role. For instance, during the annual ‘Week of Water and Planting of Trees’ and other national events such as Saba International Trade Fair and Farmers Day (Nane Nane), stakeholders provide opportunities to educate people about their responsibilities in protecting and maintaining water and forest resources without having to pressure them.

Increased efforts are needed to protect Tanzania’s forests and water

Vice President Hassan stressed that increased efforts are needed to guarantee water and forest resources are protected and properly used so that future generations can benefit from them. Despite achievements to date, many challenges remain and there is no room for complacency. She thanked participants for their attendance and sincerely hoped that deliberations on these important issues would bring positive change and that the declarations from this year’s Platform will assist the government to strengthen the policy, legal and institutional frameworks to improve the management, use and protection of these resources. She reiterated that the government is open to work with all stakeholders, and the participants of the GGP are encouraged to collaborate with the Government to rollout the implementation of the resolutions made by the platform.

In closing, the Vice President extended a serious message that she would exempt herself from the role as patron of the GGP if the directives, emerging issues and the resolutions made as a result of the Platform are not implemented. She declared the 2019 Green Growth Platform officially open.

- Pangani Basin
- Wami-Ruvu Basin
- Rufiji Basin
- Ruvuma and the Southern Coast Basin
- Lake Nyasa Basin
- Lake Rukwa Basin
- Internal Drainage Basin
- Lake Tanganyika Basin
- Lake Victoria Basin

The 2009 Act also introduced a participatory structure for water management with five levels as follows;

- National Water Board
- Basin Water Boards
- Catchment Water Committees
- Regional Secretariats; and
- Local Government Authorities (LGAs)



Policy and institutional frameworks for managing forestry and water resources in Tanzania: The missing links

A. Presentation 1: Frameworks for managing water resources in Tanzania *Ms. Pamela Temu, Principal Hydrogeologist, Ministry of Water, Tanzania*

Ms. Pamela Temu

Principal Hydrogeologist, Ministry of Water, Tanzania

The presentation on frameworks for managing water resources in Tanzania was made by Ms. Temu on behalf of Dr. George Lugomela, Director of Water Resources at the Ministry of Water.

The status of water resources and usage in Tanzania

To begin, Ms. Temu said that the Tanzanian economy depends on water as an input in production.

Agriculture is the main consumer of water (approximately 80%) followed by industry and renewable natural resource-based activities. Water is also the principal source of power generation in the country. Of note, the construction of the new plant in the Rufiji River Basin is expected to contribute up to 70% of the total energy requirements in the country.

Water is not equally distributed throughout country; both the quality of water and its availability varies from one place to another. Therefore, collaborative management is essential to ensure its sustainability. Based on the existing population, per capita consumption of water is around 2,365m³ per annum (2018 data). However, Ms. Temu pointed out that water availability per capita has been declining since 1962 and Tanzania is projected to be a water-stressed country by 2035. She added that if current trends in relation to the degradation of water sources and the environment prevail, Tanzania will be a water-scarce country by 2050. Notably, current water demands account for 39% of the total water available.

Existing policy and legal frameworks for water resources management in Tanzania

Ms. Temu described the current policy and legal frameworks for water resources management in Tanzania. The two principal instruments governing water are the National Water Policy of 2002 and the Water Resources Management Act No. 11, 2009 (WRMA). However, she advised that both the Policy and Act are under review. At present, the management of water in Tanzania is implemented in nine water basins (see Figure 1). The basins are:

- Pangani Basin
- Wami-Ruvu Basin
- Rufiji Basin
- Ruvuma and the Southern Coast Basin
- Lake Nyasa Basin
- Lake Rukwa Basin
- Internal Drainage Basin
- Lake Tanganyika Basin
- Lake Victoria Basin

The 2009 Act also introduced a participatory structure for water management with five levels as follows;

- National Water Board
- Basin Water Boards
- Catchment Water Committees
- Regional Secretariats; and
- Local Government Authorities (LGAs)

Figure 1: Water basins of Tanzania



The gaps or missing links in managing water and forest resources in Tanzania

However, Ms. Temu identified a number of gaps or missing links in managing water and forest resources in Tanzania. Most importantly, an Integrated Water Resource Management (IWRM) system requires that all actors are involved in planning and management.

However, at present, water management in Tanzania, which includes multiple actors, is largely done based on individual interests. The conflicting functions and uncoordinated investments among the different actors in water resource management has resulted in duplication of efforts and inefficient outcomes. Maintaining a balance (and managing the trade-offs) between the consumption of water for economic activities and environmental needs has also been a challenge.

And despite the fact that water management is more critical for water sustainability, greater funding has been directed into improving water supply than water resources management.

In addition, the appropriate selection of tree species is essential for promoting sustainability in water catchment areas, as not all species are suitable for the conservation of water resources. Unfortunately, conflicts have arisen between the water and forest sectors on the tree species to be planted.

For example, planting of pine tree around water sources is found to have an allelopathic effect. Likewise, the planting of eucalyptus species around water catchments has also been detrimental. In several locations, including Lumeme, Ruvuma, Lake Tanganyika, Buhigwe, Kilolo and Mbeya, complaints have been made about land degradation caused by both eucalyptus and pines trees, particularly the disturbances from their harvesting.

Opportunities for better water resources management and the way forward

Despite the challenges identified, Ms. Temu said that the existing policy and legal frameworks for water sector provide valuable guidance on water management, utilization, conservation and sustainability. She also highlighted that the Green Growth Platform is a great opportunity for the government and stakeholders in the forest, water and related sectors to come together to discuss the challenges, opportunities and solutions.

As a way forward towards efficient water resources management, she said that stakeholders need to join forces and coordinate their efforts. The efficiency of water use needs to be improved. In-depth research is also needed with respect to water resources management, conservation of catchments, and rainwater harvesting. Evidence-based findings can then be fed into policy design and implementation. More specifically, research should be conducted on suitable tree species for planting in the arid and semi-arid catchment areas of Dodoma.

B. Presentation 2: Frameworks for managing forest resources in Tanzania

Dr. Ezekiel Mwakalukwa

Director, Forest and Beekeeping Division, Ministry of Natural Resources and Tourism

Extent and types of forest in Tanzania and their management

To begin, Dr. Mwakalukwa provided an overview of Tanzania's forest resources. Based on the first ground-based national assessment, which was conducted between 2009 and 2014, forest resources in Tanzania Mainland were found

to cover about 48.1 million hectares, which is equivalent to 55% of the country's total land surface area. (4) The main types of forests are montane, lowland, mangroves, plantations and miombo woodlands.

Forests are divided into two main utilization categories, namely protection and production forests. Protection forests are located on fragile landscapes, water catchment areas or biodiversity hotspots. They cover 28.09 million ha (58.4% of the forested areas). Harvesting and utilization of any kind is not allowed in protection forests.

In line with the Forest Act, No. 14 of 2002, 17 nature reserves have been established for the purpose of ensuring protection, and ongoing efforts are being made to use these reserves for ecotourism activities. Within the protection forest category, catchment forests cover about 2.8 million ha. They are managed and administered by TFS (1.6 million ha) and LGAs (1.2 million ha). These forests are under constant pressure due to over dependency, as rural communities rely on forest resources for their livelihoods. Some of the negative impacts on forests include illegal logging for timber, tree cutting for firewood and charcoal production, encroachment of farming, grazing and mining activities, and forest fires.

3. Allelopathy is a biological phenomenon by which an organism produces one or more biochemicals that influence the germination, growth, survival, and reproduction of other organisms. For example, pine needles can completely suppress the germination of understory plants in areas where they are planted.

4. Ministry of Natural Resources & Tourism (MNRT), [Tanzania Forest Services (TFS) Agency] in collaboration with the Government of Finland and Food and Agriculture Organization (FAO) of the United Nations. (2015). National Forest Resources Monitoring and Assessment of Tanzania Mainland (NAFORMA): Main Results, May 2015.

Ownership of forests

Dr. Mwakalukwa then described the existing forest tenure arrangements in Tanzania. At present, 34.5% of forests and woodlands are under the ownership of the central government, 52.2% under local and village governments, 7.3% in private ownership, and 5.7% are located on “general” land, which includes land which is not reserved, not occupied or unused village land. The highest percentage of forests and woodland (47.5%) is owned and managed by village governments.

The rights holders are responsible for all aspects of forest management, including production, conservation and protection. However, currently, only 2.3 million hectares or around 10.5% of the forests on village land are reserved and under effective management.

The remaining 19.67 million ha (89.5%) of forests on village land is unreserved (open access forest areas) and is subjected to unsustainable practices such as agricultural expansion, wild fires, livestock grazing and illegal harvesting. These data reflect the weak capacity of village governments to effectively manage the forests. In addition, the formalization of tenure of forest land, especially for villages and private owners is incomplete.

Management of wetlands

Wetland areas, which cover approximately 10% of the area of Tanzania Mainland, are also part of forest management. They include the great lakes system, inland drainage systems, major river networks and mangrove areas.

They are also found in terrestrial forest ecosystems. Wetlands have significant economic, social, cultural and biological values for humans, wildlife and livestock. They serve as water storage and also play vital environmental roles in decreasing flooding, removing pollutants from water, recharging groundwater, protecting shorelines, providing habitat for wildlife and serving important recreational and cultural functions.

However, Dr. Mwakalukwa observed that catchment forests and other protected areas are being degraded or destroyed. One of the main challenges is the lack of mechanisms to ensure that water users contribute towards conservation of catchment forests in the form of payments for ecosystem services (PES). Wetlands management is also fragmented. Along with the forestry sector, the management of wetlands cuts across many different sectors, including agriculture, water, fisheries, energy, livestock, lands, wildlife, industry and mining.



Despite being multifunctional in nature, their management is neither integrated nor coordinated. Despite their critical ecological and environmental importance, wetlands other than the great lakes are severely encroached upon, under-valued, over-exploited or neglected as wastelands.

