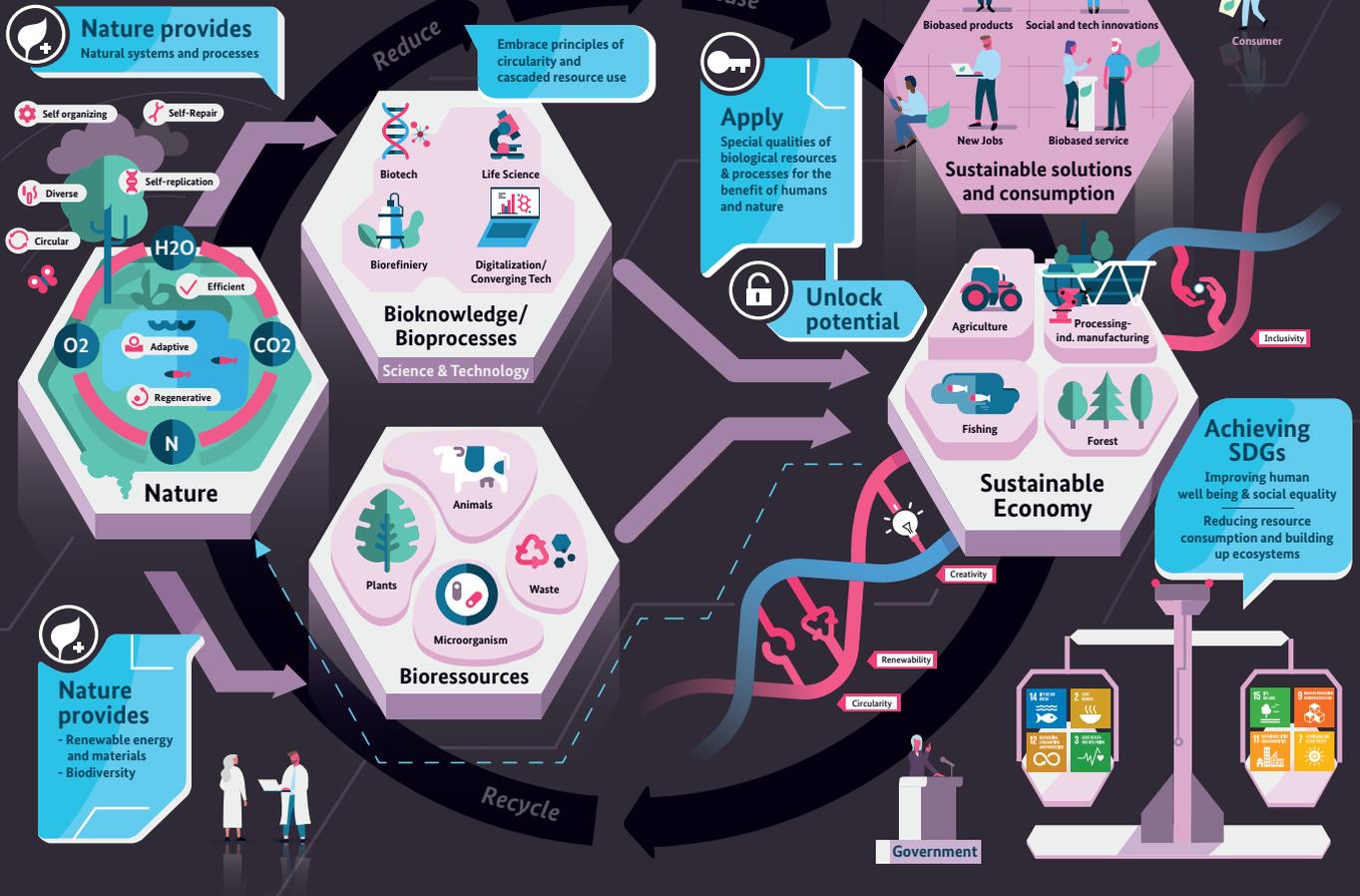




BIOECONOMY



Expanding the Sustainable Bioeconomy – Vision and Way Forward. Communiqué of the Global Bioeconomy Summit 2020

Berlin, November 2020

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Communiqué of the Global Bioeconomy Summit 2020

Executive Summary

This Communiqué is issued by the International Advisory Council on Global Bioeconomy (IACGB) on the occasion of the 3rd Global Bioeconomy Summit (see list of members of the IACGB in annex). We note that the transition to the bioeconomy is more critical than ever before. The urgency stems from the reality of global environmental threats, the opportunities brought by new sciences, and the consequences of the COVID-19. The bioeconomy has emerged as a globally impactful transformative force in industries and manufacturing on the supply side, and as a transformative force for consumption change and waste reduction on the demand side. In recent years the strong adaptive capacities of the bioeconomy to national and local circumstances have been demonstrated. While countries' and territories' bioeconomy opportunities differ, there are opportunities in all countries regardless of income levels, and natural resource endowments.

We note three overarching bioeconomy contributions to people and planet:

- **Bioeconomy for health and wellbeing** as a key element in building back better during and after COVID-19,
- **Science and technology breakthroughs** advancing the sustainable bioeconomy, and
- **Climate action, ecosystems and biodiversity** protection with and for sustainable bioeconomy.

This Communiqué by the IACGB is accompanied by a Bioeconomy Vision statement and a streamlined concept for the implementation of an institutional arrangement for international bioeconomy consultation and advisory functions.

We urge the strengthening of the following actions for global bioeconomy policymaking:

1. **Capitalizing on the power of science and technology:** The COVID-19 pandemic has revealed a new demand for innovation, with the opportunity for synergies between medical research, agricultural, materials, energy and food science. A global bioeconomy will increasingly benefit from the merging of bioscience and digitization, and by supporting circular economy processes and green growth.
2. **Bioeconomy jobs through partnerships and innovation:** Bioeconomy holds opportunities for the creation of new and sustainable jobs, in both rural and semi-rural areas. Investments in educating and training youth and on capacity building can ensure that workers and entrepreneurs adapt to new bio-markets and new bio-related technologies. Enabling innovation ecosystems, in the form of public-private partnerships, clusters, hubs, platforms, networks, accelerator and incubator models will play a key role in fostering innovation and bringing bioeconomy knowledge to market.
3. **Mobilizing finance for bioeconomy development:** New norms and standards for sustainable finance are promising for incentivizing biobased markets, i.e. through sustainability indexes, Environmental, Social, and Governance (ESG), metrics, green bonds, accounting innovations and the further development of carbon markets. Establishing an international bioeconomy finance platform that addresses major knowledge gaps in bioeconomy financing will contribute to bioeconomy development. Bilateral and multilateral development organizations should increasingly target the bioeconomy in emerging economies.

