GLOBAL BIOECONOMY SUMMIT 2015

Food Security

Decarbonization

Society

Sustainability

Energy

Health

Renewables

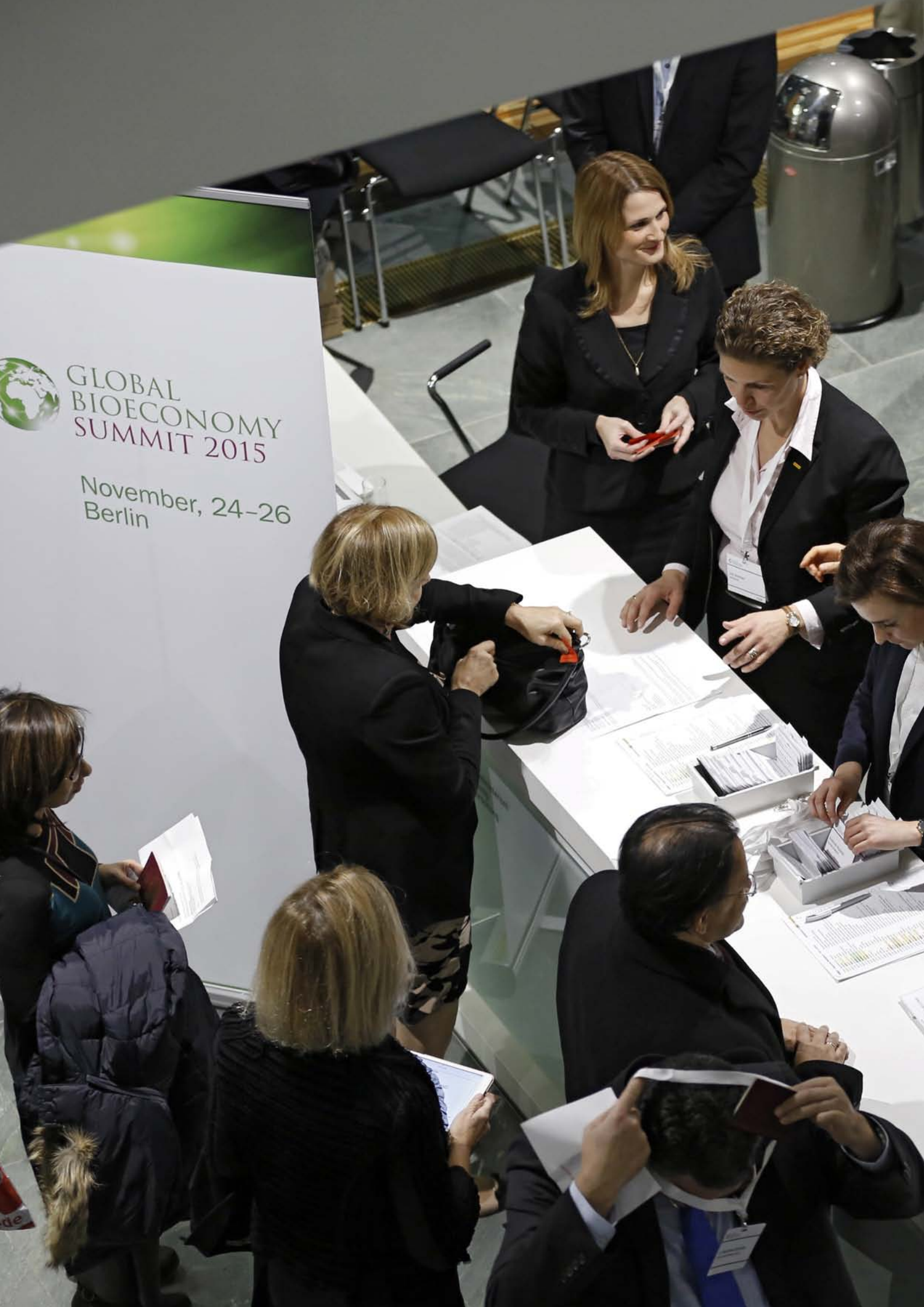
Global Bioeconomy Summit
Conference Report

For a Global Sustainable Bioeconomy

Bioökonomierat

SUPPORTED BY: Federal Ministry of Education and Research

UNDER THE PATRONAGE OF: The Federal Chancellor


GLOBAL
BIOECONOMY
SUMMIT 2015
November, 24–26
Berlin

Content

Executive Summary

About the Global Bioeconomy Summit 2015

At the Global Bioeconomy Summit (www.GBS2015.com) in Berlin, more than 700 participants from around 80 countries met to define how bioeconomy would best contribute to green growth, the sustainable development goals and to climate change mitigation and adaptation. The Bioeconomy Council of the German Government organized this first Global Bioeconomy Summit to be held in Berlin from 24 - 26 November. During GBS 2015, the Bioeconomy Council presented two comprehensive studies on the development of the bioeconomy: an analysis of the political importance of the bioeconomy in more than 40 countries [1] and a Delphi study identifying future flagship projects of the bioeconomy [2]. More than 100 international speakers presented policy concepts, lessons-learned and concrete examples in a series of plenary sessions as well as in parallel roundtables and poster sessions. The UN FAO, the OECD, the European Commission, the International Energy Agency and the Botanical Gardens Conservation International hosted workshops at the Summit. The Summit showed that the understanding of bioeconomy is very diverse and spans from sustainable smallholder farming to marine biotechnology. It became clear that there is not one bioeconomy but many. Although there was great diversity in political priorities and approaches to bioeconomy, the participants had a common goal: transitioning to a sustainable economy based on renewable resources. More than 100 speakers from around the world aligned the bioeconomy with the newly adopted Sustainable Development Agenda. However, great challenges have to be overcome to transition to a sustainable bioeconomy. It will be instrumental to involve all relevant societal stakeholders in bioeconomy policy strategies, especially recognizing the roles of science and business as innovators and civil society organizations as watch dogs and drivers of sustainable solutions. Prior to the Summit, 37 bioeconomy experts from countries on all continents and representing the major players in the bioeconomy were invited to form an International Advisory Committee (http://gbs2015.com/the-summit/international-advisory-committee/). The Advisory Committee jointly developed the cornerstones of a global political agenda to “Make Bioeconomy Work for Sustainable Development”. The resulting Communiqué [3] emphasizes that a sustainable bioeconomy will specifically contribute to achieving the SDGs related to food security and nutrition (Goal 2), healthy lives (Goal 3), water and sanitation (Goal 6), affordable and clean energy (Goal 7), sustainable consumption and production (Goal 12), climate change (Goal 13), oceans, seas and marine resources (Goal 14), and terrestrial eco-systems, forests, desertification, land degradation, and biodiversity (Goal 15). The Communiqué recognizes that bioeconomy strategies need to be adjusted to the specific conditions and opportunities prevalent in a country or region. However, if sustainable development is to be achieved, the experts insist that in certain areas it is inevitable to take a global approach. The communiqué of the GBS 2015 enlists the following priorities for a global policy agenda:

1) Optimizing the use of biological resources while ensuring food security and protecting the ecosystem.
2) Making the development of bioeconomy and its contributions to the Sustainable Development Goals measurable.
3) Intensifying international collaborations in education, research and development.
4) Exchanging experiences on policies fostering private sector and market development.
5) Integrating bioeconomy holistically in multilateral policy processes, such as the implementation of Agenda 2030 and the climate change agreement.

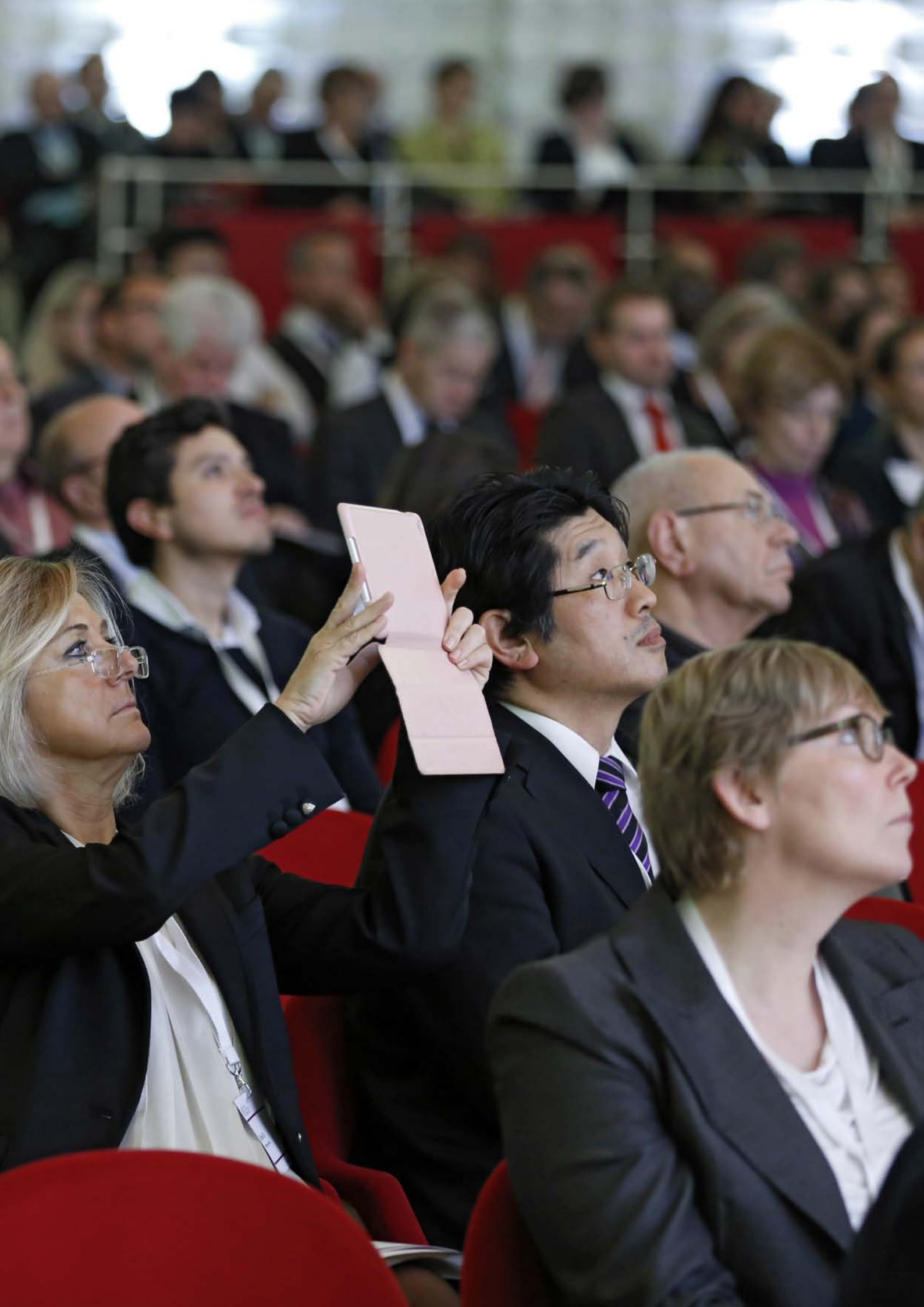
The International Advisory Committee agreed to promote the Communiqué in their networks, to take measures contributing to the global policy agenda and to initiate dialogues with policy, science, business and civil society stakeholders. The next Global Bioeconomy Summit will be held in two years.

