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**The role of forests and wildlife in building resilience and recovery from
crises and threats**

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**BUILDING A SUSTAINABLE AND CIRCULAR BIOECONOMY IN
AFRICA THROUGH FOREST PRODUCTS – TRENDS,
OPPORTUNITIES AND CHALLENGES¹**

I. I. BACKGROUND – TOWARDS A BIOECONOMY FOR SUSTAINABLE FOOD AND AGRICULTURE

1. Bioeconomy for sustainable food and agriculture is considered by FAO as one of its Priority Programme Areas (PPA),² aiming at protecting, restoring and promoting the sustainable use of terrestrial and marine ecosystems and combat climate change (reduce, reuse, recycle, residual management, the 4R) through more efficient, inclusive, resilient and sustainable agrifood systems. Bioeconomy is defined as the production, utilization, conservation, and regeneration of biological resources, including related knowledge, science, technology, and innovation, to provide sustainable

¹ This note serves as informal background document summarizing the main findings of the forthcoming report: FAO and Dalberg Catalyst. Forthcoming. Building a sustainable and circular bioeconomy in Africa through forest products – trends, opportunities and challenges. Rome. If not mentioned otherwise, information provided in this paper is referenced in the report.

² FAO. 2021. Strategic Framework 2022-31. <https://www.fao.org/3/cb7099en/cb7099en.pdf>

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solutions (information, products, processes and services) within and across all economic sectors and enable a transformation to a sustainable economy.³⁴

2. Forests can be considered as the most important biological infrastructure and main source of renewable biomaterials and bioenergy as well as the main host for biodiversity and terrestrial carbon sink. The sustainable use of forest and tree products and services such as building materials, food and energy therefore provide unique opportunities for a transition to a sustainable circular bioeconomy. Products from these forest-based value chains contribute to a number of major economic sectors, namely agriculture, energy, construction, health, manufacturing and services.

3. The annual global consumption of all natural resources, such as biomass, fossil fuels, metals and minerals, is projected to more than double from 92 billion tonnes in 2017 to 190 billion in 2060 as a consequence of population growth and increasing affluence. Only 25 percent of the total material demand is supplied by biomass, including forest products. World roundwood production, which reached 3.91 billion m³ in 2020, increased by 12 per cent in the last two decades.⁵

4. Demand for biomass is expected to rise further to meet growing needs for food, energy, housing and other material uses. Demand for forest-based biomass will be driven globally mainly by construction and packaging. Sustainably meeting the growing demand for forest-based biomass will require an increase in resource supply through restoration, reforestation and afforestation on degraded lands and increased resource efficiency.⁶

5. In most African countries, bioeconomy is still emerging as a concept. For example, in Ethiopia, the development of the bioeconomy is being considered within the larger context of a green economy and, in recent years, many bioeconomy-related strategies, policies and initiatives have been adopted by the government, including a Climate-Resilient Green Economy strategy (CRGE) (2011–2025), and a Growth and Transformation Plan. In Ghana, the bioeconomy is mainly focused on biotechnology, rural development, fossil fuel import substitution, development of bioenergy export capacity, and sustainable management of forest resources including afforestation and reforestation.⁷ In East Africa, the state of the bioeconomy has been assessed, indicating that the frequent use of biological resources for food, energy and medicine in their raw form contains a huge potential to add value to these biological resources through the development of a bioeconomy.⁸ According to the Malabo Montpellier Panel (2022), Ghana, Namibia, Uganda and South Africa have been identified as

³ IACGB (International Advisory Council on Global Bioeconomy). 2020. Expanding the Sustainable Bioeconomy – Vision and Way Forward. Communiqué of the Global Bioeconomy Summit 2020. Berlin. https://gbs2020.net/wp-content/uploads/2020/11/GBS2020_IACGB-Communique.pdf

⁴ FAO. 2021. CONFERENCE Forty-second Session 14-18 June 2021 Strategic Framework 2022-31, Medium Term Plan 2022-25 and Programme of Work and Budget 2022-23 (Draft Resolution). 8 pp. (also available at: C 2021/LIM/4 (fao.org).