4. **Increasing involvement of industry and business:** Political commitment and proactively leveling the playing field for biobased businesses (e.g. through removing subsidies for non-sustainable production, tax exemptions) will allow them to compete against traditional products and technologies.
5. **Promoting resilient value chains:** Bioeconomy reconciles local and global integration. In order to ensure the resilience and adaptability of supply chains, investments in bioeconomy development should incentivize the establishment of innovative, diversified and decentralized value-chains and the adaptation of old ones. New opportunities can be found in both regionally unique offerings and local, small scale manufacturing, as well as in an efficient open system of trade, and international collaboration for knowledge and technology generation and transfer. Resilient and fair value chains are central for a sustainable food system, as aimed for by the UN Food Systems Summit.
6. **Strengthening demand side policy approaches:** More sustainable lifestyles and consumer habits require demand-side policy approaches. “Bio-preferred” public procurement, incentives for the sharing economy, bioeconomy communication strategies, and building trust amongst actors are all part of what is now needed for building the bioeconomy.
7. **Partnership, shared responsibilities and a global platform:** The transition to a sustainable bioeconomy will be the joint, long-term task of government policies, industry, academia, and citizens with the shared responsibility to seek synergies, and manage tensions and trade-offs. A guided transition process demands a platform approach with all relevant stakeholders and actors. Global bioeconomy initiatives need to be integrated into one recognized open global platform that facilitates the collaboration of regional and national bioeconomies in the global bioeconomy arena. As the bioeconomy prepares to take off, the Global Bioeconomy Summit needs to continue in the coming years, and to provide important impulses for the further development and coordination of bioeconomy approaches around the world.

1. The global Bioeconomy is progressing to new levels

With this GBS2020 Communiqué we underline the significant progress of the bioeconomy, and the urgency of further development. This urgency is manifested in the need to transition to a sustainable economy and sustainable society. We highlight new opportunities in bioeconomy development that have the potential to address grand societal challenges and prevent and overcome systemic crises. This Communiqué builds on the earlier Communiqués of **GBS2015**¹ and **GBS2018**². We note tremendous progress in the bioeconomy over the past half-decade, and we aim to accelerate the path of global expansion of bioeconomy policies, programs, investment initiatives, guided by science-based evidence. Looking back at the Global Bioeconomy Summits in 2015 and 2018 makes us enthusiastic about the fast worldwide development of the diversifying sustainable bioeconomy. Many of the recommended actions of the previous Summits have been translated into actions, and even bottom up initiatives have emerged that shape local bioeconomy innovations.

The **Global Bioeconomy Summit in 2015** first demonstrated that the bioeconomy can contribute significantly to the implementation of the 2030 Agenda for Sustainable Development, by promoting distinct features of interest in several SDGs: knowledge-based growth and jobs, the renewability of resources, regeneration and resilience of ecosystems, quality and value-orientation, resource efficiency and circularity, as well as creativity and innovation. The **Global Bioeconomy Summit in 2018** urged for innovation as a key driver and for international collaboration as key elements of an inclusive bioeconomy for all. Bioeconomy was recognized as a transformative force for sustainable development.

[1] International Advisory Council of the Global Bioeconomy Summit 2015. (2015). Communiqué: Making Bioeconomy Work for Sustainable Development. Available at https://gbs2015.com/fileadmin/gbs2015/Downloads/Communique_final_neu.pdf

[2] International Advisory Council of the Global Bioeconomy Summit 2018. (2018). Communiqué: Innovation in the Global Bioeconomy for Sustainable and Inclusive Transformation and Wellbeing. Available at https://gbs2018.com/fileadmin/gbs2018/Downloads/GBS_2018_Communique.pdf

Since then the relationship between the **Sustainable Development Goals** and the bioeconomy has solidified. In recent policy debates and government agendas the bioeconomy is further viewed as a new strategy for reindustrialization and for coping with changing global political contexts, such as changes in international power structures, fostering resilience, combating zoonotic and epizootic diseases, and biodiversity loss. Bioeconomy strategies strive for a higher level of ambition, in order to make important contributions to environmental and economic transformation, and even societal transformation.

Considering the global challenges our society faces, the members of the **International Advisory Council on Global Bioeconomy (IACGB)** with this Communiqué define three overarching themes of global relevance for bioeconomy innovation and policy agendas. These themes emerged from a broad range of bioeconomy stakeholders from all over the world and have been incorporated into the workshops of GBS2020.³ Drawing from this initial collaborative process, the following three bioeconomy contributions represent dynamic fields for advancing the bioeconomy, which have taken on a new level of heightened importance in the wake of the COVID-19 pandemic.

A comprehensive analysis of a decade of bioeconomy policy development, the **Global Bioeconomy Policy Report (IV)**,⁴ as well as a **Global Expert Survey**,⁵ commissioned by the IACGB, provide a wealth of knowledge on the state of the bioeconomy in different parts of the world and help identify opportunities and challenges for accelerating the transition to a sustainable bioeconomy. They reveal that while the bioeconomy has become more visible and important in the policy process worldwide and the trend of developing dedicated bioeconomy policy strategies has prevailed, official policy documents still must better reflect current discussions in science and industry and incorporate new opportunities in bioeconomy development. Tasking stakeholder platforms with this challenge at the national and regional levels can make a difference by both, bringing more attention to the demand and consumption side of the bioeconomy and bringing more attention to the fast translation of policy strategies to capitalize on science opportunities, to manufacture innovative products, and to mobilize investment.

2. Bioeconomy for people and for planetary health

The COVID-19 pandemic has made clear that bio-innovations are becoming increasingly important for **addressing global health** issues, particularly in the development of health care products, new drugs and treatments, biosimilars, and diagnostic kits for infectious and genetic diseases. Global dynamics in converging technologies, engineering and synthetic biology have played a key role in rapidly responding to the coronavirus by getting off the ground diagnostic tests and developing potential vaccines. Driven by health needs and bioeconomy tools and technologies, new materials are being produced through manufacturing for vaccine development.

Combined with adaptable and flexible automatic workflows, biotechnology innovations have helped increase our capacity to test for COVID-19. New industrial and academic collaboration and global partnerships further contribute to improving disease surveillance, but also to developing new and advanced manufacturing processes to produce the medicines, plastics and fuels that underpin society. Global crises provide us with an impetus to develop an economic recovery strategy based on the bioeconomy and not

[3] <https://gbs2020.net/program-workshops/>

[4] International Advisory Council on Global Bioeconomy. (2020). Global Bioeconomy Policy Report (IV): A decade of bioeconomy policy development around the world. Available at https://gbs2020.net/wp-content/uploads/2020/11/GBS-2020_Global-Bioeconomy-Policy-Report_IV_web.pdf

[5] Dietz, T., Rubio, K. & J. Börner. (2020): Designing Sustainability Governance for the Bioeconomy – a Global Expert Survey. International Advisory Council on Global Bioeconomy. Available at https://gbs2020.net/wp-content/uploads/2020/11/GBS-2020_Expert-Survey_web.pdf

on the old oil-based economic order. These fundamental changes in society bring both opportunities and risks. Bioeconomy solutions must not only play a key role in rebuilding a dismantled global economy in the short-term, but, also, in contributing to the transition to a more resilient, sustainable economic and environmental system and a sustainable and equitable society in the long-term.

The recognition that within a sustainable bioeconomy our water, energy, and food systems exhibit strong and multi-dimensional interlinkages has solidified over the years. Moving beyond sectoral thinking to find synergies and reveal tradeoffs allows us to preserve the health of natural ecosystems, as well as human, plant and animal health, i.e. **One Health**. The livestock and poultry sectors are increasingly seen as a risk for public health, particularly with regard to zoonotic diseases. COVID-19 highlighted the need to be better prepared for health disasters and to embrace “One Health” strategies.

