FORESTRY SOCIETY OF KENYA

PROCEEDINGS OF THE

FORESTRY SOCIETY OF KENYA

NATIONAL SCIENTIFIC CONFERENCE 2025

23RD - 25TH SEPTEMBER 2025

AT LESOVRAIN SUITES HOTEL KISUMU, KENYA

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2025

Acknowledgement

We appreciate the Ministry of Environment, Forestry and Climate Change, and the County Government of Kisumu for gracing the conference and for their active deliberations on policy issues affecting the forestry sector in Kenya.

Our sincere gratitude goes to the Chief Conservator of Forests (CCF), Director General Kenya Forestry Research Institute (KEFRI), Director General National Environment Management Authority (NEMA), and Director General, Kenya Wildlife Service for their financial and logistical support towards facilitating their staff to participate in the conference.

Forestry Society Kenya (FSK) acknowledges the financial support from Nature Kenya,Forest Stewardship Council (FSC) and JICA which made the conference a success.

The technical guidance from FSK leadership and logistical support from FSK Secretariat, that played a critical role in making the conference a success is highly appreciated.

The active participation of FSK members through presentations, deliberations, exhibitions and policy discussions which formed the backbone of the conference is deeply appreciated.

Cover Caption:

Photo of the participants during group photo and conference session

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EXECUTIVE SUMMARY

The Forestry Society of Kenya (FSK) convened it's 2025 National Scientific Conference under the theme *"Forests for People, Planet, and Prosperity: Catalyzing Innovation and Resilience in Kenya's Forestry Sector."* The conference brought together about 200 participants, including forestry professionals, researchers, policymakers, County and National government representatives, Community Forest Associations, private sector actors, development partners, and youth representatives. The conference was organized around five sub-themes: (i) Policy, Governance and Indigenous Knowledge in Sustainable Forest Management; (ii) Restoring Landscapes and Reviving Ecosystems through Nature-Based Solutions; (iii) Smart Forestry and Digital Innovations; (iv) Forest-Based Economy and Green Growth; and (v) Forests in a Changing Kenya. The deliberations focused on positioning forests as strategic national assets that contribute to climate resilience, economic growth, ecosystem stability, and social well-being. The conference reinforced the importance of science, innovation, and inclusive governance in achieving Kenya's forest restoration and sustainability commitments.

Participants emphasized the need to strengthen forest governance frameworks and institutional coordination. Integrating Natural Capital Accounting (NCA) and advancing the System of Environmental-Economic Accounting (SEEA) were identified as priorities to ensure forests are fully recognized in national economic planning. Transparent benefit-sharing mechanisms, certification systems, and community inclusion were highlighted as essential pillars of sustainable governance.

Discussions underscored the need to move beyond tree planting targets toward survival, productivity, and ecosystem functionality. Evidence-based species-site matching, improved genetic materials, invasive species management, and dryland forestry innovations were identified as critical towards achieving restoration outcomes and long-term resilience. The conference showcased digital monitoring systems, timber traceability tools, and data-driven decision-support platforms. Strengthening Monitoring, Reporting, and Verification (MRV) systems and leveraging digital technologies were recognized as vital for enhancing transparency, accountability, and performance tracking in the forestry sector. Moreover, forests were positioned as drivers of green growth through ecosystem services valuation, nature-based solutions, commercial forestry development, carbon markets, and sustainable enterprise models.

Adaptive forest management strategies including research-led planning and implementation and stakeholder collaboration were discussed in response to climate variability, land-use dynamics, and socio-economic transitions. The conference reaffirmed that sustainable forest management in Kenya must be grounded in research, guided by strong governance, enabled by technology, and driven by inclusive partnerships to effectively contribute to Kenya's sustainable development agenda. Achieving national commitments including the 15 billion Tree Growing Initiative and the 30% tree cover target will require strengthened policy linkages, enhanced data systems, institutional collaboration, and sustained investment in restoration and green growth.

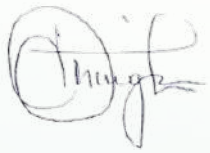
FOREWARD

The Forestry Society of Kenya (FSK) continues to play a central role in advancing professional forestry practice, policy dialogue, and evidence-based decision-making in Kenya's forestry and natural resource sector. In recognition of the increasing role of forests in delivering ecological, social, and economic benefits, FSK convened the 2025 National Scientific Conference from 23rd to 25th September 2025 in Kisumu City under the theme; *"Forests for People, Planet, and Prosperity: Catalyzing Innovation and Resilience in Kenya's Forestry Sector."*

The conference was held at a critical moment when Kenya is implementing ambitious national commitments towards forest landscape restoration, climate change mitigation, biodiversity conservation, and green economic growth. It provided a unique platform for forestry professionals, researchers, policymakers, community representatives, private sector actors, and development partners to engage in informed dialogue on the current state and future direction of the forestry sector in Kenya. Through scientific presentations, exhibitions, and panel discussions, participants examined both long-standing and emerging challenges affecting forests and tree resources across diverse landscapes in Kenya.

Key deliberations during the conference highlighted the importance of strengthening forest governance frameworks and scaling nature-based solutions for landscape restoration and climate resilience. The conference further underscored the growing relevance of digital tools, smart forestry technologies, and data-driven approaches in enhancing forest monitoring, planning, and accountability. Discussions on forest-based enterprises, carbon markets, ecosystem services, and green jobs demonstrated the potential of forests to contribute meaningfully to livelihoods and national economic transformation.

The Forestry Society of Kenya reaffirms its commitment to fostering professional excellence, mentorship, knowledge exchange, and advocacy for sustainable and ethical forestry practice. By convening this scientific conference, FSK seeks to strengthen collaboration among stakeholders and support the translation of science and innovation into practical solutions that enhance forest resilience and deliver tangible benefits to communities and the nation at large.



Mr. Emilio Mugo
Patron, Forestry Society of Kenya

Ms. Charity Muthoni
President, Forestry Society of Kenya

List of Abbreviations and Acronyms

CCF	Chief Conservator of Forests
CECM	County Executive Committee Member
CFA	Community Forest Association
CS	Cabinet Secretary
FAO	Food and Agriculture Organization of the United Nations
FCMA	Forest Conservation and Management Act
FLR	Forests Landscape Restoration
FSK	Forestry Society of Kenya
Gok	Government of Kenya
IGAs	Income Generating Activities
JICA	Japan International Cooperation Agency
KEFRI	Kenya Forestry Research Institute
KWS	Kenya Wildlife Service
KFS	Kenya Forest Service
DG	Director General
MECCF	Ministry of Environment Climate Change and Forestry
NEMA	National Environment Management Authority
NFP	National Forest Programme
NGOs	Non-Governmental Organisations
NBS	Nature Base Solution
NTFPs	Non-Timber Forest Products
PELIS	Plantation Establishment and Livelihood Improvement Scheme
PFM	Participatory Forest Management
PFMPs	Participatory Forestry Management Plans
PPPs	Public-Private Partnerships
PS	Permanent Secretary
REDD+	Reducing Emissions from Deforestation and Forest Degradation
TELIS	Tree Establishment and Livelihood Improvement Scheme
WWF- Kenya	World Wildlife Fund-Kenya

Table Contents

1.0 INTRODUCTION

MR. TITUS KORIR

MR. BENJAMIN WAMUGUNDA

MS. JUDY OLUOCH

MR. GEORGE TARUS

PROF. FREDRICK OWINO

1.1. Introduction to Forestry Society of Kenya

Forestry Society of Kenya (FSK) is the sole professional body of foresters in Kenya. Registered in 1979, the Society is dedicated to advising its members, the government and the larger public on professional forestry practices and standards, and plays a major role in informing and shaping policy discourse in the forestry sector in Kenya. FSK is committed to promoting sustainable and ethical forestry practices in Kenya, and championing mentorship of young forestry professionals. The society comprises of a pool of learned and experienced forestry professionals, researchers, educators and nature enthusiasts who are passionate about sustainable forest management, and organizes capacity building, knowledge sharing and advocacy initiatives annually.

Forests are central to Kenya's sustainable development, climate resilience, and socio-economic development. They serve as vital ecological buffers, water towers, carbon sinks, and biodiversity reservoirs. Forests also play a crucial role in supporting rural economies and indigenous cultures, and are integral to Kenya's commitment to global environmental goals such as the Paris Agreement, the Kunming-Montreal Global Biodiversity Framework, and the UN Decade on Ecosystem Restoration. However, Kenya's forests face mounting threats from deforestation and degradation driven by complex and interlinked factors. These include unsustainable agricultural expansion, encroachment of forest areas for settlement, illegal logging, over-reliance on wood fuel, infrastructure development, weak enforcement of land-use regulations, and competing land tenure claims.

The situation is particularly dire in Arid and Semi-Arid Lands (ASALs) which constitute over 80% of the country's landmass. These areas are increasingly vulnerable to desertification, loss of vegetative cover and recurrent droughts, yet they remain under-researched and underutilized in national forest restoration efforts. Kenya has made significant progress towards translating policy into practice through initiatives such as the 15 billion Tree Growing Initiative, and within the National Landscape and Ecosystem Restoration Strategy 2023-2032. However, several challenges persist including limited access to forest-related data, insufficient investment in research and innovation, weak uptake of digital tools, and fragmented approaches to community engagement and benefit-sharing.

Globally, forest landscapes are being reimagined as frontiers of green growth, climate adaptation, and nature-based solutions. Innovations in drone technology, remote sensing, artificial intelligence, and early warning systems are transforming how forest resources are mapped, monitored, and managed. At the same time, the rising significance of forest ecosystem services such as carbon storage, water regulation, and cultural heritage has placed forests at the heart of emerging carbon markets, biodiversity credits, and green finance mechanisms. It is against this backdrop that FSK seeks to advocate for sustainable forest conservation and management in Kenya, for enhanced ecological and socio-economic benefits.

1.2. Background and Context to Forestry Society of Kenya Scientific Conference 2025

The 2025 National FSK Scientific Conference was held from 23rd to 25th September 2025 at Le Sovereign Suites in Kisumu City, Kenya. The conference aimed to provide a multi-stakeholder platform for advancing knowledge and innovations, and deliberating on policy actions that strengthen the role of forests in promoting people-centered development, environmental sustainability and economic resilience in Kenya. The conference brought together scientists, researchers, community leaders, policymakers, development partners, youth, and private sector actors to

deliberate on evidence-based solutions, share cutting-edge research, and explore practical innovations that can shape the future of forestry in a rapidly changing world.

The conference further aimed to elevate the role of science, technology, and traditional knowledge in solving pressing forestry challenges ranging from landscape degradation and biodiversity loss to weak forest governance and underdeveloped forest value chains. Moreover, it highlighted the critical role of urban forestry, dryland restoration, youth leadership, and green investments in unlocking the full potential of Kenya's forest resources.

The conference was attended by about 200 participants drawn from FSK membership, forest growers, Community Forest Associations, non-governmental organizations, civil society organizations, private sector alliance, county governments, national government organizations, national and international forestry research institutions, universities and development partners (Appendix III). The scientific conference featured technical paper presentations, exhibitions, expert panels, youth forums, and policy roundtable discussions.

1.2.1 Objectives of the Scientific Conference

The overall objective of the conference was to provide a multi-stakeholder platform for advancing knowledge, innovations, and policy actions that strengthen the role of forests in promoting people-centered development, environmental sustainability and economic resilience in Kenya.

The specific objectives of the conference were:

1. To showcase practical solutions and emerging research on forest and landscape restoration that enhance biodiversity, climate resilience, and sustainable livelihoods through nature-based approaches.
2. To explore and promote the application of digital technologies and innovations such as remote sensing, data-driven forest monitoring, and smart forestry tools for improved forest governance and extension services.
3. To evaluate the contribution of Kenya's forest sector to the green economy by exploring opportunities in carbon markets, forest-based enterprises, ecotourism, and sustainable forest product value chains.
4. To foster dialogue on inclusive forest governance by addressing legal frameworks, participatory management models, integration of indigenous knowledge, and professional development in forestry.
5. To examine and deliberate on the emerging challenges and opportunities for forestry in a rapidly changing Kenya, including urbanization, youth engagement, and adaptive forest management in the face of climate change.

1.2.2 The Key Outputs from the Scientific Conference

The key outputs of the scientific conference ware:

1. Conference proceedings outlining technical papers, innovations, and case studies presented under each sub-theme.
2. Policy briefs on national and County-level forestry policies, regulations, and strategies.
3. A youth dialogue report highlighting role and strategies for youth participation in forestry development

2.0 OPENING SESSION OF THE SCIENTIFIC CONFERENCE

MR. EMILIO MUGO

MS. FRANCISCAH WAMBOI


DR. GEORGE MUTHIKE


MS. MICHIKO NISHIKAWA

MR. NOOR HUSSEIN

2.1. Welcoming Remarks

Moderator: Mr. Samson Osee-FSK National Secretary

The 2025 FSK conference started with opening prayers from Mrs. Charity Munyasya followed by welcoming remarks from Chair of FSK Nyanza Chapter, FSK secretariat, the FSK National Chairman, representatives from JICA, FSC, Nature Kenya, WWF, KEFRI, KFS, NEMA, and KWS. The FSK patron officially welcomed the members and invited representative of the Governor of Kisumu County to officially open the conference.

2.1.1 Official Opening by the Governor; County Government of Kisumu

The County Government of Kisumu Governor's representative, CECM Environment, Water and Climate Change Kisumu County-Madam Judith Oluoch read the governor's speech as outline below:

The Chairperson and Members of the Kenya Forestry Society,

Distinguished Scientists, Researchers, and Academics,

Representatives from Government Ministries and Agencies,

Our Valued Development Partners,

Members of the Private Sector and Civil Society,

Distinguished Guests, Ladies and Gentlemen,

On behalf of the people and the County Government of Kisumu, it is my distinct honor to welcome you to Kisumu City. A City of passion! I want to thank the Kenya Forestry Society leadership and organizers of the conference for picking Kisumu for this year's event. Welcome to Kisumu.

I am indeed very honored for the invitation to come and share with you some thoughts at this very significant National Scientific Conference. The theme you have chosen—"Forests for People, Planet and Prosperity: Catalyzing Innovation and Resilience in Kenya's Forestry Sector"—is not merely a topic for academic discussion; it is an urgent call to action that resonates deeply across our nation and right here in our county.

There is no doubt that forests are central to Kenya's very soul and our journey towards sustainable development. They are the lungs of our nation, our vital water towers, our most effective carbon sinks, and precious reservoirs of biodiversity. Beyond this ecological significance, our forests are the bedrock of rural economies, the cradle of indigenous cultures, and the tangible proof of Kenya's commitment to global environmental goals like the Paris Agreement and the UN Decade on Ecosystem Restoration. They are, in essence, our green inheritance.

But we are gathered here today not just to celebrate this inheritance, but to confront the uncomfortable truth of the threats it faces. Across Kenya, our forests are receding under the immense pressure of deforestation and degradation. These are not random acts, but the consequences of complex and interlinked factors: rapid urbanization, unsustainable agricultural expansion, illegal logging, and an over-reliance on wood fuel. This precarious situation is especially critical in our

Arid and Semi-Arid Lands (ASALs), which cover over 80% of our country. These vast landscapes are increasingly vulnerable to desertification, yet they remain tragically under-researched in our national restoration efforts.

Here in Kisumu, we face our own stark reality. With a forest cover estimated to be as low as 0.44%, we are far below the national ambition of over 10%. This is not a statistic to be ashamed of, but a challenge that we must confront with honesty and resolve. It is our local call to action, demanding innovative solutions tailored to our unique landscape.

While we commend the national government for bold initiatives like the 15 Billion Tree Growing Programme, we must also acknowledge that gaps persist in translating good policy into effective practice. Limited access to scientific data, insufficient investment in research, and fragmented approaches to community engagement continue to hinder our progress.

This is why your presence here is so vital. This conference must serve as a multi-stakeholder platform to bridge these gaps. It is our collective responsibility to advance the knowledge, innovations, and policy actions that will truly strengthen the role of forests in our society. Over these conference days, I urge you to focus your expertise on several critical areas.

First, let this be a marketplace of practical solutions. We need to showcase emerging research on landscape restoration and nature-based approaches that simultaneously enhance biodiversity, build climate resilience, and create sustainable livelihoods for our people.

Second, we must transition our forestry from an analogue past to a digital future. Let us explore and promote the application of digital technologies—from remote sensing and data-driven monitoring to smart forestry tools—to revolutionize our forest governance and extension services. Third, our forests are not just ecological assets; they are economic powerhouses. I challenge you to evaluate the contribution of Kenya's forest sector to the green economy. We must unlock the immense opportunities in carbon markets, forest-based enterprises, ecotourism, and sustainable value chains, ensuring that conservation pays.

Finally, the era of top-down conservation is over. We must foster a robust dialogue on inclusive forest governance. This means strengthening legal frameworks, championing participatory management models that empower local communities, integrating invaluable indigenous knowledge, and investing in the professional development of our forestry experts.

As you deliberate, I also ask you to look to the horizon and examine the emerging challenges and opportunities for forestry in a rapidly changing Kenya. How do we manage the pressures of urbanization? How do we harness the energy and innovation of our youth? And how do we pioneer adaptive forest management in the undeniable face of climate change?

Let us leave this conference not with more papers, but with clear, actionable strategies. Let us forge partnerships that turn research into reality and policy into practice.