⁵ FAO. 2022. The State of the World's Forests 2022. Forest pathways for green recovery and building inclusive, resilient and sustainable economies. Rome, FAO. <https://doi.org/10.4060/cb9360en>

⁶ FAO. 2022. The State of the World's Forests 2022. Forest pathways for green recovery and building inclusive, resilient and sustainable economies. Rome, FAO. <https://doi.org/10.4060/cb9360en>

⁷ Verkerk, P.J., Hassegawa, M., Van Brusselen, J., Cramm, M., Chen, X., Maximo, Y. I., Koç, M., Lovrić, M. and Tegegne, Y. T. 2022. The role of forest products in the global bioeconomy – Enabling substitution by wood-based products and contributing to the Sustainable Development Goals. Rome, FAO. <https://doi.org/10.4060/cb7274en>

⁸ Virgin, I., Diaz-Chavez, R., Morris, E.J., Haileselassie, T., Tesfaye, K., De Cliff, S., Njau, K., Munganyinka, E.,

Muyambi, F., Otim, M.O. 2022. The State of the Bioeconomy in Eastern Africa: 2022. Stockholm Environment Institute, The East African Science and Technology Commission and BioInnovate Africa.

file:///C:/Users/Sven/OneDrive%20-%20Food%20and%20Agriculture%20Organization/Documents/Sven/FAO/FO/RAF/Dalberg%20LoA/the-state-of-the-bioeconomy-in-eastern-africa-2022.pdf

countries that have combined biosciences, technology, and political commitment towards policy innovations and opportunities for Africa's bioeconomy.⁹

6. The forest-based bioeconomy in Africa is a unique ecosystem that presents its own set of opportunities and challenges. It can be characterized :

- as a means towards local community socio-economic development, as opposed to being solely driven by aspirations for conservation, natural resource capitalization or reindustrialization;
- by major challenge related to high forest loss due to agricultural expansion, logging, mining, fuelwood collection, and other factors;
- by limited integrated value-add industries along forest value chains and continues reliance on the trade in primary products of forest resources;
- by a strong presence of informal markets consisting of small actors and fragmented players providing significant direct income and employment, but being constrained by limited business acumen as well as access to finance and markets;
- by an underdeveloped forest-based circular economy that still produces valuable "waste" material that could be repurposed based on the 4R, and the principles of a cascading use, to both reduce wastage and create other opportunities in form of green jobs as well as goods and services.

II. THE FOREST BASED ECONOMY IN AFRICA

7. Wood products in Africa create most of their value through primary production activities in the region that is a net importer of forest products. As of 2011, the formal wood harvesting and processing sector in Africa was estimated to generate USD17 billion per year, of which just under two thirds was from forestry and logging activities, and about a third from processing activities. The value creating in processing activities is largely attributed to the production of wood charcoal, sawn wood and paper and paperboard.

8. Wood fuel plays a significant role in the African energy mix. Wood energy accounts for 44 percent of total primary energy supply in the region, and an estimated 63 percent of the population is reliant on wood fuel for cooking.

9. Within non-wood forest products (NWFP), plant-based foods and biomass, specifically for medicinal, aromatic and colourants dominate the formal African market. Regional trade and local consumption of NWFP are significant to the trade of these products in the region, and in many cases, these local and regional markets dwarf those for exported products. Within the formal sector, edible plants alone in Africa account for an estimated 45% of the commercial market production value of NWFPs.

10. However, the NWFP sector in Africa also enjoys significant informal activity and income is dominated largely generated from animal-based NWFPs. In contrast to the formal sector, the informal activities in the NWFP sector in Africa were largely attributed to animal-based NWFP, valued at USD3.2 billion. Wild protein is an important part of local diets for some areas for the region, such as the Congo Basin, where bushmeat is eaten in both urban and rural settings. In the Basin, the commercial trade of bushmeat is a significant driver to increasing extraction of the protein from forest resources.