The food-health-bioeconomy linkage offers opportunities for **healthier diets**, reducing malnutrition and minimizing overconsumption and waste, and establishing innovative businesses. Microbiome research and engineering offers further solutions and applications across industries, e.g. for animal feed and human health to combat obesity and noncommunicable diseases. System-oriented, integrated research and policy approaches will contribute to addressing the interdependent relationship between economic development, food production, livelihoods, ecosystem integrity resilience and health.

3. New science and technology for sustainable Bioeconomy – urban and rural

Breakthroughs in the life sciences combined with digitalization and the ongoing convergence of key technologies, such as nanotechnology, information technology, biotechnology, synthetic biology, and engineering are resulting in knowledge and applications that have the potential to provide solutions to many grand societal challenges:

- They promise novel manufacturing processes for industrial production that can for example convert carbon, such as food waste and CO₂, into valuable products and materials.
- Advanced biomaterials have the potential not only to replace plastics, but can be used as substitutes for steel or other high emission performance materials.
- Biologically inspired engineering has allowed our knowledge of biological models to be transferred to materials as well as production systems.
- Computing and information sciences enable the compilation of complex biological datasets and the use of “omics” (genomics, proteomics, metabolomics) technologies.
- Furthermore, by reviewing links with converging technologies other than biosciences, from digital, nano and hydrogen to AI to cognitive sciences, we are learning to optimize their usage and potential.

While **new industries and new value-chains** emerge, and thereby create new jobs, traditional ones adapt to new opportunities and create synergies. The bioeconomy generates employment in rural areas by linking farmers to new markets and by adding value to bio-based products.. Transition approaches can give ports a key role as future bioeconomy hubs. **Cities are becoming major circular bioeconomy hubs** as they allow for experimentation and for developing new solutions. Research and innovation on bio-inspired solutions for cities (often also used under the synonym nature-based solutions) is flourishing. Transferring biological knowledge into urban planning, architecture, infrastructure and food production to build sustainable cities has become a prominent trend in recent bioeconomy development. This is reflected, for

example in the emergence of local clusters and related working groups that aim at promoting the transition to a bioeconomy in urban and adjacent rural areas. Furthermore, initial pilot projects promote the collection and conversion of urban biowastes and wastewater into innovative bio-based products such as bio-based chemicals, plastics and fertilizers.

The bioeconomy plays a key role in **ensuring food security** for a global growing population. At the same time, it provides new business and innovation opportunities (e.g. through biomanufacturing) and facilitates the adaptation of climate-smart agriculture. The bioeconomy provides solutions to strengthen the resiliency of local and regional food supplies, by contributing to the sustainable use of natural resources and management of agriculture and livestock, by

- protecting soil health while increasing productivity,
- increasing recovery reuse and recycling of nutrients,
- making new protein sources accessible,
- advancing eco-compatible solutions for fertilizers,
- reducing food waste and losses,
- reducing pesticides, antibiotics and by
- reforming food markets and incentivizing sustainable consumption patterns.

4. Bioeconomy to address climate change and environmental sustainability

The excessive release of greenhouse gases is contributing to global warming and the increased occurrence of extreme weather events and rising sea levels. Human activities are exacerbating planetary boundaries, resulting in water pollution, land-use change, altered nitrogen and phosphorus cycles, and the damaging of ecosystems to degrees that exceeds their repair capacities. In 2020, the world is confronted with a systemic climate, biodiversity, economic and health crisis, one that has been exacerbated by the recent coronavirus and its impacts on global livelihoods, economies and health systems. These developments go hand in hand with the current lack of environmental, economic and social sustainability and the undermining of the natural system.

Bioeconomy provides great potential for **contributing to climate change mitigation and adaptation** both in terms of carbon neutrality (e.g. carbon sequestration) and improved resilience. The IPCC recognized this potential by highlighting many bioeconomy-related response options to climate change, particularly referring to land management (agriculture, forests, soils, other ecosystems) and value chain management (demand and supply options). All pathways that limit warming to 1.5°C or well below 2°C require, according to the IPCC, land-based mitigation and land-use change, with most including different combinations of reforestation, afforestation, reduced deforestation, and bioenergy.⁶

Bioeconomy is being furthered by science-supported nature-based solutions (NBS)⁷. These are gaining attention for their contribution to resilience in agriculture, forestry and coastal management, but also for providing solutions in urban planning and infrastructure.⁸ While NBSs have the potential for policy inte-

[6] IPCC. (2019). Climate Change and Land. Available at https://www.ipcc.ch/site/assets/uploads/2019/08/4-SPM_Approved_Microsite_FINAL.pdf

gration, they require effective translation into research and rigorous scientific testing. The bioeconomy is critical for **protecting and restoring biological diversity and ecosystems** in the areas of agriculture, marine systems, freshwater systems, urban areas.⁹ Examples include replacing unsustainable farming practices with innovations such as microbial-based fertilizers, plant growth-promoting bacteria and engineered crops. Sustainable intensification of land use offers further opportunities to increase efficiency, reduce land used for food production and deforestation.

Ecosystem services related to building, decentralized energy production as well as water and landscape management demonstrate the synergies and opportunities for biodiversity in the bioeconomy and provide new business opportunities, especially in rural communities.

The blue bioeconomy includes new marine bio-resources, e.g. macroalgae, microorganisms and invertebrates. They are increasingly being applied for commercial purposes and promising high market potential. In addition, the extraction of high-value bioactive compounds for the cosmetics or pharma industry, or the development of biomaterials or biofuels (3rd and 4th generation) and for biomitigation services. Sustainable aquaculture will play a key role in the future in contributing to sustainable food systems and to release pressure of overexploited resources.¹⁰

5. Priorities for the way forward with the global Bioeconomy

In 2020 in order to build back better with “bio”, we can draw on existing bioeconomy research and development, best practice examples from science, business and industry,¹¹ and the experiences made in bioeconomy policymaking during the last decade.¹²

We urge the **strengthening of the following practices and principles for global bioeconomy policymaking.**

1. Systems policy approaches – Bio- and Food systems

The agri-food system is to be a focus area. In addition to single policy instruments, such as carbon pricing, progress in the bioeconomy requires comprehensive and context-specific systems frameworks, that pay attention to conducive governance design. The transition requires a long-term policy perspective, changes in regulatory frameworks and (traditional) economic incentive structures as well as new institutional arrangements. We recognize the **need for action** to develop **well-designed strategic policy frameworks and related action plans** that set in motion transformative processes.

[7] Nature-based solutions are „(...) solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience.“ See European Commission (2016). Nature-based solutions. Available at https://ec.europa.eu/info/research-and-innovation/research-area/environment/nature-based-solutions_en [09.11.2020].