Existing institutional and regulatory frameworks for forest management in Tanzania

Dr. Mwakalukwa then gave an overview of the institutional and regulatory frameworks for forest management in Tanzania. The principal institutions in forest management include the following:

- The Ministry of Natural Resources and Tourism (MNRT) is responsible for the coordination of cross-sectoral aspects of natural resources management.

- Within the MNRT, the Forest and Beekeeping Division (FBD) is mandated to lead all aspects of forest policy, strategy, regulatory frameworks and forest administration in Mainland Tanzania
- The Tanzania Forest Services Agency (TFS) is mandated to provide professional forest management services for the forest resources owned by the central government, while local government authorities (LGAs) are responsible for the management of forests under their ownership and jurisdiction, and for approving by-laws on village forest reserves.

Research is also important for forest development. The Tanzania Forest Research Institute (TAFORI) is mandated to provide research leadership. TAFORI was established by Act No. 5 of 1980. Under Section 4 of the Act, its functions include:

- i. To promote the development, improvement and protection of the forestry industry; and
- ii. To carry out, and promote the carrying out of, experiments and research relating to the planting, growth, development, conservation and use of local and foreign trees and evaluate their suitability for adaptation and alternative use in the wood and other industries in the United Republic.

Other important entities include the Tanzania Forest Fund (TaFF), training institutions such as Forestry Training Institute (FTI) and Forest Industries Training Institute (FITI) and the Eastern Arc Mountains Conservation Endowment Fund (EAMCEF).

TaFF was established for the purpose of funding country-wide forest-related activities that aim to ensure the sustainable management of the country's forest resources, while the EAMCEF provides more localized funding to promote sustainable conservation of the Eastern Arc Mountains.

Existing policy and legal frameworks for the conservation of forest and water resources include the National Forest Act, No. 14 of 2002, which is currently under review, the National Forest Policy 1998 also under review, the Forest Regulations of 2004 (GN. 153), and various forest management guidelines, such as Participatory Forest Management Guidelines (PFM).

Challenges and recommendations for forest management

Dr. Mwakalukwa identified two major challenges with respect to forest management:

- i. Inadequate capacity (human, financial and technological) to manage the country's forest resources, which results in encroachment on forested areas for farming, livestock grazing, tree cutting for fuel, and illegal mining.
- ii. Recurrent fire incidences within natural forests and to a lesser extent on plantations causing severe loss of forest resources; and

To ensure efficient management of forests and water resources, Dr. Mwakalukwa offered two main recommendations.

- i. Stakeholders need to contribute to the cost of conserving forest resources. To do so, a payment for ecosystem services (PES) scheme needs to be instituted for all users of forest services. Some studies on the valuation of catchment forests have estimated the actual value of the forests to be USD 496 million whereas the potential value was USD 620 million. Similarly, water users (both domestic and industrial and for irrigation) need to contribute to water conservation.



Responding to questions from the floor at the end of their presentations; Dr. Ezekiel Mwakalukwa (left) and Ms. Pamela Temu

- i. For example, in 2017, about 567.7 megawatts of electricity were harnessed from water sources (equivalent to 40.54% of the total 1400.34 megawatts of electricity produced in the country). However, no portion of this income went back to the conservation sector.
- ii. Increased sectoral coordination is required in the development of management or utilization plans. All sectors related to forest management need to be involved, including agriculture, land, water, livestock and urban planning.

For instance, coordinated efforts are needed to ensure that cultivation is abandoned on hills and steep slopes.

An increasing number of barren hills and slopes are found in Tanzania due to unsustainable agricultural activities, which subsequently pose severe risk of erosion and loss of productive capacity of the land.

To strengthen sectoral coordination, participants were informed that the FBD is setting up an integrated land-use and restoration program for Tanzania's productive forest landscapes. The program is placing emphasis on multisectoral collaboration and coordination. Under the Global Environment Facility, the program has secured funding worth USD 8.7 million.



Basic principles for managing forestry and water resources in Tanzania: Opportunities and challenges

A. Presentation 1: Basic principles for managing forest resources

Ms. Bettie Luwuge

Communications Officer, Tanzania Forest Conservation Group

Ms. Luwuge made the presentation on behalf of Mr. Charles Meshack, the Director of Tanzania Forest Conservation Group (TFCG). TFCG is a local NGO, based in Morogoro, that operates in the Eastern Arc Mountain and coastal forests of Tanzania.

Ms. Luhuge commenced her presentation by describing TDCG's scope of work. She said that the organization works towards the vision of Tanzanians and the rest of humanity enjoying the diverse benefits from well-conserved, high-biodiversity forests. To do so, TFCG programs are implemented in the following thematic areas:

- Protected area and participatory forest management;
- Climate change mitigation and adaptation;
- Communication and advocacy on policy and social issues, environment and research;
- Environmental Education (community and other stakeholders); and
- Networking (working with other people) and partnerships; and
- Community Development.

TFCG's mission of reducing poverty and conserving high biodiversity forests directly contributes to Tanzania's development vision. She emphasized that the rapid economic growth needed to realize Vision 2025 will depend on the extent to which adverse trends in the loss and degradation of the natural resources are reversed.

Importantly, the principle of Participatory Forest Management (PFM) was introduced in the Forest Act, 2002. This provides a clear legal basis for communities across Tanzania to own, manage or co-manage forests under a wide range of conditions. The law recognizes two different types of PFM: Community Based Forest Management (CBFM) and Joint Forest Management (JFM). (7)

Core principles for designing and managing the use of forestry and water resources

Under its legal frameworks and management regimes, TFCG activities adhere to the following core principles:

Recognising and Granting rights

Under this principle, affected local people need statutory rights to access, manage and govern forest and water resources. Rights-based approaches have existed for decades as an important commitment to ensure that all interventions identify and respect the rights of all affected actors.

Accountability

Policies and programmes should be designed with effective mechanisms in place to

ensure that various actors working across different scales (local, national and global) of forest and water utilization are accountable for their activities on the management and utilization of water and forest resources.

Transparency

The expected outcomes and beneficiaries of forest and water conservation interventions should be transparently monitored and communicated to all on a regular basis. Without transparent information-sharing, affected stakeholders cannot adequately participate in decision making. Without proper water management schemes even the forest management schemes won't work effectively. TFCG's initiatives have trialled ways of making the use of forest and water resources more transparent, including the use of information and communication technologies (ICTs) as well as Free, Prior and Informed Consent (FPIC).

Participation

Socially marginalized groups, including women, should be empowered and actively supported to participate in forest and water resources management decision-making. TFCG adopts effective participatory approaches in decision making which have achieved positive outcomes for marginalized groups. These include:

- Village Land Use Planning Process;
- Community Based Forest Management (CBFM); and
- Joint Forest Management (JFM).

To make participation more meaningful may require challenging power relations and power dynamics across and within levels of governance. Participation at national, regional and local level is essential for uptake and to build the sense of ownership. Participatory approaches are necessary to implement decisions. To achieve a meaningful participation, local people should be made aware so that they make informed decisions.

Capacity development

It is not only the local people affected by the use of forest and water resources who may need support so as to participate in the programme design and implementation. Programme managers themselves often need support and training to build the skills necessary to run effective, participatory and inclusive process. They need support to be ecologically and socially literate. Facilitators are needed to steer forest management processes skillfully, which requires knowledge of resource assessment, management and harvesting plans, by laws, conflict analysis and resolution, and stakeholder analysis.

Additionally, user-friendly approaches need be incorporated in policies to ensure their easy understanding at the grassroots level. For example, capacity building on the application and use of Geographic Information Systems (GIS) and land use management are necessary to ensure all stakeholders can participate in decision making.

Recognizing and rewarding contributions

Local people's stewardships of forest and water resources and their contribution to flows of ecosystem services and goods must be adequately recognized early in the decision-making process and sufficiently rewarded. Conditional transfers of cash and in-kind resources are one way of achieving this but may need to be augmented by other forms of recognition and rewards. Based on TFCG implementation, various pilot initiatives implemented for Payment for Ecosystem Services (PES), such as REDD+ and Payments for Watershed Services (PWS), have shown good prospects for benefit sharing.

Adaptive process and learning

As the physical sustainability of forest and water resources use is measured and monitored over time, so, too, the social impacts must be measured and monitored.

Governance systems must be adaptive and be able to cope with often rapid changes in the local context. Benefit-sharing mechanisms should also be clear.

Challenges on the management of forest and water resources

Ms. Luhuge then identified several key challenges facing the management of forest and water resources in Tanzania. First and foremost, expanded cultivation for agriculture has been driving deforestation in many parts of the country. Historical trends from the 1990s reveal increasing rates of deforestation over the last 30 years. Tanzania loses about 4,690 square kilometres from deforestation annually as indicated in Tanzania's Forest Reference Emission Levels (FREL). Based upon the country's existing forest area of around 320,000 square kilometres, unless action is taken, all forests in Tanzania will disappear in the next 50 to 60 years.

Ms. Luhuge also highlighted that local people have poor access to legal information. Most of the documents applicable to forest management, including the National Forest Policy and Act, forest guidelines and regulations, and harvesting guidelines have not been produced as simplified/popular versions that can be more easily understood by communities.

In addition, ongoing delays in finalizing and signing Joint Forest Management (JFM) agreements hinder mutual accountability among the right holders and duty bearers.

Opportunities to strengthen forest management

Ms. Luhuge said that the completion of the new National Forest Policy, which is currently under review, will be a milestone towards enhancing the governance of forest resources in Tanzania. She recommended this process should be fast tracked and strategized for implementation.

Incorporating the core principles discussed earlier—including transparency, accountability, participation, recognition of rights and reward for forest contributions to local people across scales of governance—help to create momentum towards fairer and more ecologically sustainable forms of forest and water resources management and use.

Notably, pilot studies conducted in Morogoro indicate that investing in Community Based Forest Management (CBFM) can reduce the effects of deforestation. Maintaining forest on village land through CBFM can help to retain a mosaic of forest within predominantly agricultural landscapes, which bring multiple benefits. These include:

8. The original definition of REDD+ referred to "reducing emissions from deforestation and forest degradation in developing countries" but terminology has been expanded through successive COP meetings to include "the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks in developing countries."

