European Commission

Where next for the European bioeconomy?

The latest thinking from the European Bioeconomy Panel and the Standing Committee on Agricultural Research Strategic Working Group (SCAR)

Research and Innovation

EUROPEAN COMMISSION

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Disclaimer: The papers presented in this publication were drafted respectively by the Strategic Working Group on «Sustainable bio-resources for a growing bioeconomy» of the Standing Committee on Agricultural Research (SCAR), and the European Bioeconomy Panel. The papers were not drafted by the services of the European Commission, and they do not necessarily reflect the European Commission's views.

1. Introduction

1. Introduction

This publication presents the latest thinking on the bioeconomy from the Standing Committee on Agricultural Research and the European Bioeconomy Panel. It is released on the occasion of the Bioeconomy Stakeholders' Conference organised by the Italian Presidency of the European Union in Turin on 8-9 October 2014.

The **Standing Committee on Agricultural Research (SCAR)** is a committee of EU Member State representatives, chaired by the European Commission. Established in 1974 by a regulation of the Council, it was re-launched in 2005 with a strengthened mandate to advise the Commission and Member States on the coordination of agricultural research efforts.

The SCAR established its Strategic Working Group «Sustainable Bio-resources for a Growing Bioeconomy» in 2012. This publication presents an overview of the work and key messages from the Strategic Working Group, also taking account of inputs from other SCAR working groups.

The **European Bioeconomy Panel** was established in 2013 to support interactions among different policy areas, sectors and stakeholders in the bioeconomy. The Panel was created with 30 members, selected after a call for applications and representing business and producers, policy-makers, the scientific community and civil society.

In its first year the Panel established two thematic working groups, one on biomass supply and one on market-making in the bioeconomy. Taking the work of these two groups as a starting point, the panel members have agreed the two issues papers that are presented in this publication.

The publication of these papers is intended to stimulate informed debate on the future of the bioeconomy, at the Turin stakeholders' conference and beyond.

2. Standing Committee on Agricultural Research Strategic Working Group

Sustainable Bio-resources for a Growing Bioeconomy

A. The Standing Committee on Agricultural Research

The European Union's Standing Committee on Agricultural Research (SCAR), established in 1974 by a Regulation of the Council of the European Union, is mandated to advise the European Commission and the Member States on the coordination of agricultural research in Europe. Its work covers the European Research Area, currently composed of 28 EU Member States and 11 Observers. In 2005, the SCAR was given a renewed mandate by the Council to play a major role in the coordination of agricultural research efforts and the organisation of European advisory services, education, training and innovation.

SCAR's members are in charge of national public funding in areas of classic biomass-based research (food, agriculture, forestry, fisheries, and biotechnology – the Knowledge-based Bioeconomy or KBBE). The European Commission actively participates in the SCAR, chairing and providing members of its working groups.

SCAR operates within the context of a supply and processing chain approach:

- Agricultural production – animal production and food, feed, fodder and fibre
- Food safety, food security, food confidence
- Fisheries and aquaculture
- Forestry
- Biomass for a bio-based economy

Figure 1.1. SCAR membership

How does SCAR work?

SCAR provides advice on policy papers and implementation of Framework Programmes for Research and Innovation. It elaborates strategic horizon scanning through a foresight process, while promoting dedicated collaboration between its members in strategic and thematic working groups. New research cooperation is established through Joint Programming Initiatives or collaborative research networks (ERA networks).

A number of working groups and actions of SCAR are connecting to the Commission's 2012 Bioeconomy Strategy and Action Plan:

- The **Foresight action** – explores the future of agriculture (chain) development in the bioeconomy
- The **Strategic Working group on Sustainable Bio-resources for a Growing Bioeconomy** – develops a strategy and a Research & Innovation agenda for the SCAR on bioeconomy
- The **Collaborative Working group on Integrated Biorefineries** – focuses on the research needs for the development of bio-refinery technology and capacity in Europe. This working group is aligning with member states and JTI
- The **Collaborative Working Group on Agricultural Knowledge Systems** – works on the development of an interactive innovation approach

Figure 1.1. The bioeconomy is integrating traditional agricultural, forest and marine biomass feedstock production systems with a range of biorefinery options and applications

CWG Integrated Biorefineries

The Collaborative Working Group on Integrated Biorefineries is specially targeting on the biorefinery concept as a key enabling technology for the bioeconomy. It maps biorefinery centres and identifies research needs in the field of biorefinery. In the process, it connects to stakeholders while analysing innovation instruments.

CWG Agricultural Knowledge and Innovation Systems

While innovation is an important challenge for the European Bioeconomy, little is known about the performance of the Agricultural Knowledge and Innovation Systems (AKIS). The SCAR installed a Collaborative Working Group of civil servants from the European Commission and the Member States to reflect on Agricultural Knowledge and Innovation Systems and advise on improving functioning of the system.

Innovation starts with mobilising existing knowledge. It is a social process, more bottom-up or interactive than top-down from science to implementation. Innovations are socially embedded in a process with clients, advisors etc. Very often partners are needed to implement new systems. Innovation is no longer a linear process; it requires participation of stakeholders that are involved in the production chain. Instruments to achieve this are Public Private Partnerships and European Innovation Partnerships.

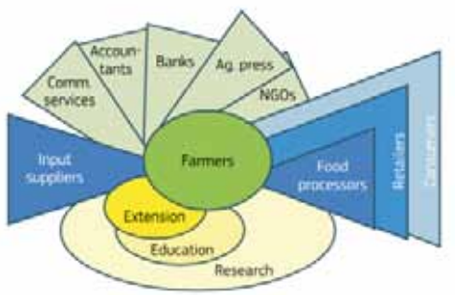


Figure 1.2. Knowledge and innovation landscape as developed by CWG Agricultural Knowledge and Innovation Systems

Source: EU SCAR (2012), Agricultural knowledge and innovation systems in transition – a refection paper

SCAR Strategic Working Group on Bio-resources for a Growing Bioeconomy

The Strategic Working Group on Bio-resources for a Growing Bioeconomy is exploring the field of the Bioeconomy: identifying its scope, Member States' strategies, research needs, barriers and perspectives. This is done through regular workshops, connecting to the different stakeholders, excursions and strategic surveys. Its main objective is to support SCAR, EU and Member States with advice on Research & Innovation needs.

Foresight action

The fourth Foresight action recently has been set up by SCAR. The purpose of the Foresight action is to develop a long-term view on changes in the bioeconomy field, and how this will affect the work of SCAR members. Building on earlier experiences, newly appointed experts will collect selected information on the way driving forces will develop within the bioeconomy. Output from other SCAR groups will be an important source in the process.

B. Scope of the Bioeconomy

According to a definition provided by the European Commission, the bioeconomy encompasses the production of renewable biological resources and their conversion into food, feed, bio-based products and bioenergy. It thus includes agriculture, forestry, fisheries, food and pulp and paper production, as well as parts of chemical, biotechnological and energy industries. Bioeconomy sectors have a strong innovation potential, using a wide range of sciences (life sciences, agronomy, ecology, food science and social sciences), enabling and industrial technologies (biotechnology, nanotechnology, information and communication technologies (ICT), and engineering), and local and tacit knowledge.

