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# NEAR EAST FORESTRY AND RANGE COMMISSION

## Twenty-seventh Session

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## Bioeconomy Opportunities in the Region

### Executive Summary

Bioeconomy is an emerging field that promotes the sustainable production and use of biological resources, including forestry, to generate economic value while advancing environmental sustainability and forest inclusion. Its rapid growth is driven by technological innovation, supportive policies, and rising consumer demand for sustainable and renewable products.

At its 43rd Session in July 2023, the FAO Conference<sup>1</sup> “stressed the importance of bioeconomy for sustainable agrifood systems and highlighted the need to discuss this topic within Governing Bodies and Technical Committees of FAO, bearing in mind the ongoing collaboration between Committee on Agriculture (COAG) and Committee on Forestry (COFO) on the linkages between agriculture and forestry and the COFO–COAG joint work roadmap.” This call for greater engagement reflects the growing recognition of the bioeconomy as a key driver of sustainable development across agrifood sectors.

FAO’s dedicated work on bioeconomy began in 2015, following the Global Forum for Food and Agriculture (GFFA), where agriculture ministers underscored the importance of food security and policy guidance. In 2021, “Bioeconomy for Sustainable Food and Agriculture” was established as a Programme Priority Area (BE2) under FAO’s Strategic Framework 2022–2031.

In October 2024, during the COAG 29th Session, members recognized the need to initiate a multistakeholder global bioeconomy partnership for sustainable agrifood systems, intended to serve as a catalyst for developing policies, strategies, and action plans, while strengthening capacities, knowledge systems, and incentives at global, national, subnational, and local levels (C/2025/21, para. 18g). At the 27th Session of the COFO, members also encouraged FAO to initiate a global bioeconomy partnership and cooperation (C/2025/24, para. 13c). Additionally, COFO 27 encouraged Members and invited FAO to scale up support for inclusive bioeconomy approaches and forest-based value chains, promoting cross-sectoral collaboration, sustainable practices, value-added innovation and material efficiency.

In this context, and to support the formulation of a proposal for such a partnership, FAO and its Near East and North Africa (NENA) Regional Office have facilitated an inclusive multistakeholder consultation process, including an online written consultation. FAO is also actively addressing the broader set of recommendations put forward by COAG 29 and COFO 27.

<sup>1</sup> [C 2023/REP](#)

While definitions of bioeconomy<sup>2</sup> may vary and its development depends on specific contexts, agrifood systems are typically at the core of bioeconomy strategies. These strategies help countries and regions reach socio-economic and environmental objectives and align with global common objectives, such as enhancing food security and nutrition, reducing greenhouse gas emissions and waste, improving competitiveness, and fostering inclusion through innovation. This document reviews the status of the bioeconomy in the region, highlights best practices being applied, and explores potential opportunities for strengthening bioeconomy-based approaches to support sustainable development in the region.

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<sup>2</sup> <https://openknowledge.fao.org/server/api/core/bitstreams/d8f82717-d3f1-495c-a788-863f7512fa89/content>

## I. Introduction

1. According to the Organisation for Economic Co-operation and Development (OECD)-FAO Agricultural Outlook 2024–2033, the NENA region faces significant agricultural challenges, including substantial food losses, declining productivity, and the escalating impacts of climate change. 30-40 percent of agricultural land in the region is degraded, and post-harvest losses reach about 30-40 percent of certain crops, exacerbating food insecurity. The region heavily relies on food imports, with 60 percent of wheat consumption met through imports. Climate change is expected to reduce agricultural yields by 10-20 percent by 2050, further stressing the already vulnerable food systems. These factors, combined with a rapidly growing population, place increasing pressure on the region's agricultural sector, highlighting the need for urgent action to reduce food loss, enhance productivity, and build resilience to climate change.<sup>3</sup>