9. Forest Reference Emission Levels (FREL) is a benchmark against which all emission reduction efforts will be compared in the future. It is a requirement for receiving results-based payments under REDD+. Tanzania submitted its FREL to the United Nations Framework Convention on Climate Change (UNFCCC) in December 2016. See The United Republic of Tanzania. Tanzania's Forest Reference Emission Level Submission to the UNFCCC, November 2017.

- Safeguarding ecosystem services, such as water, local and regional climate, soil and pollinators
- Promoting climate change adaptation and livelihood diversification
- Generating revenues for community development projects
- Supplying biomass energy

In closing, Ms. Luhuge said that now is the time to get behind CBFM and encourage every forest-owning village to establish a village land forest reserve. For communities to benefit directly, they need to be supported and facilitated by their local government authorities to develop ecologically viable and sustainable forest-based enterprises including eco-tourism.

Most importantly, dialogue needs to be encouraged between stakeholders in the key sectors of agriculture, forestry and energy and water so as to make balanced decisions on how land is allocated as deforestation is mainly driven by the demand for land, not the demand for trees.

B. Presentation 2: Basic principles for managing water resources

Dr. Herbert Kashilila

Chairperson, *Shahidi wa Maji* (10)

This presentation focused on water resources management (WRM) and its links with forest management. To start, Dr. Kashilila remarked that 97% of the world’s water is salt water that is unfit for consumption (Figure 2).

In total, fresh water sources constitute only 3% of the water on the planet, and it is estimated that by 2025, two-thirds of the world’s population will be facing severe to moderate water stress. This adds up to a monumental management challenge if Sustainable Development Goal 6 (SDG 6)—which aims to ensure availability and sustainable management of water and sanitation for all—is to be met.

Moreover, the long-term sustainability of water resources is dependent on their co-existence with forest resources. The presence of forests:

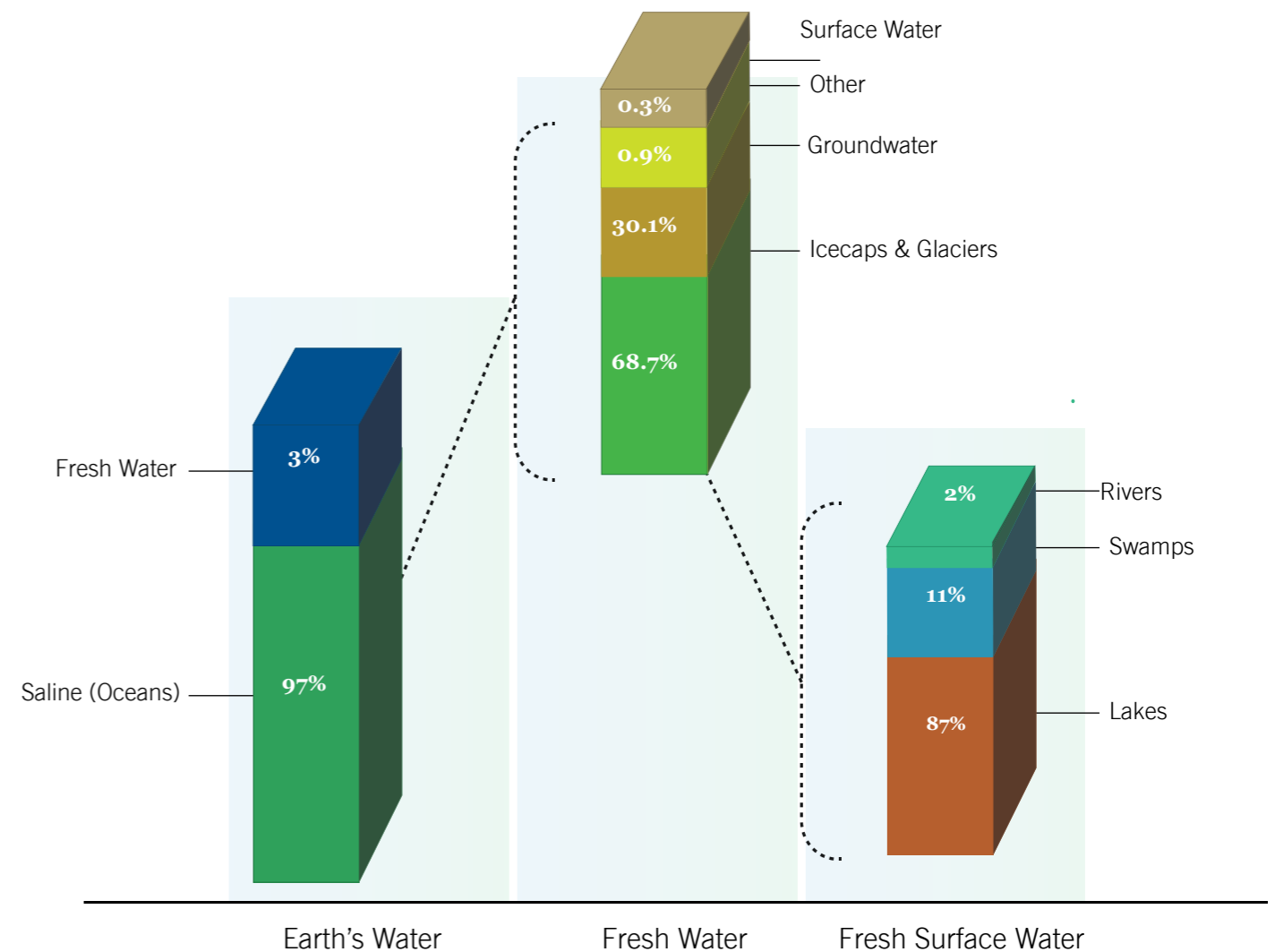
- Influences the quality and quantity of water in water bodies by regulating water flow and sediment transport;
- Protects watersheds and provide habitats for biodiversity;
- Reduces the frequency and intensity of floods; and
- Contributes to the protection of both aquatic and terrestrial biodiversity.

However, it is estimated that almost 30% of the world’s major watersheds have lost about 75% of their original forest cover (World Resources Institute, 2000).

Water resources management in Tanzania

Dr. Kashilila identified several pertinent issues with respect to water resources management in Tanzania.

Figure 2: Global distribution of water



10. Formed in 2008, Shahidi wa Maji is a Tanzanian civil society organization dedicated to sustainability, equity and accountability in water resource management. See <http://www.shahidiwamaji.org/>

11. See <https://www.wri.org/publication/world-resources-2000-2001>

Water allocation

In Tanzania, water availability is widely perceived as a gift and thus does not really need to be regulated. In turn, this has resulted in:

- Long waiting times and a backlog of permit applications to be processed by Basin Water Boards (BWBs)
- No environmental flow needs assessment, hence sustainable limits for water use are poorly understood
- Compensation flow or seasonal variations not specified within Water Use Permits (WUPs).
- WUPs are unenforceable as they fail to specify requirements for measuring devices or for users to monitor use; and
- Basin Water Boards have inadequate budgets to inspect or enforce compliance.

Protection and conservation of water sources

Implementing water pollution control measures have been problematic due to the overlapping roles of different key institutions. He provided three examples.

- Industrial discharges flowing into the Msimbazi River, Dar es Salaam's main river, from NIDA Textiles put the health of thousands of people at risk. Formal complaints to the Wami/Ruvu Basin Water Board (WRBWB) and the National Environment Management Council (NEMC) have been made since 2014. Despite a ministerial visit and fines of TZS 30 million, pollution is ongoing.
- Discharges from water treatment ponds of the Morogoro Urban Water Supply and Sanitation Authority (MORUWASA), and from 21st Century Textiles in Morogoro and others, have resulted in dangerous levels of faecal contamination and industrial waste in the Ngerengere River, Morogoro's main river, which is also a source of drinking water for Dar es Salaam. This pollution has serious health and livelihood impacts on thousands of people and businesses downstream. Yet, again, despite formal complaints to WRBWB and NEMC since 2014, senior level visits and stop orders, pollution of the watercourse continues.
- Around 3000 kg/year of mercury (Hg) enter the Lupa River through mining activity. Multiple studies have found unsafe levels of mercury in sediments, fish and humans....

Mercury bio-accumulation in the fish of Lake Rukwa, which is one of the principal sources of freshwater in the country, poses risks to millions of people supplied. Requests for help from mining communities to control pollution yield no response. A 2016 report from the Ministry of Water reported it was unable to monitor mining pollution because of a lack of facilities.

Dr. Kashilili pointed out that Tanzania has world-class, powerful pollution control laws, but the actual powers to control pollution have been ineffective due to:

- Limited persistence in enforcement and accountability. Polluters can ignore enforcement action and orders with impunity, especially given limited monitoring and follow up.
- Interference with enforcement processes. Enforcement orders are prematurely lifted and there is a misguided narrative that preventing pollution will come at the costs of jobs.
- Regulators cannot function and inspect sites because of limited resources. At present, BWBs are provided with 9% of the budget needed for regulation and enforcement.

- Polluter pays powers are dormant. Powerful financial incentives to comply are available but not used. As a consequence, government revenue is lost and pollution continues.

Floods, drought and the impact of climate change

Dr. Kashilili explained that floods and droughts have significant impacts on people, development and the economy, and the incidence and severity of these events is increasing due to climate change. However, at present, there are no processes that link the management of catchments, land-use and water resources, or measurement of weather events for effective flood protection.

At the same time, the implementation of the Disaster Management Act, 2015 is lagging behind. The law calls for establishment of a Disaster Management Agency, Committees and Emergency Preparedness and Response Plans.

Water financing

The Ministry of Water (MoW) Financing Options study in 2019 found that WRM receives, on average, 18% of total funds requirement. It was similarly reported that in terms of the Basin Water Boards, the annual funding requirement was lower compared to current annual spending and ranged between 3% and 40%.