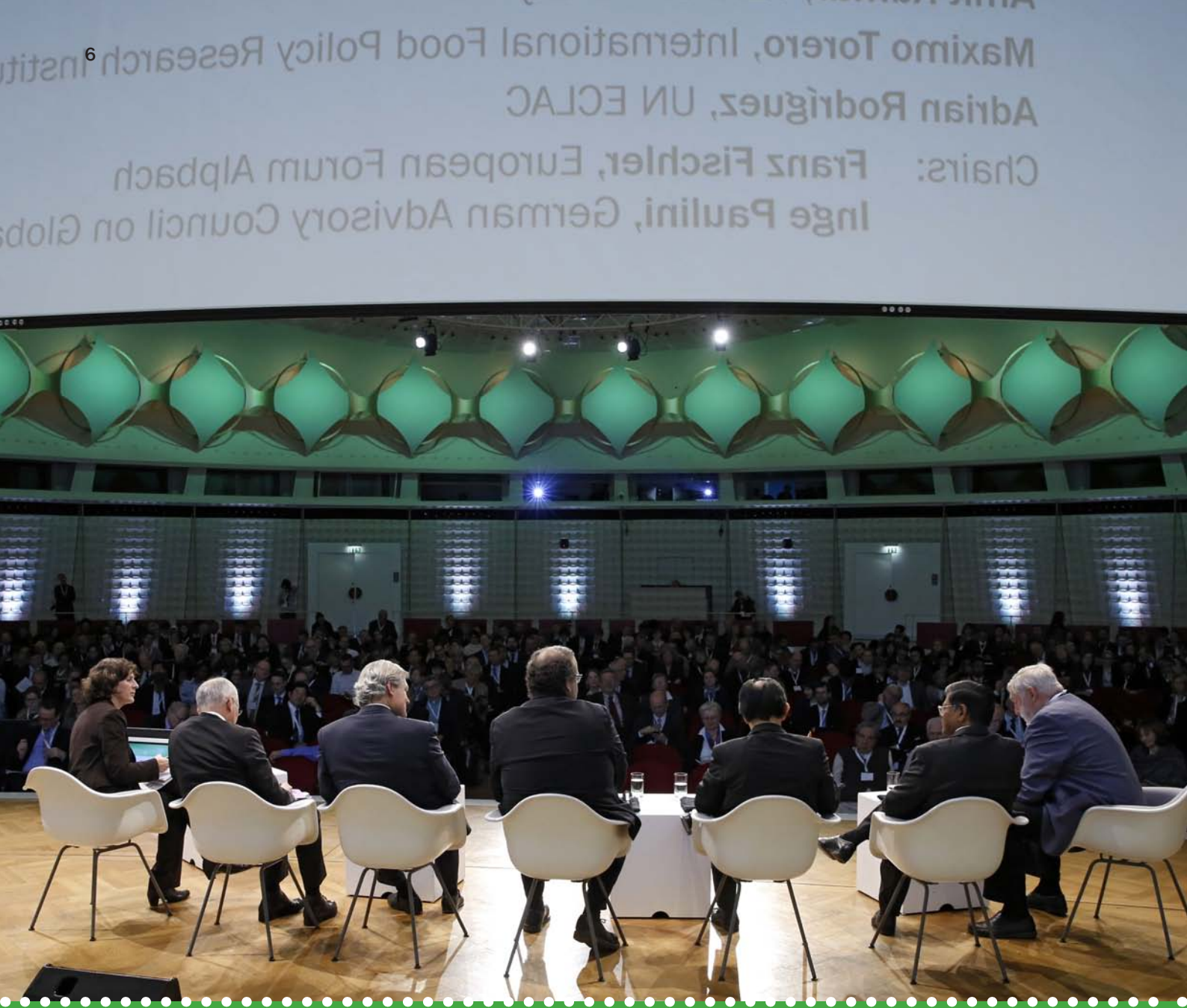
The Communiqué and the Summit Documentation are available for download at: www.gbs2015.com/resources

[1] Bioeconomy Council (2015) Bioeconomy Policy – Synopsis of National Strategies around the world

[2] Bioeconomy Council (2015) Global Visions for the Bioeconomy – an International Delphi Study

[3] Global Bioeconomy Summit (2015) Communiqué: Making Bioeconomy Work for Sustainable Development





Reports on the Strategic Debates

25th–26th November 2015

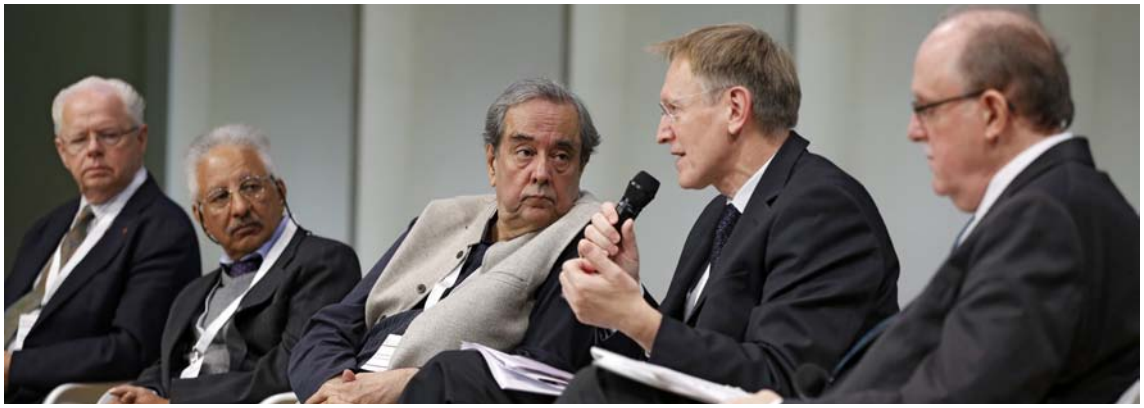
Strategic Debate I: Which Bioeconomy Strategies can Best Contribute to Innovation, Economic Growth & Sustainable Development

Chairs:

- Dilek Bil, Sustineo Istanbul
- Joachim v. Braun, German Bioeconomy Council

Speakers:

- Janez Potocnik, International Resource Panel
- Ashok Khosla, Development Alternatives
- Neway Gebre-ab, Ethiopian Development Research Institute
- Murray McLaughlin, Bioindustrial Innovation & Sustainable Chemistry Alliance



During the first Strategic Debate the panelists quickly agreed that bioeconomy-related policy strategies in particular would become increasingly important in order to manage the current problems of globalization. The session made clear that bioeconomy-related policies should involve sustainability aspects and should therefore concentrate on economic but also on social and environmental aspects. As an example, Ashok Koshla highlighted that ensuring food security requires not only looking at the production side but also looking at the sustainability side. Furthermore, he mentioned the ever-greater disparity between rich and poor people in the world, which would have implications on the use of resources. In this respect, bioeconomy policy strategies need to be designed from the bottom-up and need to involve each community, family or household. Promoting the employment and empowerment of women and considering the growing role of civil society as the watchdog of bioeconomy development, as well as the private sector's role as bioeconomy innovator should be also part of bioeconomy strategies, he argued.

Policies should further aim at finding new ways of controlling fossil fuel production and thus the emission of CO_2, said Murray McLaughlin when speaking about the petrochemical industry in Canada. He stressed that bioeconomy can considerably contribute to decarbonization and will also play a key role in the climate negotiation processes in Paris. Referring to Europe's obsession for growth and jobs, Janez Potocnik stressed that to develop a trajectory toward a working bioeconomy, we need to move toward a resource efficient and low-carbon economy. The intent is to decouple the economic growth from our resources and energy use in production processes, while promoting greater energy security and align it with the concept and implementation of decarbonization. A circular economy is not just about recycling and using biomass from land, sea, crops and microorganisms for fuels and energy, Potocnik stressed, but manufacturing, building and establishing green processes across industries. Dilek Bill generally emphasized that policies need to change in the interest of the bioeconomy. Furthermore, she underlined that global health problems are increasing rather than diminishing. Notably, the Ministries of Transport, Energy, Agriculture, Fisheries and R&D would have a special responsibility on bioeconomy policy-making. The debate showed that bioeconomy is not just a technical agenda but a policy and cultural change.

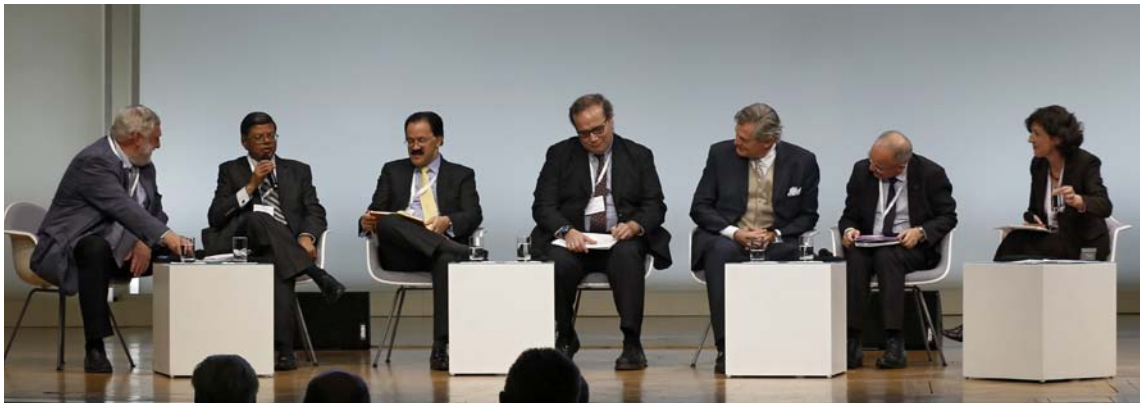
Strategic Debate II: Defining the Transition to a Sustainable Bioeconomy

Chairs:

- Franz Fischler, European Forum Alpach
- Inge Paulini, German Advisory Council on Clobal Change

Speakers:

- Gunther Pauli, ZERI Initiative & Novamount
- Francois Houllier, French National Institute for Agricultural Research
- Amit Kumar Radjeysjayan Nigam, TERI University
- Adrian G. Rodriguez, UN ECLAC



The second day of the summit opened with the strategic debate II: Defining the Transition to a Sustainable Bioeconomy. A topic of great significance and often conflicting opinions, the session's chairs and speakers came together to establish pathways and throw out questions and deliver some answers. Unanimous across the board: it is non-debatable that fundamental changes need to be made in the way business is carried out across the globe if we are to reach a low carbon economy that meets environmental and economic goals. Introducing the debate, Chair Franz Fischler underlined how sustainable bioeconomy is of upmost importance. The challenge that we are faced with today: if we are to achieve a sustainable bioeconomy, a strategic approach has to be adopted by the actors and policy makers, and we need to concentrate on the powers that shape strategies and frameworks. This means more engagement in the business, private and public sectors has to be organized. An interdisciplinary approach must be found and to do this, decision makers, society and policy makers must be brought together. All were in agreement that at the top of the agenda of this transition is the need to prioritize certain areas: sustainable growth, the use of pesticides on crops, the production of fuel from biomass, smart growth – an economy based on innovation and knowledge and high employment. To attain this, awareness of the bioeconomy needs to increase worldwide. One of the main topics to arise from the debate is how do we define boundaries in the bioeconomy. This raised the question: "What is our understanding of the bioeconomy?" The range of perceptions across the sector is vast – and throws up conflicting opinions and definitions. As a result, improved and more transparent communication is required and must be accomplished between the different sectors on a global scale. Because the bioeconomy is not singular and there are several types of bioeconomy, we need to share our experiences and knowledge. Currently, there is a lack of efficient communication. To sum up, we need to focus and turn our attention to the ethics of dimension within the bioeconomy. By definition, the bioeconomy is innovation-driven with huge potential, but this has to be utilized. Furthermore, for the bioeconomy to become more operational, legal and administrative structures need to be put in place and implemented.