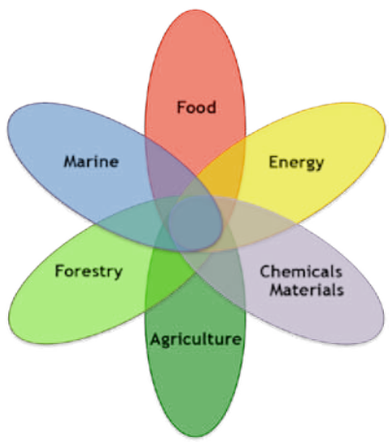


Figure 2.1. Fields covered in the Bioeconomy

Various workshops organized by the Strategic Working Group have learned that the bioeconomy consists of six areas that are only partly integrated. All areas have their own strategy, actions and innovation This is logical, since they also have their own (research) needs. In the bioeconomy, they influence each other. The combination of different areas is providing opportunities for new innovations. This is where interesting innovations occur because of the new possibilities and the new ideas. Competition may occur between biomass generating sectors – which, in principle, may mutually replace each other – and biomass converting sectors – which may compete for available feed-stocks.

- ***Key Message 1:***
  Balanced attention is required for all knowledge demands in the bioeconomy. As areas influence each other, this demands an integrated systems approach.

- ***Key Message 2:***
  The added value of the bioeconomy lies in the interaction of the bioeconomy areas providing opportunities for new innovation.

C. Results of SCAR activities

Joint SCAR / Bioeconomy Observatory survey

A joint survey has been held with the Bioeconomy Observatory amongst SCAR members to identify the current status of bioeconomy policy implementation.[1] Out of 18 countries responding to the survey, 10 countries use a definition for the bioeconomy that is more or less similar to the definition used by the European Commission. Most of the other countries do not use a particular definition.

In Member States:

- Four countries have one integrated strategy, another five have some kind of bioeconomy policy. For many countries this is still work in progress. Two thirds of the countries use a bioeconomy definition which is more or less similar to that of the European Commission.
- Reasons to implement bioeconomy policy are related to a range of factors, including social, economic, and sustainability challenges. The most important driver is the new perspective countries see to develop classic bioeconomy sectors (hence: agriculture, forestry, marine production).
- Economic drivers on average are given a higher score than social and environmental objectives. Hence, the development of a bioeconomy policy is seen as an opportunity to enhance economic development, including both classic and new bioeconomy sectors, while food security and the need to combat climate change are also relevant.
- Different language, strategies, and instruments are chosen to support innovation and research. Because many stakeholders in the bioeconomy are internationally orientated, this diversity makes international strategy difficult. It may lead to unequal international competition.
- Principles are developed in different countries: food demands take priority over other demands, cascade use of biomass is needed, market-driven approach, equal benefits in the value chain, how farmers can profit from the bioeconomy, and how they can get involved as stakeholders.

The need for International Cooperation on Research and Innovation: Participating countries see large (potential) benefits of participation in international R&D programmes related to the bioeconomy, although in many cases countries found it difficult to provide priority assessments. Highest scores were given to research on the development of sustainability criteria, and to research on biorefineries, food security, resource efficiency and knowledge transfer. Average scores for social, economic, and for environmental elements were almost similar.

From the survey, it becomes clear that individual Member States and Associated Countries are currently applying different language, strategy and instruments. Discussion among individual countries in SCAR working groups is helping to develop a common language defining bioeconomy strategy.

1. Results of the survey will also be presented on a website of the European Commission Bioeconomy Observatory *http://ec.europa.eu/research/bioeconomy/observatory*

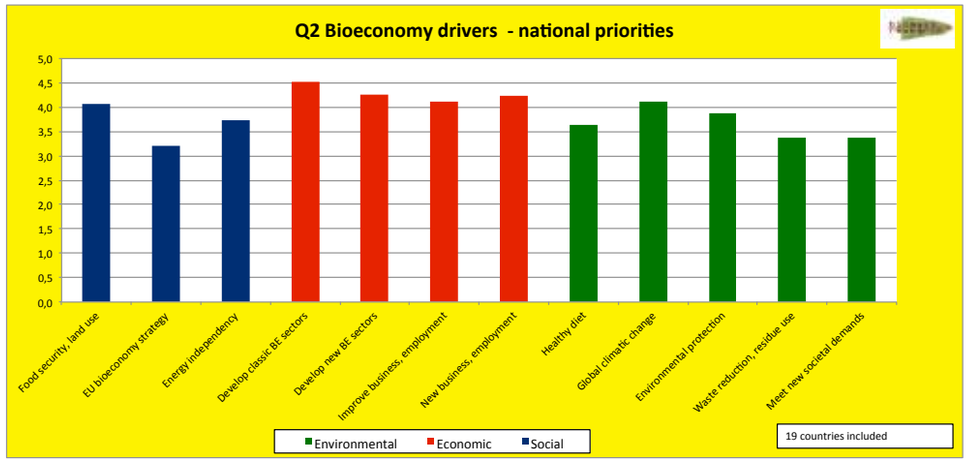


Figure 3.2. Bioeconomy drivers – national priorities

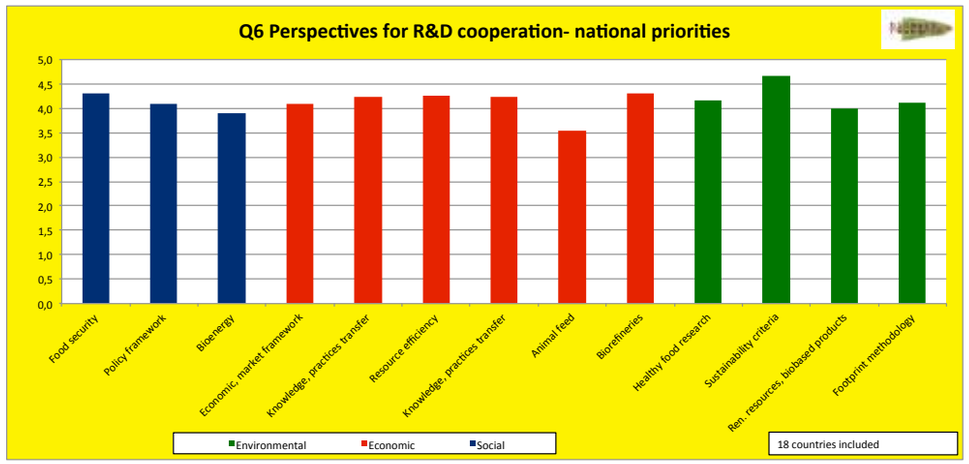


Figure 3.3. Perspectives for R&D programme collaboration

- ***Key Message 3:***
  Agree on common principles. SCAR can play an important role in supporting this discussion.

Identification of Barriers and challenges

From the survey and meetings in workshops, three main groups of barriers and challenges can be identified.

Challenge 1:
Future Gap between Demand and Supply

The demand for biomass is increasing. The FAO foresees a rising demand for food and feed, bioenergy and bio-based products. To avoid extensive use of non-sustainable biomass and loss of social and economic strength in communities all over the world a new design of biomass production systems is needed.

The additional land available is – under current use and harvests – not enough to meet the increasing demand towards 2050. It follows that biomass should be used much more efficiently and that more intensive use of land and of biomass is needed, however without overexploitation. Good examples can help to realize a smart design of agricultural systems that can be intensive as well as sustainable.

New sources of biomass can be found in side streams, new crops (including algae), and new biomass production systems (Short Rotation Crops, Short Rotation Forest crops).

Cascading of biomass can enable a more efficient use of available resources.

SCAR working groups address research needs on this point. The Foresight Expert Group can work on exploring options for enhancing biomass supply.