I wish you fruitful deliberations.

Thank you.

2.1.2 Remarks by Key Institutions

Remark from the Forest Society of Kenya Patron – Mr. Emilio Mugo

The Forestry Society of Kenya Patron, Mr. Emilio Mugo, saluted the guests and conference members. He stated that it was an honor for him to interact with distinguished forestry professionalss. He noted that the Forestry Society of Kenya has evolved to a vibrant professional society over the years, and observed that the growth of FSK has redefined its identity, strengthened professionalism amongst forestry professionals, and reclaimed the voices of foresters. He emphasized that forestry governance is increasingly being recognized locally, globally and regionally as a critical concern, and that at the County level, Governors are taking forestry matters seriously, signaling a growing political acknowledgment of the importance of the sector.

He expressed sincere gratitude to those who played a role in revitalizing the Kenya Forestry Society, noting that many of them had not been in mainstream government. He acknowledged that support from UNDP Kenya had been instrumental, especially in funding early conferences that had helped rebuild momentum in the development of FSK. He mentioned that young professionals had stepped forward with energy and commitment, helping to breathe new life into the Society.

He said he was particularly encouraged by the increasing participation of younger professionals and stressed that intergenerational inclusion was essential to sustain and elevate the standards of the Society. He urged the incoming FSK leadership to elevate FSK standards and raise the bar higher. He noted that the appointment of Professor Fredrick Owino as patron had been a strategic decision that had enhanced the Society's image and credibility, and emphasized the need to maintain the standards.

In conclusion, he urged everyone to remain passionate, dedicated, and principled towards meeting the society's mission. He further called on members to continue strengthening the Forestry Society of Kenya by upholding integrity, and defending their professional space, emphasizing that the Country's forests and future generations depended on it. He concluded by thanking members and encouraged them to give back to the profession that had shaped them.

Remark from the Kenya Forest Service Board Chairman - Mr. Titus Korir.

Mr. Korir, the Kenya Forest Service board chairman thanked the FSK Executive committee for inviting him to the conference. He expressed his excitement to listen to presentations by forestry professionals, noting that he also considered himself a student of forestry as he has a strong interest in forestry. He informed members that he was attending the conference in his capacity as Chairman of the Kenya Forest Service Board, with a deep interest in understanding the insights and recommendations presented, as these would guide efforts to implement the President's directive to plant 15 billion trees by 2032.

He acknowledged that there were many challenges affecting the forestry sector in Kenya, but affirmed the determination amongst forestry professionals to overcome them. He stated that he was strongly advocating for the involvement of all stakeholders in the management of forests within the KFS Board. He emphasized that without engaging experts and stakeholders in the sector, success would not be possible, and that the era of assuming forests could be managed in isolation is over.

He mentioned that he was encouraged to see both young and seasoned forestry professionals make technical presentations and assured them that the KFS Board was open to consultations and provision of advisory services. He further observed that recent discussions in the media on the developments in the forestry sector demonstrated the rising level of public awareness on forestry issues and emphasized the importance of remaining open to such input.

He expressed confidence that valuable insights would be gained from the conference presentations, and noted that several representatives from the Kenya Forest Service were present to capture and relay recommendations made to the KFS Board. He expressed his intention to listen attentively and assured participants that the KFS Board was ready to take forward their ideas to improve forest management in the country. He concluded by wishing all members productive deliberations throughout the conference.

Remarks from the Outgoing FSK Chairman - Mr. Benjamin Wamugunda

Mr. Wamugunda observed that in earlier years, forestry was associated with bright and happy faces, but over time, the sector has faced challenges from land pressures and elite capture byindividuals who believed they understood forestry better than trained professionals. He called on members to remain firm in protecting the forestry profession. He state that he was delighted to see FSK members from all parts of the country gathered in Kisumu to advance the forestry agenda in Kenya, and noted that he had observed the growth of FSK from its earlier focus on forestry to a much broader perspective encompassing land, people, trees, the globe, and the interconnected systems that sustain life. He informed members that while there are ongoing debates on issues such as timbers harvesting and the management of invasive species such as *Prosopis juliflora* (Mathenge), there was need to approach these matters thoughtfully and responsibly, recognizing their ecological and socio-economic dimensions. He wished members fruitful deliberations.

Remarks from Kenya Forestry Research Institute - Dr. George Muthike

Dr. George Muthike saluted all members and stated that it was an honor for him to address them on behalf of the Director General Kenya Forestry Research Institute (KEFRI), and expressed appreciation for the opportunity to participate in the 2025 FSK scientific conference. He noted that KEFRI was proud to stand as a national institution committed to advancing sustainable forest management through research and innovation, and described the theme of the conference, "*Forests for People, Planet and Prosperity*," as timely and transformative. He challenged participants to view forests not merely as timber resources or carbon sinks, but as dynamic systems that sustain livelihoods, regulate climate, support economic development, and strengthen national resilience.

He emphasized that achieving this vision required strong scientific grounding and stated that sustainable forest management must be evidence-based, adaptive, and responsive to emerging challenges such as climate change, land degradation, pests and diseases, and increasing demand for forest products. He affirmed that research plays a central role in ensuring sustainability by informing species selection and species–site matching, improving seed quality through breeding programs, enhancing productivity through clonal forestry technologies, and strengthening silvicultural practices.

He added that research also guide restoration planning, nursery certification, pest and disease surveillance, and monitoring frameworks to ensure accountability

and long-term impact. He cautioned that without science, restoration efforts risked low survival rates, poor site suitability, and limited socio-economic returns. He referred to the Government's 15 billion Tree Growing Initiative as a bold national commitment, noting that planting trees was only one step and that ensuring survival, growth, and productivity determined success. He explained that KEFRI is supporting the initiative by providing improved and drought-tolerant planting materials, conducting genetic improvement programs, developing guidelines for sustainable plantation management, and generating data to guide policy and planning. He stated that research ensured that tree growing efforts translated into sustainable forest landscapes that contribute to economic growth and climate resilience.

He emphasized that KEFRI works closely with county governments, communities, private sector actors, universities, and development partners to ensure that scientific findings were translated into practical solutions. He emphasized that capacity building, knowledge dissemination, and technology transfer were integral to bridging the gap between research and practice, and there is need for integration of research into policy, planning, and implementation to ensure that forests are managed sustainably for present and future generations.

Remarks from Kenya Wildlife Service -Ms. Jane Wamboi

Ms. Jane Wamboi from Kenya Wildlife Service acknowledged the protocol and greeted the conference participants. She noted that as an institution, KWS was committed to forest conservation and is proud to be a Gold Corporate Member of the Forestry Society of Kenya. He explained that this partnership reflected a shared vision that forests were not merely ecological zones, but living systems that sustain biodiversity, anchor community livelihoods, and strengthen national resilience.

She described the theme of the conference, "*Forests for People, Planet and Prosperity*," as both timely and transformative, and mentioned that it challenged participants to see forests not only as carbon sinks or timber resources, but as dynamic landscapes of innovation, inclusion, and interdependence. She stated that at KWS, forests were viewed through the lens of wildlife, noting that over 70% of Kenya's terrestrial wildlife species depended on forested landscapes for shelter, breeding, and migration. However, he acknowledged that significant forest loss had narrowed wildlife corridors, intensified human–wildlife conflict and amplified the impacts of climate change.

She further explained that as a committed partner, KWS was focused not only on restoration but also on innovation, and is currently restoring wildlife corridors using indigenous species to support pollinators and browsers, reconnect fragmented habitats, and reduce human-wildlife conflict. She added that KWS was strengthening community-led stewardship by training scouts in monitoring, wildlife tracking, and fire prevention, which had contributed to a notable reduction in forest degradation in recent years. She further noted that KWS was advancing clean energy transitions and digital monitoring systems, reflecting a shift from reactive conservation to strategic, climate-smart stewardship.

She concluded with a call for restoration that centers wildlife and biodiversity in forest planning, aligns key performance indicators with climate-smart, community-driven outcomes, and revives indigenous wisdom and stewardship. He urged participants not to restore forests merely to meet targets, but to heal landscapes, reconcile communities, and honor creation. She stated that when forests thrive, wildlife returns; when wildlife returns, ecosystems rebalance; and when ecosystems are balanced, people prosper not only economically, but spiritually and across

generations. She ended by expressing gratitude to conference organizers and wishing members fruitful deliberations.

Remarks from Japan International Cooperation Agency (JICA) Representative- Michiko Nishikawa

Ms. Nishikawa stated that she was honored to participate in the conference as a representative of JICA. She explained that she has worked as a long-term expert under the SFS-CORECC project and noted that the conference theme, "*Forests for People, Planet and Prosperity*," aligned well with the goals that JICA and Kenya had been pursuing together for many years. She stated that JICA has partnered with Kenya for over 60 years, supporting development in various sectors including roads, schools, health and agriculture, and particularly in vulnerable areas. She added that in August 2025, during the 9th Tokyo International Conference on African Development (TICAD 9) held in Tokyo, Japan, African countries had reaffirmed their commitment to sustainable development and climate action, and that forests and natural resources had been recognized as key areas for building a greener and stronger future.

She emphasized that forests in Kenya played a vital role in climate change mitigation and adaptation, biodiversity conservation, and in supporting the livelihoods of local communities. She explained that JICA's collaboration with Kenya in the forestry sector had a history spanning more than 40 years. She briefly introduced the SFS-CORECC project, noting that it supported the 15 Billion Tree Growing Campaign and consisted of four main components: policy support, commercial forestry, tree breeding, and regional cooperation among African countries.

She informed participants that during the conference, the project team would present four papers covering the Standard Operating Procedures on forest ecosystem services, the timber traceability system, commercial forestry of Melia volkensii, and the breeding strategy for Melia volkensii. She expressed her pleasure in sharing the results of their work and stated that she looked forward to receiving valuable feedback.

In conclusion, she affirmed that JICA would continue to support Kenya's forestry sector and contribute to building a sustainable and resilient future for all. She expressed her hope that the conference would generate meaningful outcomes to help Kenya manage and conserve its forests sustainably.

3.0 NATIONAL SCIENTIFIC CONFERENCE PRESENTATIONS




The conference presentations were organized in the following Sub-themes:

i. Policy, Governance, and Indigenous Knowledge in Sustainable Forest Management
ii. Restoring Landscapes, Reviving Ecosystems: Nature-Based Solutions for a Sustainable Future
iii. Smart Forestry: Digital Tools, Technologies, and Innovations
iv. Forest-Based Economy: Green Growth, Revenue Generation, and Carbon Opportunities
v. Forests in a Changing Kenya: Urbanization, Risk Factors, and Future Directions

3.1 Session II: Conference Presentations

3.1 Sub-theme 1: Policy, Governance, and Indigenous Knowledge in Sustainable Forest Management

Moderator: Mr. Noor Hussein

3.1.1. Keynote presentation by. Dr. Vincent Oeba –KEFRI

Dr. Oeba, the FSK Scientific Committee Chairman outlined the main objective, specific objectives and expectations of the scientific conference to the participants. He outlined the main objective of the conference as to provide a multi-stakeholder platform for advancing knowledge, innovations, and policy actions that strengthen the role of forests in promoting people-centered development, environmental sustainability, and economic resilience in Kenya. He further stated the specific objectives of the conference as to showcase practical solutions and emerging research on forest and landscape restoration, explore and promote the application of digital technologies and innovations for improved forest management, evaluate the contribution of Kenya's forest sector to the green economy, and evaluate emerging challenges and opportunities for forestry development in a rapidly

changing world. He outlined the expected outcomes of the scientific conference as to enhance technical knowledge and capacity among forestry stakeholders, strengthen collaboration and partnerships amongst forestry stakeholders, increase visibility of Kenya's forest sector, develop policy and practice recommendations, and enhance engagement of youth, women, and local communities in forestry.

3.1.2. Formulation of a Natural Capital Accounting and Payment for Ecosystem Services Frameworks for Kenya: By Dr David Langat-KEFRI

Dr Langat stated that the proposed Natural Capital Accounting (NCA) framework for Kenya is modular and incremental, starting with forest accounts and gradually expanding to include other ecosystems, allowing for flexibility and adaptation as data and capacity improve. Implementation relies on leveraging existing data sources, such as SLEEK land cover maps, and building conceptual models like Physical Supply and Use Tables (PSUT), while transparently documenting data gaps and assumptions for future refinement.

The frameworks emphasize the importance of strong institutional structures, including the formation of a National Steering Committee on Environmental Economics (NSCEE) and multi-stakeholder committees to ensure effective governance, coordination, and stakeholder engagement. He emphasized that Kenya currently has no formal framework for implementing the System of Environmental-Economic Accounting (SEEA). As a result, natural capital is not systematically integrated into national economic planning and decision-making processes. This omission limits the country's ability to account for the true value of ecosystems and natural resources in development planning and policy formulation. He noted that without a standardized methodological framework, it is not possible to undertake robust and credible Natural Capital Accounting (NCA).

Dr. Langat further highlighted sustainability challenges affecting Payment for Ecosystem Services (PES) schemes; he noted that the compensation provided to land stewards is often not commensurate with the effort invested, reducing incentives for long-term participation. In addition, low technical capacity of land stewards affect effective implementation and monitoring of PES activities. The high costs associated with data collection and monitoring further constrain these initiatives, while revenues generated are often insufficient to cover operational costs. These challenges are compounded by the absence of an enabling policy framework to guide and institutionalize PES implementation in Kenya, raising concerns about the long-term sustainability of PES initiatives in Kenya.

He recommended that the Ministry of Environment, Climate Change and Forestry (MOECCF) officially adopt the NCA framework and establish the National Steering Committee on Environmental Economics to mainstream natural capital accounting into government decision-making processess. He further recommended that the Ministry of Environment, Climate Change and Forestry should spearhead adoption of PES framework, develop the necessary legal instruments, establish a multi-stakeholder steering committee, and design and fund pilot PES schemes.

The participants sought clarification on several key issues arising from the presentation. They inquired about the place of trees on farms within the Natural Capital Accounting (NCA) and Payment for Ecosystem Services (PES) frameworks, particularly how farm forestry and agroforestry systems would be recognized and incorporated into the accounting structure. Participants further asked whether the proposed frameworks are already in place and requested clarification on the key action points required to operationalize both the NCA and PES frameworks. In

addition, participants expressed interest in how traceability mechanisms could be integrated into the SEEA framework, especially in dryland areas where production systems are largely informal and dispersed. They also sought to understand the major challenges facing the forestry sector in compiling natural capital accounts, including data, institutional, and technical limitations.

3.1.3. Partnerships in Policy and Standard Development: Lessons, Opportunities and Challenges to FSC Certification in Kenya: By Mr. Paul Opanga-FSC

Mr. Paul Opanga from Forest Stewardship Council (FSC) explained that forests are fundamental to sustaining life on earth, noting that they cover 31% of the global land area, support 80% of terrestrial biodiversity, regulate climate, protect soil and water resources, and sustain the livelihoods of approximately 1.6 billion people, hence the need for their sustainable management. He further described the FSC as a multi-stakeholder, international, not-for-profit organization that promotes environmentally sound, socially beneficial, and economically viable forest management. He noted that FSC operates under a democratic governance structure that balances environmental, social, and economic interests equally. Through Forest Management (FM) and Chain of Custody (CoC) certification, FSC ensures responsible practices across the entire forest product value chain.

He indicated that FSC has expanded its footprint across Africa, with increasing certified forest areas and Chain of Custody certificates. The strategy toward 2026 aims to grow certified forest areas, increase CoC certificates, strengthen ecosystem service claims, and expand market uptake of certified products. According to him, FSC Africa seeks to scale its impact by building strategic partnerships, influencing policy processes, transforming markets, and promoting sustainable production and consumption of forest products. He reported that FSC has initiated engagement with the Kenya Forest Service (KFS) and Kenya Wildlife Service (KWS) to explore certification opportunities in Aberdares, Eburru, Kaptagat, and Karura forests. However, he noted that progress has been slowed by delays in finalizing management plans and High Conservation Value (HCV) assessments, gaps in collaboration agreements, and the generally slow pace of certification processes. He also observed that broader challenges across Africa include high deforestation rates, weak law enforcement, limited local demand for FSC-certified products, perceptions that certification is costly and technically complex, and political instability in some countries.

He indicated that FSK is well positioned to shape policy, influence curriculum development, promote research and raise awareness on FSC standards. He further noted that Kenya's Interim Forest Stewardship Standard provides an opportunity to develop a full national Forest Stewardship Standard in partnership with FSC. Additionally, he pointed out that the planned IUFRO 2029 World Forestry Congress presents a strategic opportunity for Kenya to showcase its forestry sustainability credentials through FSC certified forests and products.

In conclusion, he stressed that Kenya should adopt a "lead by example" approach by acquiring FSC-certified forest areas to enhance market access and competitiveness. He emphasized the need for stronger collaboration between government agencies and the private sector, increased capacity building, broader stakeholder engagement, and improved awareness. He noted that addressing gaps in forest management planning and reducing barriers to certification, would be critical for advancing responsible forest management and expanding FSC certification in Kenya.

Participants further sought to understand why Kenya's forests are not yet FSC certified. It was explained that the FSC East Africa team has been engaging Kenya Forest Service (KFS) in piloting certification within the Aberdare block. A recent gap analysis revealed that management plans for the selected areas require revision, and certain operational requirements such as grievance handling procedures are still incomplete. On this basis, KFS is working to ensure that all foundational requirements are adequately addressed before proceeding with the main FSC certification evaluation.