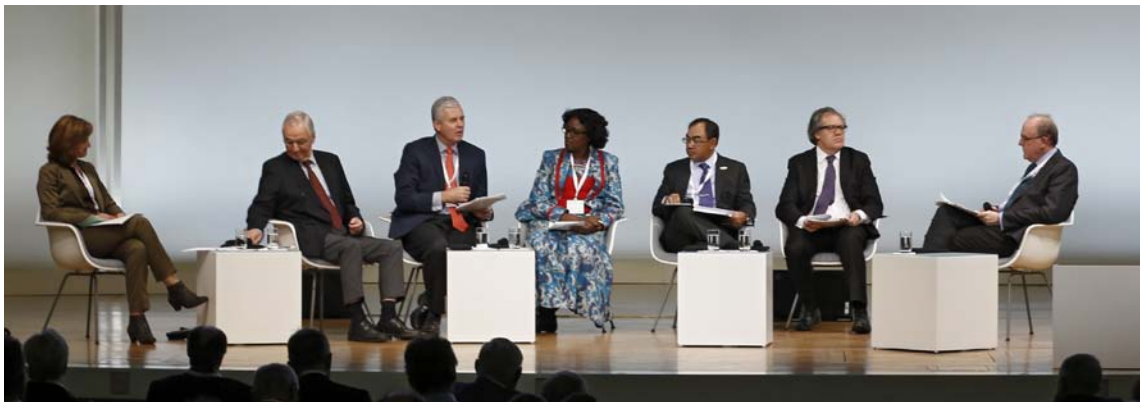
Strategic Debate III: Towards a Global Dialogue on Bioeconomy Policy

Chair:

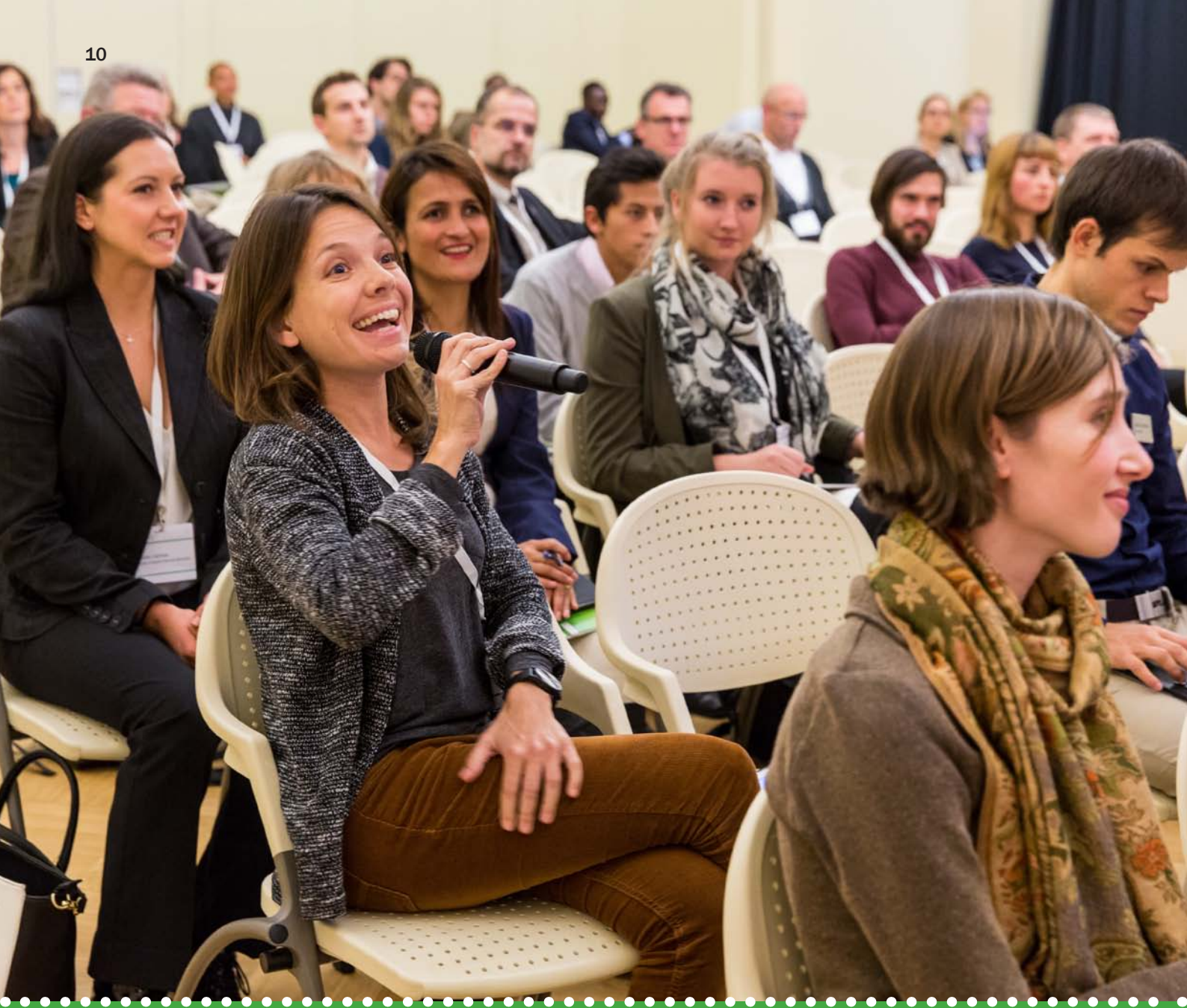
› Joachim von Braun, German Bioeconomy Council; Monika Jones (Deutsche Welle)

Speakers:

› Luis Almagro, Organization of American States
› Mohd Nazlee Kamal, Malaysian Biotechnology Corporation
› Alice Kaudia, Kenyan Ministry of Environment and Natural Resources
› Frank Rijsberman, CGIAR Consortium
› Klaus Töpfer, Institute for Advanced Sustainability Studies



In Strategic Debate III, the panelists had the opportunity to comment on the Communiqué of the Global Bioeconomy Summit, which was presented in the previous session. The Communiqué has been designed as a living document and aims at making bioeconomy work for sustainable development. Overall, the panelists were generally enthusiastic about the Communiqué and the initiative to foster international cooperation in bioeconomy development. In this respect, they highlighted the need to establish a global bioeconomy framework by developing common policies and principles. It became clear that, in particular, better communication and information is needed to promote the dialogue on bioeconomy policy. In this respect, the integration of bioeconomy-relevant stakeholders and their priorities was regarded of great importance in order to define the future policy agenda on bioeconomy development. In addition, the need to promote active dialogue between public and private sector was further mentioned. Above all, rural development was emphasized as a cornerstone of a future policy agenda in order to ensure benefitting also smallholder farmers in Africa and Asia. Alice Kaudia mentioned one fact missing in the Communiqué; namely, in how far poverty could be tackled in Africa by the use of biological resources. In Africa especially, the bioeconomy should contribute to green growth, the employment of young people, the restoration of degraded landscapes, as well as to food and water security, she said. Moreover, Frank Rijsberman requested an update of the narrative of food security in order to also consider the two billion people in the world who may not be starving but are unhealthy and obese. In this respect, he asked in how far the bioeconomy can really contribute to healthy diets and sustainable food systems? The panelists agreed that the major prerequisite for a global dialogue is defining a common definition on bioeconomy. The Summit has shown that bioeconomy is highly diverse and that there is still some confusion under the dome on “what is bioeconomy”. Nevertheless, it became clear that the common interest is to focus on sustainable bioeconomy only, which is what the Communiqué underlines. It became further apparent that to define this bioeconomy, not only economic and biological criteria should be applied, but also ethics.



Roundtable Reports

25th November 2015

Roundtable 1: Sustainable Bioeconomy Development from Civil Society Perspective

Chair: Marion Aberle (Welthungerhilfe)

Christoph Heinrich (WWF Germany) gave a talk on the conflicting goals between conservation of nature and the use of resources. “We may not have a choice but to transition to a biobased economy, if we take decarbonisation as a global goal seriously,” he said. But these goals come along with a fast growing global population, loss of arable land and with fertile soils on the decline. 45% of land in Germany is used for agriculture, but the demand for land goes beyond borders. The demand for land abroad amounts to about 5,5 million hectares; the lion’s share of it in South America, driven by soybean cultivation. He made clear that the pressure on ecosystems is increasing rapidly. He referred to WWF’s global “living planet index”. Since 1970, 50% of so-called indicator populations have been lost. The biggest decline occurs in South America. “Soybean and palm oil cultivation are currently undermining the biodiversity of our planet,” he said. Technologies have to be extremely smart in order to reduce the carbon footprint of a further growing population. He stressed two key principles: 1) Food security must have priority over any other biomass demand. 2) Conservation and regeneration of the remaining natural and semi-natural ecosystems. Heinrich: “We must apply sustainable biomass production in Germany and other countries”. He recommended using resources in multiple ways and in cascades, and to further explore waste streams as a resource.

Joseph Rahall (Green Scenery) shone a light on the issue of food security in his West African country. He also pointed at the problematic issue of land grabbing: since 2008 the food, fuel and global economic crisis has opened up new frontiers for foreign businesses, sovereign investments and other forms of investments in land for industrial agriculture. At the end of 2013, Sierra Leone had seen an estimated one million hectares dealt by foreign business interests, many of whom were speculators who traded land to other investors, he said. The global biofuel demand has catalyzed land deals that took massive land away from local farming systems. “These land deals were not transparent and lacked processes leading to uninformed decisions by land owners” he said. He explained that after the Ebola crisis, the government and policies were once again opening doors for investors. In total, the epidemic crisis has produced social instability, enhanced poverty, tension and conflict. Concerning bioeconomy, countries like Sierra Leone with the priority need for food security must be allowed to produce food and be supported to do so. Where the necessity calls for poor countries to be enlisted in the production of biofuels from crops, serious consideration must be given to small-holding farmers to benefit from schemes that will improve their status while contributing to food production.

Rafaël Schneider (Welthungerhilfe Germany) asked in his talk how food security can be ensured in practice. There is a legal framework based on the Human Right to adequate Food. Moreover, the newly adopted SDGs aim to overcome hunger by 2030. The food security targets are closely related to biomass production in developing countries and food-insecure regions. In 2004, the UN laid down voluntary guidelines towards the realisation of the Human Right to adequate Food. The UN call to action for regulatory frameworks do exist, but are often not adapted by governments or businesses. He recommended to the audience the working paper No. 143 published by the Center for Development Research (ZEF) University of Bonn which aims at defining criteria to safeguard the Human Right to Food in investments in the biomass field. The Human Right to adequate Food has to be ensured in local biomass production and certification systems could play an important role in food insecure regions. He sees the paper as a practical guide or tool, giving advice on how to introduce these criteria into existing certification standards.