Integrated Water Resources Management and Development (IWRMD)

Dr Kashilili explained that IWRMD planning means:

- Moving from sector-based planning towards coordinated or fully integrated planning for water, land and related resources;
- Moving from a view that the state alone is the one responsible for water and land resource management towards one that promotes shared responsibility with society as a whole;
- Moving from a centralized and controlled decision-making towards sharing results and opportunities, transparent negotiation or dialogue, cooperation and concerted action among stakeholders;
- Being strategic, i.e., seeking solutions that address the causes of water and land problems rather than symptoms

However, he identified several challenges that Tanzania is facing in implementing IWRMD. These included:

- Financial constraints to implement the projects proposed in the IWRMD plans;
- Inadequate coordination among sectors to implement the IWRMD plans;

- Water resources management lacks political attention as compared to water supply;
- Low awareness of most stakeholders on their roles to implement IWRMD plans; and
- Limitations to use trans-boundary water due to existing agreements among states or lack of the same.

Water governance in Tanzania

The principal institutions governing and managing water resources in Tanzania are as follows:

- The Ministry of Water (MoW), which is responsible for policy, legislation, regulation and guidelines through the Water Resources Division.
- The National Water Board is an Advisory Board to the Minister made up of representatives from different sectors.
- Basin Water Boards (BWBs) are Executive Boards in their respective water basins. Under each BWB, catchment committees are operational units.
- Water Users' Associations (WUAs) are the lowest (grassroots) level of water management in Tanzania with representation in catchment committees and BWBs.

The important roles of Water Users Associations

At the local level, WUAs are responsible for the management, distribution and conservation of water from a source, which is used jointly by members of the WUA, including the acquisition and operation of any water permits, and collection of water user fees. The WUA is also responsible for the resolution of conflicts between members, and to represent the special interests and values arising from water used for a public purpose, such as conservation. However, in practice, WUAs encounter significant challenges in fulfilling their mandated functions.

The main setback has been in the selection and inclusion of members. WUAs also lack of financing and human resources. Most WUAs do not have substantial sources of revenue, so they rely on subsidies or levies. The majority of associations are run by community members with limited managerial and organizational skills. Hence, providing training, exposure to study visits and material support will be important to build their capacity. Overlapping mandates between the associations and LGAs has hindered some WUA activities and conflicting legal and regulatory frameworks have contributed to weak enforcement in the conservation and protection of water sources. Mandates and frameworks need to be redefined to prevent conflicts and improve effectiveness and efficiency.

Opportunities for improved water resources management

Despite the challenges facing the water sector, Dr. Kashilili highlighted the opportunities for improved water management in Tanzania. To begin, existing policy and legal frameworks are in place and the ongoing review of the National Water Policy offers a space to strengthen and harmonize intersectoral activities. The current Water Sector Development Programme (WSDP) also encourages an integrated approach and identifies innovative ways to finance the sector. Integrated Water Resources Management and Development (IWRMD) plans provide key solutions on how the efforts of different stakeholders can be mobilized to implement integrated watershed management and investments.

At the local administrative level, LGAs are in place to promote and enforce laws and by-laws pertaining to water management within their jurisdictions, and at the catchment level, Basin Water Boards are vested with the power to regulate users equitably and sustainably. Therefore, in closing, Dr. Kashilili observed that the core components of the institutional, regulatory and legal frameworks are in place for the effective and efficient management, development and protection of water resources in Tanzania. But the weaknesses identified in the current frameworks do need to be addressed.

Lack of accountability and institutional overlaps on natural resources management must be resolved. At present, the lack of clarity on mandates within the sector means that no one feels responsible for water resources management. Similarly, the coordination between the water sector and the forest sector needs to be improved. Regulators and users for both sectors need to sit at the same table to achieve a truly integrated, mutually beneficial approach to water and forest management in Tanzania.



Good practice, experiences and lessons learned in managing forest and water resources in Tanzania

A. Presentation: Good practice, experiences and lessons learned in managing forest and water resources in Tanzania

Prof. David Nyange

Policy Advisor, Agricultural Sector Policy and Institutional Reforms Strengthening (ASPIRES) project

Prof. Nyange's presentation focused on the intersection between the demand for food, water and energy, and the impact on natural resources management. Attaining a balance between the three is central to sustainable development, especially in the context of increasing demand driven by a rising global population, rapid urbanization and changing diets.

Opportunities for improved water resources management

Around 55% (or approximately 48.5 million hectares) of Tanzania's land is covered by forest, of which 90% is woodland. Of this area, around 18 million hectares are contained within forest reserves and a further 3.67 million hectares are under Participatory Forest Management (PFM). However, this means that half of the country's forest is on village government land. Given the management regime for these forests is unclear, these areas are particularly vulnerable to deforestation.

Tanzania's forest resources have been subjected to increasing deforestation due to increasing demands for their consumption. Forest products contribute 90% of domestic energy needs (firewood and charcoal) as well as 75% of construction materials.

Forest good and services also contribute up to 5% of the country's GDP and about 10-15% of export earnings over the past decade. Given increasing demand, the country is losing an estimated 469,000 hectares of forest per year, and a recent assessment shows land degradation in Tanzania has increased to 50% as compared to 42% in the 1980s. If not mitigated, these current trends could lead to the total loss of forest within 50 to 80 years.

The drivers of deforestation

Prof. Nyange observed that increased population pressure, demand for agricultural land, livestock raising and rapid urbanization are central to deforestation in Tanzania. Most significantly, Tanzania's population is projected to grow from 55 million to 100 million by 2035. At present, most forest land is being destroyed by the expansion of farming activities, which centres mainly on increasing the area for cultivation rather than improved productivity. On average, per capita, production does not exceed 1 ton per hectare.

The total area under cultivation in Tanzania is estimated to be 4.4 million hectares compared with 1.7 million hectares in Egypt, hence, there is enormous scope to increase productivity through intensification. With adequate investment, food production can be increased four times using the same area without destroying the country's forests.

As the fifth largest country in Africa by population, Tanzania needs a revolution in its agriculture to become self sufficient.

Tanzania also has the largest livestock population in Africa, which is beyond carrying capacity and contributes to forest degradation and increasing desertification. Yet, the sector contributes not more than 4% of the GDP. Again, this low contribution is due to low productivity. The current rate of deforestation is also linked with the country's rapid urbanization, weak governance and corruption, the influx of refugees in western parts of the country, and technological advancements, such as the use of chainsaws for felling trees.

With proper management, forests can economically and ecologically support livelihoods (especially of the poor), sustain water cycles and soil conditions, ensure biodiversity and mitigate greenhouse gas emissions (GHGs). In stark contrast, deforestation leads to disruption of livelihoods and the water cycle, increased soil erosion, loss of biodiversity and increased emissions from degraded land.

Good practices and lessons learned from forest sector initiatives

Despite these negative trends, Prof. Nyange identified a series of good practices and lessons learned from interventions in the forest sector, which have enabled the rescue of some forests from disappearance. These include:



- Increasing the area of forest land under reserve for sustainable conservation, and implementation of Participatory Forest Management (PFM) initiatives with the inclusion of local communities through village environmental committees;
- Establishment of the Tanzania Forest Service (TFS) Agency, which has recently implemented a strategy of using paramilitary units to improve surveillance and prevent the invasion and illegal harvesting of forest products;
- Adoption of a multi-sectoral approach to environmental management that is coordinated under the Vice President's Office;
- The development of commercial forests (both public and private) has expanded, which offers opportunities of meeting increased demand for timber and fuel wood;

- The use of forest residues to generate electricity; and
- Integration of forest and wildlife management with mutually beneficial outcomes, including reduced deforestation and sustainable economic benefits.

The status of water resources in Tanzania

Prof. Nyange then turned his attention to Tanzania's water resources. He related that annual renewable water resources were 89 cubic kilometres or 2,700 cubic metres per person in 2001, but that this amount is projected to decline to 1,500 m³ per person by 2025, which is below the threshold of 1,700 m³ per person that signifies water scarcity or stress. Additionally, only 50% of Tanzania's population of 53 million have access to an improved source of safe water, and only 34% have access to improved sanitation.

Rainfall patterns naturally vary across the country. National mean annual rainfall is 1,071 mm, but the Lake Tanganyika basin and the Southern Highlands can receive up to 3,000 mm annually while about half the country receives less than 762 mm annually. However, a number of studies indicate the shifts in rainfall patterns and water availability due to the impact of climate change.

For example, the Climate System Analysis Group study (2011) generally concluded some parts of the country may receive more rainfall under various climate change scenarios and other areas, especially the central region, might receive less. The research also suggested seasonal shifts in rainfall, with less rain early in the season and stronger rains later in the season. These findings imply changes in water flows in major river basins.

Hydroelectric power also contributes one-third of the total electricity supply with installed capacity of 562 MW. The Stiegler's Gorge hydroelectricity project on the Rufiji River, which is under construction, is expected to generate a further 2,115 MW. Given the strong links between the forest, water, agriculture and energy sectors, more effective and integrated strategies are needed to sustainably manage the land, forest and water resources.

Towards sustainable water resources management: Good practices and lessons learned

As he had for the forest sector, Prof. Nyange identified the good practices and lessons learned to date in the water resources management in Tanzania. Positively, the policy, regulatory, legal and institutional frameworks for water resources management are in place. In particular, the establishment of Water Basin Boards was an important step in the sustainable management of the environment, as they ensure inter-sectoral coordination of water users.

And, at the local level, water users' associations (WUAs) and water use fees help to rationalize the allocation of water resources according to economic returns. Similarly, the existence of the National Irrigation Policy and National Irrigation Commission are important given that the agriculture sector is the largest user of water. Going forward, Prof. Nyange highlighted the need for sustained investment in irrigation and water storage infrastructure.

These will contribute substantially towards realizing Tanzania's goal to become a semi-industrialized, middle-income country. Tanzania needs to harness water harvesting technologies, including multiple small-scale dams in river basins. Water dams for industrial zones will also be important, for example, the Mindu dam for the Kihonda Industrial Estate. There is also a need to build Kidunda dam for industries in Dar es Salaam and Coast regions. Experience from road construction activities have shown that water dams excavated during road construction could be improved for use by communities to harvest rain water for irrigation and livestock.