It was clarified that certification goes beyond having updated management plans, and requires the development of comprehensive policies on health and safety, as well as Standard Operating Procedures (SOPs) for grievance handling among workers and local communities. Additionally, FSC standards require the establishment of a High Conservation Value (HCV) Framework, which is currently under development by the KFS team. These institutional and procedural requirements must be fully in place to meet FSC standards.

Participants also explored how other sector players could support certification efforts, particularly considering the European Union Deforestation Regulation (EUDR), which is now influencing market requirements in Kenya. It was noted that manufacturers in the paper and packaging sector are already at the forefront of promoting certified products, as evidenced by the increasing number of FSC Chain of Custody (CoC) certifications in the country. FSC sees significant potential for timber and wood-based companies if certified materials can be sourced from certified government and private forests. Additional opportunities are emerging in the verification of ecosystem services, including watershed protection, recreational services, and biodiversity conservation. FSC is also exploring collaboration with the Kenya Wildlife Service (KWS) to certify protected areas such as national parks, thereby expanding the scope and impact of certification in Kenya.

3.1.4. Global Processes and Their Implications to Forestry Development in Kenya: By Dr. Vincent Oeba-KEFRI

Dr. Oeba highlighted the importance of forests globally and examined how international processes influence forestry development in Kenya. Forests cover approximately 30% of the world's land area and support biodiversity, livelihoods, employment and climate regulation. However, deforestation and forest degradation continue at alarming rates, contributing to biodiversity loss, climate change, and declining agricultural productivity. In response, global attention has increasingly focused on sustainable forest management and commercial forestry as mechanisms to reverse forest loss while supporting livelihoods and economic development. He further outlined key global processes shaping forestry policy, particularly the United Nations Forum on Forests (UNFF), established in 2000 to promote sustainable forest management worldwide. A major outcome of UNFF is the UN Strategic Plan for Forests 2030, which sets six global forest goals. Other linked global frameworks influencing forestry include the UN Convention to Combat Desertification (UNCCD), the Convention on Biological Diversity (UNCBD), and the UN Framework Convention on Climate Change (UNFCCC). Regional initiatives such as AFR100 aim to restore 100 million hectares of degraded land in Africa by 2030.

Significant attention was given to the UNFCCC and the Paris Agreement, especially provisions requiring countries to conserve and enhance carbon sinks, including forests. Articles 4 and 5 of the Convention emphasize sustainable management and enhancement of greenhouse gas reservoirs, whileArticle 6 provides mechanisms for cooperative approaches and carbon markets, including Internationally Transferred Mitigation Outcomes (ITMOs). The stepwise approach

required under REDD+, including developing a national REDD+ strategy, establishing forest monitoring systems and safeguards, submitting Forest Reference Emission Levels (FREL), implementing mitigation policies aligned with Nationally Determined Contributions (NDCs), and undergoing international verification processes.

The implications for Kenya's forestry sector are significant. Forestry professionals must strengthen capacity in climate accounting, reporting, and Nature-based Solutions (NbS). There is a need to develop bankable NbS projects, enhance technical skills in carbon tracking and registry systems, and improve access to climate finance. Investment in technology, innovation, and transparent reporting systems will be essential to meet international obligations and benefit from carbon markets. The sector must also generate evidence to inform response measures, just transition programs, and loss and damage mechanisms.

In conclusion, global environmental processes present both obligations and opportunities for Kenya's forestry sector. By aligning national forestry strategies with international frameworks, building institutional and technical capacity, and leveraging climate financing mechanisms, Kenya can catalyze innovation, resilience, and sustainable development in the forestry sector.

Participants inquired whether there are designated institutions responsible for delivering specialized training in areas such as climate accounting, Nature-based Solutions (NbS), carbon markets, REDD+ implementation, and reporting under global frameworks. They also sought confirmation on whether structured programs or partnerships are already in place to support professional development and technical skill enhancement in line with emerging global requirements.

3.2. Sub-theme 2: Restoring Landscapes, Reviving Ecosystems: Nature-Based Solutions for a Sustainable Future

Moderator: Dr. Elizabeth Wambugu

3.2.1. Keynote presentation: Restoring Landscapes, Reviving Ecosystems: Opportunities and Challenges: By Mr. Elijah Korir-WWF-Kenya

Mr. Korir noted that, at the global level, land degradation has become a major driver of the "triple planetary crisis," encompassing climate change, biodiversity loss, and environmental degradation. This has in turn stimulated ambitious international restoration initiatives, including the UN Decade on Ecosystem Restoration, the Bonn Challenge, and the Global Biodiversity Framework. He highlighted Kenya's commitment to restore 10.6 million hectares of degraded land and to increase national tree cover to 30 percent by 2032. He further observed that achieving these targets will require an estimated investment of KES 1.294 trillion, aimed at safeguarding critical water towers, conserving biodiversity, and strengthening community resilience.

Despite these commitments, Mr. Korir emphasized that Kenya continues to face significant challenges that hinder large-scale restoration efforts. He identified fragmented policy frameworks, insecure land tenure systems, mounting socio-economic pressures, increasing climate-related shocks, persistent financing gaps, and limited technical capacity as key constraints. Collectively, these factors undermine coordinated implementation and reduce the effectiveness and sustainability of restoration initiatives across landscapes.

In response to these challenges, Mr. Korir recommended adoption of more integrated and enabling strategies. He underscored the importance of leveraging climate and biodiversity finance, clarifying and securing land rights, and meaningfully integrating Indigenous and local knowledge systems. Additionally, he emphasized the need to mobilize forestry professionals and promote innovation to accelerate restoration outcomes, framing ecosystem restoration as a long-term ecological, economic, and social investment rather than solely an environmental obligation.

3.2.2. Breeding Strategy for Melia volkensii for Timber Production and Supply of Improved Seed in Drylands of Kenya: By Dr. James Ndufa-KEFRI

Dr. Ndufa, informed participants that KEFRI through JICA support is developing a breeding strategy for *Melia volkensii* to improve productivity, drought tolerance, and supply of superior seed for timber production in Kenya's drylands. He stated that *Melia volkensii (Mukau)* is a valuable endemic tree species found in the arid and semi-arid lands (ASALs) of Eastern Africa, including Ethiopia, Kenya, and Tanzania. He further noted that although Melia is heavily exploited for timber and largely found on farms, it is increasingly being planted in plantations and agroforestry systems due to its fast growth and high-quality timber, contributing significantly to farmer livelihoods.

He informed the participants that a Melia breeding strategy was initiated in 2010 to improve adaptability, productivity, and timber quality, and that KEFRI, with support from JICA under the project on Development of Drought Tolerant Trees for Adaptation to Climate Change in Drylands of Kenya, commenced implementation of the strategy in 2012. Implementation of the strategy involved selection of Candidate Plus Trees (CPTs), collection of scions for the establishment of first-generation clonal seed orchards, and establishment and evaluation of progeny tests (PTs).

The breeding objective is to develop fast-growing, drought-tolerant, and healthy trees adaptable to ASAL conditions for sustainable timber production. These efforts continued under the CADEP-SFM project (2017–2021), which focused on evaluating progeny trials and selecting second-generation trees to strengthen the breeding population and genetic resources. For the first-generation trials, 100 CPTs were selected from various ASAL sites across Kenya. Clonal material from these CPTs was used to establish two 11-hectare clonal seed orchards in Kitui and Kibwezi (2012–2014). Seeds from these orchards were used to establish eight F1 progeny trials, including four main sites (Tiva, Kibwezi, Marimanti, Kasigau) and four sub-sites (Makima, Gaciongo, Ikithuki, Voi). These CPTs, orchards, and progeny tests formed the genetic base for Melia improvement.

Further, under the SFS-CORECC project launched in 2022, a second-generation breeding strategy was initiated through evaluation of F1 progeny performance. Superior families were identified based on traits such as growth rate, volume, wood density and drought tolerance. The top 10% performing clones were selected to establish second-generation CPTs, with scions grafted to create new clonal seed orchards in Tiva (Kitui) and at the University of Nairobi farm using superior clones from different trial sites. Inferior clones (bottom 10%) were removed to upgrade the F1 orchard to F1.5. The overall goal of Melia breeding is to supply improved seed for commercial plantations by enhancing height growth, diameter at breast height (DBH), wood density, and overall productivity, thereby unlocking the species' full potential for sustainable timber production in dryland regions.

3.2.3. Commercial Growing of Melia volkensii: Advancing Sustainable Dryland Forestry in Kenya: By Mr. Santos Ingosi-KFS

Mr Ingosi stated that the revised guidelines provide practical, step-by-step procedures from seed to harvesting of *Melia volkensii* end products, aiming to commercialize this drought-resistant, fast-growing timber species and boost dryland forestry in Kenya. The guidelines were developed to equip stakeholders with technical knowledge on Melia management to boost commercialization, improve livelihoods, and support climate resilience; and provide technical guidance to existing and potential melia growers; promote commercialization of Melia; Support growers in investment decisions (cost-benefit analysis); Provide technical staff with resource materials for guiding Melia growers and increase awareness among farmers, policymakers, and private sector players.

He noted that these guidelines offer technical support on seed sourcing, nursery practices, pest and disease management, plantation establishment, and cost–benefit analysis, enabling farmers, investors, and extension staff to make informed decisions on Melia growing and improve livelihoods. The guidelines include information on raising Melia seedlings in the nursery, establishment, and management of Melia plantations/woodlots among others. In conclusion. Mr. Ingosi noted that Melia volkensii thrives in degraded ASALs, combats desertification, enhances soil conservation, eases pressure on natural forests, provides high quality timber in short rotation and supports rural livelihoods and climate-resilient value chains

Participants sought to understand what interventions were being undertaken in rangelands, expressing concern that promoting monoculture plantations of *Melia volkensii* could pose ecological risks in the future. They emphasized the importance of inclusivity and the integration of indigenous species during implementation to avoid long-term environmental degradation. In response, Mr. Ingosi clarified that while the project promotes *Melia volkensii* as the primary tree species at the plot level, this is largely driven by management efficiency and market considerations, including uniform silvicultural practices and predictable timber quality. During the early establishment phase, farmers are encouraged to intercrop Melia with suitable low cover crops to optimize land use and generate short-term benefits.

He however stressed that this does not imply the promotion of large-scale monoculture expansion in rangelands, and emphasized that the project does not advocate for clearing natural rangelands to establish Melia plantations. Rather, farmers are advised to integrate Melia within existing farming systems or plant it on degraded or under-utilized lands where increased tree cover can support soil rehabilitation, improve microclimates, and reduce land degradation. He emphasized that, the project aimed to increase productive tree cover in ecologically and socially appropriate areas while maintaining and where possible strengthening the presence of indigenous species across the landscape. This ensures that Melia contributes to restoration and income generation without driving ecological simplification or rangeland conversion.

On enhancing profitability of Melia growing, Mr. Ingosi observed that small-scale farmers achieve better returns when they adhere to recommended silvicultural practices which include proper land preparation, regular weeding, timely pruning and thinning, and the use of healthy, high-quality planting material. Integrating Melia into existing farming systems through intercropping helps reduce opportunity costs and provides interim income while trees mature. Greater profitability is realized

when farmers add value by processing harvested trees into timber or other wood products rather than selling them as standing trees. Appropriate harvest timing and collective marketing arrangements, such as through cooperatives or SACCOs, also significantly enhance financial returns.

3.2.4. Status Report on Lantana Camara Invasion in Nzoia Forest: Management Lessons from Lower Imenti Forest: By Ms. Lydia Omukweyi- KEFRI

Ms. Omukweyi noted that Lantana camara is aggressively invading Nzoia Forest threatening its biodiversity, ecosystem services, and community access, yet no structured management interventions have been implemented. She mentioned that *Lantana camara* is listed among the world's most invasive species and is considered one of the ten worst weeds globally due to its ecological adaptability, prolific reproduction capacity and severe ecological impacts.

Field surveys and ecological observations in Nzoia Forest in Western Kenya comprising 5,310.2 ha plantation revealed that the disturbed areas create open habitats favorable for *L. camara* establishment and spread due to increased light availability, reduced native plant competition and altered microclimatic conditions conducive for its growth. The species' extensive soil seed bank, year-round fruiting, and animal-aided seed dispersal further enhance its invasiveness and resilience. The invasion has notable ecological consequences in Nzoia Forest, including suppression of natural regeneration, reduction in biodiversity, alteration of soil chemistry, and allelopathic inhibition of native flora. Additionally, the formation of dense, thorny thickets escalates fire risk and obstructs forest management activities, significantly increasing reforestation costs. These dense infestations limit local community access to essential resources such asgrazing lands, fuelwood, and various non-timber forest products, thereby affecting livelihoods.

In conclusion, Ms. Lydia Omukweyi noted that lessons from Lower Imenti Forest show that successful rehabilitation is possible through the TELIS model, which combines progressive restoration, community ownership, species-site matching, livelihood integration, and continuous monitoring. She observed that immediate action including annual rehabilitation, community involvement, and capacity building is essential to reverse *Lantana camara* invasion and restore the ecological and socio-economic functions of Nzoia Forest. She recommended the adoption of community-driven, progressive rehabilitation in Nzoia Forest noting that such approaches can support ecological restoration, conserve biodiversity, strengthen community livelihoods, and safeguard the forest's role as a vital water catchment.

Participants sought to understand if there were TELIS guidelines. In response, Ms. Omukweyi stated that there are currently no stand-alone TELIS guidelines, rather, , TELIS is an adaptation of Plantation Establishment and Livelihood Improvent Scheme (PELIS) which is operationalized under Participatory Forest Management (PFM). Participants further sought to know whether TELIS was appropriate to restore degraded landscape in Kenya; Ms. Omukweyi responded that evidence from lower Imenti indicates that TELIS is ecologically and socio-economically approriate for restoring degraded landscapes though its design and implementation is critical and must be tailormade to address local context. She added that TELIS can successfully rehabilitate degraded landscapes through blockbased restoration, careful species–site matching and protection of natural regeneration, leading to recovery of forest structure and biodiversity.

She further outlined the main activities involved in TELIS as: identification and demarcation of the degraded sites into manageable blocks and allocation of plot exclusively to CFA members; Site preparation that includes clearing of invasive

species and establishment of fire breaks; Tree establishment with species–site matching using indigenous and selected fast-growing trees; Regular weeding; replacement planting and protection from wildlife and grazing; Intercropping with short-life cycle, non-competitive crops during the first 2–4 years; Continuous monitoring, supervision and scaling of tree survival and re-emergence of invasive species; Progressive relocation of farmers once a block is rehabilitated, and Capacity building on nursery practices and invasive species management. Enquiries were also made on the feasibility of Lantana briquetting in Kenya just like in Tanzania; it was noted that the idea is technically feasible in Kenya given the comparable biomass characteristics of Lantana and existing experience with biomass briquetting. However, adoption must be carefully designed to avoid ecological risks such as incentivising retention of Lantana but pursued as a by-product of restoration.

3.2.5. Validation of Germination and Storability of Marula (sclerocarya birrea) Seeds: By Mr. Gabriel M. Samuel & Florence C. Towett-KEFRI

Indigenous fruit trees (IFTs) play an essential role in supporting ecological stability, food security, and rural livelihoods across sub-Saharan Africa. Among these, *Sclerocarya birrea* (marula) is valued for its nutritional fruits, medicinal bark, and socio-economic uses (Leakey, 2012). In Kenya, marula is widespread in semi-arid regions such as Makueni, Kitui, and parts of Kajiado counties, where it contributes to household resilience (Orwa *et al.*, 2009). Despite its importance, large-scale domestication and integration of marula into agroforestry systems remain limited. One major bottleneck is the poor understanding of its seed biology. The seeds are encased in a hard endocarp, often leading to low and erratic germination (Mkwezalamba *et al.*, 2015). Moreover, storage behaviour of *S. birrea* seeds is poorly documented, complicating efforts for ex-situ conservation and nursery propagation.

This study therefore aimed to validate germination performance under different pre-treatments and to evaluate storability of *S. birrea* seeds under contrasting storage conditions. The findings are expected to contribute to knowledge on propagation protocols, conservation strategies, and promotion of marula in dryland agroforestry systems in Kenya. Seeds were collected from Mbui Nzau, Kibwezi West Sub-County, Makueni County, Kenya. The site lies in Kenya's semi-arid zone (ASALs) with bimodal rainfall of 400–800 mm annually and mean annual temperature of 22–28°C. He further stated that Amarula seeds show intermediate storage behavior, with viability declining sharply after 9–12 months, so seeds should be sown within 6–9 months for best germination results.

Moreover, removing the operculum from marula seeds significantly improves germination rates and speed, while fungicide soaking does not provide additional benefits. The results indicate that seed pre-treatment had a significant effect on germination ($p < 0.05$). Removal of the operculum (RO) recorded the highest germination percentage at 60%, followed closely by the combined treatment of operculum removal and Redomil application (RO+R) at 55%. In contrast, untreated control (UC) seeds exhibited poor germination, with only 10% success. Mean germination time was also influenced by treatment, with RO-treated seeds germinating fastest at an average of 12 days, compared to 22 days for untreated control. Seed viability declined progressively with increased storage duration under both cold and ambient conditions.