In the long run "We need binding standards to make bioeconomy sustainable," he said.

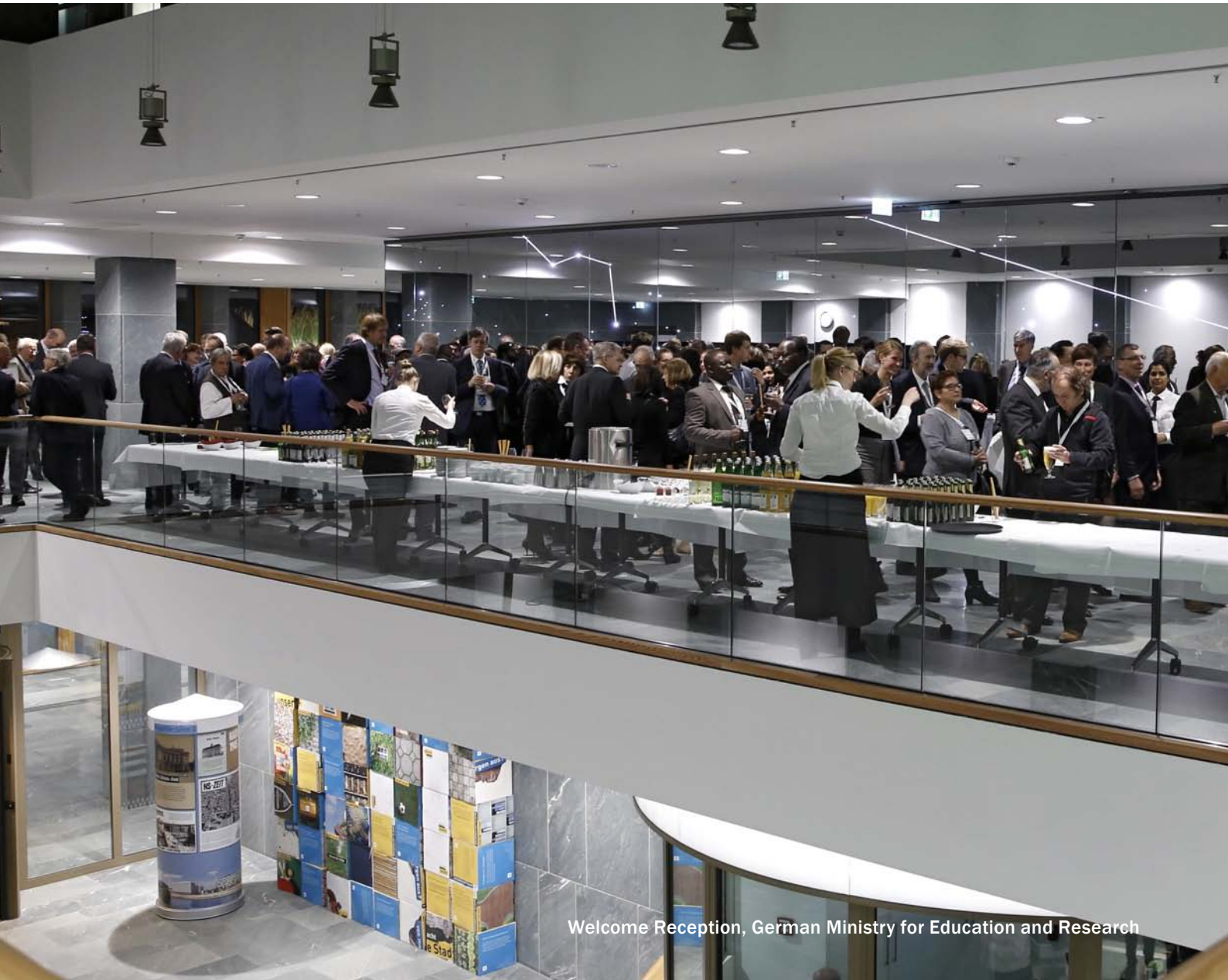
Amy Padilla (IBON) focussed on the importance of rural development and building people's capacities in agriculture. She made clear that there is rising hunger and poverty, especially among the people who produce most of the food for the world's population, i.e. small-scale farmers, coastal fisherfolk and others. Particularly in Asia, there is lack of ownership, control and access to land and other productive resources. Padilla said that such factors have not been addressed in the Sustainable Development goals (SDGs) discussions so far. IBON promotes the bottom-up concept of food sovereignty as alternative international governance mechanism that allows for countries to ensure community and peoples control over food systems. Building capacities locally is an important strategy: that is why IBON conducts trainings on food sovereignty and tries to engage people. "For a sustainable bioeconomy, it is important to develop people-based and biodiversity-based food production systems," she said. That also means recovering community control over seeds and other genetic resources for agriculture. Ensure women's access to productive resources, promote women's capacity and knowledge such as seed conservation. "There is a need for nationally developed and owned SDG goals, targets and indicators", Padilla said. To do this, she asked for mechanisms that institutionalize public participation. "Bioeconomy discussion impels everybody to move for a new development framework that abandons unsustainable consumption and production patterns," she said.

Jasper Lund-Larsen (trade union "United federation of Danish workers") referred to a recent study, in which the geographical employment potentials from expanding bioeconomy activities in Denmark were considered, with a focus on a rural perspective. The study finds that realising the future biomass potential will create more than 20,000 jobs by 2050, of which nearly 80% are in rural districts of the country. Models were calculated based on six and 12 biorefineries at locations where straw can be delivered. Notably, the employment effects would be distributed across all education levels, the study finds. A map was drawn indicating that in Denmark most of the jobs will be in rural areas. **Willis Olouch-Kosura (University Nairobi)** underlined the critical role of the civil society in the bioeconomy debate: "Bioeconomy is complex, all stakeholders should play a role and create awareness". "We have to tell policy makers/governments what society is." The sector and its institutions should be strong, he said. "Bioeconomy is not only about reducing, but also about reuse, recycle, replace, redesign, rebuild, revive, redefine, rethink, retain resiliences", he said. "We have to engage all stakeholders to give rise to a smooth transition towards a sustainable bioeconomy."

Franz-Theo Gottwald (Schweisfurth Foundation) was a newly nominated speaker at the podium, replacing Stefanie Ober from the Civil Society Platform "Forschungswende"). Gottwald said the impression he had so far at the GBS 2015, is that bioeconomy is a novel industry paradigm, with genetic engineering being a core technology, an economy that is highly capitalized, high-tech, with lots of agro-engineering and scaling-up. But he asked what strategy would be behind a global roll out? What he thought was under-represented was the issue of food sovereignty and the role of small farmers and organic agriculture in bioeconomy. "There is a need to address social issues first and to combine them with local economies," he said. Rural development has to be funded, there have to be research activities. "We have to create knowledge locally and integrate local people's wisdom," he said. We need new institutions of cooperation that work, and go for capacity building. Aiming at a knowledge-based agriculture would be a slow but sustainable path of development.

Stefan Schmitz (German Federal Ministry for Economic Cooperation and Development), talked about how governments can cooperate with civil society organisations (CSOs). "CSOs are absolutely crucial in the fight against hunger, whether they act as campaigners, watchdogs, stakeholders or active implementers of food security projects. This diversity offers great opportunities and entry points for dialogue. He mentioned as an example the German national working group "AK Welternährung", a discussion platform that brings about 20 CSO actors together. He said the BMZ is

also exploring direct cooperation within so-called public-CSO-partnerships. “We share a lot of common understanding,” he said. For example, BMZ does not implement biofuel projects. He also said that the government had a different view on cooperation with the private sector than CSOs, which are often sceptical. “We need more mutual understanding,” he said. In the Q&As, an attendee from the auditorium commented that scepticism from CSOs regarding big companies results from the fact that they typically create very few jobs in developing countries. Another attendee suggested that having a combined roundtable that brings together CSOs and economy experts would make more sense to foster cooperation instead of having separated round table sessions.



Welcome Reception, German Ministry for Education and Research

Roundtable 2: Challenge-oriented Bioeconomy Research – Solving Trade-offs

Chairs: Harald Grethe (University of Hohenheim), Léon Broers (German Bioeconomy Council)

In order to discuss the key issues in science-based policy advice, the roundtable was split into two parts. The first part dealt with general requirements on bioeconomy-related science and focused on questions regarding the role of research for bioeconomy innovation and the type of research policy needed. The second part concentrated more specifically on bioeconomic modeling and scenario analyses supporting policymaking.

Ulrich Schurr (BioSC Jülich, Germany) opened the roundtable by stating that there was no one-size-fits-all bioeconomy. Instead, a "hybrid-bioeconomy" has evolved. Mr. Schurr pointed out that the goals of bioeconomy stakeholders were diverse and had different spatial scales. Furthermore, the diversity of regionally available resources would determine the space for bioeconomy solutions. As a result, he highlighted the need for regional approaches to the bioeconomy, which would ensure the implementation of a sustainable bioeoconomy.

Léon Broers (German Bioeconomy Council) drew attention to the role of the private sector in generating bioeconomy-related innovation, which would further help to achieve a sustained transition towards a knowledge-based bioeconomy. In this respect, Mr. Broers proposed that the interaction between private and public players should be strengthened. For example, promoting public-private partnerships would ensure closed innovation chains from basic research to final products, he said. Furthermore, supporting the generation of bioeconomy-related innovations meant also creating appropriate framework conditions, he argued. These included increased research funding, changes in the regulatory framework as well as financial incentives.

Chunyi Zhang (Chinese Academy of Agricultural Sciences) reported on the opportunities of biotechnology to contribute on solving the grand societal challenges. He also drew attention to the challenges and dangers of biotechnology, and therefore emphasized the responsibility of research to develop strategies on monitoring and avoiding risks related to biotechnology. At the same time, he made clear that public awareness on the benefits of biotechnology, but also political goodwill and support for biotechnology research, should be promoted.

Ali Abdul-Zhra Al-Lami (Chief Scientific Advisor, Iraq) referred to the challenges and dangers linked to bioeconomy, especially regarding wildlife conservation and biodiversity. He highlighted the economic potential of bioeconomy in the Middle East, specifically for Iraq, which is rich in wild sugarcane, corn and other agricultural crops. According to Mr. Al-Lami, the most prominent challenge for research is to identify the impact of bioeconomy development on biodiversity. Impact studies could result in developing appropriate policies and monitoring measures, he recommended.

In the second part of the roundtable, specific modeling approaches and scenario analyses were presented. **Elke Saggau** and **Jan van Esch** presented their work within the **EU Standing Committee for Agricultural Research (SCAR)**. In this respect, Ms. Saggau explained the SCAR Foresight method, which is designed as a research instrument and should inform policy makers and strategic planning efforts. By presenting the new SCAR Foresight report (2015), Ms. Saggau made clear that its main focus lies on analyzing interactions between the primary sector and the biobased industries on the basis of future scenarios. The report explores development paths of a sustainable bioeconomy in Europe. It further identifies guiding principles for future actions, including food first, sustainable yields, cascading resource use and a circular economy approach. Examples of key future research themes include methods of sustainable intensification in agriculture, the use of emerging and converging technologies and socio-cultural dimensions of the bioeconomy.