Land and water for agriculture

Turning to the water needs of the agricultural sector, Prof. Nyange explained that 20% of cultivated land globally is irrigated. In Africa, this percentage falls to 5%, while in Tanzania only 2.5% of its cultivated land (around 475,000 hectares) is under irrigation. Hence, most of Tanzania's water drains into the ocean. However, by tapping its available water resources, Tanzania has 2 million hectares of land with high potential for irrigation.

The second phase of the Agriculture Sector Development Plan (ASDP II) and the National Irrigation Master Plan (NIMP) are both geared to increase the land under irrigation to one million hectares by 2035. Irrigation schemes are pivotal for transformation of the agriculture sector, attractive to youth, and can help to mitigate impact of climate change.

To enable multi-season irrigated agriculture, the country will need to invest in water storage infrastructure, which will also increase the potential for aquaculture compared to water bodies. India and China have consistently invested in irrigation and water storage facilities for several decades. There is also a need to adopt water-efficient irrigation technologies, such as drip irrigation.

Biomass fuel demand and deforestation

Echoing earlier speakers, Prof. Nyange remarked that biomass fuels—charcoal and wood are the primary source of domestic energy in Tanzania; 91% of households rely on these fuels for cooking and heating, which contributes to the country's alarming rate of deforestation.

Charcoal consumption is estimated at 2.3 million tons annually. To date, alternative sources of domestic energy for cooking and lighting such as paraffin, liquefied petroleum gas (LPG), electricity and renewable forms of energy (such as solar and wind) are neither widely accessible or viable for the majority of the population. Only one-third (33%) of Tanzanians have access to electricity.

Urban households have more access to electricity (65.3%) compared to rural areas (16.9%). Due to relatively high cost of alternative energy sources as compared to charcoal and firewood, the majority of the households use electricity mainly for lighting. Only a small number of urban households can afford LPG. Hence, the need exists to review fuel tariffs to promote the shift from biomass fuel to more sustainable energy sources.

Policy implications for the sustainable management of food, energy and water in Tanzania

To conclude his address, Prof. Nyange highlighted a series of policy implications for the sustainable management of food, energy and water in Tanzania.

He said that the strong nexus between these three essential elements for people's lives and livelihoods necessitates an integrated approach between stakeholders in all related sectors. Natural resources alone cannot be translated into wealth unless the resources are effectively and efficiently harnessed into production and value chain processes.

Land use planning—and its implementation and enforcement will be critical to sustainable management of resources. In particular, the institutional framework for managing village land will need to be strengthened to reduce deforestation and environmental degradation due to over-utilization.

To reduce dependence on forest resources, there is a need to improve agricultural productivity. To do so, not only does farming practice need to be intensified but post-harvest losses from pests and other spoilage must be reduced through investments in education and storage and transport infrastructure to get produce from farm to markets.

Overall, a shift is needed from subsistence to modern commercial agriculture.

Public investments in water harvesting and storage, and irrigation networks will be important as increasing squatter irrigation can be very wasteful and detrimental to water resources and the surrounding environment. Similarly, investment and promotion of alternative energy sources are required to reduce household dependence on biomass fuels.



Addressing questions from the floor at the end of their presentations; Dr. Herbert Kashilila (left), Ms. Bettie Luwuge, (middle), and Prof. David Nyange (right).

B. Q&A Session

After the presentations, participants engaged in a question and answer session. The following key issues emerged.

Stakeholder participation in development of new water policy and its harmonization with other national policies

Q:

How far has the Ministry of Water involved other sectors in the development of the new water policy?

A.

The policy review process is participatory, more so in the initial stages when stakeholders' meetings were held. At the advanced stage, the policy will also be circulated to various stakeholders for inputs.

Q:

During the ongoing process of drafting, is the new Water Policy being harmonized with other national policies, some of which are also under review?

A.

Regarding harmonization within the policy review process, stakeholders in the water sector have reviewed the draft National Energy Policy and are satisfied on the efforts.

Q:

To what extent is society involved in ensuring the sustainable development of water resources and management of forest resources, for example, by organizing forums that bring people together, and promoting grassroots participation, including monitoring and evaluation?

A.

National water boards, as higher organs within the sector, are multi-stakeholder institutions, and water basin authorities and national water forums are also multi-sectoral. The draft policy will be presented in the national water forums to solicit comments.

Inclusion of Payments for Ecosystem Services (PES) in the new Water Policy

In response, the presenters confirmed that PES is being considered in drafting the new water policy. Previously, it was difficult to implement PES due to the absence of the established regulations.

Also, the implementation of PES in Tanzania is relatively new. To date, it has been trialled on a pilot basis. Various initiatives are ongoing in collaboration with the private sector, e.g., PES is being implemented in Tanzania Breweries Limited (TBL) but not formally. Formal arrangements will be included in the new policy.

Progress is ongoing to operationalize PES in the new policy. The PES should be broadened to include various consumers of water and forest resources, apart from TANESCO. It is necessary that a framework for implementation be well defined, including mechanisms for revenue collection and a range of institutions to be involved.

Impact of planting eucalyptus and pine species on the environment especially water catchments

Q:

Several participants stressed their concern for the negative impacts of planting eucalyptus species on conservation of water catchments, specifically their effect on depleting water sources.

A.

In response, Dr Revocatus Mushumbuzi from the Tanzania Forest Research Institute (TAFORI) said that currently about 900 species of eucalyptus have been reported in Tanzania, and that almost all tree species were introduced from Australia. He explained that in extreme areas of Same, eucalyptus species grow well and have not caused water scarcity problems. However, it is true that, on average, eucalyptus species consume about 5,000 litres of water per year which is relatively high compared with other species such as 2,000 litres for acacia trees.

A.

But he added that the selection of species needs to consider the concept of “water uptake” versus “water use”. In terms of water uptake eucalyptus draw about 5,000 litres of water per year, but the amount of water used to make one gram of biomass is relatively low compared to acacia and more or less similar to other species. Hence, these data indicate that eucalyptus can be grown with modest effects, particularly because water is re-circulated into the ecosystem through evapotranspiration.

In addition, he said that older trees do not have as much water uptake, but young eucalyptus trees have much higher uptake and should not be grown close to catchment areas. He added that water uptake for paddy, sunflower and cotton sometimes exceeds eucalyptus depending on the particular area and therefore the effects of plants on water catchments should be broadened to include agricultural crops. Generally, research evidence indicates that eucalyptus should not be planted close to the water sources.

The representative of the Iringa RC, Hon. Jamuhuri William (DC for Mafundi) also raised concerns about the situation at Mzakwe Catchment where trees are not growing despite the pool of experts available in the forestry sector.

A.

He wanted the members of the forum to come up with practical resolutions on the appropriate tree species to be planted at Mzakwe. Based on his experience in Iringa, he emphasized that many pine tree species are planted around catchments and still the region maintains reliable rainfall and water availability. Besides, pines are useful commercial trees. He was concerned on how far it has been proven that pines are detrimental.

Later in discussion, Joram Lyimo from ActionAid suggested that an agro-ecological approach should be applied as a new model for sustainable forest management. Dr. Nancy Pima said the use of multi-purpose tree species for commercial and afforestation purposes should be encouraged to overcome the negative impacts of deforestation. Tree planting should be encouraged professionally, and people advised on the most suitable tree species for their specific locations.

Inclusion of Payments for Ecosystem Services (PES) in the new Water Policy

Q:

Hon. Christina Mndeme, Ruvuma Regional Commissioner raised her concern that two water basins—Ruvuma and Nyasa

basins—traverse Ruvuma Region, but they are managed separately by two different regulatory boards based in Mbeya and Mtwara. She questioned whether it would be better to have one regulatory body at the regional level in Ruvuma. She believed that bringing the authorities together at the regional level would ease service delivery.

A.

Previously, water resources were supervised on administrative boundaries. However, this arrangement complicated implementation of water interventions so the government changed the basis of supervision to hydrological boundaries. It was added that, although regulatory functions are not at regional level, as in the case of Ruvuma, water basin offices are available at different regional and district sites, including representative offices in Ruvuma.

Staffing and human resources capacity in the forestry sector

Hon. Juma Homera, Katavi Regional Commissioner, made a number of recommendations on staffing, given the challenges earmarked during the FBD presentation. To overcome the staff deficit, he proposed that the FBD consider mobilizing their human resources at the zonal level. He also expressed the need for better supervision of existing personnel, highlighting the problem of

unfaithful staff in the forest and water sectors, e.g., security guards. Hence, staff issues need to be reviewed and human resources capacity enhanced. He also stressed that all sectors must be involved to ensure that strategies incorporated directives on how encroachment will be managed.

Strong guidelines should be developed from the grassroots specifying how forests and water sources will be managed.

Later in discussion, Prof. Nyange remarked that new technology can be used to effectively manage forests and reduce the requirement for manual labour, for example, the use of drones to patrol the forests.

Livelihood diversification and women's participation in the forestry sector

In response to questions from the floor, Ms. Luhuge from TFCG said that laws pertaining to forest management provide for the involvement of women and their participation has been increasing. Efforts have been undertaken to diversify income-generating activities for local communities, women in particular, through empowerment and raising awareness to reduce the dependency on and use of forest resources. Echoing earlier remarks, she also stressed the need to reduce tariffs on alternative sources of fuel and encourage the use of resource-efficient and cost-effective

technologies to replace the use of wood biomass.

Hon. Juma Homera, the Regional Commissioner for Katavi, and the Hon. Albert Chalamila, Regional Commissioner for Mbeya, also remarked on the need to diversify livelihood opportunities (e.g., beekeeping) for local communities and raise awareness and participation in water and forest management.

Climate change, water use and irrigation for agriculture

Dr Kashilili remarked that climate change projections shows that majority of farmers will shift towards irrigation and away from rain-fed agriculture, hence more resources are needed for investment in rainwater harvesting and storage. In turn, this will drive a shift from expanded to more efficient land use. However, attempts to limit production will compromise the balance between food, energy and water requirements. Hence, the expansion of irrigated areas to 2 million hectares will only be feasible if technology is applied.