After nine months, cold storage retained approximately 45–50% viability, while ambient storage retained slightly higher viability at 50–55%. However, after twelve months, viability declined sharply to below 20% under both storage regimes,

confirming that the seeds exhibit intermediate storage behavior. Seedlings derived from RO and RO+R treatments demonstrated significantly higher vigour indices compared to those from untreated seeds. This pattern is consistent with the higher germination percentages observed under these treatments, indicating that pre-treatment not only enhances germination rates but also improves subsequent seedling performance.

The findings of this study corroborate earlier research by Mkwezalamba *et al.* (2015), which demonstrated that removal of the operculum enhances germination by facilitating water uptake and promoting embryo growth. The results showed that mechanically removing the operculum significantly improved germination rates compared to untreated seeds. The application of Redomil fungicide did not lead to any significant additional improvement beyond operculum removal, suggesting that fungal infection is not the primary factor limiting germination in *Sclerocarya birrea*. With regard to storability, the decline in seed viability observed under both storage conditions confirms that *S. birrea* exhibits intermediate seed storage behavior. These finding aligns with Ellis *et al.* (1991), who reported that intermediate seeds gradually lose viability over time, even when stored under cold conditions. The study therefore highlights the importance of adopting short- to medium-term storage strategies and ensuring timely sowing to maintain seed viability.

Participants sought clarification on the experimental design, asking whether the study included replications. They further requested details on the number of replications used to ensure the reliability, statistical validity, and reproducibility of the results.

3.2.6. Voices From Farmers as a Tool to Enhance Adoption of Nature-Based Solutions: By Wanjiku J., Mbuvi M.T.E., Tuwei P. and Mwalewa S.

The NBS approach offers a holistic pathway by promoting the protection, sustainable management, and restoration of natural ecosystems in ways that respond to social challenges while simultaneously supporting livelihoods and enhancing biodiversity (International Union for Conservation of Nature, 2016). Despite these advantages, the uptake of existing NBS technologies remains limited, largely due to inadequate access to relevant information and the absence of effective, farmer-oriented dissemination strategies.In an effort to enhance technology transfer in Kenya, natural resource management practices with high potential for adoption were systematically documented for wider dissemination.

These practices were captured directly from farmers using prescribed tools designed to identify, collect, and document effective NBS practices. Data collection was carried out through structured questionnaires that gathered detailed information on the specific problems addressed by each technology, technical specifications, suitable environmental conditions, application procedures, and observed impacts across economic, ecological, and social dimensions. The documentation process also captured challenges encountered during implementation, farmer-led modifications, and key sustainability considerations.

Ms. Wanjiku emphasized the importance of nature-based solutions as practical and scalable responses to environmental degradation. She observed that adoption of NBS in Kenya is often constrained by limited access to clear and usable information, a gap that can be addressed through creative documentation and dissemination approaches tailored to farmers' needs. According to her, structured tools such as questionnaires and standardized documentation templates play a critical role in capturing and sharing good practices, thereby facilitating replication of successful NBS technologies across regions with similar ecological and socio-economic

conditions. She further noted that technologies which are simple to implement, respond to immediate farmer needs, and demonstrate both environmental and economic viability tend to achieve higher adoption rates, particularly when information is repackaged into farmer-friendly formats and peer learning is actively encouraged.

The NBS technologies found to have high adoptability were those that effectively addressed clearly identified problems while remaining easy to learn and apply. These technologies were environmentally sound, economically viable, and closely aligned with farmers' immediate priorities. They included practices targeting landscape and soil degradation, woodfuel shortages, pasture development, and diversified livelihood options. The use of standardized formats for collecting and documenting these technologies ensured consistency in data collection and provided detailed descriptions that are essential for replication by other farmers.

The documented information was subsequently synthesized into various knowledge products, including books, manuals, videos, guidelines, and brochures, to support broader dissemination. In conclusion, numerous NBS technologies already exist in Kenya, but their impact remains limited without innovative and farmer-friendly documentation and dissemination approaches. Scaling adoption requires not only increasing awareness of available technologies but also repackaging information in accessible formats that resonate with farmers' experiences and needs. Encouraging peer learning among farmers further strengthens knowledge exchange and enhances the uptake of nature-based solutions across different landscapes.

3.2.7. Exploration of Alternative Pinus Species to Pinus patula as a Potential Commercial Plantation Species in Kenya: By M. Welimo, J. Mbinga and Balozi B. K. (Prof.)

Mr Martin Welimo stated that *Pinus maximinoi* progenies especially Max 863 and Max 907, significantly outperformed the commonly planted *Pinus patula* in both height and volume growth, with Max 907 achieving more than double per-hectare volume of *P. patula*. *P. maximinoi* also demonstrated higher survival rates (average 89.2%) compared to *P. patula* (79.2%), indicating better adaptability to local conditions in Turbo and similar regions. The study recommends further research on wood properties of the best-performing *P. maximinoi* lines, supporting their potential for diversifying and improving commercial pine plantations in Kenya. Recommendations were also made for more studies on potential pest and diseases affecting this species.

Participants sought to understand why KEFRI was still growing *P. maximinoi* in Kakamega while initial observation showed that it was not fruiting. They were informed that progenies of *P. maximinoi* were experimented in Turbo Kakamega County for growth performance monitoring targeted towards timber production to meet the current deficit in pine timber, and not for seed production. It was further noted that production of *P. maximinoi* for seed production was mainly being done in Timboroa and londiani among other areas.

Clarification was also sought on why production of P. radiata had been discontinued in Kenya while other Countries are still managing it. They were informed that *Pinus radiata* discontinuation was not premature but aimed at allowing the country to undertake more research on the threats affecting it including attack by *Dothistroma pinii*. Currently, there is ongoing research on breeding for *Dothistroma pinii* resistance in Timboroa, and already there are some P. radiata progenies showing a high level of resistance to the nortorious *Dothistroma pinii*, and it is expected that Pinus radiata will be back as a large-scale plantation species in Kenya.

3.2.8. Evaluating Nature-Based Solutions to Mitigate the Impacts of Ipomea hildebrandtii in Kajiado County, Kenya: By Ms. Jane Chepkonga

She recognized that the invasive spread of *Ipomoea hildebrandtii* in Kajiado County has caused significant ecological and socio-economic harm, displacing native forage species, reducing biodiversity, and threatening pastoral livelihoods. Nature-based solutions such as Farmer Managed Natural Regeneration (FMNR), reseeding with native grasses, controlled grazing, and community-driven interventions show strong potential for restoring degraded rangelands and managing the invasive species effectively.

Success in combating *Ipomoea hildebrandtii* depends on integrating scientific and traditional knowledge, empowering local communities with resources and institutional support, and mainstreaming invasive species management into policy and livelihood diversification strategies. The review demonstrates that nature-based solutions (NBS) particularly Farmer Managed Natural Regeneration, reseeding with native grasses, controlled grazing, and the establishment of buffer zones offer significant potential for restoring degraded landscapes. Such interventions are most effective when they integrate ecological science with socio-economic benefits, ensuring that both ecosystems and communities thrive.

The synthesis revealed that local communities possess valuable knowledge, willingness, and experience in managing invasive species, but their efforts require greater institutional support, financial resources, and capacity building. In conclusion,

the study underscores that *Ipomoea hildebrandtii* presents a major ecological and socio-economic challenge in Kajiado County. Its spread has displaced native forage species, disrupted ecosystem processes, and undermined pastoral livelihoods that are highly dependent on rangeland health. The findings echo global evidence on invasive plant species, which consistently highlight biodiversity loss and reduced ecosystem resilience as critical consequences. The study makes the following recommendations:

- Strengthening Ecological Monitoring and Research by establishing long-term monitoring plots in Kajiado to track the spread and ecological impacts of *Ipomoea hildebrandtii*.
- Promoting Nature-Based Solutions (NBS) for Habitat Restoration through Scaling up Farmer Managed Natural Regeneration (FMNR) and reseeding with native grasses to restore degraded rangelands
- Empowering Community-Led Management by providing capacity building, financial incentives, and extension services to strengthen local participation in invasive species management. Also, documenting and integrating traditional ecological knowledge into formal management strategies and encouraging the formation of community-based natural resource management (CBNRM) groups to coordinate collective action.
- Policy and Institutional Support through mainstreaming invasive species management into county and national climate adaptation and land-use policies.
- Socio-Economic Incentives and Livelihood Diversification by exploring opportunities for converting *Ipomoea hildebrandtii* biomass into bio-briquettes, compost, or craft materials to provide alternative livelihoods and promoting eco-enterprises linked to restoration, such as seed banks for native grasses and sustainable grazing cooperatives.

Participants inquired about the available management options for *Ipomoea hildebrandtii*, particularly given the rapid spread and persistence of the species in affected areas. It was explained that mechanical and manual control remains the most commonly applied method. Hand-pulling is widely practiced, especially among pastoral communities, and has been supported through organized community initiatives and government-led campaigns. For instance, trained teams have worked with local communities to identify, uproot, and safely dispose of the invasive vines. Large-scale community efforts, such as those supported by WWF-Kenya in Nasaru-Olosho Conservancy, have demonstrated that collective action can successfully clear extensive areas of over 1,840 ha. The establishment of demonstration sites has further strengthened community-led restoration efforts. In addition to physical removal, competitive planting was highlighted as a long-term strategy. The invasion of Ipomoea has led to the decline of robust forage grasses such as Cenchrus and Brachiaria, and reseeding these grasses can help suppress regrowth by restoring ground cover and limiting opportunities for reinvasion.

The possibility of converting Ipomoea biomass into biogas was also raised. Participants were informed that while the study did not specifically explore this option, it was noted that in some regions, including parts of Tanzania, communities have used *I. hildebrandtii* as a source of fuel. In Kenya, other invasive species such as *N. juliflora* have been successfully utilized for biomass energy production, demonstrating the potential to turn invasive species into economic resources. Given that Ipomoea biomass contains substantial organic material, further research could explore its suitability for energy production, including biogas generation or composting, as a complementary management approach.

3.3 Sub-Theme 3: Smart Forestry: Digital Tools, Technologies, and Innovations

Moderator: Mr. Joseph Machua

3.3.1. Keynote Paper: Leveraging on Technological Innovations in Catalyzing Forestry Development and Resilience in Kenya: the CASE OF #JAZAMITI: By Mr. Gilbert Busolo, representing Dr. Jane Njuguna

Mr. Busolo stated that the JazaMiti-swahili translation for "Fill with Trees", is a science-based digital platform implemented as a mobile and web platform that seeks to guide sustainable tree growing activities based on the science of species site matching towards supporting the 15B tree growing Initiative. The objective of JazaMiti is to provide science-based information that supports sustainable and climate-resilient greening initiatives for landscape restoration, agroforestry, and commercial forestry development. The platform is designed to contribute to the achievement of Kenya's Vision 2030 goals and the National Government's agenda of attaining and maintaining 30% national tree cover by 2032. It serves as a practical guide for sustainable tree-growing activities, offering a robust and comprehensive framework for the implementation and monitoring of reforestation and conservation initiatives.

The app offers significant benefits to the forestry sector. By promoting species-site matching, it improves tree survival rates and enhances the effectiveness of restoration initiatives. It supports data-driven decision-making, strengthens transparency in national restoration programs, and facilitates collaboration among government agencies, NGOs, communities, and other stakeholders involved in the whole-of-government approach to achieving national tree cover targets. The app provides several key benefits to the forestry sector and restoration stakeholders. It improves tree survival rates by applying the science of species-site matching, ensuring that the right tree species are planted in ecologically suitable locations. This

enhances the effectiveness and sustainability of restoration efforts. The platform supports data-driven decision-making by generating real-time information and analytics, enabling more informed and strategic planning of restoration initiatives. It also increases transparency in national greening and restoration programs by providing verifiable and accessible data on progress and outcomes. Furthermore, the app facilitates easier collaboration among government agencies, NGOs, private sector actors, and local communities towards achieving national tree cover and landscape restoration goals.

The implementation of the app has revealed several important challenges and lessons. A significant concern is the digital divide, particularly in ASAL regions where smartphone access is limited. To address inclusivity, alternative access channels such as SMS and USSD interfaces are being explored. Interoperability also presents technical challenges, especially integrating the app with legacy systems used by counties, NGOs, and development partners. Data verification remains another constraint, as image quality and poor internet connectivity can affect the reliability of monitoring and reporting. In addition, the diversity of stakeholders involved in restoration efforts means that customized indicators and reporting formats are often required to meet varying institutional needs. There is thus need to institutionalize the use of JazaMiti across all government and county restoration programs to standardize reporting and monitoring. Furthermore, strengthening partnerships with Huduma Kenya, youth groups, nurseries, and the private sector can accelerate adoption, while integrating robust carbon estimation modules will position the platform to support climate finance mechanisms. Enhancing the AI component with localized pest, disease, and dryland species data will also improve ecological relevance.Sustainability is a critical consideration, as continuous system upgrades, user support, and capacity building demand sustained funding, strategic partnerships, and long-term institutional commitment.

At the regional level, replication can be achieved through the development of harmonized digital forestry frameworks under platforms such as AFR100 and COMESA. Localizing species databases and user interfaces to reflect ecological and linguistic diversity will enhance usability across countries. Establishing cross-border restoration dashboards can support regional monitoring, while targeted capacity building through Training of Trainers (ToTs), academia, and professional forums will strengthen technical expertise. Linking digital forestry records to carbon registries and climate funds can also unlock green financing opportunities. There is a need for collaborative action across science, policy, and communities to scale digital forestry solutions. Investment in capacity building, policy integration, and regional partnerships is essential to maximize impact. Every tree counts, and through coordinated effort, innovation, and shared commitment, a greener and more climate-resilient Africa can be built for present and future generations.

Participants sought clarification on several operational aspects of the JazaMiti app to better understand its functionality and reliability. One concern related to how the system prevents double entry of information. In response, Mr. Busolo explained that the app incorporates an internal algorithm that automatically flags entries that appear to be duplicates. The system analyzes parameters such as planting dates, geographic location, and the number of trees planted. When a potential duplicate is identified, it is flagged for review and verified in consultation with the person who submitted the data. Participants also sought to understand how the app captures information on seedling mortality, particularly in cases where trees fail to survive due to pests, diseases, prolonged drought, or other environmental factors. Mr. Busolo clarified that the app includes a verification module that allows field officers or users to conduct periodic site visits. During these visits, they can record

the number of surviving and dead trees and document additional observations, including causes of tree failure such as pest or disease outbreaks. He further indicated that efforts are underway to strengthen this monitoring process through enhanced use of spatial data and emerging technologies to improve accuracy and reporting reliability.

Clarification was also sought on how nursery owners can register within the JazaMiti system. It was explained that registration can be completed in two ways. From the Home Page after logging in, users can select the "Locate Nursery" feature and choose "Register a Tree Nursery," which opens a form to capture the required details. Alternatively, from the Profile Page accessible via the top-left menu, users can access the Nursery Registration section and complete the necessary information. Participants further inquired whether trees planted in 2023 could be documented in the app. They were informed that JazaMiti supports the entry of historical data. Trees planted in 2023 or earlier can be recorded as previous activities by selecting the appropriate past date and attaching supporting documentation, including images from the device gallery, to validate the planting activity.

3.3.2. Smart Forestry, Digital Tools, Technologies, and Innovations for Sustainable Forest Management in Kenya: By Dr. Benjamin Kinyili

Dr. Kinyili outlined that Kenya's governance framework, anchored in the 2010 Constitution and the Forest Act of 2016 aims to increase tree cover from the current 10% to 30% by 2032, while devolving forest management to counties and and actively involving local communities in forest management through Community Forest Associations (CFAs). The presentation outlined how smart forestry technology and digital advancements can be deployed in the governance of forests, and monitoring of sustainable forest resource use. Digital transformation is becoming crucial in facilitating adaptive forest management as forest ecosystems are put under more pressure due to population growth, illegal logging and climate change.

Dr.Kinyili mentioned that Kenya has in the recent past embraced the use of digital tools such as the use of satellite to monitor forest cover, drone surveillance, mobile data collection applications, Geographic Information Systems (GIS), and remote sensing to enhance transparency and efficiency of forestry activities. Digital innovations ranging from Earth Observation (EO) and radar to drones, mobile GIS, dashboards, and CFA reporting are transforming forest protection by shortening the detection-to-response cycle and strengthening accountability. The Kenya Forest Service has adopted Integrated Forest Alert System (IFAS), which integrates satellite alerts with app-based ground verification. This system has significantly improved detection rates and response speed, with pilots in coastal and highland counties showing measurable impact. to the system develops real-time forest inventory, provides illegal logging alerts, and licensing, and has reduced illegal logging cases by 23% in the 2020-2024 period. Moreover, Community Forest Associations (CFAs) are benefitting from mobile platforms that allow them to participate in data collection and report incidences on forest health, fire outbreaks, and encroachment. In pilot Counties such as Kericho and Baringo, drones have been used to survey forests increasing coverage and saving up to 35% on the cost of operations. It was recommended that scaling up IFAS and EO analytics nationwide, standardizing patrol workflows, and expanding CFA/citizen science reporting could consolidate progress. Further suggestions were made for policy-based incentives to invest in digital technology, public-private partnerships, and training to scale up smart forestry technologies in Kenya. Smart forestry can provide a transformative route to sustainable forest management, forest-based economy, national goals on climate mitigation, biodiversity, and forest restoration. Participants sought to know

how to examine infected forest plantations using digital tools without affecting other trees. They were informed that they should use remote sensing/drones to identify infected hotspots and this could be confirmed with rapid geotagged ground checks.

