G20
SOUTH AFRICA 2025

Solidarity
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PURPOSES AND APPLICATION OF METRICS FOR BIO-ECONOMY SECTOR DEVELOPMENT

GIB MEETING

Department of International Relations and Cooperation,

27 May 2025

MEASUREMENT AND DEFINITIONS

"an economic system that uses renewable biological resources to produce goods, services, information, and energy in a sustainable and efficient manner. It emphasizes minimizing environmental impacts and maximizing social and economic benefits, shifting from traditional linear economies to a more sustainable model."

G20 view of bio-economy: is a multifaceted approach to economic development that integrates environmental sustainability, social responsibility, and economic growth, all while leveraging the power of renewable biological resources

Economy based on renewable biological resources

- Key sectors: agriculture, forestry, fisheries, energy, chemicals, pharmaceuticals and general intersection of all areas with technology
- Drives sustainability, climate action, and innovation

WHY MEASURE

Cross-Sector Integration	•The bioeconomy spans agriculture, forestry, fisheries, biotechnology, energy, and industrial processes. Each has its own metrics (e.g., carbon intensity in energy vs. biomass yield in agriculture). Interoperability allows for coherent evaluation and comparison.
Sustainability and Circularity	•Monitoring environmental, economic, and social impacts requires harmonized indicators (e.g., GHG emissions, land use, water footprint). Without interoperable metrics, assessing progress toward sustainable or circular bioeconomy goals becomes fragmented.
Trade and Regulation	•Global trade in bio-based goods (like biofuels, bioplastics, or biomass) relies on standardized metrics for certification, carbon accounting, and life cycle analysis (LCA).
Social	•measuring the positive and negative impacts of bioeconomy initiatives on society, encompassing aspects like employment, social inclusion, and equitable access to resources. These metrics are crucial for ensuring that bioeconomy developments are socially sustainable and beneficial for all stakeholders
Innovation and Investment	•Investors and policymakers need comparable performance metrics to assess the viability and impact of new bio-based solutions.
Data Sharing and Digitalisation	•Digital platforms for monitoring bioeconomy activities (e.g., remote sensing in forestry, blockchain for biomass traceability) require harmonized data structures

KEY METRICS

Environmental

- Carbon Footprint (kg CO_2e per unit of drug)
- Water Footprint (L/unit of drug produced)
- Biodegradability Rate (%)
- Land Use Efficiency (hectares per ton of bio-based pharmaceutical ingredients)
- Renewable Energy Utilization (%)

Economic

- Market Share of Bio-based Pharmaceuticals (%)
- Investment in Bioeconomy R&D ($ per year)
- Economic Contribution of Bio-based Pharmaceuticals (GDP %)

Social

- Job Creation (Employment per million $ invested)
- Public Health Impact (Reduction in disease burden, DALYs (Disability-Adjusted Life Years) and QALYs (Quality-Adjusted Life Years))
- Access to Affordable Biopharmaceuticals (Price reduction %)
- Regulatory Approvals for Bio-based Drugs (Annual approvals by FDA/EMA/WHO)

KEY CHALLENGES

- **Fragmented standards**
  - Different organizations (ISO, FAO, EU, OECD, etc.) develop sector-specific or regional standards, leading to inconsistencies.
- **Data heterogeneity**
  - Varied data formats, scales, and methodologies limit integration and comparison.
- **Lack of common taxonomies**
  - Definitions of "bio-based", "sustainable", or "circular" can differ across countries or industries.
- **Governance gaps**
  - No single global framework coordinates metrics interoperability across the bioeconomy.

KEY CONCEPTS FOR CONSIDERATION

- Harmonisation
- Interoperability
- Taxonomies
- Comparability
- Mutually acceptability in assurance systems
- Voluntary vs. Mandatory?

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Thank you