Hon. Chalamila agreed on the need for strategies for climate adaptation. He said that in many parts of the country, including Mbarali District, a rice growing area in the Southern Highlands, indicators of desertification are more visible due to unsustainable water use

Therefore, suitable strategies for climate adaptation are inevitable for the area. Evidence-based findings on the quantity of water and amount of rice to be produced are needed to manage water more effectively. Pilot irrigation/ water resources management studies need to be undertaken and successful approaches need to be scaled up all over the country.



Participants during the Q&A session.

C. Panel discussion

Moderator:

Prof. Andrew Temu

Panellists:

Ms. Pamela Temu

Principal Hydrogeologist, Ministry of Water, Tanzania

Ms. Clara Makenya

Executive Director, United Nations Environment Programme, Tanzania

Ms. Rahima Njaidi

Executive Director, MJUMIT

Mr. Segule Segule

Basin Water Officer, Pangani Basin Water Board

Eng. Ngwisa Mpembe

Managing Director, Lahmeyer Consulting Engineers Ltd.

The panellists were asked for their perspective on a series of pre-determined questions. The questions focused on the roles of major stakeholder groups in water and forest management. The first two questions focused on the role of the government through its Basin Water Boards.

Questions 3 and 4 focused on the role of development partners while questions 5 and 6 related to the roles of the private sector and civil society, respectively. The main issues emerging from the discussion are summarized below.

From L-R: Eng. Ngwisa Mpembe, Ms. Clara Makenya, Ms. Pamela Temu, Ms. Rahima Njaidi, and Mr. Segule Segule.



The role of Basin Water Boards

Question 1: Directed to Mr. Segule

Pangani is known as one of the successful basins in the country. Based on your experience, what makes it successful?

In response, Mr. Segule explained that Pangani River Basin is one of the 9 water basins in Tanzania. The Pangani Basin Water Board (PBWB) is the oldest in the country. It was established as a pilot in 1991 and all other basin authorities were derived from there. As to its success, Mr. Segule remarked that given the historical challenges of water use in the area, communities had established their own local institutions for water management, including allocation.

Since its establishment, the PBWB has been responsible for water resource assessment, allocation and conservation. Mr Segule said that to ensure appropriate implementation water users must be recognised and the governing laws and guidelines applied fairly and transparently. Proper water planning, allocation and use must also be followed. Importantly, collaborative planning approaches are recommended over working in silos. Water users need to be actively involved in the planning stages, otherwise ad hoc initiatives which do not work may be the end result.

Question 2: Directed to Ms. Temu

What are the criteria for a basin that performs well? And what are the criteria for a basin that is not performing very well? What is our vision for a better performing water system?

Ms. Temu emphasized the mandates bestowed upon the basins. Therefore, the best performing basin is the one that fulfils the following roles:

- Manages and conserves the basin resources
- Collects data relating to water management
- Puts in place appropriate follow-up/ monitoring system
- Protects strategic water sources, including setting boundaries and providing education to local communities
- Implements an effective water allocation system
- Employs an effective revenue collection mechanism

The role of development partners

Question 3: Directed to Ms. Makenya

What is your perspective on the roles that development partners have in natural resources management?

In response to the question, Ms. Makenya reiterated that the day's discussions have been revolving around the global challenge of deforestation. With 7 million hectares of forest disappearing every year, deforestation is an economically driven paradox.

The world needs to find a balance between the goods and services taken from forests and the food needs for the projected 10 billion people in 2050.

She felt that the main role of development partners is to provide evidence that will influence policy decision making. Better coordination of interventions by development partners (DPs) are also needed to avoid the duplication of efforts in the same areas. DPs should also strive for local ownership of initiatives. She emphasized that many times resources are invested, but once the donor funding ends, all implementation ceases.

Therefore, building ownership from the very beginning of the planning and design phases through to the implementation and transition phases is crucial. This is a challenge in relation to many donor-funded projects. Natural capital accounting is relatively new, but UNEP is trying to work with TFS to see how forest services can be monetized. GDP needs to be linked to natural capital, and development partners have a big role to play in capturing the contribution of ecosystems services to the economy.

Question 4: Directed to Mr. Kari Leppänen

Forestry Sector Innovation Systems, Embassy of Finland

The Embassy of Finland is one of the leading development partners on the environment. What is your perspective?

In response, Mr. Leppänen pointed out that the water cycle is a global issue; no one is independent. Referring to the role of the Finnish Prime Minister on climate change within the Nordic countries, he underscored the importance of engaging young people by providing hands-on skills from the planning to the implementation phase of forest projects. For example, he cited involvement of young people in planting 10 million seedlings in the field over a three-year period. He felt that Tanzania can tap into Finland's experience in climate change financing.

Mr. Kari Leppänen contributing from the floor



The role of the private sector

Question 5: Directed to Eng. Mpenbe

What role could be played by the private sector if it was involved at all stages with regards to forest policy? experience, what makes it successful?

In response, Eng. Ngwisa said that the private sector has the muscle to finance forest management activities provided that legal backing to support financing by the private sector is put in place.

Importantly, the Tanzanian government has a positive attitude on the participation of the private sector in the financing and implementation of forest and water resources management initiatives. Water is an economic good as it has a value. Having the perspective of financing water-related initiatives will give it a value.

Referring to Prof Nyange's presentation, his emphasis on technology to transform agriculture will bring in the private sector. In addition, he believed that Tanzania has huge potential to develop solar energy and decentralize the energy supply. Again, the private sector can join in to minimize energy prices.

The role of civil society

Question 6: Directed to Ms. Njahidi

Can you tell us about civil society's contribution to this process?

Referring to the work undertaken by MJUMITA and TFCG, Ms. Njahidi said that civil society has done much to restore degraded ecosystems in the last ten years. She said that the key to success is placement of the local stakeholders at the centre of planning, designing and implementation. Local communities should be made aware and have their capacity enhanced so that they are able to fully participate in decision making and implementation of projects, including the power to accept or reject specific approaches.

She said that the management of the forest will hardly be sustainable without tangible benefits to the surrounding communities. For example, TFCG is piloting a sustainable charcoal project in Kilosa where some benefits have trickled down to fund community projects. She stressed that avoiding charcoal extraction may not be realistic. Rather, communities should be empowered to undertake sustainable harvesting from their surrounding forests based on agreed procedures.

She also cited cases where CSOs are looked at as enemies of development. Therefore, there is a need for stakeholders from the government,

private sector and civil society to work in harmony. Coordination and partnership are important to understand what others are doing. Based on lessons learned, investment in community-based forest management (CBFM) has the potential to sustainably manage forest resources and provide community benefits. However, to ensure the sustainability of donor-funded initiatives, communities need to change their mindset from donor dependency to direct ownership of the initiatives.

D. Issues emerged from the discussion

Following the Q&A session with the panellists, a plenary discussion was facilitated. Important issues emerging from the discussion are summarized in the sections below.

Local communities need to be actively engaged by the private sector and the government to obtain a social licence for forest and water resources management projects

Planning for the management and utilization of forest and water resources should actively engage local communities. Transparently communicating the nature of a project and specifying opportunities for economic benefits or alternative income-generating activities will help to foster community buy-in and support for implementation, i.e., government and private sector initiatives need to obtain and maintain a social licence for initiatives that will impact on the lives and/or livelihoods of local people.

Ongoing discussions with community members are important for them to understand the process and be able to weigh up the associated costs and/or benefits of the proposed action. The publication of guidelines and regulations in user-friendly, popular language is recommended to increase awareness and understanding at the grassroots level.

Private sector involvement

The private sector is already involved in environmental projects in Tanzania, including forest plantations and development of alternative sources of energy. For example, the mining sector in Chunya District has been working collaboratively with private sector to rollout a new technology involving the use of coal dust to make charcoal.

Some participants stressed the need for the government and civil society to work collaboratively with the private sector to develop alternative sources of energy to address forest degradation, and for the government to put in place incentive mechanisms. Discussion also emphasized the importance of multi-stakeholder forums citing the experience in the Rufiji and Lake Victoria water basins, where successful working groups have been established inclusive of the private sector. The latter forum has been actively contributing towards water use efficiency.

Water management and the environment

The ongoing initiatives to develop the Stiegler's Gorge HEP project will help to increase availability of water for irrigation and affordable energy. However, ensuring the protection of the surrounding environment is essential for sustainability of the project and related activities.

Another participant cited the example of Egypt, which has very strong legal and policy frameworks for water, including water harvesting. Tanzania's new water policy should similarly consider and incorporate provisions for water harvesting.

Land management, agriculture and livestock keeping

To protect the environment, interventions in the agricultural sector need to focus on increasing farm efficiency and productivity through intensification rather than expanding the land under cultivation. Farmers should be educated and facilitated to boost productivity within small areas.

The government should specify the quantities of production needed and encourage private sectors to produce efficiently. Focusing on a multitude of individual subsistence farmers is time consuming and inefficient.

Traditional livestock keeping is very detrimental to the environment. Hence, sensitization of herders is important. They should be part of the GGP. Towards efficient land use and resource allocation, participants highlighted the need for land allocation for livestock keepers.



Field visits to Chenene Forest Reserve and Mzakwe Catchment Area

A. Remarks by government leaders at Chenene Forest Reserve

Hon. Mwanahamisi Munkunda

Bahi District Commissioner

The Hon. Munkunda welcomed visitors from the GGP. She related that the Tanzania Forest Service (TFS) and district, local and village authorities have collaborated from time to time to manage the Chenene Forest Reserve. However, more financial and human resources are inevitable to ensure the sustainable management of the forest which serves as a catchment area for water used by Dodoma City. She added that as a result of two-week campaign to close down illegal activities, there has been a substantial reduction in deforestation and degradation in the Reserve.