2. In the Arab region, demand for resources is rising, particularly in the food, materials and energy sectors, with traditional biomass being vital for the livelihoods of local populations, in particular in rural areas like Mauritania, the Sudan and Yemen.<sup>4</sup> The Trends and Outlook of Natural Resource Use in West Asia report highlights increased material extraction, including biomass, driven by economic and population growth, especially in countries like Saudi Arabia.<sup>5</sup>

3. Despite current limitations in technology and infrastructure, the region holds significant potential to expand sustainable biomass use. Strategic investments in clean bioenergy are critical, as research indicates that the biomass power market in the Middle East and Africa is projected to reach USD 3344.7 million by 2030, with a compound annual growth rate (CAGR) of 1.6 percent from 2022 to 2030.<sup>6</sup>

4. Bioeconomy can address key challenges including climate change, land degradation, water scarcity, and unemployment. By promoting sustainable, resource-efficient practices, it improves livelihoods and creates inclusive jobs. It also enhances climate resilience through sustainable management of biodiversity, water and soil while fostering innovation in sectors like agriculture, forestry, energy, and waste management. By strengthening regional cooperation and institutional capacity, bioeconomy can drive economic growth, enhance environmental sustainability, and improve community well-being.<sup>7</sup>

## II. Status and outlook of the bioeconomy in the NENA region

5. FAO's programme uses the working definition of the bioeconomy as “the production, utilization, conservation, and regeneration of biological resources, including related knowledge, science, technology, and innovation, to provide sustainable solutions (information, products, processes and services) within and across all economic sectors and enable a transformation to a sustainable economy”.<sup>8</sup>

6. A stocktaking exercise by the FAO NENA regional office on the status of bioeconomy in the region found that while many countries have explored its broader opportunities, few have taken concrete steps to implement bioeconomy-dedicated policy frameworks and strategies. It should be noted that there are many similar and overlapping concepts to bioeconomy including circular economy, green economy, green growth and regenerative economy. In most cases, countries do not

<sup>3</sup> OECD/FAO (2024), OECD-FAO Agricultural Outlook 2024-2033, Paris and Rome, <https://doi.org/10.1787/4c5d2cfb-en>

<sup>4</sup> E/ESCWA/SDPD/2019/TP.1 <https://www.unescwa.org/publications/bioenergy-and-sustainable-development-arab-rural-area>

<sup>5</sup> United Nations Environment Programme (2023). Trends and outlook of natural resource use in West Asia. Report of the International Resource Panel. United Nations Environment Programme, Nairobi, Kenya

<sup>6</sup> [https://www.grandviewresearch.com/horizon/outlook/biomass-power-market/mea?utm\\_source=chatgpt.com](https://www.grandviewresearch.com/horizon/outlook/biomass-power-market/mea?utm_source=chatgpt.com)

<sup>7</sup> G20 reaches consensus and establishes High-Level principles on Bioeconomy and <https://openknowledge.fao.org/handle/20.500.14283/cb3706en>

<sup>8</sup> C2021/LIM/4: <https://www.fao.org/3/nf765en/nf765en.pdf>

explicitly use the term "bioeconomy" in their policies, instead, national efforts are framed within related areas such as the terms listed here.

7. According to FAO's Food and Agriculture Policy Decision Analysis (FAPDA) tool,<sup>9</sup> national strategies across the NENA region already reflect policy directions aligned with bioeconomy principles, particularly in areas such as sustainability, resource efficiency, and climate resilience. This provides a strong foundation for integrating bioeconomy initiatives into existing national frameworks. FAPDA's policy monitoring indicates that 10 countries, especially those in the Gulf Cooperation Council (GCC), have shown significant policy activity related to the bioeconomy. Key focus areas include agricultural technology, bioeconomy-related research, and a regional emphasis on circularity, particularly in the sustainable management of natural resources.