3.3.3. Smart Forestry: Digital Tools, Technologies and Innovations MTICARBO App: By Ms. Ashanet AtienoAshanet Atieno, Kariuki Waitherero, Ekisa Joseph, Joseph Magara and Balozi K. Bekuta

Participants were taken through the MTICARBO App. MTICARBO is an innovative mobile application designed to calculate the amount of carbon sequestered by trees of different species and estimate their monetary value.The App provides accurate carbon stock assessments and financial valuation, using species-specific allometric equations, biomass estimation techniques, and carbon pricing data. The application allows the users to input key variables such as tree species, diameter at breast height (DBH), height, and location to generate precise carbon sequestration estimates.

The application is a valuable tool for foresters, researchers, carbon project developers, policymakers, and communities involved in climate change mitigation and forest conservation. By integrating tree growth data, carbon sequestration data and carbon market prices, the App helps stakeholders quantify the economic benefits of carbon sequestration, supporting decision-making in carbon trading, afforestation projects, and sustainable land management. The App enhances accessibility to carbon accounting tools, thus helping local communities and businesses monitor and reduce their carbon footprints. MtiCarbo was granted an exclusive invitation to pitch their project at the prestigious AfricaArena Climate Summit 2025, positioning them for potential partnerships and funding opportunities on a continental scale.

In conlusion, MTICARBO is a transformational digital tool with great promise for Kenya's forestry sector. It democratizes access to carbon estimation and valuation, enabling smarter forestry decisions, greater climate finance participation, and increased forest-based prosperity

Ms. Atieno called for collaborative support from Forestry Society of Kenya, KEFRI, KFS, Better Globe Forestry, CBOs and NGOs to scale up this innovation and integrate it into national forest monitoring and climate reporting frameworks, and mentioned that they were seeking for at least Ksh.1.5 million to upgrade MTICARBO APP.

Participants suggested that the application should be upgraded to measure both above-ground and below-ground carbon stocks, noting that incorporating both components would provide a more comprehensive and accurate assessment of total carbon storage taking into account root biomass and soil organic carbon alongside above-ground biomass.This would strengthen carbon accounting, improve reporting credibility, and enhance the tool's usefulness for climate mitigation initiatives and carbon market engagement.

3.3.4. Timber Traceability System in Kenya: By Ms. Diana Kishiki-KFS

Ms. Kishiki stated that Kenya's current timber flow system faces several structural challenges, including limited documentation, inconsistent enforcement across counties, and insufficient technical capacity at sawmills. These weaknesses have created gaps in monitoring and accountability, underscoring the urgent need for digitization and standardization of records and operational procedures across the timber value chain. A phased, volume-based traceability approach is

therefore essential to improve timber tracking from plantation to final consumer. This approach would require supportive legal framework, strong stakeholder engagement, and strategic investment in digital infrastructure. Such a system would not only enhance transparency and accountability but also unlock opportunities for improved governance, increased revenue collection, and more sustainable resource management.

Drawing lessons from Mozambique and Tanzania, it shows that technology-based solutions such as barcoding and digital tracking systems have shown promising results. However, she cautioned that successful implementation depends on adapting these technologies to local conditions, ensuring reliable infrastructure, and maintaining strong institutional oversight. Without these safeguards, systems may fail due to factors such as weather-related disruptions or over-reliance on concessionaire self-reporting.

The preliminary findings indicate that financial constraints, infrastructure limitations, uncertainties in data management, compliance and acceptance challenges, and varying levels of stakeholder commitment remain significant barriers to implementing traceability technologies in Kenya's forestry sector. Nevertheless, she proposed that a wood traceability system potentially using QR codes could be introduced within the framework of existing forest legislation and tailored to Kenya's socio-economic realities through a phased implementation strategy. The recommended process is supported by a secure, integrated online platform anchored in policy and monitored by legally designated competent authorities. Integrating certification schemes within national forest laws and governance structures would ensure that timber is produced legally and sustainably. Incentivizing certification through improved market access or subsidies could accelerate uptake. Ultimately, a well-designed traceability system would enhance Kenya's credibility in international markets by demonstrating compliance with quality, legality, and sustainability standards required by buyers.

The participants raised concerns questioning whether traceability is still necessary if forest certification systems are functioning effectively. In response, it was clarified that timber certification and timber traceability are both essential and complementary components of sustainable forest management and legal trade, though they serve distinct purposes at different levels of the supply chain.

Certification is a voluntary process that assures compliance with established standards on sustainable forest management, social responsibility, and environmental protection. Traceability, on the other hand, refers to the ability to track the origin, movement, and transformation of timber products from the forest through processing stages to the final consumer. It was further explained that global timber traceability practices vary widely depending on technological advancement and institutional capacity in different regions. The effectiveness of these systems significantly influences forest protection, governance, and community well-being. Timber traceability supports low-impact logging and biodiversity conservation by enabling the monitoring of species from harvest to final use. Tracking systems can be implemented prospectively by marking trees before or during harvesting or retrospectively, by verifying the geographic origin of timber already in the market.

A range of traceability methods are currently used worldwide, including anatomical wood identification, DNA analysis, forest legislation and certification systems, marked wooden board surfaces, QR codes, RFID technology, Near-Infrared Spectroscopy (NIRS), blockchain platforms, and stable isotope analysis. The growing demand for product traceability in global value chains reflects increasing

expectations from governments, producers, and consumers. Producers seek to minimize the risk of sourcing illegal or low-quality materials; regulatory authorities require accurate information on imported and traded products; and consumers increasingly demand assurance that the products they purchase are safe, legally sourced, and sustainably produced. In this context, certification and traceability function not as substitutes but as mutually reinforcing tools that enhance transparency, accountability, and market confidence in the forestry sector.

3.3.5. Evaluation of Extension Methods in Forestry Development for Increased Information Dissemination of Forestry Technologies and Innovations in Lamu County: By Mr. Kevin Muema, Joram Kagombe, and Florence Mwanziu

Mr. Muema emphasized the critical role of strong linkages between forestry research and extension services. He noted that the failure to establish effective connections between research institutions and extension systems has disrupted the flow of technologies to end users. This has resulted in low adoption rates, prolonged time lags between the development and uptake of new technologies, slow forest development, and limited contribution of forestry to community livelihoods. He further highlighted land tenure challenges in Lamu County, where the majority of land is communally owned (74%), with most land acquired through inheritance. This tenure arrangement creates insecurity and discourages long-term investments in tree farming and sustainable forest management, as individuals lack clear ownership rights and incentives to invest in forestry enterprises. The study sought to identify effective dissemination methods for increased information dissemination of forestry technologies and innovations in Lamu County.

Results from the study indicate that 60% of the respondents preferred demonstration plots for disseminating forestry technologies with print media platforms being the least preferred. Farmers and stakeholders indicated that through the demonstration plots they were able to learn and apply the technologies directly on their farms.

The study further found that the adoption of forestry technologies in Lamu County is hindered by weak linkages between research and extension, communal land ownership, and limited technical knowledge among farmers. In addition, Inadequate technical information on tree farming and access to technical advice and information on proper tree management is a challenge especially to farmers who are far away from the KEFRI offices This coupled with the high illiteracy levels has hindered dissemination of forestry technologies to the local communities. The results of this study will guide the development of forestry extension strategies, guide effective resource use, and development of more effective dissemination platforms and methods.

In conclusion, the rate of adoption of forestry technologies in Lamu County was found to be low. Hence, there is a need for more extension services focusing mainly on agroforestry tree species which would enhance the adoption of forestry technologies. Furthermore, the study area has a high potential for fruit farming and fodder species conservation, hence KEFRI should focus on fruit and fodder tree species on farms in order to incentivize a large number of farmers to adopt tree farming technologies. Establishment of demonstration plots, community sensitization forums through farmer groups and farmer field schools, strengthening collaboration with local leaders and extension workers and regular monitoring can play an important role in disseminating forestry technologies.

Participants sought to understand what incentives are available to encourage farmers to adopt agroforestry practices. They inquired about the types of financial, technical, policy, or market-based incentives that could motivate farmers to integrate trees into their farming systems and sustain long-term agroforestry investments.

3.3.6. Local Introduction, Distribution and Manufacture of Non - Lethal Weapons in Kenya: By Mr. Caleb Muiruri Kamau

Mr. Muiruri stated that Kenya's security environment has evolved over the past two decades shaped by factors such as urbanisation, political transitions, transnational terrorism and community level disputes. Kenya has faced complex security challenges, ranging from civil unrest and political demonstrations to law enforcement operations in most areas. Law enforcement officers are often forced to choose between verbal warnings and lethal force leaving a critical uncertain gap in intermediate non-lethal option. He informed the participants that the study aimed to enhance public safety by providing officers with alternative approaches that minimize fatalities. Reduce crime by ensuring swift arrests and prevailing of justice through the constitution; Protect human rights by ensuring policing practices align with Kenya's constitution and international treaties; Stimulate economic growth through job creation, technology transfers and local industrial developments; Improve affordability and availability of non-lethal weapons (NLWs) and Strengthen regional security cooperation by supplying ethical, tested and affordable NLWs to African partners.

The study proposes establishing a sustainable, human rights-compliant industry for manufacturing and distributing non-lethal weapons (NLWs) in Kenya, integrated with smart forestry digital tools to enhance both security and forest conservation. Kenya faces challenges such as limited access to NLWs, unaccountability of illegal activities in forests, and over-reliance on lethal force, which could be addressed by locally producing NLWs and training law enforcement in their ethical use.

Additionally, the expected outcomes include a significant reduction in fatalities, improved accountability in forest areas, job creation, and positioning Kenya as a regional hub for NLW production, with risks mitigated through mandatory training, oversight, and stakeholder engagement. The study recommends developing a national NLW strategy, expanding local manufacturing, incorporating NLW training into security forces, and collaborating with universities and international partners to ensure context-specific, effective solutions.

3.3.7. Cypress and Juniperus Dieback; A Case of Mites and Fungal Attack: By Joseph Machua, Jane Njuguna, Susan Karani and Angela Muthama

Participants were informed that in Kenya, Cypress, Pines, and Eucalyptus are the primary species in forest plantations at about 54%, 24%, and 8.3% respectively (KFS, 2010). However, Cypress and Juniperus (Cupressaceae) dieback has been observed during various surveys. The outbreak has resulted in widespread browning and tip dieback of planted Cypress species and indigenous Cedar (Juniper). The symptoms have been observed on *Cupressus lusitanica*, arborvitae (*Cupressus sempervirens*, and *Thuja occidentalis*) and *Juniperus procera.* The epidemic is more pronounced on the highly valued ornamental arborvitae; if the epidemic is not addressed, it could threaten the productivity of trees in this family and also impact on their sustainable utilization for commercial and ornamental purposes. The notable key symptoms observed include yellowing, bronzing, and browning of the needles, as well as dieback. These symptoms progressively reduce tree vigor and, if unmanaged, eventually lead to seedling and tree mortality.

Mr. Machua highlighted that analysis conducted at the KEFRI Biosciences laboratories indicate a severe infestation by Red Spider Mites. The mite has been morphologically identified as *Oligonychus ununguis*. This represents the first recorded report of this Red Spider Mite affecting any species within the Cupressaceae family in Kenya. It has been observed that the spider webs created by the mites provide a conducive environment for fungal pathogens, particularly those within the Botryosphaeriaceae, Amphisphaeriaceae, Nectriaceae, and Davidiellaceae families. These fungal pathogens further exacerbate tree decline and accelerate mortality. The on going research at KEFRI has confirmed the identity of both the mites and associated fungal pathogens using molecular techniques. This involves DNA extraction from mites and fungal isolates, followed by PCR amplification of the Internal Transcribed Spacer (ITS) region and other target genes, amplicon sequencing, and phylogenetic analysis. Additional studies include pathogenicity tests to determine the role of isolated fungi in disease development.

So far, fungal isolates recovered belong to the families Botryosphaeriaceae, Amphisphaeriaceae, Nectriaceae, and Davidiellaceae, with the most dominant genera identified as Pestalotia, Cladosporium, Botryosphaeria, Fusarium, and Seiridium. Notably, the major known pathogen traditionally associated with cypress was not detected in the samples analyzed. In addition, the management of Red Spider Mite involves an integrated approach combining both cultural and chemical control measures. Cultural management practices include conducting regular field surveillance to enable early detection of symptoms and timely intervention. Salvage harvesting is advised for mature trees with less than 50% infestation, while trees with more than 50% infestation should be incinerated to prevent further spread.

In nurseries, regular spraying of seedlings with soapy water is recommended to dislodge mites and reduce damage. The use of certified planting material and strict phytosanitary measures are also emphasized to prevent cross-border and local spread of the pest. In the long term, the adoption of biological control options is encouraged as a sustainable management strategy. Chemical control involves the application of selective systemic miticides effective against mites. Recommended products include EMERALD GOLD 700WP (imidacloprid), IMAXI 200SC (imidacloprid), BAZOOKA 18EC (abamectin), and ALONZE 50EC (abamectin), applied where appropriate and in accordance with approved guidelines.

Management of associated fungal pathogens similarly requires integrated measures. Trees with more than 50% infection should be incinerated or utilized as fuelwood to minimize disease spread, while those with less severe infection can be salvaged. Pruning of dead and dying branches is recommended, with removed material used as fuelwood where feasible. In nursery settings, systemic copper-based fungicides can be applied to manage fungal infections. As with mite management, the use of certified planting material and adherence to strict phytosanitary controls are critical components of disease prevention and management. He indicated that the study highlights a declining health status of two conifer plantation species in Kenya; *Cupressus lusitanica* and *Juniperus procera.* Despite their economic, ecological, and cultural importance, these species are now severely threatened by a complex of pests and pathogens, mass infestations of a Juniper mite suspected to be *Oligonychus ununguis*. This is an emerging pest threat with the potential to exacerbate disease severity and tree mortality. Field assessments also revealed widespread dieback in three Ecosystems; Mt. Kenya, Aberdares, and Mau.

The pathogenicity and virulence of fungal pathogens in the genera *Botryosphaeria, Fusarium*, *Pestalotia*, and *Cladosporium* is ongoing through a set pathogenicity

trial. Poor silvicultural practices and physical injuries by animals appear to have created ideal conditions for pathogen entry and subsequent disease development. This underscores the need for immediate forest health surveillance, improved plantation management, and integrated pest and disease control strategies. If left unaddressed, this combination of biotic stressors could lead to substantial timber losses, biodiversity decline, and setbacks in Kenya's forest sector recovery. Strategic action is therefore required to contain the threats, prevent further spread, and protect the future viability of Kenya's highland conifer plantations.

Participants sought to know whether the similar pest and disease challenges observed in avocado trees have any correlation with those affecting cypress and juniper. In particular, they questioned whether the same or related pest species, such as red spider mites, could be responsible across these host plants, or whether environmental factors may be driving parallel infestations. Participants also inquired about the factors that may predispose cypress trees to mite infestation. They were interested in understanding whether specific environmental conditions, tree stress factors, silvicultural practices, or landscape-level dynamics could be favoring the proliferation of mites. Concern was further raised over reports that Melia volkensii has also experienced red spider mite attacks, underscoring the urgency of implementing effective management interventions to prevent wider spread and economic losses. Additionally, participants questioned whether the observed decline of Mukogodo cedar could be linked to mite infestation, seeking clarification on whether mites are a primary cause or a secondary factor contributing to tree decline. Finally, participants enquired whether pest alerts and advisory information have reached local communities, particularly forest-adjacent populations and tree growers, to ensure timely awareness, early detection, and appropriate response measur

3.4. Sub-Theme 4: Forest-Based Economy: Green Growth, Revenue Generation, and Carbon Opportunities

Moderator: Jamleck Ndambiri


MR. RUDOLPH MAKHANU


DR. JORAM KAGOMBE


DR. KANDIE KIPKEMBOI

3.4.1. Keynote Paper: Natural Capital Accounting: Role of Forests and Tree Resources in Green Growth and Sustainable Development: By Mr. Rudolph Makhanu-Nature Kenya

The presentation highlighted the role of Nature Kenya's Green Heart Initiative in catalyzing sustainable development through the creation of 11 cooperatives across 8 green value chains, including livestock and commercial beekeeping, with thousands of beehives distributed and investor interest growing in eco-friendly enterprises. Mr. Makhanu indicated that Natural Capital Accounting and SEEA frameworks are being adopted in Kenya to integrate environmental data into national statistics, helping policymakers recognize the true value of ecosystems and make informed decisions that balance economic growth with ecological sustainability.

He emphasized the need to appreciate that nature is a stock of capital and there are consequences of its depletion for society and businesses. He underscored the need for government to shift from exclusively focusing on economic growth to a more holistic strategy that prioritizes human well-being and the sustainability of economic activities. He further emphasized the need to go beyond traditional market assessments that value nature by goods extracted to the negative impacts of extraction e.g pollution that are costly to mitigate. He urged the policy makers in Kenya to ride on the prevailing global push to quantify the economic and intrinsic value of the world's natural capital to understand real benefits of conservation.