Challenge 2:
Innovation by Cross-overs between areas

Cross-over positions in bioeconomy areas provide a unique opportunity for innovation. To achieve this, the development of a good connectivity between individual areas is a prerequisite. An exploratory exchange of development ideas between different fields can help to identify innovation opportunities that may be neglected if the focus remains on single areas.

Learn from experiences presented by different Member States, Associated Countries and the EU which instruments can be implemented to cover the whole innovation cycle. A balanced chain of instruments is required to assure that investments early in the innovation chain are being followed by sufficient and effective follow-up demonstration and investment activities. SCAR can play a role in the evaluation of existing innovation instruments and identify crucial gaps

SCAR working groups can help to explore new opportunities that are arising by facilitating the cross-over between formerly separated areas of the bioeconomy (for example, algae cultivation as a cross-over between agricultural and marine production systems, providing biomass feedstocks for food, material and energy).

Challenge 3:
Level Playing Field

One of the main barriers that prevents cross-overs and integrated approach to the bioeconomy is the lack of a level playing field currently existing between the six areas of the bioeconomy. This lack of level playing field demonstrates itself in:

- Each area demonstrates specific characteristics including a typical speed of innovation and dynamism.
- Agriculture, forestry, and marine production are showing an important variation in supply realization due to, for instance, weather conditions causing market volatility, while biomass users are building on constant quality and quantity.
- As a result of a fragmented organization (a lot of small companies), some sectors are being confronted with problems when trying to generate private research funding, while other areas have more power to generate research money.
- Policy orientation of many areas is different, some being steered at EU level while others are being determined more by global market forces or national policies.
- Combining bioeconomy areas is promising but also presents some great challenges. Conflicts in policy goals of individual areas need to be solved.
- Experience from the past learned that it is important to involve all members of the value chain from the start and that also the added value returns to the whole value chain.

SCAR can play a role in trying to connect these different playing fields, for instance through its working groups where stakeholders from different areas can meet and explore ideas to better connect the areas.

- ***Key Message 4:***
  Tackle conflicting policy goals, leading to improved policy coherence at EU and national level. Be aware that there is not a level playing field.

- ***Key Message 5:***
  Pay attention to all steps in the innovation chain, target instruments from supply to the market.

D. Next steps in research and innovation

What? – Target Enhanced Biomass Production and Cross-Over Benefits

Discussions in SCAR Working Groups, focussing on the bioeconomy, have identified sustainable biomass production as a main topic. Member States are implementing different strategies to enhance biomass production and resource efficiency. All are relying on Research & Innovation as focal instruments.

Elements of this Research & Innovation are enhanced biomass production and cross-overs.

Biomass:

- Produce more biomass with fewer inputs given limitation of available land.
- Use available biomass more efficiently (larger part of the product, use "waste", prevent losses).
- Develop new biomass potential.

Focus on opportunities in the cross-overs of the areas:

- All societal challenges/areas should create space for bioeconomy research and opportunities.
- Cross-overs between areas are very interesting but difficult to organise: from experience we know that bottom-up works and top-down initiatives less. It is preferable to stimulate cooperation rather than to address specific amounts of budget for individual areas.
- Connect the different areas and stimulate this as Member States and Commission.

■ ***Key Message 6:***
Development of a biomass strategy is desirable.

■ ***Key Message 7:***
Stimulate research cross-overs between areas of the bioeconomy.

How? – Stimulate innovation

Realization of the perspectives offered by the bioeconomy can best be realized by the implementation of a modern style of innovation that is based on work done by SCAR CWG Agricultural Knowledge and Innovation Systems (AKIS). This approach integrates a market orientation, bottom-up approach with a strong stakeholder involvement and application instruments like PPP, EIP and learning networks. This requires a dedicated effort from education, research, governments and stakeholders.

■ ***Key Message 8:***
Adopt the interactive innovation approach already developed by AKIS. Invest in capacity building required to facilitate the necessary stakeholder participation.

Whom? Seek cooperation

- Use the European Research Area landscape: stimulate alignment of national research and exchange of best practices of sustainable biomass production
- Have a long term strategy, use the foresight work for this
- SCAR collaborative working groups have identified challenges and research needs The SCAR SWG is constructing a Knowledge & Innovation Agenda, based upon research needs from the Member States as identified in the survey and on discussions in the working group.
- Work is under development in different SCAR groups willing to cooperate with stakeholders.
- Research needs to be targeted to three key fields: enhance sustainable biomass supply, support of innovation and support of sound policy. The research should make optimal use of good examples, smart solutions and reality assessments, and not just rely on models.

■ ***Key Message 9:***
Use existing SCAR working groups to further develop cooperation between Member States and research institutions in the different areas.

■ ***Key Message 10:***
Use the Knowledge & Innovation agenda under development of SCAR as an input for the Horizon2020 work programme of 2016.

E. Key messages

1. Balanced attention is required for all knowledge demands in the bioeconomy. As areas influence each other, this demands an integrated systems approach.
2. The added value of the bioeconomy lies in the interaction of the bioeconomy areas providing opportunities for new innovation.
3. Agree on common principles. SCAR can play an important role in supporting this discussion.
4. Tackle conflicting policy goals, leading to improved policy coherence at EU and national level. Be aware that there is a not a level playing field.
5. Pay attention to all steps in the innovation chain, target instruments from supply to the market.
6. Development of a biomass strategy is desirable.
7. Stimulate research cross-overs between areas of the bioeconomy.
8. Adopt the interactive innovation approach already developed by AKIS. Invest in capacity building required to facilitate the necessary stakeholder participation.
9. Use existing SCAR working groups to further develop cooperation between the Member States and research institutions in the different areas.
10. Use the Knowledge & Innovation agenda under development of SCAR as an input for the Horizon2020 work programme of 2016.

Further Reading

SCAR Strategic Working group on Sustainable Bio-resources for a Growing Bioeconomy: *www.scar-swg-sbgb.eu/*

Bioeconomy Observatory website: *http://ec.europa.eu/research/bioeconomy/observatory*

3. European Bioeconomy Panel: issues paper on biomass supply

Unlocking the EU's potential: towards sustainable and competitive supply of biomass

1. Introduction: the triple challenge

The demand for biomass will rise dramatically in the next decades.[2] By 2050 the world population is expected to reach 9.1 billion. As incomes are expected to increase, food preferences and diets may also change. The FAO has calculated that the 9.1 billion people will need 70% more food and feed than used now. At the same time the demand for biomass in sectors such as energy and bio-based products increases too, although some sectors (for example paper) may show a decreasing demand. In industry sectors a transition is foreseen towards bio-based materials and energy. The EU facilitates this transition, amongst other things by implementing its Action Plan on the bioeconomy and through its renewable energy policies. Additional land to grow crops and forests for energy or materials is available but limited. Increased supply to meet the growing demand is not self-evident. There is a real risk of more desertification and of overexploitation of the earth's resources (forests, soils, fresh water, nature and the marine environment), which could also lead to declining public support for the bioeconomy.

The *first challenge* is therefore to produce enough biomass without overexploitation. Production increases and a better use of biomass, including residues and waste, are both required. If we optimise processes we can produce more biomass with less influence on the environment. The challenge is huge but on the positive side, there is evidence that an active, long-term focus on biomass sustainability gives results. For instance, contrary to commonly held belief, Europe as a whole has seen a net increase of 16.9 million hectares of forest (more than five times the area of Belgium) over the past 20 years, of which half is in the EU. The volume of timber biomass in the EU is at its highest since records began, though difficulties remain in exploiting some of this resource. Another example is recovering fish stocks in the North-East Atlantic due to sustainable harvesting and processing practices.