11. Forest areas can provide a multitude of regulating, provisioning and supporting as well as cultural and social services. Ecotourism contributes significantly to local economies and conservation

⁹ Malabo Montpellier Panel (2022). Nature's Solutions: Policy Innovations and Opportunities for Africa's Bioeconomy. Kigali, Rwanda. https://www.mamopanel.org/media/uploads/files/Bioeconomy_Report-Malabo_Montpellier_Panel-May_24_2022_WdoAcqS.pdf

efforts in the region. However, the sector has been severely impacted by the COVID-19 pandemic. Payment for Ecosystem Services has gained traction in the region, though the activities conducted are not without social and legal constraints.

12. The COVID-19 pandemic has had significant impact on the African economy, including the continent's forest-based bioeconomy. The services sector, specifically tourism, is the most financially impacted economic sector by the pandemic. Precautionary measures such as lockdowns, social distancing mandates and border and mobility restrictions created an economic shock for ecotourism across Africa. COVID-19 has also caused disruptions in the demand, export prices and supply chains for wood and NWFP. In some cases, however, COVID led to increased demand for medicinal plants and functional foods. Illegal harvesting of timber and NWFP in Africa have increased because of the resultant decrease in public sector monitoring of forests. Populations, who have had their incomes and livelihoods negatively impacted in the region, have engaged in illegal activities such as poaching and illegal timber production.

III. OPPORTUNITIES FOR A BIOECONOMY IN AFRICA BASED ON FOREST AND WILDLIFE RESOURCES

13. The major goods and services that stem from forest resources are linked to six economic sectors, namely, construction, manufacturing, services, agriculture, energy, and health. The 2050 projections for the market value and the employment for the opportunities are presented below based on methodology applied and the modelling assumptions described in FAO and Dalberg (forthcoming)¹.

14. The construction sector in Africa provides an opportunity to increase the sustainable use of wood products. The built environment in the region is responsible for 56 percent of energy use, 25-40 percent of all waste generation and 5 percent of all water consumption. However, modern wooden construction materials, such as cross laminated timber, that generate reduced emissions when compared to concrete and steel, still have limited use in the region. As the population in Africa expected to double by 2050, an estimated 80% of the buildings needed by that time have not yet been constructed. If this trend is expected to continue, the market for durable construction materials is likely to rise.

15. This also could create carbon sinks through new forest plantations to be created on agricultural, degraded or open lands for continued wood supply. At the current trajectory, in order to meet Africa's growing demand for wood products, an estimated 300,000 additional hectares of plantation area would need to be established per year.

16. The increased use of wood building materials has the potential to contribute up to an estimated USD83 billion towards Africa's bioeconomy by 2050. This could be achieved via the production and primary processing of wood to meet the expected demand for housing in 2050. An estimated USD25 million jobs could be created through the additional plantations needed to build the supply of wood needed for this opportunity, and for the subsequent processing needed to develop the building materials.

17. The opportunity for increased manufacturing has long been recognized in the region and holds true for forest resources as well. Africa is the only global region where forestry and logging accounts for a greater contribution than processing activities in the wood harvesting and processing sector. There is still a low capacity for wood processing in the region, and a low supply of industrial wood to meet the demand for processed wood products, among others due to a low state of development and investment into technology and skills of the existing wood processing.

18. There will be significant investment required in increasing wood supply, accessing markets as well as strengthening technology and skills capacity in order to pursue this opportunity. The wood

processing sector could contribute up to an estimated USD572 billion to the continent's bioeconomy by 2050. This economic activity could also create an estimated 29 million jobs by the same period. This opportunity would anchor on transitioning the sector towards increased value add through secondary processing activities.

19. A promising future for ecotourism in Africa can be driven by the growth of domestic tourism in the region. Domestic tourism accounted for 55 percent of travel and tourism in Africa in 2019, but jumped to 68 percent in 2020 due to restrictions in international travel. Countries in the region have realized the importance of domestic tourism in developing a resilient tourism sector that protects against international shocks. However, even with this recent state, Africa's level of domestic tourism is significantly less than the global average of 73%. With a growing middle class, and the African Continental Free Trade Area that has recently been launched, travel and tourism hold potential for the future of the bioeconomy in the region.