8. The regional stocktaking exercise identified numerous strategies and best practices across various sectors that could contribute to the development of a comprehensive bioeconomy strategy. The following examples highlight how bioeconomy principles are being applied in areas such as sustainable agriculture, waste management, bioenergy, and resource-efficient technologies:

- a. Egypt developed a Circular Bioeconomy Strategy in 2018 structured around four key pillars: research and development (R&D), technology transfer, market access, and policy implementation.<sup>10</sup> While the term "bioeconomy" is not always explicitly used in its policies, the concept is supported by several national policy frameworks, including the Sustainable Development Strategy 2030, the Sustainable and Green Growth Strategy, the National Action Plan for Sustainable Consumption and Production, and the National Solid Waste Management Program. These strategies reinforce Egypt's transition to a more sustainable and resource-efficient economy.<sup>11</sup>
- b. The Arab region's circular economy is still in its early stages with fragmented efforts and limited integration into national policies. Key barriers include weak regulatory frameworks, low technical capacity, and limited financing. However, the United Nations Economic and Social Commission for Western Asia (ESCWA) estimates that adopting circularity practices could generate economic benefits of up to USD 230 billion by 2040, including through improved resource efficiency, reduced waste, and green job creation. While countries like Egypt, Jordan and the United Arab Emirates are making progress in specific sectors, broader regional coordination and investment are essential for scaling impact.<sup>12</sup>
- c. Morocco has embraced circular economy principles through its 2019 National Strategy for Sustainable Development, which integrates circularity into key sectors such as water, energy, agriculture, and waste. The strategy aims to contribute 4 percent to GDP, while the National Waste Recovery Program is expected to reduce waste-related damages by 0.4 percent of GDP.<sup>13</sup>
- d. The Sudan stands out as one of the few countries in the region where the private sector is leading some bioeconomy initiatives, in particular in the bioenergy sector. It has established clean facilities that generate power from crop residues and wastewater, while producing

<sup>9</sup> <https://fapda.apps.fao.org/fapda/#main.html>

<sup>10</sup> MIIC of the Arab Republic of Egypt. (2018). Bio Economy Strategy 2018 – 2022. Ministry of Investment and International Cooperation, [https://www2.investinegypt.gov.eg/en/publications/Bio%20Economy%20Strategy%202018%2022\\_English\\_Fal\\_Version\\_18072018\\_Final\\_Version\\_18072018\\_pdf](https://www2.investinegypt.gov.eg/en/publications/Bio%20Economy%20Strategy%202018%2022_English_Fal_Version_18072018_Final_Version_18072018_pdf)

<sup>11</sup> Piccinetti, L, et.al. 2023. Circular bioeconomy in Egypt: the current state, challenge and future directions. EcoPapers. vol. 5, issue 1, 97-112. <https://econpapers.repec.org/RePEc:ssi:jouird:v:5:y:2023:i:1:p:97-112>

<sup>12</sup> E/ESCWA/CL1.CCS/2024/Guidelines.1 Mainstreaming a circular economy in the Arab region: guidelines for a cross-sectoral transition

<sup>13</sup> <sup>12</sup> Mofadel, H. 2020. KSC Integrated Cane Model Approach for Green Production. A paper presented at a meeting organized by the Industrial Research and Consulting Studies Center to discuss the possibility of establishing a Green Economy Center in Sudan in collaboration with UNIDO. KSC, Khartoum, Sudan.

ethanol from cane juice and biodiesel and animal feed from soybeans intercropped with sugar cane.<sup>14</sup>

