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RECOMMENDATIONS

“Towards a Danube Region Bioeconomy Concept”



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p. 3	<p>R1: PREDICTABILITY</p> <p><i>To ensure stable and consistent policy outlook for investments in Bioeconomy, coordination mechanisms shall be deployed to harmonize policies developed by different line ministries, at different levels of governance, including the transnational dimension, and among different sectors. This will increase investors' confidence and stakeholders' motivation to uptake innovative technologies and business models</i></p>
p. 4	<p>R2: SUBSIDIARITY</p> <p><i>To take full advantage of the Bioeconomy as a driver for local development, enhanced bi-directional interaction between national and sub-national governments shall be pursued. This will facilitate capitalizing on local material and immaterial assets, while contributing to the transition to Bioeconomy in the Danube macro-region</i></p>
p. 5	<p>R3: COOPERATION</p> <p><i>Action shall be taken to favour cross-sectoral cooperation and clustering among Bioeconomy stakeholders from the EUSDR, in line with S3 and the Quadruple Helix approach. This is expected to enhance research, deployment of new technologies and uptake of innovative business models</i></p>
p. 6	<p>R4: COMPETITIVENESS</p> <p><i>Harmonized measures shall be developed to prioritize the socio-economic development potential of Bioeconomy and enhance the competitiveness of the bio-based sector in the Danube Region. In order to underpin the new socio-economic model, particular efforts shall be invested in increasing entrepreneurial literacy and capacities, and in supporting technology transfer and innovation</i></p>
p. 7	<p>R5: FINANCING</p> <p><i>Action shall be taken to facilitate access to finance for activities and initiatives related to Bioeconomy. This shall include extensive awareness raising and training on existing facilities and instruments, but also exploration of innovative funding mechanisms that could accelerate deployment</i></p>
p. 8	<p>R6: FEEDSTOCKS</p> <p><i>Regional quantitative biomass assessments shall be performed periodically to ensure sustainability. Policymakers, academia and stakeholders along the bio-based value chains shall enhance cooperation to optimize existing monitoring practices and indicators. Dialogue with the bio-based industry shall be fostered in order to assess specific needs and innovate methodologies to better respond to the challenges of Bioeconomy</i></p>
p. 9	<p>R7: SUSTAINABILITY</p> <p><i>Policymakers, academia and stakeholders along the bio-based value chains shall enhance cooperation to elaborate shared innovative soft- and hard-measures to favour the shift to Bioeconomy. While increasing the competitiveness and resilience of agriculture, forestry and ecosystem services, this is expected to enhance sustainability and foster rural development</i></p>
p. 10	<p>R8: MOBILIZATION</p> <p><i>Policymakers, academia and stakeholders along the bio-based value chains shall enhance cooperation to elaborate shared innovative soft- and hard-measures to favour the shift to Bioeconomy. While increasing the competitiveness and resilience of agriculture, forestry and ecosystem services, this is expected to enhance sustainability and foster rural development</i></p>
p. 11	<p>R9: TECHNOLOGIES</p> <p><i>Policymakers, academia and economic operators shall enhance cooperation to define shared methodologies to assess new technologies deployed along the Bioeconomy value chains. This is expected to promote technology neutral decision-making and objective cost-benefit benchmarking</i></p>
p. 12	<p>R10: MARKETS</p> <p><i>Policymakers, academia and stakeholders along the bio-based value chains shall enhance cooperation to develop shared approaches to promote market pull for bio-based products, with particular regard to certification schemes, quality controls, labelling and consequent awareness raising. This is expected to foster internal demand for domestic products and promote high added value exports</i></p>

To ensure stable and consistent policy outlook for investments in Bioeconomy, coordination mechanisms shall be deployed to harmonize policies developed by different line ministries, at different levels of governance, including the transnational dimension, and among different sectors. This will increase investors' confidence and stakeholders' motivation to uptake innovative technologies and business models

The shift towards more bio-based products and energy carriers on European markets is a change in paradigm that requires articulating sophisticated, forward-thinking and all-embracing regulatory frameworks. Investors reasonably require more predictability to develop businesses on firmer grounds.

Therefore, stable, responsible and comprehensive policy and regulatory frameworks shall be elaborated to harmonize all the segments of the bio-based value chains through enhanced horizontal (intra- and inter-ministerial) and vertical interaction, involving different levels of governance. The consolidation of Bioeconomy as a new concept of socio-economic development pivoting on sustainability and de-carbonization shall necessarily include consistent transnational dialogue, which shall concretize in the framework of the EU Strategy for the Danube Region (EUSDR).

In order to establish a stable and consistent framework and to promote a successful transition towards bioeconomy, strong political commitment and leadership is needed. At national level, inter-ministerial dialogue and cooperation is paramount, while it is important that governments delegate the coordination of these efforts to a single body that could steer the process and ensure consistency. This could be, for instance, the Ministry of Agriculture, if the accent is to be made on the feedstocks, or the Ministry of Economic Development, if priority is given to innovation and job creation. Bioeconomy strategies sketching medium- and long-term socio-economic and environmental objectives are a possible tool that would allow focusing on priorities and valorising local potentials.