Mr. van Esch consequently presented the activities of the Strategic Working Group on Sustainable

Bioresources for a Growing Bioeconomy (SWG SBGB). The group seeks to identify the state and scope of the bioeoconomy in Europe and to analyze the strategies of the member states in order to define research needs, barriers and perspectives. The working group has identified different drivers for bioeconomy development in Europe, such as searching for new business opportunities and finding solutions for the grand societal challenges. Mr. Van Esch underlined that implementing the bioeconomy requires, for example, agreements on common bioeconomy-related principles, that interdisciplinary research needs to be stimulated and that the focus of the research and innovation agendas needs to lie on biomass production.

Regarding bioeconomic modeling, **Hans van Meijl** (**Wageningen UR**) presented outcomes of the European 7th Framework Program project 'Sustainable Assessment Tool for the BioBased Economy' (SAT-BBE). SAT-BEE's objective is to provide tools for monitoring and evaluation of the implementation of the EU Bioeconomy Strategy. The MAGNET model was presented as an example of a macroeconomic general equilibrium model that covers every sector of the economy and has been used extensively in agricultural, environmental, and trade policy analysis. Mr. van Meijl stressed that compatibility and integration between different model types need to be improved in order to evaluate the development of the bioeconomy and its impacts across different sectors and levels of aggregation.

Harald Grethe (**University of Hohenheim**) presented the Competency Network, composed of interdisciplinary modeling teams who intend to analyze integrated bioeconomic scenarios. The Competency Network is part of the Bioeconomy Research Program Baden-Württemberg/Germany. It seeks to analyze the direct and indirect effects of different biomass utilization paths. Furthermore, the assessment framework serves to compare the economic benefits and costs associated with certain bioeconomic scenarios.

Hermann Lotze-Campen (**Potsdam Institute of Climate Impact Research**) made clear that meeting ambitious climate change mitigation targets will require substantial amounts of bioenergy as part of the energy mix. In this respect, the role of second-generation lingo-cellulosic bioenergy is expected to grow, he said. Mr. Lotze-Campen explained that modeling agricultural and land use allocation provides information on how the increasing bioenergy demand may affect the future land and water use, as well as agricultural trade and food prices. He pointed out that pricing greenhouse gas emissions from all sectors should be a key element of the future climate policy mix. Providing the right incentives for increasing agricultural productivity and sustainable intensification in crop, livestock and bioenergy products is another prerequisite for managing a growing bioeconomy, he stated.

The last presentation was held by **Hannes Böttcher** (**Oeko-Institut**), who explained that permanent grasslands have also been converted or are under conversion pressure. The amount of cropland and grassland in Germany will have to decrease, he said. A sustainable bioeconomy in Germany can only succeed if a fundamental change in land utilization takes place. In this respect, he proposed to monitor the bioeconomy and to promote knowledge transfer. He further recommended to establish early-warning systems, which include the development of indicators for system characteristics, system drivers etc.

Roundtable 3: Sustainable Business Models and Innovation Networks

Chairs: Gunter Pauli (ZERI Initiative & Novamont), Dirk Pilat (OECD)

In order to develop valid business models and innovation networks, several major issues were addressed by the roundtable speakers, including interdisciplinary and cross-sectional communication, regulatory frameworks, research culture and incentives as well as linkages with SMEs, addressed several major issues.

Gunter Pauli (ZERI Initiative & Novamont) called on the business community to change their business models. Biobased businesses would have to focus on regenerating not degenerating the ecosystem. For policy makers this meant that new rules of the game were needed.

Dirk Pilat (OECD) argued that whereas new jobs, ideas and growth result from new business models and start-up firms, policy mostly favored existing firms. Policies in the G20 were generally not aligned with a low carbon economy and still favored fossil fuels. Additionally, public investment in energy research & development was not aligned with agricultural and forest policies.

Besides policy alignment, **Angela Karp (Rothamsted Research)** highlighted the need for new research models in agriculture and food. Although these areas were of strategic importance for the bioeconomy and sustainable development, public research money was rather spent for biomedical research and biobased chemistry. In particular the complex nature of agricultural innovation was seen as a cause of conflicts of interests and regulatory hurdles. A cultural change was needed where research funders encourage entrepreneurism and scientific excellence. Research organizations also needed to change. For example, setting up interdisciplinary teams dealing with broader topics and engaging with business and practitioners. It was recommended, that research organizations could employ both, scientists doing science and others that engage in projects that do not primarily serve to publish results. The latter could be rewarded for working outside of their field.

Susanne Braun (University of Hohenheim) reported on the EU project Trafoon, which seeks to improve the know-how transfer between food SMEs and research. Having identified a lack in appropriate means of communication with small businesses, the project establishes a know-how transfer network and uses mediators to reach out to SMEs. Knowledge of the needs, habits and the working conditions of SMEs would be generally necessary to address and motivate these companies for collaboration.

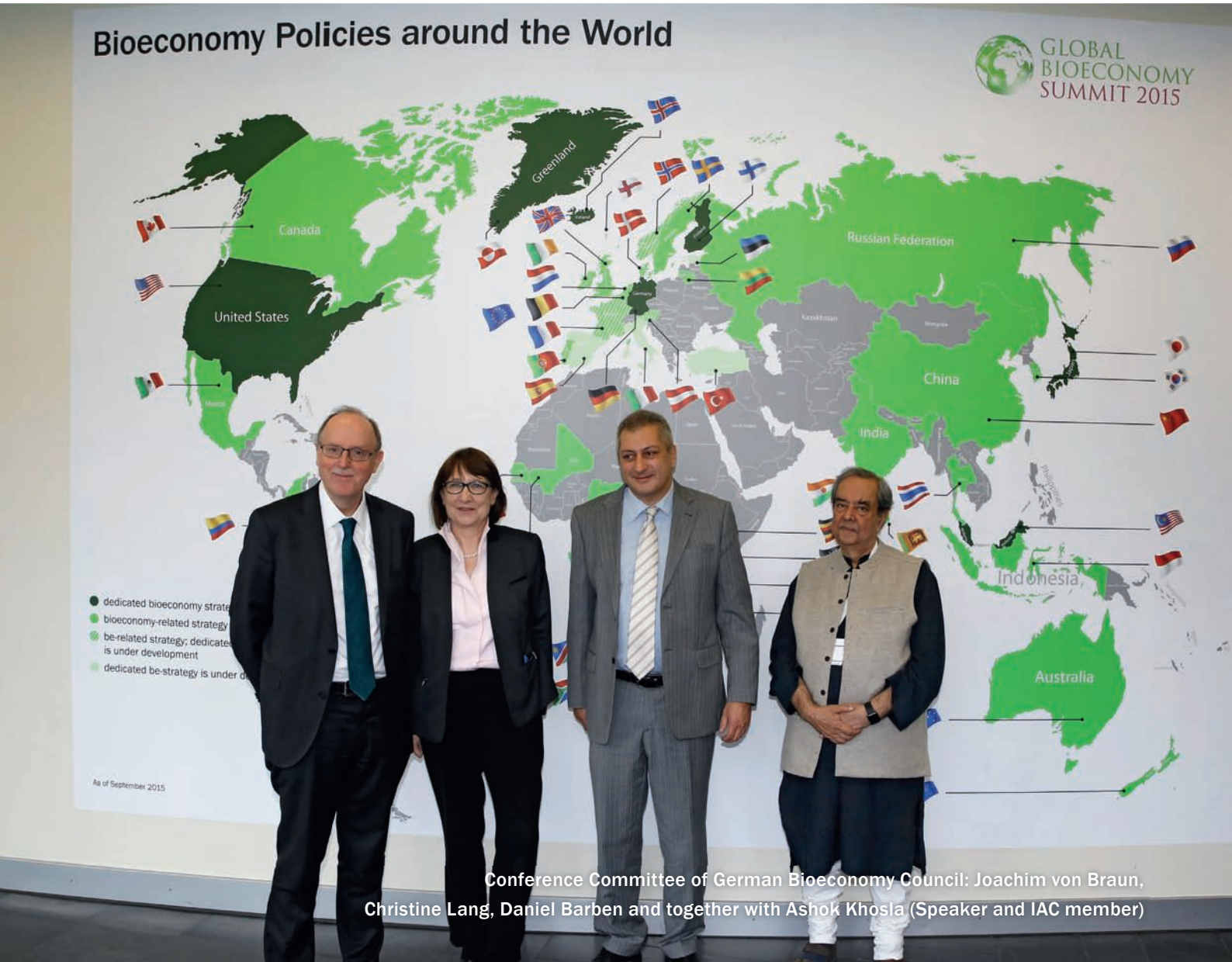
Monish Ahuja (Bermaco Energy Ltd.) presented the business model and the lessons-learned from Punjab Renewable Energy Systems in India. The company is active in R&D, process development and management of the complete biomass supply chain for regional power and processing plants. Typically, they focus on farm residues and waste biomass. They work with farmers in a radius of about 50 – 100 km around the processing and storage infrastructure. Based on biomass assessment studies, fixed price contracts, e.g. for rice straw, are concluded with the farmers, who receive additional income for their renewable resources. Key success factors are the provision of information and training of farmers, financing of the equipment and management of the complete supply chain. Mr. Ahuja cited many positive outcomes of his business model: rural jobs and income generation, skills development and biobased business. In future, they plan to develop biofuel and chemical supply chains.

Gordon Yu (Taiwan Hsinchu Green Industry Association) presented a circular business model developed in Taiwan that deals with marine plastic garbage patches. The RONE business model makes use of the fossil fuel-based garbage for generating oil and new energy. Although not biobased, the advanced pyrolysis process developed does not seem to require sorting or washing of the plastic, and thus emits only small amounts of green house gases resulting in high-quality oil. The business model

envisions a ship located within the pacific garbage patches producing fuel, which could be sold to e.g. large container vessels. Mr. Yu claimed that the regulatory framework has inhibited the wide adoption of such desirable technology, because it cannot be classified as biodiesel or recognized as an environmentally friendly product.

Angela Schultz-Zehden (**SUBMARINER Network for Blue Growth**) presented an ongoing blue economy initiative in the Baltic Sea region. The open network seeks to encourage SME collaboration in the wider region and to monitor their development. The know-how is shared via a mix of communication means, such as a website, round tables, conferences and working groups.

Nathalie Moll (**EuropaBio**) discussed the suitability of public-private partnerships for bioeconomy development. Whereas pharmaceutical companies prefer acquisitions, industrial biotechnology companies prefer to collaborate and thus seem more prone to work in clusters and networks. The Biobased Industries Joint Undertaking (BBI) is a €3.7 billion Public-Private Partnership (PPP) between the EU and the Bio-based Industries Consortium and covers the complete bioeconomy value chain. Ms. Moll argued that due to the diversity in actors involved, the policy issues at stake were diverse and the collaboration complex. To get things moving, a more structured approach via five bioeconomy value chains has been implemented. However, making the PPP known and communicating its activities to the business and research communities was of key importance and remained a major challenge. It is important to integrate the existing clusters and vertical value chains.