- e. The Kingdom of Saudi Arabia developed a National Biotechnology Strategy in 2024, aiming to position the country as a regional leader in biotechnology. The strategy supports economic growth, fosters innovation, and improves the wellbeing of its citizens. It focuses on four main areas: vaccines, biomanufacturing and localization; genomics; and plant optimization. It also outlines key enablers to support sector development. Although the country lacks a formal dedicated bioeconomy strategy, policies like Vision 2030 and the National Environment Strategy also support a gradual shift toward circularity.
  - f. Iraq possesses significant biomass resources from municipal solid waste, agricultural, and animal waste. Approximately 10 million tonnes of crop residues, including wheat, barley, and rice straw, as well as tree pruning, are available annually. This biomass has the potential to generate around 115.13 petajoules (PJ) of energy per year. Despite the availability of these resources, bioeconomy uses and valorization, including bioenergy, have received limited attention in Iraq.<sup>15</sup>
9. The stocktaking exercise also highlighted that countries in the region can unlock the bioeconomy's potential as a cross-cutting approach to building more efficient, inclusive, resilient, and sustainable agrifood systems by:
- a. Prioritizing the use of agricultural and forestry residues and solid and liquid municipal waste to produce value-added bio-based products. This not only supports climate change mitigation and environmental protection but also contributes to socio-economic benefits as well as advances progress toward the Sustainable Development Goals (SDGs) by 2030.
  - b. Investing in scientific research, technological innovation, and skills development, particularly within the private sector. Such investments can unlock the bioeconomy's full potential, offering innovative solutions for climate adaptation and driving the growth of new industries and value chains that create jobs, especially for rural youth and marginalized groups, while promoting economic diversification.
  - c. Linking bioeconomy initiatives with entrepreneurship and innovation in bio-based sectors, and encouraging cross-border knowledge sharing, including traditional practices mainly led by women. This will improve the alignment of sustainability goals related to bioeconomy, climate, and biodiversity. The combination of traditional knowledge and new scientific advancements is key for better use and valorization of biomass and local biological resources. Robust cross-sectoral collaboration is key to effectively utilizing natural resources and advancing bioeconomy development.
  - d. Enhancing scientific knowledge and innovation capacities through closer collaboration between research institutions, policymakers, and businesses. NENA countries should prioritize funding for research and development and raise awareness about the benefits of bio-based products and services, particularly within the private sector and among consumers.

### **III. Forest-based value chains in the bioeconomy**

7. Forest-based value chains are essential elements of the bioeconomy. They can play a key role in strengthening Non-Wood Forest Products (NWFPs) and forest-based bioenergy by enhancing rural development, creating employment and promoting sustainable resource management. In the NENA region, where forests are primarily managed for NWFPs and environmental protection, there is great

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<sup>15</sup> Alhassani, H. D., et. al. 2022. Review of Bioenergy Potential from the Agriculture Sector in Iraq. <https://www.mdpi.com/1996-1073/15/7/2678>

potential for advancing forest-based bioeconomy. FAO's data on NWFP value chains provides a foundation for developing bioeconomy strategies. Products like nuts, fruits, resins, and oils can achieve higher market value when certified as organic or sustainably produced, and forest-based ecotourism offers additional opportunities for bioeconomy growth. *Refer to NEFRC/2025/5*<sup>16</sup>

8. As an example, Lebanon became the first country in the region to launch a national bioenergy strategy in 2012. The strategy identified ten promising bioenergy streams, with forest-based bioenergy ranking among the highest. These streams include residues from forestry felling, fruit and olive tree residues, olive cake by-products, waste wood, in combination with other agricultural-based residues such as crop residues, animal fat, and slaughterhouse residues.<sup>17</sup>

9. Under the FAO's One Country One Priority Product (OCOP) initiative, countries such as Morocco are investing in the carob tree as a key forest-based value chain. Carob offers high-value products for the food, medicine, and cosmetics industries such as flour, syrups, and cocoa substitutes, while supporting bioeconomy models. Strengthening this value chain promotes restoration of degraded forest landscapes, enhances rural livelihoods, and drives green economic growth across the region.