Simultaneously there is a need to reduce greenhouse gas emissions related to agriculture and land use. Worldwide, the agricultural sector is estimated to be responsible for 25% of greenhouse gas emissions. Bioenergy is promoted to replace fossil resources and to mitigate climate change, which makes sense to the extent that greenhouse gas emissions related to land use are reduced. **The *second challenge* is therefore to reduce greenhouse gases related to land use and biomass production.**

A *third challenge* is to ensure economically viable biomass for all operators in the chain. The bioeconomy has huge potential for providing environmental benefits and improving socio-economic development. Biomass can be grown in virtually any environment around the globe. Consequently, every nation has the potential to develop its own resources and in doing so to stimulate economic growth, provide skilled jobs and support primary industries, such as forestry and agriculture. Fair prices and incomes for primary producers raise investment capabilities. These impacts could be also important in developing nations. The FAO has stated that agriculture is expected to be the only industry capable of supporting the rapidly expanding rural population in developing nations. Realising the potential of bio-based industries to lead the reindustrialisation of Europe depends, amongst other things, on those industries have a sustainable supply of raw material at competitive prices.

The Bioeconomy Panel supports the European Commission Action Plan on the bioeconomy,

2 Biomass can be of forestry, agricultural or aquatic origin, either virgin or as residue. It is defined by the European Committee for Standardisation (CEN/TR 16208:2011) as material of biological origin excluding material embedded in geological formations and/or fossilized. CEN cites as examples of biomass: (whole or parts of) plants, trees, algae, marine organisms, micro-organisms, animals, etc.

but notes that the triple challenge regarding biomass supply is not addressed sufficiently. The Action Plan is based on three pillars: new technologies and processes, development of markets, and cooperation across sectors. For a bio-based industry to develop within Europe, the EU's primary production should be increased without overexploitation of land and other resources, while ensuring competitive prices and low greenhouse gas emissions. Sustainable production and efficient processing and use of biomass are keys to the successful development of the bioeconomy.

Considerations

The Bioeconomy Panel has analysed current policies, environmental realities and the needs of industry and primary producers. It considers the following:

Increased supply by sustainable production

A. **Sustainable biomass**: There is no "sustainable" or "unsustainable" biomass as such. Rather, there are less sustainable production practices, at the expense of factors such as soil, biodiversity, water and ecosystems. Overexploitation has an adverse impact on the future ability to produce food, on the earth's natural capital and on the capacity to replenish natural resources.

B. **Current policies**: Sustainable production is promoted by current policies within the EU. The Common Fisheries Policy (CFP) aims to ensure that renewable resources from marine ecosystems are exploited in sustainable way. Sustainable forest management policies are promoted through national legislation of all EU member states. The Common Agricultural Policy (CAP) and environmental legislation have outlawed most unsustainable practices. Cross compliance rules under the CAP have been developed to penalise farmers (by reducing received subsidies) who infringe EU law regarding environmental, public and animal health, animal welfare or land management. These rules ensure that 'good agricultural and environmental condition' is maintained and sustainable agriculture is promoted. However, a clear focus on reduction of greenhouse gasses has only recently found its start. Acceleration is needed.

C. **Sustainability criteria**: Sustainability criteria are also implemented, for example, in the Renewable Energy Directive (RED) and the Fuel Quality Directive. Under these directives, compliance with sustainability criteria is obligatory when using biofuels to fulfil targets for transportation fuels. These sustainability criteria apply also to imported biomass for biofuels and their feedstocks. They cover land use and greenhouse gas reduction. To prove compliance, certification is needed. The criteria do not prevent indirect changes of land use (ILUC). In order to prevent undesirable ILUC, the European Commission has proposed to limit the use of food crops for biofuels. One of the cornerstones of the RED is its market development for sustainable biomass: a target and an obligation to fulfil the target with sustainably produced biomass when using biofuels.

D. **Private initiatives**: there are many private schemes that focus on more sustainable production processes, for instance on sugar, palm oil, coffee, fish and wood (products). These systems are typically comprehensive, governing all sustainability aspects of a project (e.g. lifecycle emissions, water and nutrient utilisation, land and labour rights, impacts on biodiversity, waste management etc.). These initiatives deserve full appreciation. However:

- The certification systems are complex, both for primary producers and for consumers.
- Business cases are often not possible or very difficult: sustainably produced products have difficulties entering consumer markets, partly because of price differences. Market development is needed in order to move beyond niche markets.
- Not all voluntary schemes adequately address issues such as the reduction of greenhouse gas emissions, soil quality or ILUC, although the Low Indirect Impact Biofuels methodology is being developed by a number of organizations to reduce the risks regarding ILUC.

E. **Unlocking the possibilities and the full potential of sustainable biomass supply**:

- Forestry: Forestry is often seen as the main resource of bioenergy and biomaterials. Sustainable forestry also allows for species-rich terrestrial ecosystems, prevents floods, reduces soil erosion and manages air and water quality. Bearing in mind the full range of demand and production constraints on forests, the vision of the Forest-Based Sector Technology Platform is that harvesting possibilities in Europe could be increased sustainably by 30% from 2010 to 2030 if the adequate research and innovation activities are successful.
- Agriculture: There is potential to increase yield by applying new techniques, choosing the most efficient crops (for biofuels these are currently often food crops), using unused or unproductive land (for example around highways, in industrial areas or in cities), restoring degraded lands and soils, and (re)introducing integrated animal-plant systems. Efficient use of agricultural land is essential for minimising the amount of new land brought into production to meet demand. Adoption of innovative and existing best practices around the world has huge potential to increase productivity without increasing demand for land.
- Biomass from restoration ecology: In some areas, use of conservation biomass can be increased, thus reconciling protection of biodiversity and using biomass for energy and materials.
- Marine and aquatic resources: Aquaculture (on land and at sea) has huge potential for creating new supplies of biomass. Developing new feed components is a pressing issue for the future. Algae (macro and micro) and other micro-organisms may be a good source for new biomaterials. While utilization of harvested traditional marine resources has improved, there are still significant amounts of residue raw material that need to be better utilized via new techniques to make the most of our limited marine resources. Many traditional fish stocks have been assessed as overexploited. Although some stocks are recovering, and it seems that there is limited room for significant increase in biomass production in fisheries. Improved resource use may be obtained, however, from co-products and biomass obtained from the fisheries discard ban. Aquaculture development should provide additional potential for creating new supplies of sea-based biomass (e.g. integrated multi-trophic aquaculture). Significant opportunities exist for unused and underutilized marine resources (wild or cultured).
- Municipal waste: In the first place the principle 'reduce, re-use, recycle' should be pursued. Secondly, there is room for better utilization of the biomass fraction in municipal waste for compost or energy purposes. (See also section 'Efficient use of biomass', below).