3.4.2. Neltuma Juliflora Management for Decent Green Jobs and Livelihood Support for the Host Communities and Refugees in Garissa and Tana River Counties: By Dr. Joram Kagombe

Dr. Kagombe informed partipants that the project was implemented through International Labour Organization (ILO) support with the objective of enhancing livelihood and building resilience of host communities and refugees through sustainable use of forest products, thereby creating decent jobs and sustainable livelihoods. The project further aimed to support local communities (groups and individuals) to exploit the economic benefits of *Neltuma juliflora* through management, harvesting, value addition and manufacturing using pro-employment and local resource-based approaches

The key project interventions included mechanical removal of *N. Juliflora* in eight project sites, whereby youth from local communities were trained in mechanical removal techniques, including the use of chainsaws and manual tools. Weekly groups of youth were engaged in the removal of *N. juliflora*, with a focus on restoring degraded lands and preventing re-infestation. Moreover, the project supported value addition; Communities were provided with modern charcoal kilns and chaff cutters to process *N. Juliflora* into charcoal, briquettes, and animal feed. Training sessions were conducted on the production and marketing of these value-added products, with a focus on enhancing the economic viability of *N. juliflora* utilization. The project further supported capacity building: through organizing workshops and training programs to build the capacity of local communities and refugees in sustainable *N. Juliflora* management and utilization including sessions on ecological restoration, business development, and the use of innovative technologies.

Dr. Kagombe informed participants that the ILO-funded project was successful and created over 2,400 green jobs and cleared 570 acres of Prosopis-infested land in Garissa and Tana River counties, transforming an invasive species into a source of income and ecological restoration. Through value addition, communities produced charcoal, briquettes, animal feed, and biochar, supported by training, equipment distribution, and multi-stakeholder collaboration including KEFRI, International Labour Organization (ILO), and County governments. The presentation highlighted the need for policy reform, market incentives, and institutional coordination to formalize Prosopis-based enterprises and unlock its potential as a driver of sustainable development in Kenya's drylands.

The key challenges facing the project were highlighted as : policy and regulatory barriers- regulatory restrictions on charcoal production posed significant hurdles, necessitating engagement with authorities to advocate for controlled prosopis charcoal production; limited infrastructure in rural areas impacted the timely delivery and distribution of equipment, floods rendered project sites impassable; while there is need to ensure consistent community interest and engagement and ongoing support and motivation due to the labour-intensive nature of the tasks.

Recommendations were made to finalize legal and strategic frameworks, establish coordination structures, strengthen county-level engagement, launch targeted community capacity building, and accelerate product standards and market entry. The presentation further highlighted the existing opportunities for expansion of Prosopis-based enterprises, formalizing sustainable enterprises by establishing recognized cooperatives or associations, Policy support for charcoal production and coordinated, multi-scalar solutions that bridge the gap between community action and institutional systems.

3.4.3. Forests for Prosperity: Integrating Carbon Markets with Rural Livelihoods in Kenya: By Dr. Benjamin Kinyili

The case study looks into the dynamic forest-based economy of Kenya as a strategic concept to foster green growth, sustainable livelihoods and mitigate climate change in sub-Saharan Africa. Kenya is an example of countries whose economy can be derived through the exploitation of forest ecosystems to produce timber products, non-timber forest products (NTFPs), ecotourism and the new frontier of carbon finance. Forestry sector adds approximately KES 87 billion to the national economy every year which is approximately 3.6% of the GDP with the informal and subsistence-based forest activities estimating KES 30 billion in unrecorded value. Another major bright spot of the case is the Kasigau Corridor REDD+ Project that has sold more than 6.1 million verified carbon units (VCUs) worth around USD 44 million in voluntary carbon markets, with the direct impact on community livelihoods and forest preservation

Mr. Kinyili emphasized that Kenya's forestry sector is being positioned as a cornerstone of rural prosperity through a rules-based, high-integrity carbon market framework that embeds community benefit-sharing, FPIC safeguards, and Article 6 readiness. Case studies from Kasigau and Chyulu Hills illustrate how REDD+ projects can generate significant verified carbon credits while highlighting the need for transparency in revenue flows, robust worker protections, and inclusive governance.

He noted that the case highlights some of the ongoing problems such as unlawful logging, unfair benefit-sharing and weak MRV systems of carbon credits. Based on the experience of Kenya, this paper concludes that there are lessons that can be learned about how to match forest management with national green growth plans and there is a strong need to promote good governance, investing in nature-based solutions, and preparing to the carbon markets to scale up climate-smart forest economies across Africa

In conclusion, Kenya now operates a rules-based carbon market with Article 6 readiness and embedded community benefit-sharing mechanisms. The rising tree and forest cover, together with the ongoing national restoration drive, create favorable conditions for integrity-focused climate finance. Although the regulatory framework is robust on paper, its success will depend on effective implementation, particularly in ensuring rights and consent through FPIC, maintaining MRV integrity, and promoting transparent Community Development Agreement (CDA) reporting. Experiences from Kasigau and Chyulu demonstrate the potential to channel carbon revenues into community priorities when safeguards are properly enforced. When effectively implemented, carbon markets can complement Kenya's NDC and position forests as a central pillar of inclusive rural prosperity.

He ephasized that successful integration of carbon markets with rural livelihoods will depend on operationalizing the national carbon registry, strengthening MRV and social-impact monitoring at county levels, and ensuring co-designed benefit-sharing agreements with communities. At the project and community level, this requires using CDA-first planning to co-design benefit-sharing arrangements and livelihood pipelines, publishing annual CDA reports, and aligning methodologies with ICVCM eligibility to reduce offtake risk.

3.4.4. Forest-Based Economy in Kenya: Green Growth, Revenue Generation, and Carbon Opportunities A Meta-Analysis: By Dr. Kipkemboi Kandie

Dr. Kandie noted that Kenya's forest-based economy offers strong potential for green growth through diverse interventions like plantations, bamboo, NTFPs, PES, and carbon markets, though financing, enforcement, and technical capacity remain key constraints. Economic returns from forestry vary by model, with industrial plantations and bamboo processing showing high margins and job creation, while nature-based tourism and PES schemes demonstrate strong environmental and community benefits. Scaling successful models, standardizing payments for ecosystem services, and improving monitoring and benefit-sharing mechanisms are essential for unlocking sustainable forest value chains and climate resilience.

The section on bamboo and bio-materials highlights their economic potential and associated challenges. Margins are strongest when production is organized through cooperatives, combined with proper grading and diversified processing, with products such as poles, panels, and briquettes generating positive returns. However, risks exist, including mismatches between species and planting sites, as well as potential market saturation in the absence of clear standards. While the sector provides steady employment opportunities, wages are generally lower compared with those in timber processing.

Nature-based tourism and concessions generate gross receipts of approximately KES 3.2 to 6.5 million per site annually, offering significant opportunities for local development. Their success is supported by factors such as long-term concessions of five to ten years, arrangements that retain 30 to 50 percent of revenue locally, and a variety of diversified offerings that attract visitors. However, a major challenge remains in revenue leakages, as 80 to 90 percent of earnings are often remitted to central authorities without safeguards to ensure local benefits, limiting the potential impact on local communities.

Payments for ecosystem services (PES) provide farmers with approximately KES 4,000 to 12,000 per hectare per year in exchange for practices such as terracing, establishing buffer zones, and implementing agroforestry. These interventions have shown measurable environmental benefits, including a reduction in sedimentation by 18 to 35% and an increase in baseflows by 8 to 15% within two to five years. In well-established schemes, transaction costs remain below 15 percent, and the use of mobile payment systems has improved efficiency. Additionally, bundling multiple incentives has been shown to enhance compliance, increasing participation and adherence to agreed practices by around 22%. In conclusion, Kenya's forest-based economy offers strong and scalable pathways for green growth, revenue generation, and high-integrity carbon opportunities. To fully realize this potential, proven models should be scaled up, payments for ecosystem services standardized, and site-specific reinvestments ring-fenced to ensure local benefits. Investment strategies should combine financial support with integrity measures, including transparent community benefit-sharing and robust national monitoring, reporting, and verification (MRV) systems. At the landscape level, risks can be reduced through early warning systems, species diversification, and the adoption of climate-smart afforestation, reforestation, and improved forest management practices, ensuring both ecological resilience and sustainable economic returns.

3.4.5. Guidelines for Forest Ecosystem Services Assessment in Kenya: A Standardized Framework for Valuation and Integration of Forest Ecosystem Services into National Natural Capital Accounting and Development Processes: By Ms. Beth Welemba

Ms. Welemba informed the participants on guidelines for ecosystem services assessments in Kenya. She noted that the Standard Operating Procedures (SOPs) provide a structured and standardized framework for valuing Forest Ecosystem Services (FES) in Kenya, with the aim of integrating these services into national natural capital accounting and policy-making processes. She explained that Kenya's approach emphasizes simplicity, transparency, and the use of existing national data to assess key ecosystem services such as carbon sequestration, water regulation, biodiversity conservation, and ecotourism. The SOPs clearly outline valuation methods and data inputs to ensure consistency, credibility, and ease of application. She noted that applying FES assessments can strengthen climate resilience, guide sustainable land-use planning, attract green investments, and enhance community livelihoods, while aligning with global biodiversity commitments and Kenya's sustainable development agenda.

She further informed participants that FES assessments have practical applications across multiple sectors. At the community level, they can raise awareness, inform benefit-sharing arrangements, and help reduce resource-related conflicts in land use and forest management. The findings can guide spatial planning, support ecosystem restoration, and strengthen protected area management. From a policy perspective, integrating FES into national accounts can enhance evidence-based decision-making and environmental governance. In financing, valuation outcomes can support mechanisms such as Payment for Ecosystem Services (PES), REDD+ initiatives, biodiversity offsets, and green investment proposals.

She highlighted the importance of targeting unique ecosystems, such as the Kaya forests, to capture culturally significant and diverse ecosystem services. She encouraged the use of readily available datasets, including the National Forest Monitoring System (NFMS), to facilitate periodic updates. Field testing was recommended to refine methodologies and ensure alignment with other national surveys for sustainable outcomes. She stressed that the SOPs should serve as a unified national framework while remaining flexible to accommodate future advancements in data and technology. Broad dissemination of the SOPs was also recommended to establish a national system for ecosystem service valuation and improve data comparability.

In conclusion, forest ecosystem services are essential to both people and the environment, yet they are often overlooked and undervalued. Establishing a standardized assessment framework ensures that information generated is reliable, comparable, and useful for shaping policy and planning. Proper valuation can strengthen national accounts, inform land-use decisions, and support the livelihoods of forest-dependent communities.

3.5. Sub-Theme 5: Forests in a Changing Kenya: Urbanization, Risk Factors and Future Directions

Moderator: Mr. Joel Laigong'

MR. MESHACK MUGA

DR. JOSHUA CHEBOIWO

MR. EUGENE OJUKU

MS. SUSAN KARANI

3.5.1. Keynote Paper: Forests in a Changing Kenya: What it is and what it's not!: By Prof. Balozi Bekuta

The presentation highlights the lack of proper land-use zoning and weak enforcement of forest protection laws, which contribute to forest degradation and conflict between conservation and development agendas. Prof. Bekuta emphasized the need to modernize forest growth and carbon stock monitoring using integrated methods encompassing field inventories, modeling, and remote sensing with cross-validation and ground-truthing to ensure data reliability and inform adaptive forest management. He reiterated that strengthening forest education, enhancing institutional capacity, and aligning national development with ecological sustainability are critical in ensuring forests remain resilient and productive in a rapidly changing Kenya.

Respondents sought to know how increase in population can be addressed to avoid over-exploitation of forest resources. They were informed that its difficult to control population growth, however there exists alternatives and potential for importation of forest products. Other existing alternatives include embracing use of plastic furniture and promoting recycling to avoid further over exploitation of forest resources.

3.5.2. Urban and Peri-Urban Forestry for Climate Resilience and Livability: Challenges and Emerging Opportunities for Nairobi and Kisumu Counties Under the Green Cities Initiative: By Mr. Meshack Muga

Mr. Muga informed participants that the Green Cities Initiative in Nairobi and Kisumu aims to enhance urban climate resilience through forest and landscape restoration, riparian rehabilitation, and green infrastructure development. Nairobi's plan focuses on mapping green areas, integrating trees into urban planning, and promoting nature-based solutions like pocket forests and green building codes, while Kisumu emphasizes quarry restoration, tree-growing programs, and transforming waste-filled sites into community parks.

Both cities prioritize stakeholder engagement, youth education, and community-driven implementation frameworks to ensure sustainability, inclusivity, and alignment with broader climate and biodiversity goals.

The Programme aim at improving people's wellbeing through increased availability and access to products and services provided by green spaces including urban and peri-urban forestry, agriculture and by sustainable food systems. However key gaps exist and they include existence of degraded riparian zones, quarries, and open spaces which reduce ecosystem services, the lack of tree cover and biodiversity enhancement programmes in urban parks, and lack of agroforestry and food-tree integration opportunities in peri-urban areas.

Mr. Muga outlined the expected project outputs in Nairobi as: Output 1: Nairobi Urban Forest and Landscape Restoration Implementation Action Plan (NUFOLAREP) Developed and Implemented; Output 2: Local Physical and Land Use Development Plans Prepared and Implemented; Output 3: Strategic Stakeholder Engagement and Synergy with Ongoing Initiatives Achieved. The key outputs of the project in Kisumu were outlined as: Output 1: Kisumu county forest and landscape restoration implementation action plan (KCFOLAREP) formulated and implemented; Output 2: Tree growing programs in public and private institutions promoted; Output 3: Degraded quarries in Kajulu, Nyahera and Karateng restored into green parks and agroforestry zones; Output 4: Riparian restoration and pegging of riparian lands promoted; Output 5: Degraded and waste-filled sites transformed into functional

pocket parks supporting community use, urban greening, and biodiversity restoration.

Participants sought to enquire how the project would address environmental problems associated with urban settings, such as waste management. They were informed that the proposal has several components which include urban forestry, Circular bioenergy, waste management and bioeconomy. Participants further sought to enquire whether KIPPRA had been incorporated in the project, to which they were informed that various stakeholders will be incorporated during the implementation phase.

3.5.3. Incentivizing Tree growing to Reverse low Tree Cover in Siaya County: A systematic Review of Challenges and Opportunities for Tree Growing: By Dr. Leila Ndalilo

Dr. Ndalilo informed participants that Siaya County has the lowest forest cover in Kenya (0.23%). The low forest and tree cover have been attributed to encroachment of forest areas for settlement and agricultural productivity, as well as socio-cultural factors that constrain tree growing. This has resulted to significant negative impacts and exercabated climate change leading to a decline in agricultural productivity. The County is also characterized by high poverty levels; and as such residents are highly dependent on natural resources, and particularly agricultural production and forest resource extraction leading to a vicious cycle between poverty and environmental degradation. Several interventions have been put in place by various organizations to promote tree growing in Siaya County. However, these initiatives have not borne fruit, and both forest and tree cover remains very low. This has had negative implications on both conservation and livelihoods.

A study was conducted to assess residents' perceptions on tree growing, identify challenges and opportunities for tree growing and develop strategies for scaling up tree growing in Siaya County. A combination of household surveys, key informant interviews and focus group discussions were used to collect data in Bondo, Rarieda, Alego-Usonga, Ugenya, Ugunja and Gem Sub-Counties. Results of the study revealed that tree growing is largely hindered by a combination of socio-economic, environmental and cultural factors which vary from one Sub-County to another. Small land sizes resulting from population growth and land sub-division amongst majority of the residents was the leading hinderance to tree growing. Moreover, insecure land tenure resulting from communal land ownership in some areas have also posed challenges to residents in venturing in tree growing which is a long-term venture; in some cases land use conflicts amongst clan and family members resulting from communal land ownership have posed significant challenges to tree growing.

Inadequate technical know-how on tree growing was also noted as a hinderance to tree growing by 19% of the respondents. This has led to poor silvicultural practices which often result to high mortality and low tree productivity. The situation is further exacerbated by weak extension services which has made it difficult for farmers to access relevant knowledge and skills on tree growing as well as periodic technical backstopping.

Cultural barriers have also been a hinderance to tree growing in Siaya County; some cultural beliefs and taboos bar residents from growing specific tree species, while women are barred from growing trees in specific areas such as homesteads thus hindering their participation in tree growing activities. Environmental factors such as prolonged drought and poor soils in areas such as semi-arid parts of Rarieda and Bondo Sub-Counties have posed challenges to tree growing. This calls for

capacity building of residents on appropriate species to site matching to ensure high tree survival in such areas. Farmers should also be capacity built on the need to undertake periodic soil testing to ensure high productivity of both crops and trees.

However, various opportunities exist for scaling up tree growing in Siaya County including the presence of farmer groups, conservation groups and Community Based Organizations that can effectively act as champions to promote tree growing in the County with proposed strategies focusing on capacity building, tree diversification, and policy support for agroforestry. The study recommends a review of existing agricultural and forest extension policies at both national and county levels to recognize and integrate agroforestry as key strategy for sustainable land management and livelihood improvement.