10. To sustainably meet the growing demand for forest-based biomass, coordinated policy, investment, and capacity-building efforts are needed at all levels. Cross-sectoral approaches are essential to enhance synergies and manage trade-offs between sustainability objectives. Key priorities include: (i) expanding and enhancing agroforestry systems, as well as utilizing restoration approaches to increase biomass supply; (ii) improving value addition, manufacturing efficiency, and promoting the cascading use of forest products; (iii) encouraging more sustainable consumption patterns; and (iv) driving a broader transition to sustainable economies. Scaling up science-based forestry innovation is essential to maximize the sector's contribution to the bioeconomy.<sup>18</sup>

11. While regional demand for biobased products is growing, it remains less developed than in global markets. To accelerate this shift, efforts should focus on promoting sustainable consumption through public awareness campaigns, ecolabelling, and economic incentives. These actions can help highlight the environmental benefits of biobased products and increase consumer adoption.

#### IV. Updates on FAO's work on bioeconomy

12. FAO's work on bioeconomy commenced 10 years ago with the issuance of the Communiqué of the 7th Berlin Agriculture Ministers' Summit<sup>19</sup> held under the Global Forum for Food and Agriculture (GFFA) in 2015. The communiqué advocated that "FAO continues and intensifies its work on the primacy of food security in bioeconomy and provides information and pertinent policy advice for the benefit of its Members," and acknowledged that FAO, in collaboration with other partners, would provide the appropriate platform for "tangible action and international cooperation [that] are necessary to seize the opportunities provided by sustainable bioeconomy for agriculture and rural development while securing the primacy of food security and nutrition".

13. FAO's bioeconomy activities are closely aligned with the goals of the Organization's strategies<sup>20</sup> and relevant action plans on mainstreaming biodiversity across agricultural sectors, climate change, science and innovation, as well as corporate environmental responsibility. Programme Priority Area (BE2: Bioeconomy for Sustainable Food and Agriculture) emphasizes a bioeconomy that balances economic value and social welfare with environmental sustainability.

<sup>16</sup> NEFRC/2025/5

<sup>17</sup> [https://www.undp.org/sites/g/files/zskgke326/files/migration/lb/The-National-Bioenergy-Strategy-report.pdf?utm\\_source=chatgpt.com](https://www.undp.org/sites/g/files/zskgke326/files/migration/lb/The-National-Bioenergy-Strategy-report.pdf?utm_source=chatgpt.com)

<sup>18</sup> COFO/2024/4 [Enhancing the contribution of forestry to the bioeconomy – Opportunities and challenges](#)

<sup>19</sup> [GFFA25\\_FinalCommuniqué\\_EN.indd](#)

<sup>20</sup> FAO. 2020. FAO Strategy on Mainstreaming Biodiversity across Agricultural Sectors. Rome. <https://doi.org/10.4060/ca7722en>

14. FAO provides bioeconomy-related expertise to key multilateral environmental agreements, including the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement;<sup>21</sup> the Convention on Biological Diversity (CBD) and the Kunming-Montreal Global Biodiversity Framework;<sup>22</sup> the United Nations Convention on Combating Desertification (UNCCD), the Global Framework on Chemicals, and the ongoing negotiations on the international legally binding instrument on plastic pollution, including in the marine environment, among others.

15. In response to outcomes from COFO 27 and the United Nations Forum on Forests (UNFF) 19 and 20, the Country and Organization-Led Initiative (COLI) on Sustainable Forest-based Bioeconomy Approaches, initiated by Austria in collaboration with partner countries and organizations, aims to promote the forest-based bioeconomy globally. This initiative fosters a multilateral dialogue to exchange sustainable bioeconomy practices and connect stakeholders. Austria will host the "Global Leadership on Sustainable Forest-based Bioeconomy Approaches" summit in Vienna in February 2026, bringing together experts to discuss key topics such as scaling up bioeconomy practices, unlocking investments, building resilient supply chains, and advancing carbon neutrality through wood, alongside transforming agrifood systems with forests and trees.<sup>23</sup> Furthermore, in the context of COLI, FAO launched the "2025 Global Webinar Series on Sustainable forest-based bioeconomy approaches" to explore key themes and examine how to unlock the forest sector's transformative potential for decreasing reliance on non-renewable resources in a sustainable bioeconomy and advancing the transition to climate-positive societies.<sup>24</sup>