20. There is also an opportunity for projects to reduce emissions from deforestation and forest degradation (REDD) in Africa for global carbon markets. Despite Africa being one of the early adopters for REDD projects, carbon credit transactions are merely nascent in the region, largely due to large capital investment requirements and unclear land rights and regulations in the region. The carbon market has significant potential in the region and has shown significant growth in countries like Peru, which was able to increase the volume of carbon credits transacted from 1.5 MtCO_{2e} in 2016 to 21.2 MtCO_{2e} in 2018, the equivalent to a 9.85 MtCO_{2e} transacted a year. This opportunity assesses the potential for Africa to use REDD projects to protect forest resources and generate income through carbon transactions.

21. Ecotourism and REDD projects have the potential to contribute value within a model of estimation of USD605 billion and USD31 billion respectively to the African bioeconomy by 2050. This growth of ecotourism would be driven by an increase in domestic tourism to contributing 62 percent of tourism spend. At the current rate of deforestation REDD projects in the region have the potential to sequester 314M tCO_{2e} of carbon annually. The opportunity for ecotourism could also create an estimated additional 37 million direct and indirect jobs, while these REDD projects could create some 13,000 jobs for local community members.

22. The opportunity for further upscaling of agroforestry in Africa has the potential to improve the socioeconomic and environmental improvement for smallholder farmers. Agroforestry has garnered interest in the region as a means to improve rural livelihoods for smallholder farmer households by diversifying incomes and providing greater ecological resilience. The domestication of indigenous tree species also has the potential to increase income and food security and serve as a complement to wild harvest. While there still is limited adoption of some fruits as profitable crops, wild harvesting of fruits is a promising and profitable activity in the region as both wild meat and plants add to food security and nutrition of forest-adjacent people in Africa.

23. The production of fruits and nuts in Africa has the potential to grow to an estimated value of USD200 million in 2050. Africa could be able to better meet local demand for fruits and nuts and promote export for international markets by growing the production area and improving agronomic practices. This opportunity also has the potential to create some 19 million of full-time equivalent employment.

24. Africa is highly dependent on wood fuel. In 2018, wood fuel accounted for more than 40% of total primary energy supply on the continent. Renewable energy has the potential to meet 22% of Africa's total final energy consumption by 2030. There is an opportunity to address the energy supply by more effectively recovering forest and wood residue for biofuel in the region. Forest residue biofuel has the potential for the circular processing of recovered wood that would increase the productivity of wood harvested.

25. By 2050 forest residues in Africa has the potential to generate an additional wood energy valued at USD621 million in the form of wood feedstock. Additionally, the processing of this feedstock could generate some 90,000 jobs.

26. The forest-based health sector has great significant value and potential in Africa. Herbal medicines aggregate to a global multibillion-dollar market, estimated at USD83 billion in 2019, and expected to reach USD550 billion by 2030. Some medicinal plants found in sub-Saharan Africa have great value in this global market. For example, the trade of red stinkwood (*Prunus africana*) and periwinkle (*Catharanthus roseus*) is valued at ~USD200 million and ~USD100 million annually, both of are available in the region and are also used as traditional treatments.

27. Despite the local and global demand for these products, the use and trade of medicinal plants in Africa is also largely unregulated and informal. Although the sector is well developed for selected value chains such as devil's claw and hoodia in Southern Africa, *Prunus africana*, Voacanga, Yohimbe, Cola, *Strophanthus* in Central Africa, *Prunus africana* in Eastern Africa and *Griffonia* in West Africa, investment into commercial opportunity of medicinal plants remained limited due to availability of trade data and resource degradation due to increased harvesting.

28. There is an opportunity to improve the cultivation and commercialization of medicinal plants in Africa and to assess the potential of combining the use of wild collected species and cultivating and commercializing the production of selected medicinal plants. Despite the growing demand for herbal medicines, and the availability of the natural resources in Africa, an opportunity in the sector will face significant barriers, including the unclear market size, and limited trade data that would impact investment risk, as well as the lack of regulation and informality of current trade.