Conference Committee of German Bioeconomy Council: Joachim von Braun, Christine Lang, Daniel Barben and together with Ashok Khosla (Speaker and IAC member)

Roundtable 4: Bioeconomy Policy and Trade Strategies

Chairs: Jacky Hunter (BBSRC), Andrea Noske (German Federal Ministry of Research)

Speakers:

- Sopida Tongsopit (National Science Technology and Innovation Policy Office, Thailand)
- Ralf Kindervater (BIOPRO Baden-Württemberg, Germany)
- Geir Oddson (Nordic Council of Ministers)
- Henrik Brask Pedersen (Central Denmark Region)
- Heinz Hetmeier (Federal Ministry of Economic Affairs and Energy, Germany)
- Lars H. Jensen (Agro Business Park, Denmark)
- Hasso von Pogrell (European Bioplastics)

The discussion in this roundtable concentrated on existing policy measures and proposals to overcome obstacles and to foster the development of a bioeconomy around the world. In this respect, three main issues were brought to light during the session.

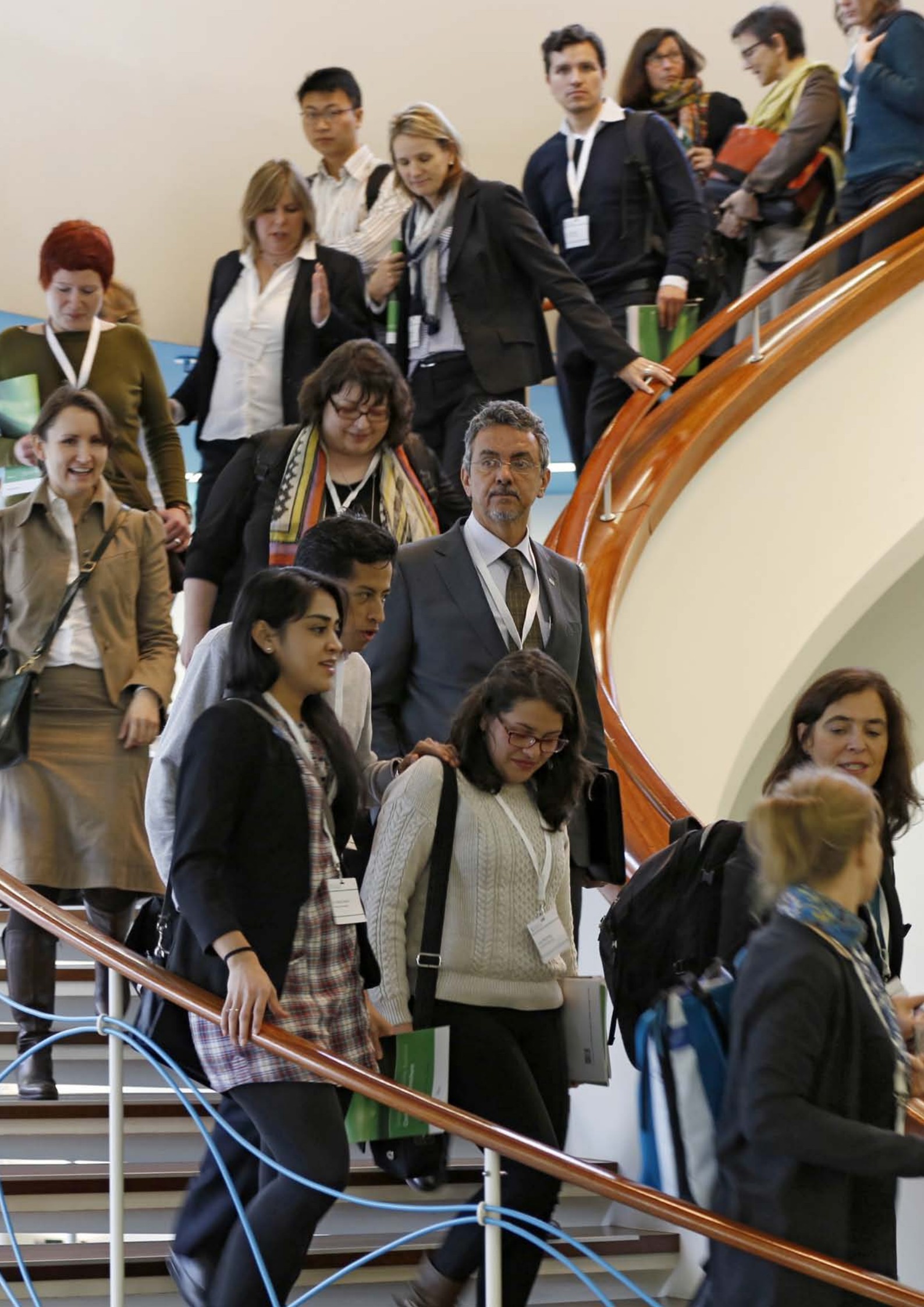
Firstly, it was highlighted that there was no 'one size fits all' bioeconomy. The political priorities are set according to the local context and opportunities. It was stressed that policies needed to be adapted to regional and local conditions, but that overarching principles (e.g. sustainability) should be mainstreamed in all policies. Furthermore, policy makers should carefully consider the usefulness of subsidies for specific applications/fields as these may lead to an undesired bias, which has been the case e.g. for biofuels/bioenergy.

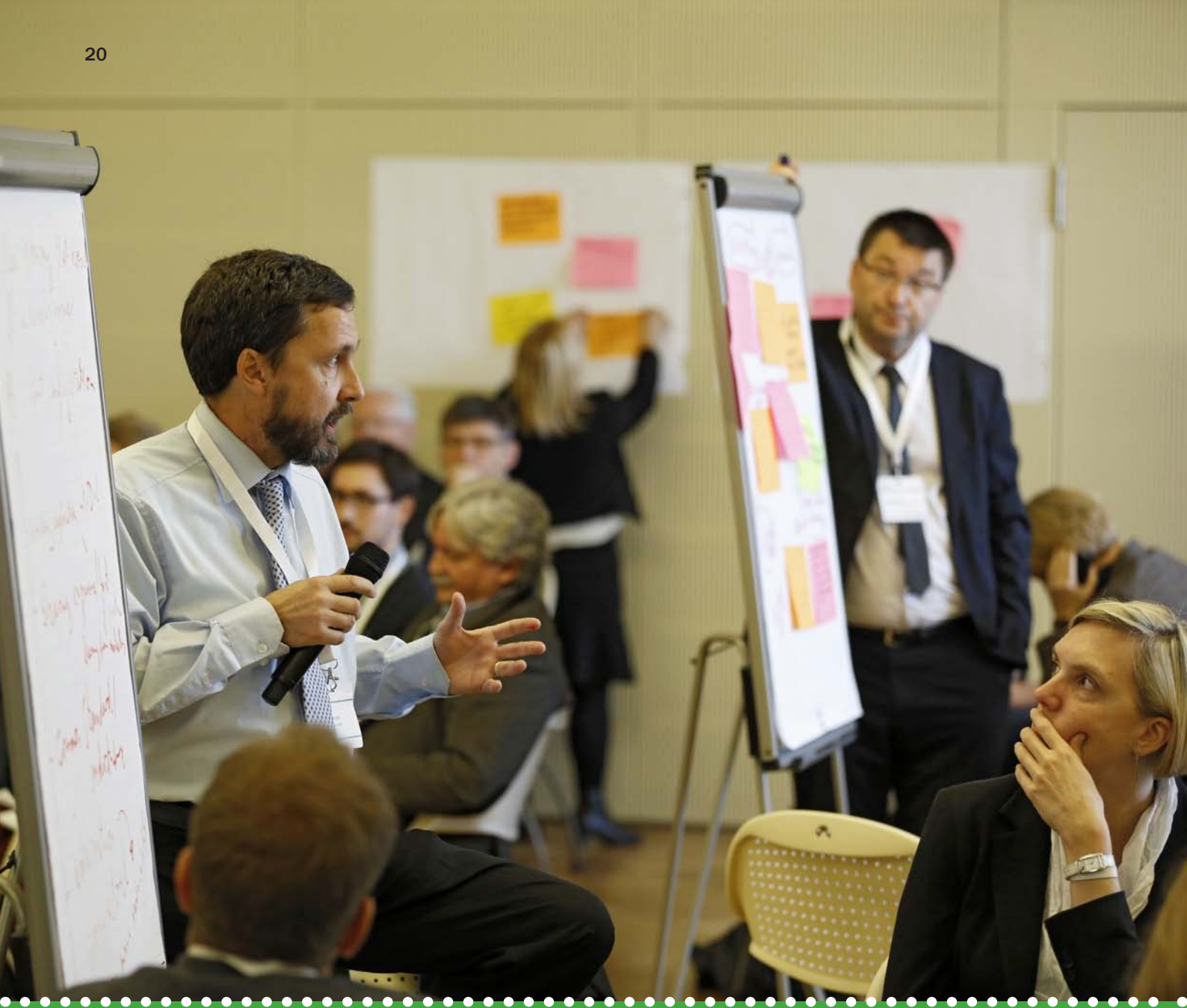
In general, public awareness and stakeholder participation in policymaking is desired but recognized as difficult to achieve. Therefore, more and better means of communication are essential to start up dialogues and learning processes among the parties involved.

Secondly, a special emphasis was put on innovation policy in the bioeconomy. The speakers recognized that industry only slowly adopts biobased methods and products. In this respect, the participants recommended increased funding for translation from science to industry and better training of stakeholders on the production side (i.e. farmers) to inform them about alternative uses of biomass and agricultural residues. Moreover, providing incentives to SMEs (grants, tax credits) was deemed important. It was mentioned that publicly funded demonstration plants will be a key success factor and that integration, not only along the value chain but moreover in 'value added networks' comprising also big industry players, is needed.

Thirdly, the roundtable discussed bioeconomy-related international trade policies, e.g. the WTO Environmental Goods Agreement (EGA). Although, EGA promotes trade of 'environment-friendly' goods (only a small fraction of the eligible products are bio-based), trade of GMOs is still restricted in the EU. It was mentioned, that the sustainability of biobased products need to be considered. In this respect, further development of product sustainability standards would be needed.

The importance of 'level playing fields' was highlighted. In particular, if sustainability assessment for bio-based products would be developed, then also fossil-based products should be submitted to the same requirements. In addition, the global harmonization of sustainability criteria and hence trade policies for bio-based goods is desired (but probably not realistic). For example, the harmonization between the EU and the US is already underway.





Workshop Reports

26th November 2015

The Future Role of Biorefining in the Bioeconomy – a Stakeholder Dialogue

Chairs: Rene van Ree (Wageningen UR) & Gerfried Jungmeier (Joanneum Research)
Partner: IEA Bioenergy Task 42 Biorefining

The speakers and the workshop's audience pointed to a diverse set of key issues and open questions with regard to the future of biorefining. Industry leadership was considered a prerequisite for the transition to the future bioeconomy. In this respect, it was also stressed that existing barriers need to be identified, the role of stakeholders needs to be clarified and a consensus on common policies is needed.