Participants sought to know if intergration of tree farming into large scale cash crop farming such as sugarcane growing can be explored to improve tree cover in Siaya County, to which they were informed that KEFRI has already initiated integration of tree growing in sugarbelts and that research on potential benefits of the integration is underway. The respondents further mentioned that community forests could play an important role in improving tree cover in the County, but the prevailing governance issues should be addressed. They further recommended the need for enhancing synergies between national and County governments in enhancing tree cover in the county, although limited financial and human resources were noted as major gaps at the County level.

3.5.4. Germination Response to Temperature and Moisture Stress: Preliminary results for Four Acacia Species Collected in Kenya Indicate Phenotypic Expression of Temperature and Moisture Stress Tolerance By Mr. Eugine Ojuku

Mr. Ojuku outlined that while seed viability is inherently determined and linked to embryo maturity, the resumption of active growth of seed embryo is determined by exposure of the seed to favorable germination environments. Among the environmental conditions important for seed germination are temperature and moisture. Generally, seed germination for tropical species ranges between 10°C to 45°C under adequate moisture. However, changes in the global climatic patterns is hypothesized to result in temperature and precipitation shifts. Such shifts have the potential to affect soil seed bank longevity, seed germination as well as seedling establishment and survival through adversely affecting soil moisture. Also, arid and semi-arid areas cover approximately 45% of the earth's surface, with the Acacia species as the predominant species. Therefore, environmental shifts that could lead to warmer conditions have the potential to affect species survival, as well as species adaptability.

This study therefore investigated seed germination response to varying Constant : (25°C to 45°C) and Alternating (25-15°C, 30-20°C, 35-25°C, 40-30°C) temperatures, for *Acacia nubica*, *Acacia.nilotica, Acacia polyacantha* and *Acacia senegal*. In addition the study investigated seed germination response to varying water potentials (0, -0.2, -0.7, -1, -2 MPa) for *A.nilotica, A. polyacantha and A.senegal* under three temperature regimes (35-25°C, 30°C, 40°C, 45°C), in order to identify vulnerable species for targeted conservation and climate tolerant species for trait utilization.

Results indicated that seed germination was not affected significantly under alternating temperature conditions, but was affected at constant temperatures at and above 35- 40°C. In addition, the effect of extreme temperatures on seed germination was intensified under moisture stress, and seed germination under moisture stress was adversely impacted by negative water potentials. *A.senegal*

seeds showed potential for temperature and moisture stress tolerance, while A. polyacantha seeds showed potential for stress susceptibility. The results indicate that optimal temperatures for root development occur at 30°C, 35°C, and alternating 35°C–25°C conditions, with root growth significantly retarded at temperatures below and above 35°C. Both germination rate and germination percentage were highest within the 30–35°C range, confirming this as the optimal temperature window for seed germination. Thermotime modeling from the study estimated the base temperature (Tb) for Acacia senegal seed germination to lie between 12°C and 16°C. Germination was observed under water stress conditions up to -1 MPa, achieving 15% germination at 30°C and 7% under 35°C–25°C conditions at optimal temperatures. At higher temperatures (40°C), germination occurred up to -0.7 MPa, with 15% germination recorded. These findings demonstrate a degree of tolerance to water stress, though germination declines substantially under more severe moisture deficits.

The study further highlights that rainfall failure coinciding with germination events can negatively affect soil seedbanks, emerging seedlings, and established individuals in dryland species, as noted by Armoza-Zvuloni *et al.* (2021). This vulnerability is compounded by evidence from multiple studies indicating that many tropical and dryland species have germination thresholds between 10°C and 45°C and are particularly constrained below 15°C. Such sensitivity underscores the potential risks posed by shifting climate patterns. The study emphasizes the importance of integrating indigenous knowledge systems and targeted conservation strategies for dryland species into national forest management plans. This approach is critical for enhancing resilience and sustaining forest ecosystems under changing climatic conditions.

The participants sought to understand if the study considered insitu vs exsitu experiments. In response Mr.Ojuku indicated that Exsitu experiments have multiple potential treatments whereas In situ experiments allow for limited treatments and apportioning of variations to specific treatments and seed physiology. These then becomes a basis for eliminating variations by observed treatments under ex situ environments and improving accuracy.

3.5.5. Insights from Forest Managers on Building Climate - Resilient Forest Ecosystems in Kenya -By Mr. Isaac Omoding Ingura

Forest ecosystems are vital to Kenya's economy and environment, providing services such as carbon sequestration, biodiversity conservation, water regulation, soil stabilization, and livelihoods for local communities. However, they are increasingly under threat from deforestation, illegal logging, agricultural encroachment, charcoal production, and climate change effects such as irregular rainfall, frequent drought, and high temperatures. Active Community Forest Associations (CFAs) and alternative livelihoods significantly reduce forest encroachment and improve forest management. Adoption of technologies such as GIS and UAVs enhances forest monitoring and supports climate-resilient ecosystem restoration.

Semi-structured interviews and Focus Group Discussions (FGDs) were conducted with 27 Forest Station Managers and Officers in Mau Complex, Aberdare Range, Kakamega Forest, Mt. Elgon Forest, Kapseret Forest Ecosystem, and Nabkoi/ Timboroa Forests to identify feasible solutions and management gaps. to the selected sites capture diverse ecological zones and management contexts.

The results indicate that Over 75% of Forest Station Managers reported a significant rise in forest degradation in the last decade, citing anthropogenic encroachment and climatic fluctuations as major drivers. Key issues observed included increased

forest fires, delayed natural regeneration, and reduced stream flows threatening downstream water security. 81% of the managers noted illegal logging and charcoal production as constant pressures, particularly in areas with poor road access and limited monitoring. Forest Stations co-managed with Community Forest Associations (CFAs) saw a 35-50% reduction in encroachment, confirming the effectiveness of community co-management. About 60% of managers use GIS, drones, and remote sensing to track forest cover changes, identify hotspots, and support restoration, though limited by resources, poor internet, and inadequate training.

Findings support multi-pronged forest management approaches combining law enforcement, community involvement, and climate-smart restoration. Forest Station Managers identified three priorities for climate-resilient forestry: sustainable financing, early warning systems for fires and pests, and stronger stakeholder engagement. These insights can guide decision-making towards achieving 30% tree cover target by 2032, biodiversity conservation, and sustaining local livelihoods under changing climatic conditions.

In conclusion, forest degradation in the six study sites is driven by a consistent mix of anthropogenic pressures particularly agricultural encroachment, illegal logging, and charcoal production—and climatic stressors such as irregular rainfall and prolonged droughts, with the Mau Complex, Mt. Elgon, and Aberdare Range being most affected. These pressures have led to interconnected ecological impacts, including increased forest fires, delayed natural regeneration, and reduced stream flows in key catchments, thereby undermining ecosystem resilience and water security. Active Community Forest Associations (CFAs) have proven effective in reducing encroachment where they are well-resourced, fully operational, and linked to tangible community benefits, while weak or absent CFAs correspond with poorer outcomes.

Furthermore, the combined use of advanced monitoring technologies (GIS, UAVs, remote sensing) and well-designed, market-oriented alternative livelihood projects has shown promise in both reducing illegal forest exploitation and enhancing community engagement.To address these challenges, it is recommended that integrated land-use planning and targeted enforcement be prioritized in high-risk zones; site-specific restoration strategies including fire-resistant planting and enrichment of degraded areas should be implemented; CFA coverage and capacity be expanded alongside formal benefit-sharing arrangements; and investments in both forest monitoring technologies and scalable, market-driven alternative livelihoods be increased to provide sustainable conservation incentives.

3.5.6. Future of Plantation Forest Development and Manufacturing in Kenya: Can Forest Concessions Revive our Fortunes? By Dr. Cheboiwo

Dr. Cheboiwo stated, that Kenya is a big player in forest products trade within Eastern, Central and Southern Africa hence well placed to play critical role in the AfCFTA ambition. Opportunities exists in the vast investment opportunities in forest plantations, wood processing industries and trade in diverse products. He mentioned that enhanced trade in forest products will significantly contribute to increasing economic and forest resource development and conservation within the continent. However, policy, legal and infrastructure challenges need to be addressed to facilitate efficient trade in forest products within and outside the continent. According to him, forest plantation concessions present a significant opportunity to meet Kenya's rising demand for timber and wood products while reducing pressure on natural forests.

Successful implementation depends on transparent concession frameworks, clear tenure arrangements, and benefit- sharing mechanisms with communities adjacent to plantation areas. Integrating environmental safeguards, sustainable harvesting practices, and private-sector investment into these concessions can enhance economic returns while promoting forest restoration and climate resilience.

He emphasized that the flow of forest products into Kenya is dominated by hardwood from DRC and softwoods from Tanzania and Malawi. The hardwood imports have remained almost constant but the softwood are more varied due to influence of the frequency of the government logging bans on harvesting in public forests in the country. Imports of treated transmission poles has also remained a common trade feature over the period mostly from Tanzania and Uganda. .

He further mentioned that Kenya is a net importer of manufactured boards, paper and paper products from East Africa, Africa, Europe and Asia. Kenya has also expanded its forest related products imports from the region to include teak planks, tamarind fruits and even Cinchona. On the other hand, the Country exports cork, wood carving, paper, and wattle bark to Sudan, Democratic Republic of Congo, Rwanda, South Africa, Uganda, Tanzania, Ethiopia, Cameroon, Zimbabwe and Western Sahara. Kenya also exports wood products to other parts of the world namely Israel, Italy, England, Belgium, Norway and China.

The study concluded that Kenya is a big player and beneficiary of transboundary trade in East and Central Africa. It is a dominant importer of sawn timber, paper products and re-exporter of various forest products to neighbouring countries.

The transboundary trade is dominated by informal operators. Inadequate policy and legal frameworks has hindered entry of large operators in transboundary timber trade. Moreover, Africa has vast forestry resources but production, processing and intra Africa trade is relatively low and need policy and legal frameworks to facilitate investment in industries and infrastructure to enhance timber trade. The study further highlighted that timber supplies from Tanzania and DRC bridged the deficits during the logging bans 2002-2012 and 2018-2021.

Dr. Cheboiwo highlighted the key challenges affecting trade in forest products as cumbersome processes due to standardization and policy and legal procedures; dominance of informal sector, and low manufacturing capacity hence net importer of manufactured products from Europe and Asia. The study recommended investment in small scale and large scale wood processing plants with latest efficient technologies, massive investment and certification of plantation forests in East and Central Africa, enactment of national and regional trade policies and legislations to facilitate certification, investments in processing and production for local and export markets, and urgent policy and legislative framework for enhanced intra Africa timber trade.

Participants sought to understand why we are stuck in Timber production yet countries such as China are making billions in NTFP; they were informed that there is need to enhance the contribution of forestry to the Country's economic development. It was further clarified that concessions are area based and not production based, and that volume-based method can be more efficient. It was further emphasized that FCMA allowed concession and so much effort has been made to improve on it, but concessions come with risks that need to be addressed. Land tenure system is becoming critical, volume-based method can be more efficient

3.5.7. Leveraging Clonal Forestry for Sustainable Forest Productivity: By Ms. Susan Karani

Ms. Karani mentioned that traditionally, forest plantations in Kenya have over relied on exotic species mainly cypress, pine and eucalyptus. However, there is a renewed interest in industrial forest plantations comprising indigenous species. The breeding cycle of these species is long, and cultivation of many species is limited by low seed germination, unpredictable flowering and short seed viability, making seed propagation unsustainable. Kenyan forests directly contribute around 1.1% to 1.3% of national GDP. In an effort to increase forest contribution to the GDP, clonal forestry has the potential of enhancing productivity of forest industrial plantations. By adopting clonal forestry through mass propagation, it is possible to shorten the breeding cycle to enhance productivity and contribute towards the attainment of 30% forest cover through the 15B tree initiative.

The Kenya Forestry Research Institute (KEFRI) has developed tissue culture protocols for propagating tree species that are difficult to grow conventionally, thereby advancing sustainable forest production. Clonal forestry offers opportunities to address challenges associated with seed propagation such as low seed germination, unpredictable flowering and short seed viability, low yields, pest and disease pressures, and the need for climate-resilient species. Clonal forestry with superior tree genotypes leads to faster, more uniform, and higher-yielding plantations. Bamboo and Melia volkensii offer unique opportunities for clonal forestry plantation in Kenya.

Bamboo has been recognized as a cash crop since 2020. However, its cultivation is limited by unpredictable flowering and short seed viability, making seed propagation unsustainable. Tissue culture protocols of six bamboo species (Dendrocalamus and Bambusa) have been developed to enhance mass clonal production of high-quality seedlings. Melia volkensii on the other hand is a multipurpose deciduous tree that is endemic to drylands of Eastern Africa. It is a fast-growing tree, drought tolerant and produces high quality termite resistant timber. It attains maturity in 10 to 15 years depending on site conditions. It however faces seed propagation challenges due to dormancy and low seed viability . KEFRI has therefore developed tissue culture protocols for propagation of this species. These studies are ongoing and will promote sustainable forest plantation establishment in Kenya.

She concluded that clonal forestry offers practical solutions to key challenges in the forestry sector by enabling shortened breeding cycles, large-scale mass propagation, and enhanced productivity of industrial plantations. Through the use of superior genetic material, clonal technology improves uniformity, growth rates, and overall plantation performance. The adoption of clonal forestry will therefore advance sustainable forest production, support the 15 Billion Tree Growing Initiative, and strengthen the forestry sector's contribution to Kenya's GDP.

4.0. YOUTH EVENT

4.1 Introduction To The Youth Event.

The conference had a youth engagement session which was sponsored by the Forest Stewardship Council (FSC) and NatureKenya. The session provided a platform to deliberate on pressing issues affecting the youth and which limits their participation in forestry development. The youth also had an opportunity to network, and showcase their role as future custodians of Kenya's forest resources.

The youth participated in the following activities during the conference: A debate facilitated by FSC tittled "Kenya's forests will only be saved by technology, not traditional knowledge" where they discussed divergent views on the significance of modern technology and traditional knowledge in the management and coservation of forest and emerging forestry issues. The youth also contributed to key policy discussions and provided logistical support during the election of the FSK National leaders. Their involvement in supporting the FSK National elections demonstrated not only their commitment to the profession but also their integrity, responsibility, and dedication to supporting transparent and accountable electoral processes within the Society. The conference offered an opportunity for youth mentorship, networking, and collaboration with senior professionals and reinforced the role of youth in providing solutions for sustainable management of forests and natural resources.

The youth session at the 2025 FSK Conference was a resounding success, made possible by the generous support of FSC. The youth debate and dialogues underscored the importance of blending technology with Indigenous Knowledge as twin pillars of sustainable forestry. The branding materials provided by FSC not only enhanced the professional visibility of the youth but also left a lasting impression of solidarity and recognition. The active role of the youth in both technical discussions and governance processes, affirmed their position as the next generation of forestry leaders. The youth reaffirmed their commitment to championing inclusive, innovative, and culturally grounded approaches to forest conservation in Kenya.

5.0 FIELD EXCURSION




A field excursion was held on the second day of the conference where conference participants visited the Impala sanctuary and Kajulu hills forest in Kisumu. The Impala sanctuary located at the shore of Lake Victoria is home to different flora and fauna while Kajulu hills forest is a degraded forest where restoration work has been undertaken making it one of the unique ecotourism sites in Kisumu County.

During the excursion, members were taken through an educative tour at the Impala Sanctuary, while the second set of members were taken through a guided tour of Kajulu hills forest to appreciate the restoration work as well as the key challenges affecting the forest. Participants had an opportunity to deliberate on possible conservation strategies for the two ecosystems.

6.0 EMERGING ISSUES AND POLICY RECOMMENDATION

Moderator: Dr. MTE Mbuvi

6.1 Emerging Issues

Following deliberations by participants, the following key issues emerged from the conference:

- The need to promote the adoption of Mpingo tree species for its diverse uses and sensitize community on its cultivation and proper management was emphasized.
- The need to develop sustainable forestry-based business models coupled with an appropriate legal and policy framework, market linkages, certification and economic incentives was emphasized.
- Documentation of current and past forestry research and development activities and establishment of centralized data bases to support long-term monitoring and future reference was also emphasized. Further, participants reiterated the need for establishment of permanent sample plots (PSPs) for long-term forest monitoring
- Knowledge dissemination to the youth through partnerships with institutions of higher learning to impact skills was highly recommended.
- The need to streamline and operationalize carbon regulations in Kenya was emphasized for enhanced benefits and socio-economic development of local communities.

6.2 Key Policy Recommendations

The following policy recommendations were made during the conference

1. There is need to promote reforestation and afforestation programmes targeting native tree species for enhanced diversity and ecosystem resilience. The need to promote diversification of on-farm tree species to include high value indigenous tree species was also emphasized.
2. The conference recommended strengthening of community-based forest governance through capacity building of community forest associations and providing incentives for sustainable forest-based livelihoods such as ecotourism, beekeeping and herbal medicine among others.
3. The need to ensure equitable benefit-sharing mechanisms was emphasized to ensure local communities gain from forest resources and their efforts in forest conservation.
4. Participants recommended measures for enhanced forest protection through continuous monitoring, enforcement of rules and regulations to deter illegal activities and designating biodiversity hotspots as conservation areas.
5. Participants emphasized the need for favourable national and regional trade policies and legislations to facilitate certification, investments in timber processing and production for local and export markets. Further, participants emphasized the need for investment to transform the country into a leading manufacturing hub for timber products through technical skills, SMEs, large firms, policy support and infrastructure.