Hon. Asia Juma Abdallah

Kililo District Commissioner

The Hon. Abdallah highlighted that facilitated field visits of selected villages to other forest areas, such as Mufindi, Njombe and Kililo, are recommended to enable local people to learn from successful conservation and tree-planting activities. In this way, communities can see first-hand the tangible benefits from effective management of forests and catchments, and government authorities won't have to expend resources on evictions to prevent forest degradation.

Most importantly, the activities of governmental institutions and entities responsible for forests and water management should be harmonized to ensure effective management. Due to lack of coordinated activities, some authorities issue permits for charcoal extraction while other institutions within the same jurisdiction enforce bans.

Hon. Jamhuri William

Mufindi District Commissioner

The Hon. William remarked that tree planting has a substantial impact on the livelihoods of local people in Mufindi. Given the economic benefits, most local people in villages are inspired to plant trees. He added that tree planting and conservation initiatives in Mufindi District offer great lessons for villagers around the Chenene Forest Reserve to visit and learn from.

Hon. Juma Njwayo

Rufiji District Commissioner

The Hon. Juma Njwayo, Rufiji District Commissioner related his experience in managing forests and water catchments. He emphasized that strong collaboration (and coordinated efforts) between the responsible institutions including TFS, TAWA, Water Basin Boards, regional and local government authorities and villages help to minimize illegal activities and ensure the sustainable management of water and forest resources. To achieve the best results, he said it was essential to engage stakeholders at the grassroots level in all stages of forest management, including planning and implementation.



Hon. Mwanahamisi Munkunda explaining some of the initiatives undertaken to manage Chenene Forest Reserve.

Hon. Sophia Kizigo

Namtumbo District Commissioner

Namtumbo District Commissioner Hon. Sophia Kizigo shared her experience and insights to address forest and water management challenges in Dodoma. She said that Namtumbo District is well endowed with tree resources inclusive of natural forests and planted woodlots. As in Mufindi District, the majority of local people are inspired to voluntarily plant trees given the economic benefits. She said that, on average, households have 20 trees or more. Echoing the remarks of the Kilolo DC, she said that, instead of telling success stories, communities can be motivated through field visits to successful villages where they can acquire direct practical advice and hands-on skills to translate back to their local areas.

She added that the utilization of forest resources is closely linked with people's needs, and that most resource degradation is poverty-centered. Therefore, the management of water and forest catchments should carefully focus on addressing practical needs of the local people by diversifying alternative income-generating activities rather than focusing efforts mainly on eviction.

B. Key issues observed during visit to Chenene Forest Reserve

During the field visit inside Chenene FR, participants were able to directly observe the status of the forest and the following key issues on its management were discussed.

Encroachment on the reserve

Despite many efforts to stop people encroaching in the forest reserve, evidence of charcoal burning and livestock grazing in the forest were clearly seen, including charcoal bags as well as animal tracks and cow dung near a stream inside the reserve. Forest staff reported that the process of evicting people from the reserve was very expensive. One mission can cost between TZS 80 to 100 million. Therefore, if missions were undertaken on a monthly basis, the annual cost would exceed TZS 1 billion.

Sustainable practical solutions to encroachment

Participants highlighted the need for sustainable solutions to prevent/discourage encroachment and illegal activities in the reserve. Notably, interventions need to address the needs of local people. For example, a proportion of the funds invested to expel people from the reserve could be redirected to expand/ scale up the livelihood projects for neighbouring communities in the Chenene area.



A charcoal bag abandoned within the Reserve by illegal charcoal makers.

Through the creation of alternative income sources and employment, the government can reduce the activities that are contributing to deforestation and land degradation in the reserve. Field visits for local people to learn conservation approaches in other villages will be very important to change mindsets and behaviour towards management of the resources.

For example, bee-keeping activities are being promoted in surrounding villages. However, to date, the economic gains have not been substantial. Delegates advised that efforts to facilitate beekeeping should not only focus on the construction and distribution of beehives, which has been the common trend. In-depth research on honeybee species, their suitability for the area, and production capacity should also be carried out.

Based on experience from forest conservation in Botswana, tree labeling to include scientific names, age of trees and other unique factors has the potential to create a positive impact, encourage ecotourism and attract study visits by researchers and academics, thereby reducing degradation over time.

Monitoring and protection of the Chenene Forest Reserve

Participants said that a sufficient number of forest guards need to be recruited to monitor and enforce forest regulations,

and equipped with modern transport, security equipment and protective gear. At present, forest operations by guards mainly relied on bicycles and local bush knives without efficient protective gear. During the visit, one guard showed evidence of severe injuries he had sustained in protecting the reserve. In response, the District Commissioner for Bahi offered a motorcycle to the injured forest guard. Despite the hazardous conditions encountered by forest guards including long distances travelled to patrol the forest, none were covered by any insurance scheme for health, damage or injuries. In collaboration with other stakeholders, it was recommended that responsible authorities should devise mechanisms to better equip and safeguard forest staff.

Expanding the technology used in the management of the forest would assist to meet monitoring challenges in Chenene and overcome the shortage of human resources reported. For example, TFS provided training of trainers on the use of simple electronic gadgets such as drones to monitor forest areas and identify illegal activities. However, it was reported that these innovations were yet to be trialed in Chenene FR.

Entry and exit points to the forests should also be clearly marked to ensure easy visibility of the gazetted forest area. At present, warning signs were located every 32 kilometres, hence, more demarcation and warning signs are required to mark forest boundaries.

C. Key issues observed during field visit to Mzakwe Catchment

Following the field visit to Chenene FR, participants visited the Mzakwe catchment area. Equipped with large water storage tanks, the catchment together with Chenene Forest Reserve is the principal water source for Dodoma City. Key issues emerging during the visits are summarized below.



One of the water sanitation and storage facilities installed at the Mzakwe Catchment Area.

Coordination of water and forest management activities

To ensure the sustainability of Chenene FR and Mzakwe Catchment, which was referred to as the life of Dodoma, integrated and holistic management approaches are required, that are inclusive of grassroots communities and aligned with proper land use planning and management in the area.

To achieve these objectives, coordination will need to be strengthened between the ministries responsible for forest and water sector and their agencies as well as local government authorities. The collaboration between the central and local government, forest authorities and water basins boards can be facilitated through regular meetings and joint steering committee to restore the endangered area.

A regular supply of clean water is the first priority for the City. To ensure its sustainability, management strategies for the catchment must take account of population growth projections for Dodoma, as large increases are expected for the capital. Forest management also needs to be prioritized to safeguard the flow and quality of supply. Much emphasis was also placed upon water harvesting.

Delegates recommended that the government should embark on water harvesting in the area. Roads and housing should be designed to enable water harvesting.

Engagement of local communities

Participants further emphasized that responsible authorities build the capacity of grassroot communities and empowerment through creation of alternative income-generating activities (IGAs). The legal and policy frameworks as well as guidance issued by the forest and water sectors should be available in easy to understand language.

If done successfully, government spending on regular forest patrols or expulsion missions can be reduced. In certain areas, the relocation of villages whose activities are negatively impacting on the water sources may need to be considered.

D. Plenary discussion following the field visits

Plenary discussion mainly focused on what should and could be done at the grassroots level to enhance forest and water management. The following resolutions were proposed:

- Undertake an in-depth study to identify practical solutions for restoring the health of the ecosystem health of Mzakwe catchment through tree planting

- For recovery of Mzakwe catchment, allow natural regeneration of native species in the area instead of introducing new species
- Restrict human activities and planting of imported trees species
- Finalize and implement a Payment for Ecosystem Services (PES) mechanism to address challenges on resource management facing local communities. As part of PES implementation, responsible authorities should engage with the Tanzania Tourism Board to see how a portion of the earnings from tourism, which essentially benefit from forest conservation will be injected back to forest management.
- Ensure the inclusion of grassroots communities at all stages of forest and water management to help build rapport and a sense of ownership of forest and water-related initiatives. Sensitizing local people will be an essential part of community engagement.
- Strengthen the coordination mechanisms between government agencies, the private sector, non-state actors and LGAs, for example, through collaborative steering committees, to ensure effective and transparent management of forest and water resources
- Organize a forum that brings together stakeholders at all levels to discuss and deliberate issues in the water, forest and related sectors. Participants proposed that the Vice President's Office would be best placed to facilitate establishment of the forum and coordinate implementation of the issues identified during field studies
- Strengthen collaboration among stakeholders of the GGP to ensure that resolutions made on key issues are put into practice and every participant becomes an agent of change
- Improve collaboration between the Tanzania Wildlife Management Authority (TAWA) and the Tanzania Forest Service Agency (TFS) to address the issues of wildlife in forest reserves and catchment areas. TFS should not bear conservation problem alone
- In anticipation of earnings from the development of the Rufiji hydroelectricity project, the Ministry of Energy and the ministries responsible for forest and water management should hold formal discussions to agree on how economic gains from the project should be equitably distributed given that the management activities of the forest and water sectors are central to the operation and sustainability of the project.



Closing remarks

Hon. Mwanahamisi Munkunda

Bahi District Commissioner

Given the important issues raised during the conference and the resolutions made following a visit in Chenene Forest Reserve and Mzakwe Catchment area, Hon. Munkunda proposed that the 2020 GGP conference be convened in Dodoma to follow-up on the outcomes of the resolutions from the current meeting. She requested that officials attending the 2019 GGP conference incorporate the recommendations related to conservation of forest and water resources in Chenene FR and the Mzakwe Catchment area in their respective budgets. In closing, she thanked her fellow government leaders and all participants for their contribution to the success of the GGP conference.