16. FAO launched the Bioeconomy for Sustainable Food and Agriculture: A Global Stocktaking Study within its Programme Priority Area BE2.<sup>25</sup> The study identified key gaps and opportunities in the global bioeconomy landscape, emphasizing areas that could be addressed through a global multistakeholder partnership. This initiative seeks to promote collaboration across sectors and stakeholders to drive sustainable bioeconomy development worldwide.

17. In response to the guidance provided by FAO Members in the Governing Bodies, and under the project "Towards Establishing the Global Partnership on Bioeconomy for Sustainable Food and Agriculture (GP-BSFA)", funded by Germany, FAO conducted virtual regional consultations between March and April 2025. These consultations aimed to support the development of a proposal for a global multistakeholder partnership by identifying key objectives, potential focus areas, and mapping stakeholders across the global bioeconomy landscape.

18. FAO also launched a Bioeconomy Dashboard, a global public resource designed to support the advancement of a sustainable bioeconomy. The dashboard offers decision-makers comprehensive insights by analysing two key datasets: national bioeconomy strategies and their alignment with global biodiversity and climate goals.<sup>26</sup>

19. The NENA virtual consultation webinar took place on 28 April 2025 with over 65 participants including partners and governmental and the private sector actors in support to the project "Towards Establishing the Global Partnership on Bioeconomy for Sustainable Food and Agriculture (GP-BSFA)".

<sup>21</sup> Gomez San Juan, M., Harnett, S. & Albinelli, I. 2022. Sustainable and circular bioeconomy in the climate agenda: Opportunities to transform agrifood systems. Rome, FAO. <https://doi.org/10.4060/cc2668en>

<sup>22</sup> Gomez San Juan, M., Harnett, S. & Albinelli, I. 2022b. Sustainable and circular bioeconomy in the biodiversity agenda: Opportunities to conserve and restore biodiversity in agrifood systems through bioeconomy practices. Rome, FAO. <https://doi.org/10.4060/cc3417en>

<sup>23</sup> [Country-Led Initiative \(CLI\) on Sustainable Forest-based Bioeconomy Approaches](#)

<sup>24</sup> <https://www.fao.org/forestry/our-focus/forest-products/sustainable-forest-based-bioeconomy-approaches/en>

<sup>25</sup> Albinelli, I., Gomez San Juan, M., Lester, G., Nijmeijer, M. & Neretin, L. 2024. Bioeconomy for sustainable food and agriculture: A global stocktaking study. Environment and Natural Resources Management Working Papers, No. 101. Rome, FAO. <https://doi.org/10.4060/cd2490en>

<sup>26</sup> [Dashboard | Sustainable bioeconomy for agrifood systems transformation | Food and Agriculture Organization of the United Nations](#)

20. The regional consultation aimed to gather input on priorities, operational elements, and possible focus areas for a global partnership, ensuring regional realities are reflected in the proposed structure. Participants highlighted the growing interest in sustainable bioeconomy across the region, and FAO-supported projects were cited as valuable examples.
21. Key discussions and recommendations focused on strengthening regional cooperation, enhancing the role of bioeconomy in sustainable agriculture and food systems, developing bioeconomy policies and monitoring systems, enhancing cross-sectoral collaboration including between academia, private sector and policymakers, and promoting innovative partnerships to drive sustainable development in the region. Participants were invited to complete the online survey (available in Arabic, English, and French) and share it within their networks.
22. The RNE consultation underscored both the region's rich experience in bioeconomy-relevant sectors and the need for structured, inclusive, and well-resourced coordination. The participants reaffirmed their commitment to shaping a partnership that aligns with local realities while contributing to global sustainability goals.