[8] World Economic Forum. (2020). New Nature Economy Report II The Future Of Nature And Business. Available at http://www3.weforum.org/docs/WEF_The_Future_Of_Nature_And_Business_2020.pdf

[9] IPBES. (2019). Media Release. Nature’s Dangerous Decline ‘Unprecedented’; Species Extinction Rates ‘Accelerating’. Available at <https://ipbes.net/news/Media-Release-Global-Assessment>

[10] European Commission. (2020). The EU Blue Economy Report 2020. Available at https://ec.europa.eu/maritimeaffairs/sites/maritimeaffairs/files/2020_06_blueeconomy-2020-ld_final.pdf

[11] UN FAO (forthcoming). How to mainstream sustainability and circularity into the bioeconomy? A compendium of Bioeconomy Good Practices and Policies. Will be available at <http://www.fao.org/in-action/sustainable-and-circular-bioeconomy/en>

[12] International Advisory Council on Global Bioeconomy. (2020). Global Bioeconomy Policy Report (IV): A decade of bioeconomy policy development around the world. Available at https://gbs2020.net/wp-content/uploads/2020/11/GBS-2020_Global-Bioeconomy-Policy-Report_IV_web.pdf

2. Capitalizing on the power of science and innovation

COVID-19 has revealed a new demand for innovation, with the opportunity for spillover effects from medical research to other research areas, such as agricultural, materials, energy and food. New findings and insights from research are being fed into policy roadmaps and agendas in order to react appropriately to the current crisis. This heightened focus on the power of science needs to be capitalized on by **increasing science funding for a sustainable bioeconomy** – a particularly important task, at a time when science funding may come under stress around the world. In addition, the key role of **open source technologies for global benefit sharing** has become more important than ever. This will require us to rethink and explore the understanding, organization and funding of science for sustainable bioeconomy development. We must improve the relationship between bioeconomy-related science, technology and innovation and effectively involve local primary producers and citizens in innovation development.

3. Innovation and training for Bioeconomy jobs

The economic recovery phase needs to be accompanied by **increased work on the science and policy interface** at the international level – to direct human and financial resources to sustainable biobased innovations and to share benefits resulting from science and technology globally. This holds opportunities for the creation of new decent and sustainable **jobs in the bioeconomy**, which will contribute a new normal high rate of employment, especially in rural and semi-rural areas. A strong focus needs to be on Youth and Women when designing **investments in training and capacity building**. Initiatives, such as the Bioeconomy Youth Champions, will help build a global bioeconomy youth and innovation community. It must be ensured that workers and entrepreneurs are prepared for and can adapt to new markets and new technologies. For the bioeconomy to reach its full potential, increased **investments in innovations in the life sciences** are needed, including fundamental science and research. While future bioeconomy innovation agendas need to include **connecting technologies** such as digitalization and artificial intelligence, urban and regional bioeconomy and novel manufacturing processes, they should further focus on related policy areas such as finance, culture, education, research, regulatory, and market development, and should include research on enabling policy measures and instruments as well as global governance. **Low cost innovations** with strong impact, resulting e.g. from new start-ups and lab-based innovations should be given increased attention in overall innovation agendas.¹³ Enabling innovation ecosystems, e.g. **public-private partnerships**, clusters, hubs, platforms, networks, accelerator and incubator models, will play a key role in fostering innovation and bringing bioeconomy knowledge to market. It will be necessary to rethink and reorganize innovation ecosystems for bioeconomy development and to ensure that data and data systems that drive bioeconomy enterprises are protected.

4. Enabling a strong and resilient bio-industry

a. Exploiting the growth potential of innovative start-ups and community enterprises

Appropriate support measures are needed to **promote innovative start-ups** in the bioeconomy. This includes public funding programs and access to risk capital, such as tax regulations to incentivize investment in start-ups, seed and early stage funding. The COVID-19 crisis has shown that **community enterprises** in rural areas play a key role in ensuring a sufficient economy, for food security, job creation and

[13] OECD (2019). Innovation ecosystems in the bioeconomy. OECD Science, Technology and Industry Policy Papers 76. OECD Publishing, Paris. <https://doi.org/10.1787/e2e3d8a1-en>

business opportunities in times of crises. Further promoting community enterprises in the bioeconomy will contribute to revitalizing rural communities and rural areas.

b. Mobilizing investment for bioeconomy development

In order to accelerate the transition to a sustainable bioeconomy a far more rigorous approach is needed to provide financial resources. **New norms and standards for sustainable finance** are necessary for incentivizing biobased markets, i.e. through sustainability indexes, ESG metrics, green bonds, accounting innovations and the further development of carbon markets. The role of institutional investors, such as foundations, insurance companies or pension funds in mobilizing financial resources for sustainable bioeconomy development needs to be further explored. Moreover, the increased risks of investing in traditional carbon heavy industries need to be better communicated to financiers, banks and lenders, e.g. through adapted risk management analyses to better **communicate future proof investments**. Establishing an **international bioeconomy finance platform** that addresses major knowledge gaps in bioeconomy financing will also contribute to identifying traditional and alternative funding options for bioeconomy development. Development cooperation with resources from Official Development Assistance (ODA) that aims to support reaching the Sustainable Development Goals (SDGs) should target the bioeconomy in emerging economies more.

c. Building-up infrastructure for the bioeconomy

Bioeconomy development requires investments in **research and development infrastructure**, but also bridging the gap between demonstration and industrialization with the help of large-scale **biorefinery development**. In addition, flagship projects supporting **novel manufacturing infrastructure** and bio-production systems, e.g. biofabrics and biofoundries should be promoted in order to capitalize on innovative solutions. COVID-19 has pushed countries to reconsider security of supply and explore new local manufacturing opportunities. For specific goods of urgent humanitarian need, it is more necessary than ever to enable knowledge and technology transfer within the framework of the bioeconomy in order to **assist countries with technology localization and to cope with local challenges of procurement**. Promoting **partnerships between industrialized and developing economies** will contribute to supporting technology transfer in countries that have thus far been highly dependent on imports.

The importance of industry and business in the bioeconomy and its key role in the transformation process is beyond question. Long-term political commitment and proactively **leveling the playing field** for biobased businesses (e.g. through removing subsidies for non-sustainable production, lump sums, tax exemptions) contribute to competing against traditional products and technologies. Sharing risks and funding, industry partnerships, and **public-private partnerships** can contribute to encouraging industry and business in investing bioeconomy-related activities and to successfully bring research, development and innovation for new bioproducts and ecosystem services to the market. Strategies for technology push and market pulls will further contribute to scaling-up and commercializing bioeconomy development.

d. Promoting resilient value chains

Bioeconomy reconciles local and global integration. New political impulses to strengthen smart international and local value chains, require carefully **balancing global and local objectives**. In order to ensure the resilience and adaptability of supply chains, investments in bioeconomy development should incentivize the **establishment of new, innovative, diversified and decentralized value-chains and the adaption of old ones**. The bioeconomy's strength lies in its diversity, adaptability, and close interactions with local and rural communities. While countries are exploring new opportunities in regionally unique offerings and local, small scale manufacturing, a global perspective for ensuring an efficient system of trade, international collaboration and knowledge and technology transfer must be ensured.