F. **Regional (sub-national) approach**: Creating more certification systems or requirements, or more regulations, may not be the best way to increase sustainable production. Sustainable production needs to be embedded in regional habits, practices and policies, and it needs public support. It has to be complemented by a regional or an urban approach that promotes and ensures sustainable forestry, agriculture and marine/aquatic practices. A regional/local approach can also take into account divergent natural or social circumstances and needs. It can focus on unlocking potential in order to increase supply at competitive prices. It can accommodate shifts in demand – if paper mills need less biomass, alternative applications building on current biomass streams can be established. Commitment of primary producers can be found at regional and local levels. Instead of complex certification procedures, a certificate of origin from a Sustainable Biomass Region should be enough to prove sustainability. The intention of such a regional approach would be to reduce and not increase administrative complexity. The concept of Sustainable Biomass Regions would not necessarily cover all sources of biomass. For example, there appear to be valid reasons not to include forestry.[3]

G. **Market development:** Measures – such as incentivising sustainable practices – are needed for sustainably produced biomass in cases where sustainable production is more

3. Europe has a complex network of forest ownerships that manages forests with different protection statuses. The primary management purpose might not be biomass production but for instance water source protection, recreation or nature conservation. The prevention of forest fires and other such phenomena is not restricted to a regional level. Several instruments are already in place on the national and regional level that safeguards sustainability.

costly than unsustainable production. In the long term, however, sustainable production is not inevitably more expensive. A level playing field may be needed: while biomass production is increasingly based on sustainable processes, the extraction of fossil fuels, gas and coal is not.

H. **The EU is import dependent**: 'Exporting' problems (i.e. overexploitation) should be avoided. Imported biomass should also be sustainably produced. The method developed within the RED is WTO-compatible and can be a model. The Forest Stewardship Council (FSC) and Programme for the Endorsement of Forest Certification (PEFC) are global certification schemes for sustainable forest management. Similar schemes have been developed for both fisheries and aquaculture.

Efficient use of biomass

I. **Efficiency:** Sustainably produced biomass is limited, and efficient production, processing and use is therefore necessary. It avoids spillage and waste, and reduces the demand for 'virgin' biomass. Inefficiency in the use of food/feed crops is huge. It is estimated that food production costs 20 times more energy than it delivers in calories leaving considerable room for efficiency gains. Additionally, 30-40% of the agricultural and aquatic biomass is 'wasted' in the chain from farm-to-fork.

J. **Circular economy**: In the bioeconomy, land use and food security are optimized through a sustainable, resource-efficient and largely waste-free utilisation of Europe's renewable raw materials, so contributing to a circular economy. Therefore, the bioeconomy can help in the move towards a low-waste society through waste prevention and waste valorisation. While the development of a low-waste society requires consideration of important factors aside from processing, sustainable development of industrial processes can help provide a platform in achieving this objective.

K. **Cascading use**: A guiding principle towards more efficient use of biomass in the wood sector is the idea of cascading use. One definition of this principle has been provided by the German Federal Environment Agency: "a strategy for using raw materials or the products made from them in chronologically sequential steps as long, often and efficiently as possible for materials and only to recover energy from them at the end of the product life cycle."

L. **Cascading use is happening now**: The principle is applied in a similar way to the waste hierarchy but over the whole life-cycle of a material. Wood, as a raw material, is generally used in a very resource-efficient way and as many times as possible before it is used as energy (e.g. solid wood furniture, chipboard, recycled chipboard, burning). For example, glycerine, as a raw material and by-product of biodiesel production, is used sequentially for materials and then for energy use. There is however potential for increased cascading use, if relevant technology developments can be harnessed.

M. **Flexibility and level playing field:** However, taking the cascading principle as a binding rule applied to all kind of biomass should be avoided as it would bring unnecessary new barriers to the development and commercialisation of much needed environmentally beneficial bioeconomy products in Europe. Biomass should be used depending on the most pressing needs and/or societal challenges to be addressed.

N. **Support schemes:** Current and future biorefineries bio-based production processes will contribute to the development of more value-added products and bioenergy at the same time, maximising efficient use of resources. It would be important that companies increase their awareness about the upstream and downstream uses of biomass. In this respect, national support schemes that are established to fulfil the national renewable energy targets should comply with the EU guidelines for energy and environment state-aid, including when this implies an adjustment of such schemes in order to take into consideration other uses of biomass.

O. **Synergy and co-operation**: Synergy and cooperation across and within sectors and production chains is needed. It is already found for example in the utilization of co-products and waste streams. The use of sugar as a biofuel feedstock can provide proteins from its side streams as well as mineral-rich co-products used as feed. Biomaterials and biochemicals can be produced from side streams from the food sector. Also, composting and anaerobic digestion of food waste is a source of renewable energy and soil improvers (compost). Developing technologies is crucial. Co-location can help to better take advantage of waste streams. This points towards a regional/local approach, although biomass chains can also be long distance.

Economically viable biomass for all operators

P. **A positive cycle that generates fair and competitive prices**: Increasing use of co-products, side streams and waste will have a positive impact on supply, both directly and indirectly. Directly it reduces the need for 'virgin' biomass. Indirectly, using waste streams may have an impact on the initial price: under some circumstances the farmer, forestry-owner or food processor may have a better price when more value is produced with the products. This may create a positive cycle: more investment, higher yields, more efficient land-use and less environmental degradation. Paying better prices to primary producers is however not self-evident. Because of new opportunities, large and small scale industrial and other users might – in line with the economic well-being of local producers of biomass – pay adequate prices for biomass supply, thus raising the effectiveness of agricultural production.

Q. **Food security**: Fair food prices strike a balance between an adequate revenue for the producer/the processing industry, irrespective of where it is in the world, and the need to provide safe nutritious food. Better synergy between different processes and end-uses of biomass also has a positive macro-economic aspect. The biomaterials and bio-energy sector can provide stability in agricultural markets. If overproduction for the food sector can be used and is not wasted, food security may increase. However, harmful competition between food and other sectors that endangers food security cannot be excluded. When food prices of a certain crop rise unusually fast because of growing demand by industry, some foods may become less affordable. A temporary reduction of incorporation quotas (crop-specific) on industrial use may in that case be needed. Flexible quotas like in Brazil or Thailand can be considered. Interventions should be predictable for industry, and not disruptive. All this should be considered against the backdrop of the major influence of fluctuating oil prices on commodity (and hence food) prices.

R. **Market development to make business cases possible**: There are many pathways towards sustainable production, and a more resource efficient use and processing of biomass. Not all options to increase resource efficiency can be applied by all the producers, as barriers may exist. There are several ways to help markets to develop, for instance (i) agreements that an increasing share of the market is sustainably produced or originates from a resource-efficient production chain (the RED method), (ii) bio-preferred procurement programmes, (iii) setting targets for use of biomass in material and chemical sectors, and (iv) financial incentives. These measures may support the creation of markets and would make the business case possible in Sustainable Biomass Regions and within resource-efficient production chains. Removing barriers (economic, regulatory, logistical, cultural etc.) that play against the sustainable increases of biomass feed-stocks for all uses, and better logistics/infrastructure to facilitate improved resource efficiency, are also needed. All measures will need further discussion and elaboration.

S. **Technology development helps to maximise the potential all operators:** Public investments in Research and Innovation support bio-refineries and other bio-based industries and technologies that improve resource efficiency. Capitalize on research that explores and innovates sustainable use of the natural potential. Examples include micro-organisms with enzymatic pathways to produce novel bio-plastics and other bio-chemicals; staple crops that give higher yields with less input; woody species with a lignocellulosic composition that is more readily extractable; 'robust' farm animals that are more resilient to diseases and climatic variation, have a higher protein conversion, and less environmental impact; and introducing diversification options and new species in aquaculture.

T. **A multilevel approach is needed:** The EU should create a framework, but Member States' commitment and policies are necessary. A regional/local approach may be especially important in developing a circular economy. It is also important to foster an approach that focuses on the whole production chain, from primary producers to end user and waste treatment.