While discussing best approaches of using biomass, the participants stressed that in particular, integrated biorefineries would provide the most sustainable solution. In order to promote these integrated biorefineries, **Stefan Rauschen (Juelich Division Bioeconomy)** presented, based on the results of the SCAR Collaborative Working Group, the following recommendations:

- Capturing appropriate funding instruments in order to close the gap in funding demonstration activities.
- Creating new market opportunities by establishing other instruments, such as the Green Deals in the Netherlands.
- Facilitating access to existing pilot and demonstration facilities, e.g. by providing vouchers for SMEs.
- Promoting networking activities and knowledge exchange of existing infrastructures.
- Embracing different types of biorefineries with a regional perspective.

By reporting on the industry's role in the transition towards the bioeconomy in relation to biorefinery, **Henning Jorgensen (Technical University of Denmark)** highlighted the chemical, biofuel and the pulp and paper industry as drivers for the transition process. However, this process is still hindered by several barriers, including the profitability of possible products and political hurdles. Establishing networks across traditional sectors and creating trust amongst industry stakeholders would support their future collaboration and thus the transition to a future bioeconomy, he said.

Although the issue of genetic modification obviously was of great importance during the discussion, it does not represent a priority area of IEA Member States. This was the result of the IEA survey on biobased economy strategies, which was presented by **Martin Beermann (Joanneum Research)**. In fact, the priority areas mentioned in the survey are biomass supply and bioenergy production.

During the discussion it was further highlighted that microbial processes will take on a key role in future bioprocessing. In this respect, in particular microorganisms from extreme environments were considered increasingly important.

Asking about examples of small-scale biorefineries, it was noted that economies of scale are important especially for multi-purpose facilities.

In addition, it was considered important to strengthen consumer perception on biorefineries. Further relevant issues mentioned by the audience link the bioeconomy with the fossil fuel industry, but also the integration of sectors and the work on interfaces.

Bioeconomy, Food Security and Small-scale Producers

Chair: Olivier Dubois (FAO)
Partner: United Nations Food and Agriculture Organization

Some opening remarks were made by Ms. Maria Helena Semedo, FAO's Deputy Director General for Natural Resource, who highlighted the importance of small-scale producers in bioeconomy.
This was followed by statements and presentations by four people: **Christine Chemnitz** (**Heinrich Böll Foundation**), **Detlef Virchow** (**Center for Development Research**), **Jukka Tissari** (**FAO**) and **Pragnesh Mishra** (**Abellon Clean Energy**). The presenters highlighted challenges and opportunities that they might face with bioeconomy development, based on some concrete examples. This was followed by an interesting debate.

Some key challenges include:

- The possible loss of land and other natural resources by small-scale producers if the increased need for biomass production leads to significant demand for these resources for large scale industrial investments;
- Competition from large scale production systems in terms of markets and access to inputs;
- Increase in the cost of inputs due to the increase in demand for these inputs caused by bioeconomy;
- Small-scale producers' lack of access to knowledge on innovative technologies and the insufficient account of their own knowledge in bioeconomy development;
- Changes in production systems to meet the demands of bioeconomy that might hamper their own food security and the environmental quality of their farming systems, including the use of crop residues for biomaterials or bioenergy at the expense of soil quality and animal feed, monocropping instead of mixed cropping and rotations, etc.;
- Insufficient support regarding the financing, market access, support services and policies regarding small-scale producers' production of both food and non-food goods;
- More broadly lack of voice in decisions made in relation to bioeconomy development.

Some opportunities that were highlighted during the workshop include:

- The opportunity to combine crops that produce food and non-food goods through mixed cropping systems such as agroforestry that also improve the environmental performance of their farming systems;
- Better support from private companies in terms of access to inputs and markets through out grower schemes;
- Better support from government policies and institutions where sustainable bioeconomy development is officially promoted;
- Possible additional income opportunities created by the demand for non-food goods such as bioenergy from residues and wood products, job creation in local bioeconomy-related businesses;
- The possibility to increase their knowledge through training in biotechnologies, and also to share their own knowledge.

The following recommendations were made in terms of "what next" regarding challenges and opportunities for small-scale producers in bioeconomy development:

- Firstly that their important role in bioeconomy development be fully acknowledged and translated into action by other stakeholders, mainly governments and the private sector. Broadly speaking this means effectively involving them sufficiently in decisions related to bioeconomy development.

More particularly this also means:

- Guaranteeing their own food security;
- Ensuring their rights to land and natural resources are respected;
- Supporting small-scale producers in maintaining and possibly sustainably improving their farming systems;
- Supporting small-scale producers in maintaining and if possible increase their access to markets opportunities created by bioeconomy development

Global Investment in the Bioeconomy

Chairs: Lino Paula & Szilvia Nemeth
Partner: European Commission

The chairs introduced the workshop by presenting Commissioner Moedas' priorities on promoting the European Bioeconomy by investing in open innovation, open science and openness to the world. They also reported on the outcomes of the Bioeconomy Investment Summit, held on 9th and 10th November in Brussels, which showed amongst others, that a predictable and more consistent policy environment is needed for creating a stable investment climate, and that regions and local investment decisions are crucial, not only for high-tech or big companies, but also for traditional sectors to reinvent themselves. Furthermore, emphasizes was put on the need for more education, social awareness and dialogue to create a stronger interest in bioeconomy and that benefits of the bioeconomy need to be demonstrated to the public more clearly.

The chairs further focused on possible future actions in promoting international cooperation on bioeconomy development. In addition to reviewing the EU Bioeconomy Strategy and its Action Plan, continuing the dialogue with international partner countries in existing fora and promoting better alignment of the bioeconomy research agendas in Europe, the chairs drew attention to the launch of a specific International Forum on Bioeconomy (IBF), which intends to foster multilateral cooperation respecting bioeconomy.

The workshop was organized in two rounds of 'World Café' discussion. In the first round, the participants were asked to discuss the question of 'Why is a forum for international cooperation needed?'. The answers ranged from…

- Linking on-going bioeconomy activities and networks,
- Sharing and transferring best/worst practices,
- Coordinating bioeconomy policy and creating synergies,
- And promoting a cross-sector approach to foster bioeconomy development.

Furthermore, it was mentioned that bioeconomy represents a global issue, which is still not fully understood. In this respect, the participants called for further interaction to remove the lack of information.

During the second round of 'World Café' the participants were inspired to discuss 'What activities can such a forum undertake?'. In this respect, various activities were mentioned, such as …

- Providing bioeconomy foresight and technological forecasts,
- Supporting global bioeconomy monitoring by developing measurements (e.g. indicators),
- Acting as advisory body to predict consequences and give suggestions for improving bioeconomy development,
- Providing bioeconomy impact studies on technology, environment and social conditions,
- Ensuring transparency and integrate a cross-mixture of stakeholders,
- Standardizing definitions, certifications, regulations and criteria for bioeconomy development,
- Creating public awareness and an optimistic vibe on bioeconomy.
- And promoting showcasing examples as well as innovative business and investment models.

Further input to the discussion was provided by **Jim Philp (OECD)**, who reported on the internationalization of bioeconomy. In this respect, he highlighted the biomass trade around the world and mentioned that multinational developments in bioenergy have led to expansion in international markets. In particular, OECD nations and companies chose to invest abroad and to import bioenergy products from North and South America, Africa and South-East Asia. Mr. Philp also called for increased international collaboration in order to reconcile the food and industrial use of biomass and to evaluate common definitions, regulations and standards relating to bioeconomy.

Bioeconomy & Biodiversity

Chairs: Johannes Vogel (German Bioeconomy Council) & Stephen Blackmore (BGCI)
Partner: Natural History Museums & Botanic Gardens Conservation International

Johannes Vogel (German Bioeconomy Council) gave an introduction on why exploring biodiversity can help better harness the vast potential nature has to offer. In this respect, he regarded naturalists Hans Sloane, Joseph Banks and Alexander von Humboldt as bioeconomy pioneers, being closely associated with the rise of biodiversity collections. Vogel pinpointed at the large network of natural history collections in the world, with 550 million specimens stored in capitals and major cities alone. He also made clear the challenges of the field: 90% of human calories come from only 16 species in the world. In total, there are estimated 25 million species in the world, only 1,8 million have been identified. “With major technological advances in bioanalytics and IT, the information in collections is now available,” he said. He underlined the potential of biodiversity could be explored using the existing global scientific infrastructure. The challenge is now to link this know-how to a sustainable bioeconomy.

Stephen Blackmore (BGCI) made clear, how low the number of economically important crop species in the world is: rice, maize and wheat are the top three calorie-deliverers. Blackmore underlined there were 400,000 plant species potentially available. In the genomics era, there are new tools available that allow “genomic prediction”, which improves breeding a lot. “Nowadays, we are not only concerned with species extinction but also with loss of genetic diversity in agriculture”. He made clear that biodiversity is an integral part of sustainable development goals (SDGs) 2, 11 and 15. He made clear how rich the resources of BGCI member institutions are.

Paul Smith (BGCI) argued that plant-based solutions are inevitable to address all major environmental challenges – from food security to climate change. Plant diversity enables innovation, adaption and resilience, he said. He stressed the role of botanical gardens as knowledge-centers of how to identify, conserve and manage plant diversity. There is no technical reason, why a species should go extinct, he said. He pinpointed the rationale for a global system for the conservation and use of plant diversity. Botanic gardens need to show greater leadership in conserving and managing plant diversity, he said.

Andreas Vilcinskas (Institute of Insect Biotechnology, University Gießen & Fraunhofer IME) introduced the audience into so-called yellow biotechnology. He uses insects as a resource for compounds that he translates into products and applications for medicine, plant protection and biotechnology. Insects are the most diverse animal group, and this huge diversity is also reflected at the biomolecular level, he said. “Insects are a gigantic compound library”, Vilcinskas said. He explores insects and their larvae as a source of anti-infectives and wound-healing agents or technical enzymes.

In addition to the four main speakers, there were three speakers giving short talks:

Maria Costa (Planeta Organico) spoke about Latin America and the Caribbean as a biodiversity super power. Brazil alone is home to the world largest biodiversity. She mentioned the Amazon forest-based cosmetics project, in which seven Brazilian states are involved. She presented the Green Rio/Rio Organico platform, that was established in 2012 as a marketplace for sustainable and organic players. She also mentioned CEAL, which is regarded as the voice of Latin-American entrepreneurs. At a CEAL Summit in October 2015, bioeconomy was included in its priority goals.

Jörg Overmann (Leibniz-Institute DSMZ) spoke on microbial biodiversity. He made clear that his institute stores 80 percent of all known microbes. “We now have the tools to recognize the huge potential that microbes have to offer,“ he said. From an economical perspective, the main point is not possessing a biological resource or organism:

“Value comes from knowledge” he explained. We should use all available technologies to explore microbial biodiversity, he said. But this should be organised in a focused way. For better cooperation, he proposed an international network platform that could do this, like a broker.

Thomas von Rintelen (Museum für Naturkunde Berlin) explained how researchers from Germany and Indonesia are jointly building up an Indonesian biodiversity discovery and information system (INDOBIOSYS). This aims at providing the foundation for knowledge-based biomedical discovery in Indonesia. Indonesia ranks number three of most biodiverse countries (but 50-90 % of species are not known). Von Rintelen explained the strategies of building up a fast biodiversity discovery pipeline combined with a information management system. The knowledge will be made available to research and the wider public.