5. Providing frameworks for the development for a sustainable bioeconomy

a. Strengthening the role of regions

In addition to national and international efforts, an increasing number of regions and macro-regions are now active in bioeconomy policy.¹⁴ **Regional bioeconomy** initiatives are not only adding value and supporting national policy efforts, they also help create synergies by integrating national approaches, facilitate macro-regional collaboration, and provide a shared regional vision for bioeconomy development. Decentralized governance (with administrative, fiscal and political decentralization) is beneficial for best fit choices in regional bioeconomies. **Interregional coordination** is necessary to share best practices and facilitate knowledge exchange, but also to overcome divergences among different territorial aspects.

b. Strengthening policy alignment, harmonization and evidence based advisory bodies

Maximizing impact and transitioning to a sustainable bioeconomy particularly requires **integrated policy approaches** that combine economic development and industrial policies, social and health policies as well as environmental policies (such as Green Deals). Bioeconomy policy strategies need to be aligned with existing policy approaches across government levels. In addition, to achieve progress on the SDGs, bioeconomy policies and regulations need to be aligned internationally, e.g. to the United Nations' convention on biological diversity (CBD), climate change (UNFCCC), desertification (UNCCD) and the UN Food Systems Summit. This requires **new governance approaches** and **coordinated public intervention** along the entire value chain, and different policy levels to enhance and ensure the efficacy of public investments. **Independent advisory bodies** with a broad mandate anchored, for instance, in a national bioeconomy strategy can contribute to coordinate ministries, agencies and industry sectors and assisting governments by monitoring policy progress, including new developments, demands and challenges.

c. Strengthening metrics to advance bioeconomy measurement

Progress has been made in instituting policies for realizing bioeconomies yet systems to measure and track the economic, environmental, and social impact of such policies have not kept pace. Key to successful sustainable bioeconomies is the transformation of economic systems to allow **measurement of bioeconomic advances**, particularly in terms of sustainability parameters. An understanding of the total value of a country's bioeconomy – the sum of direct and indirect inputs – provides a baseline from which realistic growth targets can be developed. Economists have already begun to set up satellite accounts (SA) as forecasting, planning and measuring instruments for the bioeconomy in order to generate information relevant to both economic policy and corporate strategy decisions. With baseline bioeconomy values determined, government procurement targets for biobased products can be used to catalyze significant bioeconomy growth. In addition, other digital tracking systems, e.g. for materials tracking, need to be further discussed and explored as tools for measuring bioeconomy activities. The development of **international frameworks** to more accurately measure the impact and value of the bioeconomy should be encouraged. This will allow for illustrating resource bases and resource flows of the future bioeconomy and will further result in **speaking a common international language on methodologies, metrics and indicators**.

d. Strengthening demand side policy approaches

In order to stimulate change and create reliability for biobased markets and encourage more sustainable lifestyles and consumer habits (e.g. “sharing economy” initiatives), demand-side policy approaches are required, including a legislative environment that is more supportive of **biobased procurement** in the public and private sector. Furthermore, **standards and labels** can incentivize the uptake of biobased prod-

[14] International Advisory Council on Global Bioeconomy. (2020). Global Bioeconomy Policy Report (IV): A decade of bioeconomy policy development around the world. Available at https://gbs2020.net/wp-content/uploads/2020/11/GBS-2020_Global-Bioeconomy-Policy-Report_IV_web.pdf

ucts with approaches such as “bio-preferred” public procurement. **Awareness raising, highlighting the potential of the bioeconomy for competitiveness, sustainability and inclusion, benchmarking activities and communication strategies** on bioeconomy are not only necessary to informing the general public, but also different policy departments and business sectors. Demand-side policies need to minimize the emerging tensions and trade-offs, e.g. between rising consumption and resource use, and maximizing synergies by aligning and weighting SDGs accordingly.

e. Enhancing education, capacity building & training

In order to advance the opportunities provided by innovative products and services for sustainable development, considerable efforts are needed. Therefore, a sustainable bioeconomy attaches particular importance to knowledge, education and training, knowhow transfer and capacity building. In light of the current changes in the educational system, new opportunities in bioeconomy-related education and capacity building arise with the increased role of inter- and transdisciplinary education, global e-learning and blended learning. A new skills base for the bioeconomy that integrates life sciences skills with computer sciences, engineering, mathematics as well as social and economic sciences must be created.

6. Partnership, shared responsibilities and joint platforms

The transition to a sustainable bioeconomy will be the **joint, long-term task of government policies, industry, academia, and citizens** to find **new approaches for good governance to seek synergies, and manage tensions and trade-offs**. Governments, on the one hand, will be responsible for providing a strategic policy framework and incentives for bioeconomy development. In this regard, they will need to promote a supportive **innovation ecosystem** and business environment, while ensuring long-term societal dialogue. Industry and business, on the other hand, will be responsible for investing in promising innovations and emerging businesses in the bioeconomy, while citizens will determine future consumption patterns by developing environmentally and climate-friendly behavior.

A guided transition process demands a platform approach with all relevant **stakeholders and actors**, including policy actors, educators and academics, businesses and investors, communities and civil society, through **new forms of engagement and networks** to develop locally suitable approaches and to forge partnerships for knowledge transfer and capacity building. **Partnerships** between established knowledge-hubs and less advanced regions will play a key role in knowledge transfer and inclusive development. Powerful global platforms and networks, such as the United Nations and G20 and other international cooperation organizations, can help to bring together different actors worldwide and develop a common perspective and guiding principles for global bioeconomy policymaking.

In order to avoid the replication of efforts and reinforce insights and outcomes, existing global bioeconomy initiatives need to be integrated into **one recognized open global platform** that in turn facilitates advancement of collaboration of regional and national bioeconomies in the global bioeconomy theater. The **Global Bioeconomy Summit** has established itself as an institution that provides important impulses for the further development and coordination of different bioeconomy approaches around the world. The Global Bioeconomy Summits must continue in coming years.

Joint vision for a global sustainable bioeconomy

In Brief: Bioeconomy makes people and planet better off, by pursuing an economic system which is based on sustainable economic growth, while reducing resource consumption and by protecting and regenerating ecosystems. Using science to add value to biological resources and biological processes, the bioeconomy embraces principles of renewability, and circularity.

The bioeconomy is 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.¹⁵ The bioeconomy is not a static notion and its meaning is continually evolving. Since its origins in the late 1960s and 1970s, in which bioeconomics applied the laws of entropy to economic questions,¹⁶ the concept has further evolved in scope and in direction around the world.¹⁷

The bioeconomy aims at reconciling the needs of humans and nature. It pursues an economic system that is far superior to today's: one that strives for achieving the UN 2030 Agenda for Sustainable Development and its Sustainable Development Goals and one which is based on sustainable economic growth, which centers on improving human well-being and social equity, while reducing resource consumption and regenerating ecosystems. Bioeconomy activities enhance economic, social, and ecosystem resilience, allowing both urban and rural communities to thrive especially during economic crises. A global sustainable bioeconomy includes all levels of society and aims at improving the quality of life for all people, while respecting biophysical limits to economic growth.