Panel recommendations for further discussions

The Bioeconomy Panel believes that the European Commission's Bioeconomy Strategy would need further efforts to address the triple challenge of producing enough biomass without overexploitation and negative impact on the environment, reducing greenhouse gas emissions, and ensuring economically viable production that benefits the whole value chain. A strategy aimed at increased supply of affordable biomass and at efficient use is needed. It should be based upon appreciation of achievements under current policies and EU-regulations. It should be consistent with the legal framework of the international climate and biodiversity policies and the WTO, while preventing exporting problems to third countries. And last but not least: it should avoid complexity and administrative burdens. Millions of farmers, forestry holders and producers, small and large, on land and at sea, should be able to create business cases that are based on sustainable production and efficient use. Four areas will be further discussed by the Panel:

1. Increase the EU's supply of sustainable and competitive biomass by mobilizing the commitment of regions and urban areas. Explore the concept of Sustainable Biomass Regions to produce raw materials for pharma, food, feed, materials and energy. Sustainable Biomass Regions would share three principles: (i) a joint focus on greenhouse gas reduction, adequate land use, prevention of soil degradation, and recovery programs when needed, as well as restoration of degraded lands and forests; ii) The intention to optimize agricultural, forestry and aquatic output, thus contributing to an increasing and competitive supply; (iii) A regionally differentiated strategy to prevent environmental harm and to facilitate social and economic growth, recognising that regions have different natural (climate zone, soils, biodiversity), social and economic conditions. Visibility for Sustainable Biomass Regions could be enhanced through a system analogous to the existing "Covenant of Mayors" scheme for reducing CO2 emissions. In the longer term Sustainable Biomass Regions would have in place a set of rules and surveillance that ensure implementation and compliance of these principles. A certificate of origin from a Sustainable Biomass Region would be sufficient to prove that production practices are sustainable. Further discussion is needed, especially on including forestry in the regional approach.
2. Facilitate the establishment of resource-efficient production chains. Resource-efficient production chains may cross 'borders' between traditional sectors like materials, agriculture, fisheries and energy. Producers within a resource-efficient production chain share a focus on reduction of greenhouse gasses, optimizing value of all parts of the biomass, minimising waste and increasing efficiency. Resource-efficient production chains will lead towards to a low-waste society and a circular economy, and will contribute to smart, sustainable and inclusive growth for Europe.
3. Market development measures are needed both to create a market for sustainably produced biomass and for products from resource-efficient chains. The measures listed under Consideration R will need further discussion and elaboration. The Bioeconomy Panel has presented some more detailed ideas in this regard in the accompanying issues paper on market-making in the bioeconomy.
4. Ensure that the right conditions are in place – the EU has an important role to play.
   - Develop a common language or a preferential method to measure greenhouse gasses within value chains, and support methodologies that express sustainability of biomass production and processing and of land use.
   - Explore the feasibility of the concept of Sustainable Biomass Regions and if appropriate, develop a set of principles or framework that define such regions
   - Strengthen efforts to ensure that biomass imported into the EU is also produced sustainably.
   - Address economic and non-economic bottlenecks and barriers, by: improving the EU policy framework for biomaterials (EU wide sustainability standards for biomaterials are underway); avoiding uncertain biomass availability; and minimising regulatory instability.
   - Develop a level playing field: apply sustainability principles also to the extraction of fossil fuels. Support schemes should favour renewables more than fossil fuels.
   - Invest and mobilise financial resources for research, innovation and technological development. Encourage when relevant collaboration with farmers, enterprises, and other stakeholders.
   - Continue to engage in technology development.
   - Engage with society at large to improve all stakeholders' knowledge and skills on bioeconomy. Tell the story of new sustainable production and use, and the opportunities for new jobs and growth.

The Bioeconomy Panel is aware that measures to achieve the full potential of the bioeconomy will need further discussion. The new European Commission is invited to create the right conditions and to develop a clear agenda that elaborates on its current strategy.

4. European Bioeconomy Panel: issues paper on market-making in the bioeconomy

4. European Bioeconomy Panel: issues paper on market-making in the bioeconomy[4]

Market-making in the Bioeconomy

There is great potential for creating dynamic new markets within the EU bioeconomy using resources more efficiently, adding value and creating prosperity and jobs across a broad range of sectors. However, EU bioeconomy markets face disadvantages when compared with international competitors in, for example, the US, Brazil, China and South East Asia, such as higher land and energy costs and lower political support, funding and incentives. These could be tackled through a refocusing of policy and support at EU and member state level.

1. Inputs: infrastructure, raw materials, energy and skills

To create sustainable new markets, productivity and resource efficiency must increasingly become the focus of the sectors within the bioeconomy. The cost of land and energy present a significant challenge and has a knock-on effect on the price of food, feed, feed-stocks and materials. In future, systemic integration of social, environmental and economic sustainability into EU policies would help pave the way towards a more productive, competitive, and resource efficient bioeconomy.

Infrastructure: There is potential to be tapped into by improving the mobilization, storage and processing of biomass through rural development and regional measures. This could help minimize waste, add value to crops and residues and help stabilize prices whilst bringing economic benefits to primary producers. In regions where there is greater potential for productivity and sustainability, the appropriate road and rail infrastructure needs to be put in place. The development of supply chains and storage, compensating for fluctuations in availability of biomass and enabling the use of a variety of sources and types of raw materials, will be crucial. In addition, enabling better collaboration between farmers and the feed sector and creating co-operative bodies in sectors such as forestry would help strengthen the bioeconomy. The same applies to the growing aquatic food industry.

Raw materials and energy: High yield, low environmental impact crops should be increasingly cultivated and agricultural practices improved in an ongoing way. In addition, the cultivation of agricultural areas which are currently out of production could be considered, whilst still preserving areas of importance for nature conservation and biodiversity. There could be increased support for the mobilization and recovery of residues and the organic fractions of waste streams, including the construction of local facilities for conversion (biomass terminals), following the study and identification of waste and residue streams per region. Other beneficial measures could include the introduction of sorting of organic waste fractions from municipal waste and the integration of biogas production from waste water and solid municipal waste. Certification schemes for biomass could also be streamlined taking into account cost effectiveness and resources used.

Skills: In terms of employment and skills, the creation and promotion of jobs in the agri-food and aquatic food sector, particularly youth employment, should be promoted as a key priority for EU policies. The establishment of regional training centres with a focus on creating new value chains within the bioeconomy, the creation of apprenticeships and the introduction of modern technologies and innovative education processes into the curricula of secondary schools, technical colleges and universities would also be beneficial. In addition, scholarships for studies related to the agri-food sector could be considered. Finally, the establishment of a Food Knowledge and Innovation Community (KIC) could be promoted for 2016/2017.

4 This issues paper is accompanied by a collection of case studies that are available online at *http://ec.europa.eu/research/bioeconomy/policy/panel_en.htm*

2. Fostering Innovation and Collaboration

Innovative technologies, products and processes have traditionally given a competitive advantage to the EU and are crucial for the development of new markets within the bioeconomy. To enable this, agri-food, aquatic food and bioeconomy policies could be geared towards expanding the toolbox of innovative techniques and approaches to allow Europe to become more productive in a sustainable way.