IV. CONCLUSIONS

29. Impactful and ready to scale opportunities for a growing forest-based bioeconomy in Africa include construction, wood processing and tourism. Wood processing, domestic ecotourism, cement and steel building material substitution, tree crop cultivation and commercialization and gathering of NWFP – both plant and animal-based, furthermore present high potential socioeconomic impact. Additionally, cement and steel building material substitution entails the ecological benefits that can significantly impact the mitigation of climate change in Africa and meet more Sustainable Development Goals than other high potential opportunities.

30. However, the realization of this forest-based bioeconomy faces many challenges. The African forest-based bioeconomy presents a unique ecosystem that differs from the well-mapped and regulated economies found in many developed markets. A major challenge in the region is the high forest loss experienced due to agricultural expansion, logging, mining, fuelwood collection, and other factors. Africa has also not sufficiently integrated value-add industries along forest value chains, and continues to rely on the trade in primary products of forest resources. The region therefore needs to safeguard against illegal activity, and mechanisms for monitoring informally used stocks of harvested materials, allowing the correct interventions to be put in place to support the sustainable use of forest resources.

31. Although Africa's forest-based bioeconomy has significant potential for impact, the pathways to realizing this impact are not always clear and differ among subregions and countries. This is evident in the limited and fragmented nature of data available in the sector. It is also true of those opportunities that are largely acknowledged for their potential impact such as forest-based wild meat, wild edible plants and medicinal plants.

32. The opportunities identified all offer socioeconomic, ecological and additional social benefits to the African population. The continent's forest-based bioeconomy has the potential to significantly contribute towards development, but would benefit from stakeholders in the various sectors supporting the ecosystem to unlock this potential and investment into better understand the operations and markets of forest-based value chains on the continent. The latter is particularly important for the

inclusive development of the sectors, if it is to progress without the exclusion of small producers and the informal sector.

33. Both the private and public sector will be crucial in addressing barriers to growing the forest-based bioeconomy in Africa. The various economic sectors and value chains identified, require an array of actors to partner towards the development of the various aspects of Africa's forest-based bioeconomy.

V. RECOMMENDATIONS

34. In order to further develop the forest-based bioeconomy in Africa it would, among others, be necessary to:

- Promote the development of policies, strategies and legislation that support the transition to a bioeconomy at country, subregional and regional levels, while ensuring that the forest sector be front and centre in those policies and strategies. Proposed interventions should be contextualised across government structures ensuring the sustainable consumption and production of forest products.
- Establish innovative public-private partnerships to promote Africa's forest-based bioeconomies, e.g. through research on supply of sustainably harvested forest products and to learn from each other through exchanging lessons learned and sharing of good practices.
- Develop sustainable plantations to address Africa's wood deficit and meet the demand for industrial wood and fuelwood for the region. As a potentially powerful means to support rural economic development, through both agroforestry schemes and the development of commercial lots by larger actors, developing these areas would also target vulnerable populations.

35. FAO could support countries to implement these recommendations by:

- Supporting countries in the development of low carbon societies through increased carbon storage in forest products and substitution of high-carbon and fossil-fuel based products as well as the establishment of related monitoring systems.
- Providing expertise for the development of targeted policies and legislations that promote a sustainable forest-based bioeconomy, including policies supporting the production and use of sustainable wood and fostering the integration of forest products in Nationally Determined Contributions
- Supporting countries in capacity building for the development of effective sustainable forest-based industries applying the bioeconomy principles and cascading use to ensure sustainable consumption and production patterns of forest products.
- Supporting countries in further developing evidence-based data and information on future supply and demand trends of key forest products.
- Through engagement with the Member Countries and their private sector and international community, coordinate alignment of relevant processes and initiatives to expand sustainable wood value chains towards carbon neutral and resilient economies in Africa, such as the SW4SW Initiative, the IPC, the ACSFI, the FFF and the FLRM, and mobilize finance for wood value chain development, in particular the development of forest finance strategies, business planning and market developments.