Appendix A: Programme

	TIME	DESCRIPTION
DAY 01	08.00 – 08.30	Registration
	08.30 – 08.35	Introductory remarks by Prof. Joseph Semboja, Chief Executive Officer, UONGOZI Institute
Moderator: Prof. Andrew Temu	8.35 – 08.40	Welcoming remarks by Hon. Dr. Binilith Mahenge, Regional Commissioner, Dodoma Region
	08.40 – 08.50	Remarks by Hon. George Simbachawene (MP), Minister of State in the Vice President's Office for Union Affairs and Environment
	08.50 – 09.00	Welcoming the Guest of Honour: Hon. George Mkuchika (MP), Minister of State, President's Office—Public Service Management and Good Governance
	09.00 – 09.40	Opening address by H.E. Samia Suluhu Hassan, Vice President of the United Republic of Tanzania and Patron of the GGP
	09.40 – 10.20	Group Photo and Tea Break
	10.20 – 11.00	Presentation 1: Policy and institutional frameworks for managing forestry and water resources in Tanzania: The missing links <ol style="list-style-type: none">Ms. Pamela Temu, Principal Hydrogeologist, Ministry of Water, TanzaniaDr. Ezekiel E. Mwakalukwa, Director of Forestry and Beekeeping, Ministry of Natural Resources & Tourism
	11.00 – 11.40	Presentation 2: The basic principles for managing forestry and water resources in Tanzania: Opportunities

	TIME	DESCRIPTION
DAY 01	11.00 – 11.40	and challenges 1. Ms. Bettie Luwuge, Communications Officer, Tanzania Forest Conservation Group (TFCG) 2. Mr. Herbert Kasilila, Shahidi wa Maji
		Moderator: Prof. Andrew Temu
	11.40 – 12.10	Discussion
	12.10 – 12.30	Presentation 3: Good practice, experiences and lessons learnt in managing forest and water resource in Tanzania 1. Dr. David Nyange
	12.30 – 13.00	Discussion
	13.00 – 14.00	Lunch Break
	14.00 – 15.00	Panel discussion: 1. Ms. Pamela Temu, Principal Hydrogeologist, Ministry of Water, Tanzania 2. Ms. Clara Makenya, Executive Director, United Nations Environment Programme, Tanzania 3. Ms. Rahima Njaidi, Executive Director, MJUMITA 4. Mr. Segule, Basin Water Officer, Pangani Basin Water Board 5. Eng. Ngwisa Mpembe, Managing Director, Lahmeyer Consulting Engineers Ltd.
	15.00 – 16.00	Discussion
	16.00 – 16.30	Summary of key messages: Prof. Andrew Temu
	16.30 – 16.45	Field visit arrangement: Dr. Felician Kilahama, Field Coordinator
	6.45 – 17.00	End of day 1
		DAY 02
	07:30 – 08:00	Arrival and registration at the National Bureau of Statistics premises
08:00 – 09:00	Travelling to the Chenene Forest Reserve	

	TIME	DESCRIPTION
DAY 02	09:00 – 10:15	- Brief history of the village and the forest activities - Challenges facing Chenene Forest Reserve and the existing measures - Visit to Chenene Forest Reserve as case study on the effects of encroachment - Discussion
		Moderator: Prof. Andrew Temu
	10:15 – 10:45	Transit to the Mzakwe Catchment
	10:45 – 12:00	- Brief history of the Mzakwe Catchment - Initiatives for ensuring sustainability of the Catchment - Visit to the Catchment as a case study on initiatives for ensuring sustainability of the Catchment - Discussion
	12:00 – 12:30	Key Summary Mr. Godgift Swai, Sokoine University of Agriculture (SUA)
	12:30 – 12.40	Closing
	12:40	Lunch

Appendix B: List of Participants

1	H.E .Samia Suluhu Hassan	Vice President of the United Republic of Tanzania
2	Hon. George Mkuchika (MP)	Minister of State, President's Office – Public Service Management and Good Governance
3	Hon. George Simbachawene (MP)	Minister of State in the Vice President's Office (Union Affairs and Environment)
4	Hon. Binilith Mahenge	Regional Commissioner – Dodoma
5	Mr. Albert Chalamila	President's Office – Regional Admin and Local Government
6	Mr. Ally Ngweja	Regional Commissioner's Office – Iringa
7	Mr. Aloyce Kwezi	Kilolo District
8	Prof. Andrew Temu	Diligent Consultant
9	Ms. Annasia Kwayu	District Commissioner's Office – Dodoma
10	Eng. Arafa Maggidi	Pangani Basin Water Board
11	Mr. Archie Malale	Katavi Regional Secretariat
12	Hon. Asia Abdallah	District Commissioner – Kilolo
13	Mr. Baraka Thomas	Lawyer's Environmental Action Team
14	Mr. Ben Sulus	SHIVIMITA
15	Ms. Bettie Luwue	Tanzania Forest Conservation Group
16	Mr. Carlos Kinyoa	Umojawa Wavunaji Mitinawenye Viwandavya Mitsu (UWASA) Sao Hill
17	Mr. Casian Siang	Tanzania Natural Resource Forum
18	Mr. Castory Makeula	Rungwe District Council
19	Ms. Catherine Kongola	Ministry of Water
20	Mr. Charles Kidua	Singida Regional Secretary
21	Ms. Christina Mndeme	Regional Commissioner – Songea
22	Ms. Clara Makenya	UNEP
23	Mr. Cosmas Ngangaji	President's Office – Public Service Management & Good Governance
24	Prof. David Nyange	USAID Aspires Project
25	Mr. Edmund Mkwama	Regional Commissioner's Office – Mbeya
26	Mr. Elias Msuya	Mwananchi Communications Ltd.
27	Ms. Elice Engelbert	Lake Nyasa Water Basin
28	Ms. Elizabeth Mrema	MLHSD
29	Mr. Emmanuel Nahozya	Ministry of Water
30	Dr. Ezekiel Mwakalukwa	Ministry of Natural Resources and Tourism
31	Dr. Felician Kilahama	African Forestry
32	Mr. Francis Sabuni	Eastern Arc Mountains Conservation Endowment Fund (EAMCEF)
33	Mr. Gabah Bugeraha	Lake Rukwa Basin Water Board
34	Mr. Gabriel Kinyaiya	Ministry of Water
35	Mr. Gerald Kitabu	Environmental Journalists Association of Tanzania
36	Mr. Gerald Sakaya	Southern Agricultural Growth Corridor of Tanzania (SAGCOT)
37	Ms. Gift Ally	District Commissioner's Office - Dodoma
38	Mr. Godgift Swai	Sokoine University of Agriculture
39	Ms. Grace Chitanda	Lake Rukwa Basin Water Board
40	Dr. Henry Njovu	Wildlife Conservation Society Tanzania
41	Eng. Herbert Kashilila	Shahidi wa Maji
42	Mr. Idris Msuya	Rufiji Basin Water Board

Appendix B: List of Participants

43	Mr. Ildefonce Ndemela	Ministry of Land, Housing and Human Settlements
44	Mr. Isaya Matata	Mundemu Division – Bahi District
45	Hon. Jamhuri William	District Commissioner – Mufindi
46	Dr. Joel Nobert	University of Dar es Salaam
47	Mr. John Lyakurwa	National Bureau of Statistics
48	Mr. Joram Wimmo	ActionAid Tanzania
49	Mr. Joseph Malongo	Permanent Secretary – Vice President's Office
50	Prof. Joseph Semboja	UONGOZI Institute
51	Hon. Juma Homera	Regional Commissioner – Katavi
52	Hon. Juma Njwayo	District Commissioner – Rufiji
53	Mr. Kari Leppänen	Embassy of Finland
54	Mr. Kastory Timbula	Tanzania Tree Growers Association
55	Dr. Kenneth Masuki	Global Water Partnership – Tanzania
56	Mr. Kikolo Mwakasungula	African Forestry
57	Mr. Leif Kindberg	Water Resources Integration Development Initiative
58	Mr. Lucas Kambelenje	Iringa
59	Ms. Lucy Lyatuu	Habari Leo – Tanzania Standard Newspaper
60	Dr. Madaka Tumbo	Water Institute
61	Ms. Magdalena Adwell	President's Office
62	Ms. Maria Hollela	Dodoma Urban Water Supply & Sanitation Authority (DUWASA)
63	Ms. Martha Kabuzya	Association of Tanzania Water Suppliers
64	Mr. Martin Ntemo	Ministry of Works, Transport & Communication
65	Mr. Mathew Kiondo	Tanzania Forest Services Agency
66	Mr. Mauri Starckman	UONGOZI Institute/HAUS
67	Mr. Michael Mkunya	Bahi Village
68	Ms. Monica Dedu	-
69	Mr. Mussa Ngokwa	-
70	Hon. Mwanahamisi Munkunda	District Commissioner – Bahi
71	Dr. Nancy Pima	Tanzania Forestry Research Institute
72	Ms. Neema Lugangira	Southern Agricultural Growth Corridor of Tanzania (SAGCOT)
73	Mr. Nehemia James	Ruvuma Regional Office
74	Eng. Ngwisa Mpembe	Lahmeyer Consulting Engineers Ltd.
75	Mr. Novat Mfalomagoha	Ruvuma Regional Commissioner's Office
76	Mr. Oscar Kaduma	Southern Highland Industries Association (SAFIA)
77	Ms. Pamela Temu	Ministry of Water
78	Ms. Rahima Njaidi	MJUMITA
79	Mr. Reginaldo Luberege	-
80	Dr. Revocatus Mushumbusi	TAFORI
81	Mr. Richard Shaba	German Government Liaison Office - Dodoma
82	Ms. Salome Kisenge	Envirocare
83	Mr. Samy David	ITV & Radio One
84	Mr. Sangito Sumari	Private Forestry Programme

Appendix B: List of Participants

85	Mr. Segule Segule	Pangani Basin Water Board
86	Ms. Sophia Kizigo	President's Office – Regional Administration and Local Government
87	Ms. Tumaini Mwamyalla	Ministry of Water
88	Dr. Ubaldus Tumnini	College of Business Education
89	Mr. Vedastus Msungu	IPP Media
90	Mr. Vicent Kalungwana	Kilolo District
91	Ms. Vicky Mubofu	Wildlife Conservation Society Tanzania
92	Mr. Yusufu Kamote	Tanzania Electric Supply Company Ltd. (TANESCO)
93	Mr. Zubery Mwachulla	Mazingira Network Tanzania (MANET)