Bioeconomy: a new economic vision inspired by nature

Nature serves as the greatest source of inspiration in the bioeconomy. Besides valuable, renewable material and energy resources, biology provides critical know-how on natural cycles, its system and processes. The life sciences explore such characteristics, abilities and functions of natural organisms in order to develop novel, high-value solutions and applications. At the moment, many bio-innovations are still in their infancy, but are already demonstrating promising solutions with clear social, health and ecological benefits. Pioneering examples in the health care sector comprise biological therapeutics e.g. in immuno-oncology, bio-degradable implants and sensors as well as bio-printed organs. In the textiles and fashion industry, bio-innovations contribute to sustainable materials and processes, e.g. biotechnologically produced spider silk, biobased water repellents or biobased dyeing and washing processes. In the IT sector, DNA has already been tested successfully for super-efficient data storage and cells have been merged with chips to diagnose air pollution. Bio-innovators in the food and feed industry have developed pro-biotic health products, new vegan protein options, high-value products from food waste and side-streams, as well as microbiome solutions for agriculture, such as microbial-based fertilizers, and for combating obesity and non-communicable diseases for better animal feed and human health. In industry, synthetic biology and applications of microbiome engineering not only result in advanced biomaterials, replacing plastics and steel, but also inspire more sustainable manufacturing processes. Biotechnology

[15] International Advisory Council of the Global Bioeconomy Summit 2018. (2018). Communiqué: Innovation in the Global Bioeconomy for Sustainable and Inclusive Transformation and Wellbeing. Available at https://gbs2018.com/fileadmin/gbs2018/Downloads/GBS_2018_Communique.pdf

[16] Nicholas Georgescu-Roegen is often considered the founder of "bioeconomics" with his work on "The Entropy Law and the Economic Process" (1971).

[17] German Bioeconomy Council. (2015). Bioeconomy Policy (Part II). Synopsis of National Strategies around the World. Available at https://bioekonomierat.de/fileadmin/international/Bioeconomy-Policy_Part-II.pdf

and related converging technologies provide remarkable potential to advance sustainable development and to accelerate job creation through innovative start-ups and global partnerships.¹⁸

Building a resilient, sustainable and innovative economy

A sustainable bioeconomy requires that we produce in a completely different way: circular instead of linear and by using science to add value to biological resources and biological processes. With its inspiration from nature, the bioeconomy fully embraces principles of renewability, circularity and cascaded resource use. The bioeconomy can be compatible with – and may contribute to – the development of a circular economy, where resources are used as long and as efficiently as possible, and waste is limited or repurposed. Sustainable bioeconomy development involves broadening our use of bioresources and including the conversion of bio-waste to useful products. The bioeconomy and circular economy both address sustainability and seek to optimize product design, material flows and resource efficiency while keeping a high level of functionality or adding new functionalities to materials. In fact, the recognition that the bioeconomy is deeply linked with circularity has become articulated under the concept of “Circular Bioeconomy.”¹⁹

Both concepts have a common interface. The concept of a sustainable bioeconomy, however, goes beyond that of the circular economy.²⁰ The bioeconomy aims for more disruptive innovation, a “biologization of the economy”, which comprises social and high-tech innovations and the development of completely new solutions, services, and products that combine sustainability with increased consumer benefit and thus enable new lifestyle concepts. Start-ups around the world are pioneering innovative, resource-efficient and sustainable protein production through the development of nutrient-rich products from algae to insects or by biotechnological manufacturing in microorganisms using CO₂ as a carbon feedstock. Large consumer goods companies are including biobased product innovations in their portfolios, from materials and packaging, functional textiles, to cosmetics and children’s toys. New processes and technologies such as biobased 3D printing, biomimicry, bionics and robotics, the large-scale technical use of CO₂ or biomanufacturing with cell-free systems are increasingly applied and embedded in new industrial and urban concepts. Elements of bio-principled cities, including algae houses, wooden buildings, waste-processing systems, insect farms, or urban and indoor farms, can be increasingly found all over the world. The bioeconomy also offers opportunities for synergies between the two concepts, where new ideas are needed to solve problems of plastics, degradability and human health.

A sustainable bioeconomy not only offers completely new solutions, but also the chance to reimagine age-old traditions and value chains in agriculture, forestry, and fisheries. It thus can also be seen as a tool to revitalize rural communities and to restructure industrial regions, such as former coal districts, by using new decentralized manufacturing approaches and thereby supporting the creation of new and sustainable, but also high-quality jobs for the future.

A sustainable bioeconomy addresses not only aspects of sustainable production, economic growth and employment, but is more and more determined by sustainable consumption and sustainable lifestyles. The bioeconomy includes producers and consumers alike. The vision of a sustainable bioeconomy is to advance technological progress and efficiency gains through science, technology and innovation. This puts the bioeconomy at the center of a new industrial strategy.

[18] International Advisory Council of GBS2018. (2018). Communiqué of the Global Bioeconomy Summit 2018, Available at https://gbs2018.com/fileadmin/gbs2018/Downloads/GBS_2018_Communique.pdf

[19] See, for example, Philp, J. & D. Winickoff (2018), or Carus, M. & L. Dammer (2018). See also the conference “Sustainable and Circular Bioeconomy, the European Way” (22 October 2018, Brussels) <https://op.europa.eu/en/publication-detail/-/publication/f57a0695-04d9-11e9-adde-01aa75ed71a1/language-en/format-PDF/source-84695789>

[20] “In a circular economy the value of products and materials is maintained for as long as possible; waste and resource use are minimized, and resources are kept within the economy when a product has reached the end of its life, to be used again and again to create further value.” See European Commission. (2015). Circular Economy Package: Questions & Answers. Available at https://ec.europa.eu/commission/presscorner/detail/en/MEMO_15_6204 [09.11.2020].

BIOECONOMY



Nature provides
Natural systems and processes

Maintain

Reduce

Embrace principles of circularity and cascaded resource use

Self organizing

Self-Repair

Diverse

Self-replication

Circular

H₂O

Efficient

O₂

Adaptive

CO₂

Regenerative

N

Nature



Biotech



Life Science



Biorefinery



Digitalization/
Converging Tech

**Bioknowledge/
Bioprocesses**

Science & Technology



Animals



Plants



Waste



Microorganism

Bioresources



Nature provides

- Renewable energy and materials
- Biodiversity

Recycle



Reuse



Apply

Special qualities of biological resources & processes for the benefit of humans and nature



Unlock potential

Biobased products Social and tech innovations



New Jobs Biobased service

Sustainable solutions and consumption



Consumer



Agriculture



Processing-ind. manufacturing



Fishing



Forest

Sustainable Economy

Inclusivity

Achieving SDGs

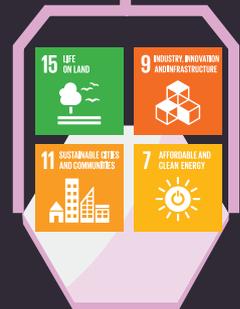
Improving human well being & social equality

Reducing resource consumption and building up ecosystems

Creativity

Renewability

Circularity



Government



International Advisory Council on Global Bioeconomy – further development as an expert think tank beyond GBS2020

Who we are

As the first international bioeconomy initiative, the International Advisory Council on Global Bioeconomy (IACGB) acts as an **independent, non-profit think tank** composed of about forty **high-level bioeconomy leaders and experts** from all hemispheres, making it **truly global in character**. It was initially formed to support the planning and organization of the Global Bioeconomy Summit 2015 and has been maintained, extended and updated since.

By uniting diverse perspectives and expertise from bioeconomy policy, science, engineering, industry and society and integrating existing global bioeconomy initiatives, the IACGB embodies and advances a **holistic understanding of the sustainable bioeconomy concept**.