7.0.CLOSING REMARKS

The scientific conference was officially closed by the CEC Environment, water and climate change Kisumu County Madam Judith Oluoch. In her closing remarks, she highlighted that Kisumu Ccounty has low forest cover at less than 2% with the main gazetted forests being Kodera Forest in Nyakach covering 411 acres, Karaten'g forest in Kisumu west covering 47 acres and Kajulu forest covering 100 acres.

She emphasized that the forestry sector in Kisumu County faces many challenges and gave an example of Karatein'g Forest which is heavily affected by human activities. She reiterated the need to transition from analogue to digital tools to effectively manage forest resources, and the need to unlock emerging opportunities such as carbon markets for forest conservation and livelihood improvement., She requested for FSK guidance and KFS support towards the development of Kisumu County forest management plan. She thanked the FSK leadership for choosing Kisumu County as the host for for the 2025 FSK scientific conference and mentioned that the County was honoured to host the conference. She then declared the conference officially closed.

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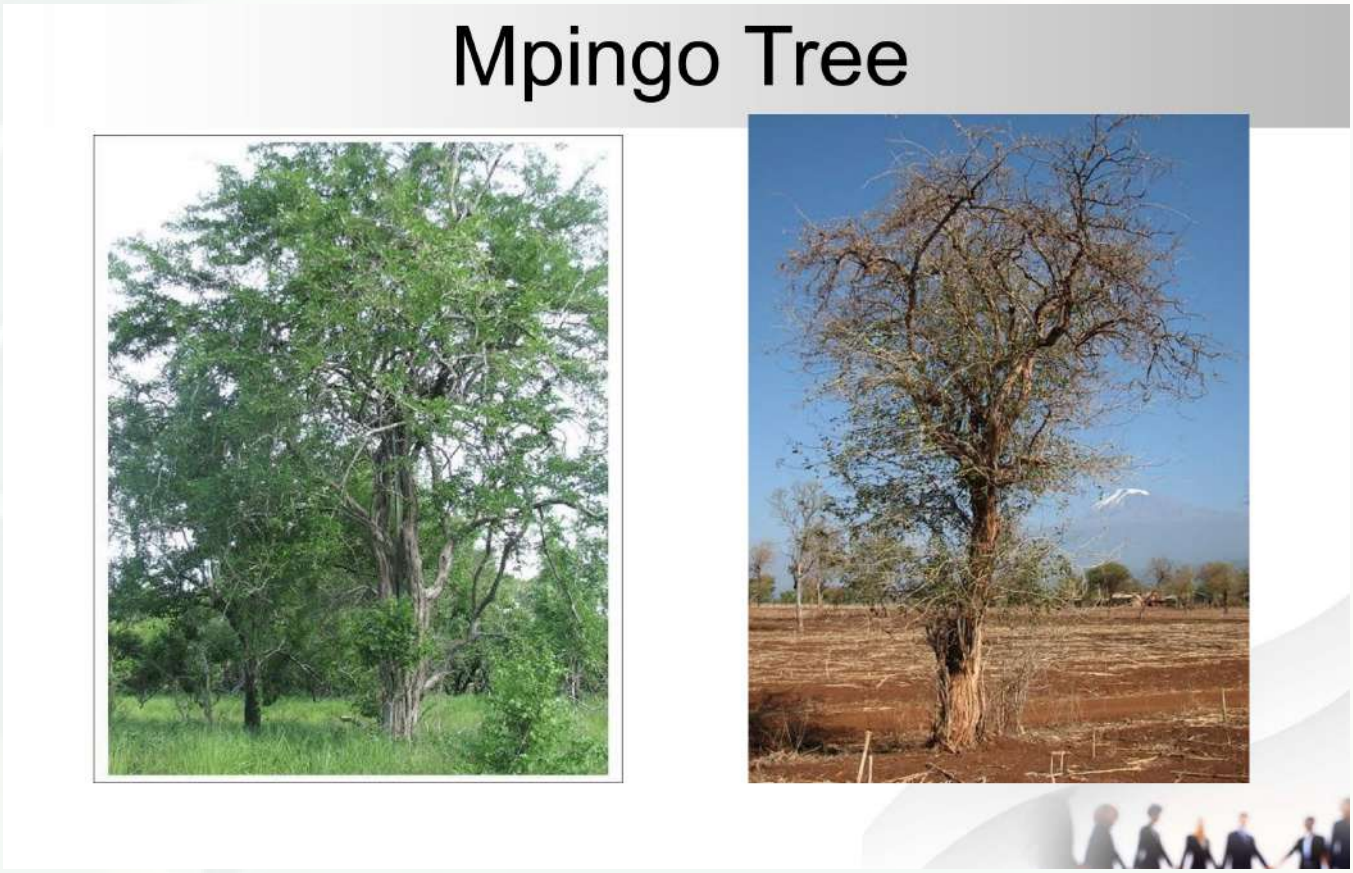
APPENDICES

Posters

Appendix I: The Sweet Sounds of Forestry in Kenya-By Mpingo Restoration Initiative



MPINGO WOOD

What is Mpingo?

- Small deciduous tree (4–15 m)
- Extremely hard, dense, durable wood
- Known locally as Boni, Maringo, Mwengo, Myingo
- Lifespan: 200+ years
- Sawn logs sells @ about KSh **900,000 - 1.3M per cubic metre**
- **SOURCE**: https://currentaffairs.adda247.com/most-expensive-wood-in-the-world/

Where is Mpingo Found?

- Distribution: Eastern, Central, Southern Africa
- Kenya: Meru, Kitui, Elgeyo, Kilifi, Machakos, Taita-Taveta, Makueni, Tsavo East
- Grows in hot, dry climates (700–1,200 mm rainfall)
- Vital for dryland restoration

Why Mpingo Matters

- 🎶 Music: clarinets, flutes, violins, guitars
- 🎨 Art & Carving: sculptures, ornaments, furniture
- 🌱 Medicine: roots, bark, leaves, smoke in healing
- 🔥 Livelihoods: firewood, heritage, artisan income

How Is Mpingo Propagated

- **Seeds:** Germination within 8–20 days under optimal conditions.Soak seeds in warm water for 24 hours to soften the seed coat
- **Cutting:** semi-hardwood cuttings from healthy branches.
- **Tissue culture**:Nodal explants cultured
- **Wilding:**Naturally occurring seedlings collected from the wild.

The Threats

- - Overharvesting for timber
- - Very slow growth, poor regeneration
- - Few mature seed trees left
- - Short seed viability
- - Habitat loss & low awareness

Solutions & Restoration

- - Map & protect seed trees
- - Improve seed collection & storage
- - Establish nurseries for propagation
- - Train & empower local communities
- - Develop sustainable wood value chains
- - Influence supportive policies

Vision for the Future

- Restoring Mpingo = Restoring music, culture, and drylands
- "Planting Mpingo is planting music and heritage."

Call to Action

- - Join Mpingo Restoration Initiative
- - Support conservation programs
- - Raise awareness in your institutions/communities

Remember:

Planting mpingo is planting music,culture and heritage.Together we can restore the sweet sounds of Africa's forests.

LET US ALL TAKE ACTION.

Conference Programme

Program for 2025 FSK National Scientific Conference and AGM

Travel and Arrival in Kisumu on Monday, 22nd September 2025		
DAY 1, TUESDAY, 23RD SEPTEMBER 2025		
SESSION I **WELCOMING AND OFFICIAL OPENING** **Session Moderator- Mr. Samwel Osee, FSK National Secretary**		
Time	**Activity**	**Responsible**
0800 - 0830	Registration of participants	FSK Secretariat
0830 - 0900	Introduction Prelude	Mr. Samson Osee FSC/youth
0900 - 0915	Welcome Remarks	Chair-FSK Nyanza Chapter
		CEC-Kisumu County
0915 - 0930	Overview of the Conference Objectives	Chair-FSK Scientific and Technical Committee
0930 - 1015	Remarks by the FSK National Chairman	FSK Chairman
	Remarks, by CEOs and other invited guests	JICA, FSC, Nature Kenya WWF-Kenya, DG-NEMA, DG-KWS, Director-KEFRI, Chief Conservator of Forests
1015 - 1025	Remarks and invitation of Chief Guest	Patron, FSK
1025 - 1045	Official opening of the 2025 National Scientific Conference, by the Cabinet Secretary Ministry of Environment, Climate Change and Forestry	Dr. Deborah Barasa, Cabinet Secretary Ministry of Environment, Climate Change and Forestry.
1045 - 1100	Group Photo	FSK Secretariat
1100 - 1120	**Tea Break**	FSK Secretariat
SESSION II **Sub-theme 1: Policy, Governance, and Indigenous Knowledge in Sustainable Forest Management**		
Moderator: Mr. Noor Hussein		**Rapporteurs**: Byron Abiero and Devinia Akinyi
1120 - 1140	**Keynote paper**-Policy instruments and institutional frameworks in Kenya supporting Forestry development in the 21st Century and beyond	Mr. George Tarus, Secretary, Forest Development-Ministry of Environment, Climate Change and Forestry.
1140 - 1155	Global processes and their implications to forestry development in Kenya	Dr. Vincent Oeba-KEFRI

1155 - 1205	Formulation of a natural capital accounting and payment for ecosystem services frameworks for Kenya	Dr. Joram Kagombe
1205 - 1220	Partnerships in policy and standard development: Lessons, opportunities and challenges to FSC certification in Kenya	Mr. Paul Opanga, FSC
1220 - 1240	Plenary	Mr. Noor Hussein
1240 - 1330	**LUNCH**	FSK Secretariat
SESSION III: BREAKOUT **Sub-theme 2: Restoring Landscapes, Reviving Ecosystems: Nature-Based Solutions for a Sustainable Future** **Room A: Hibiscus hall**		
Moderator: Dr. Elizabeth Wambugu **Rapporteur:** Antony Aluvale and Titus Kemboi		
1330 - 1350	**Keynote paper**: Restoring Landscapes, Reviving Ecosystems: Opportunities and Challenges	Mr. Elijah Korir, WWF
1350 - 1405	Breeding strategy for Melia volkensii for timber production and supply of improved seed in drylands of Kenya	Dr. James K. Ndufa
1405 - 1420	Commercial Growing of Melia volkensii: Advancing Sustainable Dryland Forestry in Kenya	Mr. Santos Ingosi
1420 - 1435	Status Report on Lantana camara Invasion in Nzoia Forest: Management Lessons from Lower Imenti Forest	Ms. Lydia Omukweyi
1435 - 1450	Validation of germination and storability of marula (sclerocarya birrea) seeds	Mr. Gabriel M. Samuel
1450 - 1505	Voices from farmers as a tool to enhance adoption of nature-based solutions	Ms. Josephine Wanjiku
1505 - 1520	Exploration of alternative Pinus species to Pinus patula as potential commercial plantation species in Kenya	Mr. Welimo O. Martin
1520 - 1535	Evaluating nature-based solutions for Ipomoea hildebrandtii in Kajiado county, Kenya.	Ms. Jane J. Chepkonga
1535 - 1555	Plenary	Dr. Elizabeth Wambugu

SESSION III: BREAKOUT **Sub-theme 3: Smart Forestry: Digital Tools, Technologies, and Innovations** **Room B: Chambers hall**		
Moderator: Dr. Doris Mutta		**Rapporteur:** Byrone Abiero and Susan Karani
1330 - 13.50	**Keynote paper**:Leveraging on technological innovations in catalyzing forestry development and resilience in Kenya	Dr. Jane Njuguna, Director/ CEO-KEFRI
1350 - 1405	Smart Forestry, Digital Tools, Technologies, and Innovations for Sustainable Forest Management in Kenya	Dr. Benjamin Kinyili
1405 - 1420	Smart forestry: digital tools, technologies and innovations MTICARBO app	Ms. Ashanet Atieno
1420 - 1435	Introduction of timber traceability system in Kenya	Ms. Diana Kishiki
1435 - 1450	Evaluation of extension methods in forestry development for increased information dissemination of forestry technologies and innovations in Lamu County	Mr. Kevin Muema
1450 - 1505	Local introduction, distribution and manufacture of non - lethal weapons in Kenya	Mr. Caleb Muiruri Kamau
1505 - 1520	Cypress and Juniper dieback; A case of mites and fungal attack	Mr. Joseph Machua
1520 - 1540	Plenary	
1540 - 1700	Young FSK professionals side event	Forest Stewardship Council (FSC)
	End of Day 1	
	DAY 2 WEDNESDAY, 24TH SEPTEMBER 2025	
0800 - 0840	**REGISTRATION**	FSK Secretariat
0840 - 0900	Recap	Chief Rapporteur
SESSION IV **Sub-Theme 4: Forest-Based Economy: Green Growth, Revenue Generation, and Carbon Opportunities**		
	Moderator: Jamleck Ndambiri	**Rapporteur**: Antony Aluvale and Susan Karani
0900 - 0920	**Keynote Paper**:Natural capital accounting: Role of forests and tree resources in green growth and sustainable development.	Mr. Rudolph Makhanu, Nature Kenya

0920 - 0935	The potentials for positioning Kenya in forest products manufacturing and timber trade under African continental free trade area	Dr. Joshua K. Cheboiwo
0935 - 0950	Prosopis Juliflora management for decent green jobs and livelihood support for the host communities and refugees in Garissa and Tana River Counties	Dr. Joram Kagombe
0950 - 1005	Forests for Prosperity: Integrating Carbon Markets with Rural Livelihoods in Kenya.	Dr. Benjamin Kinyili
1005 - 1020	Forest-Based Economy in Kenya: Green Growth, Revenue Generation, and Carbon Opportunities A Meta-Analysis	Dr. Kipkemboi Kandie
1020 - 1035	Guidelines for Forest Ecosystem Services Assessment in Kenya: A Standardized Framework for Valuation and Integration of Forest Ecosystem Services into National Natural Capital Accounting and Development Processes	Ms. Beth Welemba
1035 - 1055	Plenary	Jamleck Ndambiri
1055 - 1110	**TEA BREAK**	FSK Secretariat
SESSION V **Sub-theme 5: Forests in a Changing Kenya: Urbanization, Risk Factors and Future Directions**		
Moderator: Mr. Joel Laigong'		**Rapporteur:** Titus Kemboi and Devinia Akinyi
1110 - 1130	**Keynote paper:** Forests in a changing Kenya: What it is and what it's not!	Prof. Balozi Bekuta
1130 - 1145	Urban and Peri-Urban Forestry for Climate Resilience and Livability: Challenges and Emerging Opportunities for Nairobi and Kisumu Counties under the Green Cities Initiative	Mr. Meshack Muga
1145 - 1200	Forest in a Changing Kenya: Urbanization, Risk Factors and Future Directions	Dr. Thomas Kiprotich Kiptoo
1200 - 1215	Incentivizing tree growing to reverse low tree cover in Siaya County: A systematic review of challenges and opportunities for tree growing	Dr. Leila Ndalilo
1215 - 1230	Future of plantation forest development and manufacturing in Kenya: can forest concessions revive our fortunes.	Dr. Joshua K. Cheboiwo

1230 - 1245	Germination response to temperature and moisture stress: Preliminary results for four Acacia species collected in Kenya indicate phenotypic expression of temperature and moisture stress tolerance	Mr. Eugene Ojuku
1245 - 1300	Climate Change Threatens Eastern Arc Mountains Plant Species	Ms. Gladys Chepkoech Rutto,
1300 - 1315	Insights from Forest Managers on Building Climate - Resilient Forest Ecosystems in Kenya	Mr. Isaac Omoding Ingura
1315 - 1330	Mt Elgon Rising: A People-Centered Blueprint for Climate Resilience and Ecological Recovery	Mr. Enock Kanyanya
1330 - 1345	**Posters and Exhibitions** • The Sweet Sounds of Forestry in Kenya • XXVII IUFRO World Congress 2029 • Africa Champion of Trees-ACT AWARDS	Mpingo Restoration Initiative Kenya Forestry Research Institute Kenya Forest Service
1405 - 1415	Emerging issues and way forward	Dr. M.T.E Mbuvi
1415- 1445	Closing Ceremony	H.E. Prof. Anyang' Nyong'o EGH, Governor County Government of Kisumu
1445 - 1515	LUNCH	FSK Secretariat
1515 - 1700	Field Excursion - Kisumu Impala Sanctuary	Mr. George Wara, Chairperson- Nyanza chapter
	End of Day 2	
	DAY 3: THURSDAY, 25TH SEPTEMB ER 2025	
	FSK GOVERNANCE	
0800 - 0830	Registration for the AGM	FSK Secretariat
0830 - 1030	Annual General Meeting	Chairman, FSK
1030 - 1100	**TEA BREAK**	Chairman, FSK
1100 - 1300	Cont. of AGM	FSK Secretariat
1300 - 1400	Elections	
1400 - 1500	**LUNCH BREAK**	
	Departure from Kisumu on Friday,26th September 2025	

Attendance Register

Appendix 3: List of Participants

S/No	NAME	Organization
1	Abdalla Kisiwa	KEFRI
2	Abuto G. Omolo	KFS
3	Adala Heykerl	UOE
4	Albert Nyabuti	KFS
5	Alexon tosiko	KFS
6	Ambrose Genga	KFS
7	Andrew Soi	KFS
8	Anne A. Owino	NEMA
9	Anne Mbora	Consultant
10	Antony Aluvale	FAO
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