Supportive framework: Agricultural, bio-based materials, marine/aquatic and bioenergy research needs to be fostered in order to increase innovation. Furthermore, trans-disciplinary research will strengthen the innovations needed and may speed up development. The Standing Committee on Agricultural Research (SCAR) and the ERA-NET actions will continue to play an important role in stimulating innovation. It should also be noted that many innovative 'mirror' platforms to the ETPs already exist at national and regional level, which could be revitalized in the area of the bioeconomy to provide more valuable industry-research-policy-society interfaces for new and novel partnerships. Knowledge transfer is key to going from innovation to application. The European Innovation Partnership in Sustainable and Productive Agriculture could play a more significant role in this process, if it is appropriately reinforced, to help devote the necessary resources towards helping achieve this. A new EIP website, currently being developed by DG Agriculture, could help in this respect through assistance with partnering and through the provision of examples of assessing relevant rural development measures. Equally, synergies and support services offered by the EIPs on water and raw materials could be explored.

Effective intellectual property rights and their enforcement are essential to help foster EU innovation. Furthermore, the establishment of a stronger, less fragmented (bilateral and multinational) innovation network within the bioeconomy, corresponding to its broad, multifaceted nature, which transcends national borders and economic areas, could be beneficial. The establishment of specific R&D programmes to build supply chains in cross-disciplinary domains would be of benefit as would the organization of value chain workshops to exchange knowledge. Fragmentation could be further tackled by the organization of 'communities of practice' to examine case studies and learn from innovation-to-market successes and failures.

Value chain approach: In addition, the creation of industrial 'value chain' platforms and consortia, including farmers, forest owners and associations, fishermen and food processors could make a valuable contribution to this goal. Other actions that could help foster innovation and collaboration include the development of a database listing all possible actors in different value chains, including governments, companies, research institutions and cooperatives, and the organization of science and industry matchmaking events to support the building of relations between industry, academia and consumer product manufacturers and retailers. The creation of new clusters bringing sectors together could help stimulate knowledge and technology exchange between different countries and centres of excellence through mobility schemes and knowledge partnership programmes. International, multidisciplinary platforms and networks, consisting of multiple stakeholders from different industrial sectors, could be promoted.

Collaboration: The formation of clusters of bio-based industries is an effective way to foster innovation in bioeconomy and, ultimately, to enable EU products to reach markets. One example of such an initiative in Flanders, the Netherlands and North-Rhine Westphalia is the BIG-C initiative (BioInnovation Growth mega Cluster). These regions have joined forces in a cross-border approach to realize the transition from linear to circular value chains and from fossil resources to the bioeconomy. BIG-C uses the Smart Specialisation concept to establish cross-regional sustainable value chains and to adapt regional pillars of competitiveness to future demands. Bringing clusters together to exchange information and supporting further cluster development as part of Smart Specialisation Strategies could be of great benefit for the development of innovative new products and processes in the bioeconomy.

3. Attracting investment

Enabling commercialisation of smarter, more sustainable products from the EU bioeconomy will require the creation of a predictable and supportive 'investment friendly' environment, a greater awareness of the benefits and potential of the bioeconomy at regional and member state level and an improved understanding of how to access and combine the funding sources already available.

Accessing finance: Initiatives could include the increasing of R&D funding at EU, national and regional level for pioneering research, in collaboration with industrial sectors, in co-funding schemes. These could, for example, help build on and leverage the impact of the Bio-based Industries Joint Undertaking. The facilitation of combined funding mechanisms, through simplification of rules and alignment of basic funding principles of European and national support programmes (including CAP, Horizon 2020, European Structural and Investment funds, the LIFE programme, the Natural Capital Financial Facility, the European Investment Bank and national programmes), will also be critical. As a first step, tools that already exist for facilitating access to finance for innovation, such as the EIB InnovFin advisory service, should be explored. Exemplary bioeconomy case studies, where combined funding has been successfully accessed and applied, could also be analysed.

Future availability of Leader funding under EU rural development policy and the European Fisheries Fund, could help build on important work already carried out to create new markets in the bioeconomy through, for example, better use of residue streams. Local public-private partnerships organized by Fisheries Local Action Groups (FLAGs) have already provided environmental and economic benefits to coastal communities around Europe but, these type of projects would also benefit from better Member State and regional funding and from easier access to combined funding.

In addition, in order to compete with developments in countries such as the US, China and Brazil, the reform of EU state aid rules could help create support for demonstration and flagship biorefineries (costing upwards of €150 million), enabling bio-based products to reach the marketplace. Funding could also be made available for pilot and demonstration projects as proof of concept in cooperation with industrial partners and financial support could be promoted for interregional pilot and demonstration activities in the frame of a joint strategic bioeconomy agenda. Funding for such pilot projects could also focus on promoting the preservation of natural capital, the building block of the bioeconomy, to demonstrate a sustainable bioeconomy in practice and showcase projects that create dividends for nature and for the economy.

Furthermore, the innovation 'valley of death' could also be addressed through the implementation of funding for feasibility studies for start-ups and through the creation of special grants for product development and commercialization.

4. Coherent legislation and the need for supportive policy

There is clear support for the implementation of the EU bioeconomy strategy across the Member States in order to develop a consistent, integrated and straightforward strategic policy framework. The convergence of EU policies and international agreements is seen as critical as is the need to foster regulatory cooperation with third countries. Long-term political commitment and a supportive, predictable, and science-based regulatory environment, rooted in the need to find solutions to the grand societal challenges of mitigating climate change, using resources more efficiently and providing food and energy security, is essential for the creation of new markets in the bioeconomy. Without it, industries will continue to migrate overseas towards more supportive environments.

Regional support: In cases where large scale investment in the bioeconomy has been particularly successful, regional and national support, both in terms of policy harmonization and funding, have played a critical enabling role. In future, setting up of specific interregional programmes, directed towards regional cooperation, funding and development of joint strategic policy and technology agendas, will be important.

Cross-sectoral policy: If the European Commission's Bioeconomy Strategy is revised, it would be important to ensure stronger links with environmental, regional and agricultural policy development, in particular. To enable this, specific units

within DG Agriculture and DG Maritime Affairs and Fisheries dedicated to productivity, resource efficiency and sustainability could be established and could, for example, be responsible for development of standardized systems to obtain feedstocks, corresponding to sustainability criteria. There would also be a need to ensure that EU technology and product authorization systems are science-based, proportional, workable, efficient, cost effective, reliable and innovation friendly.

Holistic approach: However, the creation of policy to support the development of the bioeconomy is clearly a complex undertaking. The policy framework needs to be coherent, holistic and supportive, evaluating risks and benefits in collaboration with all relevant policy sectors, academia, industry and civil society.

5. Demand side measures

Improved market framework conditions will be essential in supporting the development of the bioeconomy. Such conditions are increasingly being provided by the US, China, Brazil, Canada and South East Asia which, coupled with more predictable regulatory environments and lower energy costs, continues to encourage the migration of innovative bio-based industries abroad.

Implement existing measures: One of the most significant and relevant investments of expertise in developing recommendations for EU demand-side measures was undertaken by the ad-hoc working group for the Lead Market Initiative on Bio-based Products. This group brought together national and industry experts (some of whom are now Bioeconomy Panel members) to make recommendations on how to create markets within the bioeconomy. However, several of the priority recommendations remain unimplemented and putting them into practice should be a priority for the immediate future in order to make new markets. The ongoing efforts to finalise the standardisation work on bio-based products, currently being carried out by CEN, the European Committee for Standardisation, should be supported appropriately by industry, the European Commission and Member States.