In order to implement the recommendations of the Communiqué of the Global Bioeconomy Summit 2018, the IACGB agreed to further develop itself to a more formalized international mechanism to support and promote:

- a structured exchange of policies and practices among the global bioeconomy community,
- a state-of-the art knowledge base for bioeconomy policy and governance,
- a competent and significant bioeconomy voice in global policy for a related to innovation, sustainable development and the Paris Agreement, and
- the facilitation of international collaboration programs in bioeconomy R&D and capacity building.

The IACGB meets regularly to debate current bioeconomy developments around the world and to frame options and ideals for future developments. The IACGB inspires stakeholders around the globe to take back home its recommendations and to facilitate their implementation.

Vision

We share the vision of a sustainable bioeconomy in which humanity lives with respect for nature, and where the economy benefits society and protects the planet and local environments supported by technological and social innovations.

Mission

We inspire and facilitate international collaboration and mutual exchange in all aspects of global relevance for sustainable bioeconomy development by working together with multiple stakeholders across the globe and leading representatives from policy, science, civil society and the business sector.

Strategic Goals

To fulfill our vision and mission, we:

- observe, execute and document bioeconomy efforts globally
- identify common challenges and opportunities for synergies in the bioeconomy
- conduct a transparent and science-based dialogue among key stakeholders from governments, academia, civil societies and business
- recognize important fields and issues for international policy action and provide policy advice
- bring together and collaborate with other existing bioeconomy activities and initiatives from around the globe
- promote synergistic R&D partnerships between stakeholders from more advanced and emerging bioeconomies
- promote and induce knowledge sharing and collaboration in bioeconomy development at the local, regional and the global level
- encourage regional partnerships that can facilitate future GBSs

Activities and Key Outputs

- One of the IACGB's key outputs is the **Global Bioeconomy Summit (GBS)**, a high-level biennial policy-focused conference.²¹ It has become the leading international bioeconomy policy event with a format to globally review and discuss emerging opportunities and challenges of bioeconomy and develop visions for future development of sustainable bioeconomy among key actors from governments, academia, industry, finance and civil society.
- The IACGB may initiate the development of a **GBS partnership consortium** that will help to carry the GBS forward and ensure the contingency and stability of the IACGB's future goals and activities.
- The IACGB steers the development of **GBS-signature outputs**: including but not limited to exhibitions; global expert surveys; policy reports; the communiqué and a scientific high-profile journal paper.
- The IACGB supports supra-regional and global **expert meetings** with policymakers and policy stakeholders to motivate international collaboration and to encourage and co-organize **regional bioeconomy conferences**.
- The IACGB may release **policy briefs** on key bioeconomy-related questions, and may **commission studies**, develop **flagship reports**, **market outlooks**, **workshops** and conferences.
- The IACGB hosts a **website** which communicates the IACGB's work to the broader bioeconomy community and the general public.
- The IACGB seeks to nurture the format of **Bioeconomy Youth Champions** as ambassadors to drive the bioeconomy among younger generations.
- The IACGB members **participate in other policy & research fora** to communicate policy recommendations and the IACGB understanding of sustainable bioeconomy and its contributions to the Sustainable Development Goals.
- The IACGB may **develop and promote knowledge platforms** where expertise can be bundled and evidence-based information on recent bioeconomy policy developments is shared.
- The IACGB may develop a mechanism to support small and medium-sized companies in the area of the bioeconomy.

[21] The IACGB steers the organization of the GBS, its plenary agenda and workshop program to ensure its global spirit and its non-commercial nature. The IACGB plays a key role in providing strategic programming guidance for GBS and in mobilizing speakers and participants. The IACGB develops and approves policy recommendations on how to promote the development of a sustainable bioeconomy globally. These recommendations have been summarized in the Communiqués of GBS2015 and GBS2018 and new recommendations will be published during GBS2020.

Coordination Mechanism

IACGB Membership

Expertise and role of IACGB members:

IACGB members²² are top-level experts who inform bioeconomy-related policies in their spheres of influence. They combine a broad range of expertise and backgrounds and are actively involved in different international bioeconomy-related policy, research and industry fora. IACGB members **serve in their personal capacity** as experts and do not necessarily represent an official government or organizational position. IACGB members are actively involved in implementing the key outputs and activities described above. They are further asked to be actively involved in the coordination of regional and national bioeconomy developments and to follow up on the implementation of the GBS Communiqués's recommendations.

Membership period:

IACGB members are asked to serve for at **least four years (two full conference periods)**. A Nominations Committee will recommend once to IACGB members to continue their service for another four years if they have been active in the IACGB work. However, an extended IACGB membership is not automatically offered. IACGB members are encouraged to identify successors for their positions in the IACGB after eight years of membership, to facilitate a combination of continuity and of new membership.

Appointment process:

The election of IACGB members will be coordinated by a **Nominations Committee** which recommends new IACGB candidates to the Steering Group. Everyone who meets the above mentioned expertise criteria is eligible to be recommended, including former IACGB members. The IACGB membership is not limited to one person from one country or organization. However, the Nominations Committee has the right to ensure an equal balance of regions and expertise. The composition of the IACGB strives for a broad variety of views and people (e.g. in terms of expertise and background, age, gender, nationality, career stage). In order to increase its diversity and to ensure social inclusion and global fairness, particularly women and young professionals from all hemispheres should be recommended. Each candidate will be asked to provide a brief (about 1 page) profile to present her-/himself including current affiliation, background and expertise in bioeconomy, career stage, ideas of how to strengthen the IACGB, and vision for the development of the IACGB and the GBS. The appointment of new IACGB members is decided by the Steering Group.

Procedures and decisionmaking process:

IACGB members meet regularly in virtual meetings in order to reduce travel and cost expenses. However, IACGB members meet in person once a year to discuss the annual work plan and to exchange and discuss in detail ongoing bioeconomy activities around the globe.

Decisions are typically taken by consensus or in rare circumstances by majority vote.

[22] Members 2020: Mohammed Ait Kadi, Monique Axelos, Mohd Aslam, Anne Bogdanski, Sascha Bollerman, Hugo Chavarria, Paul Colonna, Achim Dobermann, Ben Durham, Ruben Echeverria, Julius Ecuru, Ahmed Fahmi, Fabio Fava, Yoshijuki Fujishima, Josef Glössl, Richard Kitney, Christine Lang, Yin Li, Mauricio Lopes, Mogens Lund, Elspeth MacRae, Jussi Manninen, Mary Maxon, Murray McLaughlin, Paulus Mungeyi, Ian O'Hara, Torfi Jóhannesson, Christian Patermann, James Philp, Vladimir Popov, Frank Rijsberman, Adrián Rodríguez, Morakot Tanticharoen, Omid Tavakoli, Flora Ismail Tibazarwa, Federico Torres-Caballo, Eduardo Trigo/ Marcelo Regunaga, Ivar Virgin, Joachim von Braun, Peter Wehrheim, Seung Jun Yoo

Steering Group

Acting period:

The Steering Group is composed of up to ten IACGB members²³ who coordinate the various tasks of the IACGB work **over a period of two years** (or the run up to the next Summit).

Appointment process:

Steering Group members represent perspectives from all genders, hemispheres and key bioeconomy fields. The Steering Group members are proposed by the Co-Chairs and are elected by the IACGB.