In the Q&As, several contributors stressed the need for effective cooperation of biodiversity researchers on a global level. Although technologies such as genomics or informatics are essential tools, there is still a need for practitioners and taxonomists with a wide expertise, Blackmore said. Biodiversity databases should be better conceptualised to make use out of the knowledge stored in archives and collections, Overmann stated. An attendee from the audience underlined the importance of not just describing species individually but to have a look at their interaction.

Exhibition of biobased products at the Global Bioeconomy Summit

Reconciling Food and Industrial Needs

Chair: Peter Schintlmeister (OECD)
Partner: Organization for Economic Co-operation and Development

The production of biomass is very sensitive to sustainability. Moreover, on the land used to produce biomass, a competition between food and other uses such as energy or industrial applications may arise. The Workshop aimed at discussing what policies are being implemented or should be implemented to put food security first, but also allowing for biomass production for industrial usage.

The participants issued, on the one hand, what priorities are being set in the bioeconomy to ensure the "food first" principle. In this respect, emphasis was put on the ASEAN countries of South-East Asia, whose focus of bioeconomy policies lies on R&D for the agricultural production value chain, on climate change mitigation and, to a lesser extent, on bioenergy. Their main aim is to achieve sustainable agricultural systems. Furthermore, participants highlighted that building of multisectoral collaborations and the establishment of knowledge exchange platforms is required for a successful development of the bioeconomy.

Likewise in Africa, bioeconomy today mostly focuses on agriculture. Conflicts between farming and wildlife arise in some areas. Changing crops were recognized to be a solution to this problem. Moreover, abundant weeds that grow on non-arable land could be taken as feedstock for biofuels or other material uses. The concept of an "inclusive bioeconomy" in which everyone profits and no one is left behind is an important part of the development of an African bioeconomy.

In Brazil, the production of bioethanol from sugar cane is the predominant application of bioeconomy. The sector is strongly funded by the Brazilian Development Bank, whereas other uses of biomass (e.g. green chemistry) are only slowly gaining ground. Moreover, the energy use of sugarcane is deemed not to compete with food production or with rainforest integrity as only 0.5% of the land is used for ethanol production. Indirect effects, however, have not yet been surveyed.

The workshop also focused on how sustainability issues can be assessed in supply chains. In this respect, it was mentioned that sustainability criteria are currently poorly defined, and vary for different applications (e.g. energy, food/feed, materials). The need to harmonize criteria was highlighted. Furthermore, also cascading criteria should be implemented and social criteria for biomass utilization need to be improved. It still remains unclear which institutions can take on the certification process.

German Bioeconomy Council – about the Organizers

In 2009, the German Federal Ministry of Education and Research (BMBF) and the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) established the Bioeconomy Council as an independent advisory committee to the German Federal Government. In 2012, the Council has been newly nominated for a second four-year term. The 17 members represent industry, society and science and their expertise covers the full spectrum of the bioeconomy value chain. The Council is mainly tasked with providing advice on how to foster the development of a sustainable bioeconomy in Germany and in a global context. For this purpose it engages in political and scientific dialogue, publishes position statements and promotes the future vision of the bioeconomy to broader society. The activities of the council are oriented both towards long-term objectives as well as day-to-day policy requirements. Documents download and further information in English is available under www.bioekonomierat.de/english.html

Downloads and Conference Documentation: www.gbs2015.com

All conference materials, presentations, videos, pictures and other resources can be downloaded at the Global Bioeconmy Summit's website: www.gbs2015.com

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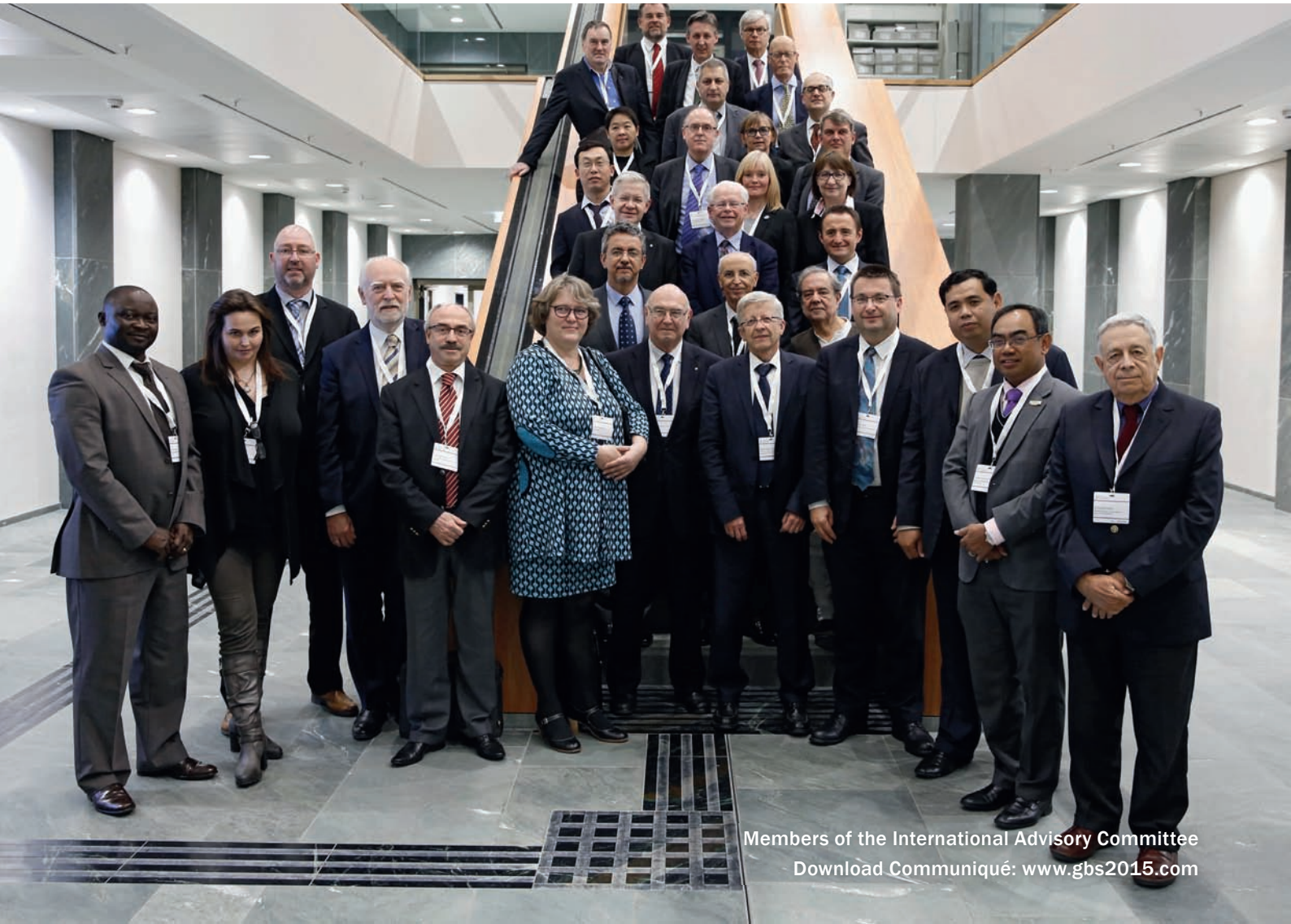

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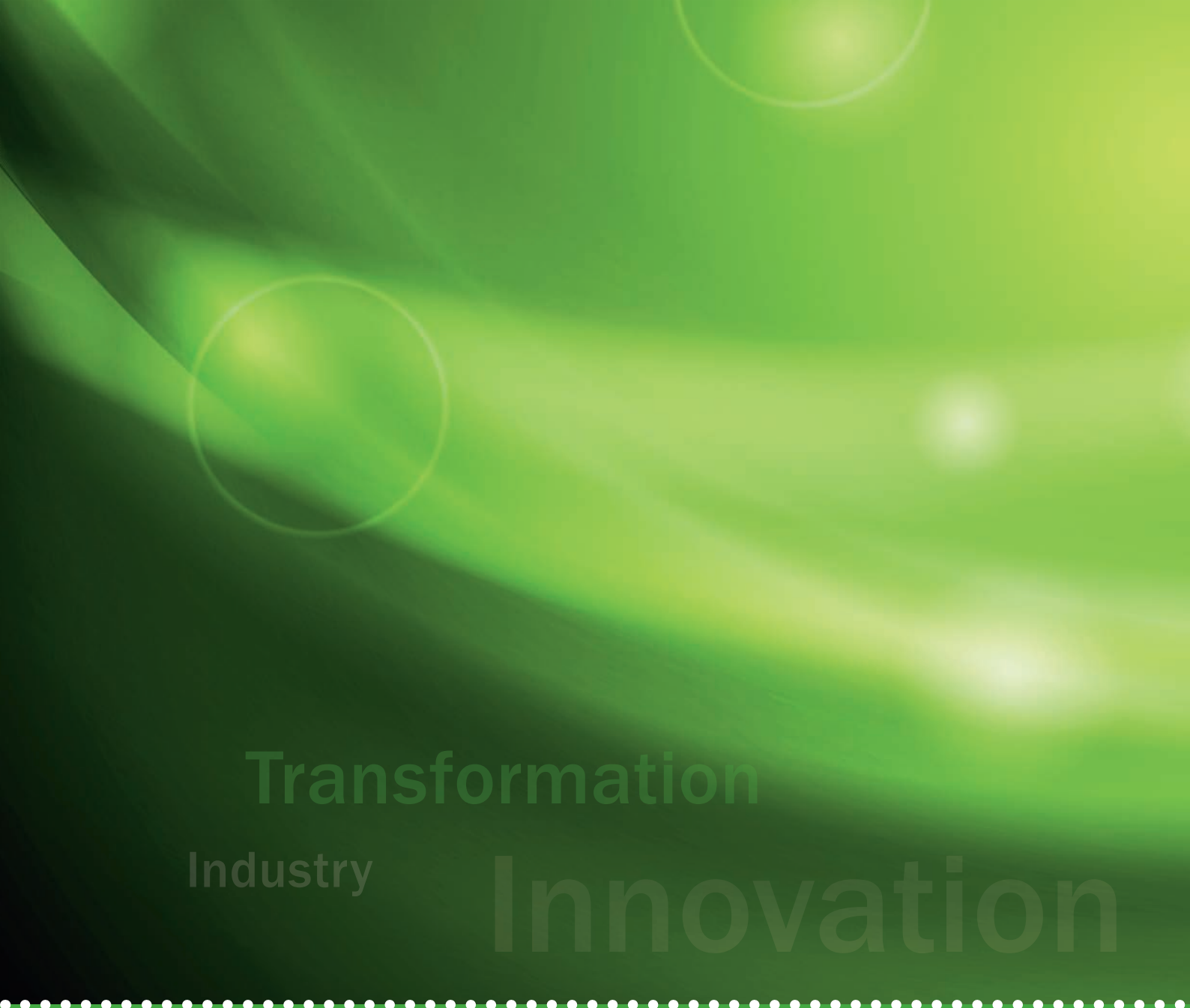

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