New initiatives for emerging markets: Furthermore, an EU wide public procurement programme could also play an important role in boosting awareness and uptake of products from the emerging EU bioeconomy. Other measures such as the adoption of specific and binding targets for best performing and most sustainable products could be considered in addition to enabling member states to grant tax incentives for certain sustainable EU bioeconomy products. Existing legislation, such as the Construction Products Directive, could be used to promote the use of products from the bioeconomy rather than those from finite sources and the possibility of mandating the use of less environmentally impactful products, such as bio-lubricants and hydraulic fluids in ecologically sensitive areas, could be implemented via soil and water protection legislation. Provisions for the collection and recycling of biomass, residues, wastes and bio-based products could also be incorporated into waste legislation and the gradual substitution of more sustainable products and processes could be encouraged through the reform of existing legislation.

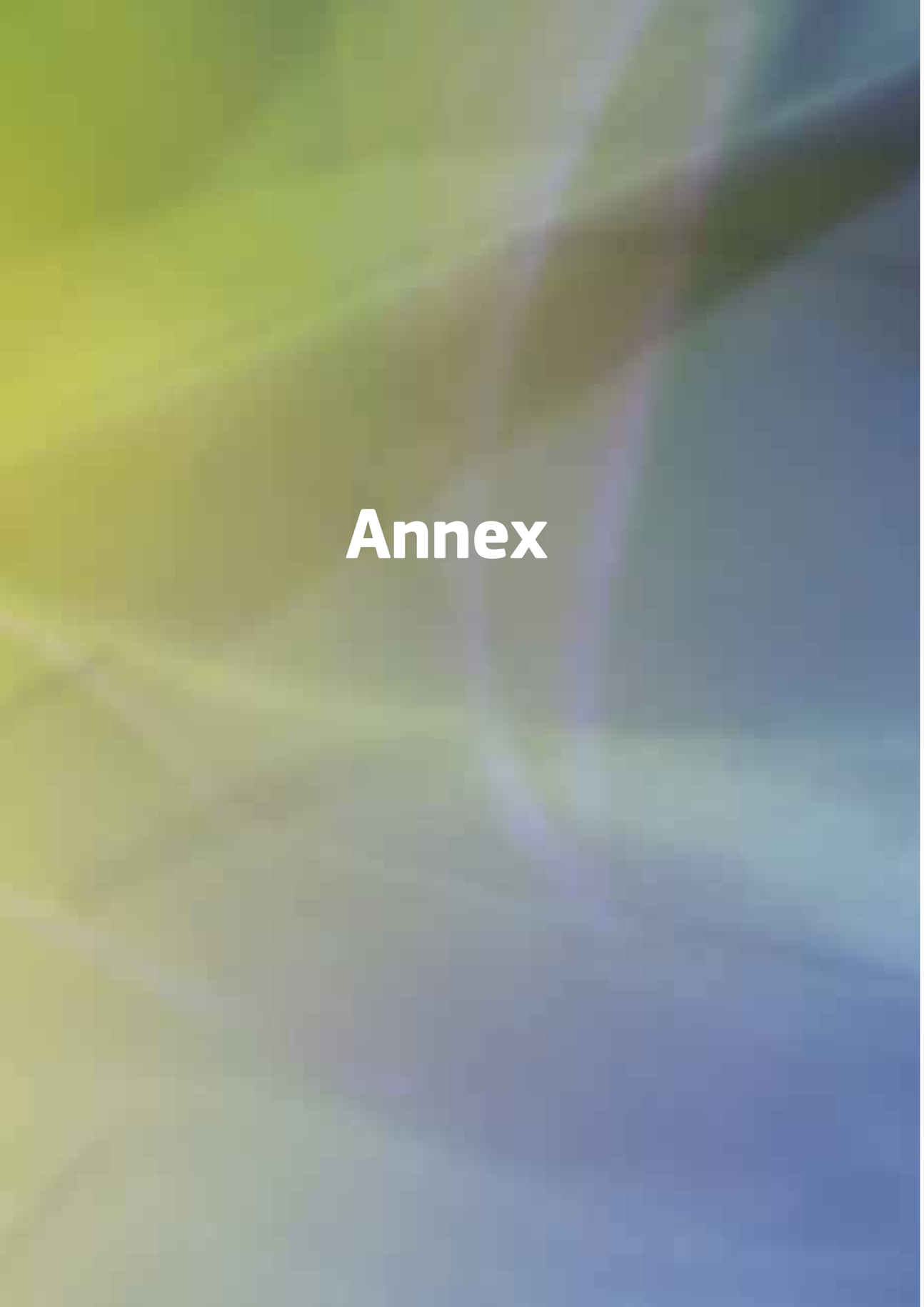
Labeling: Furthermore, to enable consumers and businesses to identify EU bioeconomy products, clear European Standards should be developed on sustainability, biodegradability and bio-based content. B2B and B2C communications could be facilitated through development of sustainable product 'ecolabels' and/or a 'bio-based' label, linked to sustainability criteria, and an EU harmonization strategy could be put in place. Certification and labeling could then be incorporated into the implementation of a coherent communications strategy to consumers. The Product Environmental Footprint (PEF) pilots organized by DG Environment, could play an important role in gathering information on the labelling process for bioeconomy products with a second wave of pilots planned for the food and drink sector.

6. Awareness and understanding

There is a clear need to develop and implement a coherent communications strategy to raise consumer awareness around the bioeconomy and the opportunities for and barriers to its development. This should be done in the context of the grand challenges facing future generations such as climate change, resource efficiency, energy and food security.

Local tangible examples: More case studies from across the regions and Member States could be made available and easily accessible, possibly at a central information point provided by the European Bioeconomy Observatory. Possible synergies, links and joint outreach with European funded environmental projects, such as those covered by DG Research and Innovation (e.g. BURBA, Endetech, Ecoweb, Waste2go etc.), DG Environment's LIFE programme, and national and regionally funded projects amongst other resources, could be explored and communicated in the context of the bioeconomy.

Improving visibility: The Commission could consider creating a 'Bioeconomy Week' where Member States and regions can hold local information days, events, seminars and conferences involving members of the public, students, consumer groups, professionals from the bioeconomy sectors and others. This could incorporate outreach by sectors within the bioeconomy oriented to the public and other specific target groups such as visits by schools, technical colleges and universities to farms, forests, fisheries, food processing plants and biorefineries. Greater outreach efforts could be undertaken towards the regions with the assistance of regional authorities and funding. The synergies and links between the development of the bioeconomy and the circular economy could also be better emphasised at EU level, both through the development of new policy and in communications and public pronouncements.



Annex

Annex: Membership of the European Bioeconomy Panel

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This publication presents the latest thinking on the bioeconomy from the Standing Committee on Agricultural Research and the European Bioeconomy Panel. It is released on the occasion of the Bioeconomy Stakeholders' Conference organised by the Italian Presidency of the European Union in Turin on 8-9 October 2014.

The Standing Committee on Agricultural Research (SCAR) is a committee of EU Member State representatives, chaired by the European Commission. Established in 1974 by a regulation of the Council, it was re-launched in 2005 with a strengthened mandate to advise the Commission and Member States on the coordination of agricultural research efforts.

The European Bioeconomy Panel was established in 2013 to support interactions among different policy areas, sectors and stakeholders in the bioeconomy. The Panel was created with 30 members, selected after a call for applications and representing business and producers, policy-makers, the scientific community and civil society.

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