Decision making:

Steering Group decisions are typically taken by consensus or in rare circumstances by majority vote.

Leadership:

The IACGB elects Co-Chairs who coordinate and lead the work of the IACGB as well as the conceptual design and organization of the GBS. At least one of the Co-Chairs represents the country or region which will host the next GBS. The Co-Chairs are automatically members of the Steering Group.

Taskforces and Working Groups

In order to develop and elaborate the IACGB's core activities and outputs, IACGB members will choose to work in smaller taskforces. In addition, the IACGB may organize larger working groups made up of individual experts from the IACGB and its affiliated organizations, as well as volunteering outside experts. The IACGB may further consider forming partnership working groups.

Scientific Secretariat

A permanently staffed scientific secretariat will support the development of the above-mentioned key activities and outputs of the IACGB, including hosting of the IACGB website, development of GBS signature outputs, commission of studies, as well as support in publishing scientific papers and policy briefs on global bioeconomy issues. The scientific secretariat further supports the organization of the biennial GBS and manage the IACGB's day-to-day operations in-between summits, including:

- the IACGB membership administration and support
- the organization and follow-up of regular IACGB and Steering Group meetings (in-person and virtually),
- the dialogue with external stakeholders and the public.

Legal Foundation

In order to achieve the IACGB's vision, mission and strategic goals and to facilitate the conduction of contracts as well as the recruitment of staff for the scientific secretariat, it is advised that it takes on a formal legal form. This is why the formation of a registered (non-profit) German association (e.V.) is proposed. The legal form e.V. is particularly favourable when a) a larger number of people (at least 7 personal and/or institutional members) join together for a non-economic purpose and b) the admission and withdrawal of members should be uncomplicated.

[23] Steering Group Members: Julius Ecuru, Yoshijuki Fujishima, Christine Lang, Yin Li, Elspeth MacRae, Mary Maxon, Murray McLaughlin, Morakot Tanticharoen, Marcelo Regunaga, Joachim von Braun, Peter Wehrheim

More information on the registered (non-profit) German association (e.V.):

- The board of directors is protected against the risks of contractual liability (i.e. typical economic risks).
- The members are not liable for the association.
- The e.V. is a legal entity, which can sue and be sued in its own name and be entered in the land register.
- The e.V. is legally clearly defined form with internal and external legal regulations.
- It represents a democratic form of organization with the same rights and duties for all members.
- The formation costs are relatively low (about 90 to 140 €).
- No minimum capital is required.
- The e.V. cannot have any economic purposes and may only engage in secondary and subordinate economic activities. The e.V. thus can be a non-profit organization with tax exemptions.
- The formation of a e.V. request certain requirements: preparation of a statute, election of the board of directors, and at least 7 members for registration.
- Obligatory executive bodies include a board of directors and a general assembly.

List of IACGB Members

- Mohammed Ait Kadi**, President, General Council of Agricultural Development Morocco
- Mohd Aslam**, Advisor, Department of Biotechnology, Ministry of Science and Technology, India
- Monique A.V. Axelos**, Scientific Director for Food and Bioeconomy, National Research Institute for Agriculture, Food and Environment (INRAE)
- Anne Bogdanski**, Senior Natural Resources Officer, Climate and Environment Division (NRC), UN Food and Agriculture Organization (UN FAO)
- Sascha Bollermann**, Senior Advisor, Strategy, Knowledge and Innovation, Ministry of Agriculture, Nature and Food Quality, The Netherlands
- Hugo Chavarría**, Coordinator, Bioeconomy and Production Development Program, Inter-American Institute for Cooperation on Agriculture (IICA)
- Achim Dobermann**, Chief Scientist, International Fertilizer Association
- Ben Durham**, Chief Director Bio-innovation, Department of Science and Innovation, South Africa
- Ruben Echeverría**, Senior Research Fellow, International Food Policy Research Institute (IFPRI)
- Julius Ecuru**, Head, BioInnovate Africa Program, International Centre of Insect Physiology and Ecology (icipe)
- Ahmed Fahmi**, Program Specialist, Natural Science Sector, United Nations Educational, Scientific and Cultural Organization (UNESCO)
- Fabio Fava**, Professor, Industrial and Environmental Biotechnology, University of Bologna
- Yoshiyuki Fujishima**, Senior Analyst, Bioeconomy Unit, Technology Strategy Center, New Energy and Industrial Technology Development Organization (NEDO)
- Josef Glössl**, Former Vice Rector for Research and International Research Collaboration, University of Natural Resources and Life Sciences, Vienna (BOKU)
- Torfi Jóhannesson**, Senior Advisor, Agriculture & Forestry, Nordic Council of Ministers
- Richard Kitney**, Professor, Imperial College London & Chairman, Institute of Systems and Synthetic Biology
- Christine Lang**, Manager, MBCC Group – Consulting and Coaching in Microbiotics and Bioeconomy
- Yin Li**, Professor, Institute of Microbiology, Chinese Academy of Sciences (CAS)
- Mauricio Lopes**, Senior Scientist, Brazilian Agricultural Research Organization – Embrapa
- Mogens Lund**, Director of Division for Food Production and Society, Norwegian Institute of Bioeconomy Research (NIBIO)
- Elsbeth MacRae**, Chief Innovation and Science Officer, SCION
- Jussi Manninen**, Executive Vice President, Solutions for Natural Resources and Environment, VTT Finland
- Mary Maxon**, Associate Laboratory Director for Biosciences, Lawrence Berkeley National Laboratory
- Murray McLaughlin**, Co-chair, Government's Industrial Bioproducts Value Chain Roundtable
- Paulus Mungeyi**, Manager Biotechnology, National Commission on Research, Science and Technology
- Ian O'Hara**, Professor, Queensland University of Technology
- Christian Patermann**, International Bioeconomy Expert & former Director Biotechnology, DG Research & Innovation, European Commission

James Philp, Policy Analyst, Science and Technology Policy Division, Organisation for Economic Co-operation and Development (OECD)

Vladimir Popov, Director, Federal Research Center «Fundamentals of biotechnology» of the Russian Academy of Sciences

Frank Rijsberman, Director General, Global Green Growth Institute (GGGI)

Adrián Rodríguez, Chief, Agricultural Development and Biodiversity Unit, United Nations Economic Commission for Latin America and the Caribbean (UN ECLAC)

Morakot Tantichaoren, Senior Advisor to the President, National Science and Technology Development Agency (NSTDA)

Omid Tavakoli, Assistant Professor, School of Chemical Engineering, College of Engineering, University of Tehran

Flora Ismail Tibazarwa, Program Director, Southern African Innovation Support Program (SAIS)

Federico Torres-Caballo, Vice-Minister for Science and Technology, Ministry of Science, Technology and Telecommunications,, Costa Rica

Eduardo Trigo, Bioeconomy Advisor to the Government of Argentina

Marcelo Regunaga, Advisor, Group of Producing Countries from the Southern Cone

Ivar Virgin, Senior Researcher, Stockholm Environment Institute (SEI)

Joachim von Braun, Director, Center for Development Research (ZEF), University of Bonn

Peter Wehrheim, Head of Bioeconomy and Food Systems, DG Research & Innovation, European Commission

Seung Jun Yoo, Chief Strategy Officer, TP Global/Healthcare

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