To tackle more efficiently those gaps that EUSDR countries have in common, while offering strong support to a nascent sector with substantial potentials, a **Danube Region Bioeconomy Concept** shall be elaborated to synergize national and sub-national efforts and promote excellence according to the smart specialization model. The **Danube Region Bioeconomy Concept** would represent the nexus of concurrent sectoral activities implemented in different PAs: prioritizing Bioeconomy as a cohesive socio-economic development paradigm responding to several societal challenges, the process shall be steered by PA8 – Competitiveness.

<i>Possible steps to implement the recommendation</i>	<ul style="list-style-type: none"> ⇒ Promoting dialogue between relevant Priority Areas (PAs) to position bioeconomy within the implementation of the EU Strategy for the Danube Region (EUSDR) ⇒ Showcasing best practices and supporting transfer of knowledge from countries with more advanced bioeconomy positions (i.e. Germany, Finland, Austria etc.) towards Danube countries
<i>Target groups to be involved</i>	⇒ Policy makers, ministries, EUSDR PAs
<i>Funding to be mobilized</i>	⇒ Seed money for developing concepts and supporting exchange of best practices
<i>Expected change</i>	<ul style="list-style-type: none"> ⇒ Stronger recognition of bioeconomy at policy level ⇒ Recognition of biomass as a resource for added value products (not just energy) ⇒ Cooperation among different levels of government and among different ministries ⇒ Development of bioeconomy policies, support to environmental sustainability

To take full advantage of the Bioeconomy as a driver for local development, enhanced bi-directional interaction between national and sub-national governments shall be pursued. This will facilitate capitalizing on local material and immaterial assets, while contributing to the transition to Bioeconomy in the Danube macro-region

A critical contribution to consolidating the operational frameworks for the shift to Bioeconomy shall come from enhanced interaction between national and subnational governments. The former strengthening the legal bases and relevant regulations, the latter shall provide fundamental knowledge on the local economic tissue and indigenous biomass potentials, while proactively tackling the specific weaknesses of the territories. Indeed, the interaction shall be bi-directional, with sub-national governments being enabled to factually contribute to strategic planning at national level, and in a macro-regional perspective.

At national level, vertical interaction with entities of the sub-national level shall be coordinated with horizontal cooperation among line ministries and other bodies. Facilitating knowledge exchange, this is expected to increase the level of the Bioeconomy debate, build consensus and facilitate strategic planning.

It would be as well critical that that this insightful understanding of local material and immaterial assets is not dispersed in the context of the EUSDR. To this end, it might be fruitful to capitalize on, and implement findings into practice of, past and ongoing EU projects (e.g. BERST, S2BIOM, BIOSStep, etc.) and to set-up a permanent dialogue with subnational governments through the governance structure of PA8, which may represent the operational mechanism that would allow enacting the Bioeconomy concept at all levels of governance.

Holistic assessment of local capacities and potentials is crucial to tailor appropriate support measures that would foster clustering along most perspective value chains and better integration of traditional (primary) and bio-based sectors. Making the positive impacts of the transition to Bioeconomy visible locally would therefore be the key to enhance stakeholders' commitment and active participation.

<i>Possible steps to implement the recommendation</i>	<ul style="list-style-type: none"> ⇒ Supporting bioeconomy forerunners and proactive local actors in building constructive dialogue with national governments ⇒ Raising awareness on bioeconomy at sub-national level to engage more regions
<i>Target groups to be involved</i>	<ul style="list-style-type: none"> ⇒ Local community council members ⇒ Sub-national regional governments
<i>Funding to be mobilized</i>	<ul style="list-style-type: none"> ⇒ National funds for incentives to local governments in order to launch small scale pilot projects for the utilisation of local biomass resources to meet local community needs ⇒ Seed money for trainings and guides for practical implementation
<i>Expected change</i>	<ul style="list-style-type: none"> ⇒ Local communities will become more conscious of the real value of the biomass they have and will provide good examples for their citizens ⇒ More conscious policies and scenarios for biomass utilization at local level delivering multiple benefits and impact

Action shall be taken to favour cross-sectoral cooperation and clustering among Bioeconomy stakeholders from the EUSDR, in line with S3 and the Quadruple Helix approach. This is expected to enhance research, deployment of new technologies and uptake of innovative business models

Collaboration among stakeholders from sectors that are sometimes very diverse is typical for advanced economies: this holds even truer for the Bioeconomy, where value chains are less linear and heavily interlaced. Fragmented biomass sourcing options, competitive use of raw materials, stretched logistics and other non-technical constraints could be solved through horizontal clustering and smart specialization.

Additional pressure is put by the societal challenges that the Bioeconomy is called to solve (from CO2 reduction, to job creation, to diplomacy via the reduction of energy dependency), and that generate the diverging discourses of industry and environmentalists. Such a compound picture can be harmonized only through enhanced Quadruple Helix dialogue on the development models that the EUSDR wants to pursue.

In particular, top-down facilitation is needed to exploit the potentials of academia-industry cooperation. Challenge-based matchmaking and brokerage focusing on industry needs could prompt collaborations across the macro-region. Moreover, the involvement of civil society shall enhance awareness and, thus, market pull. Furthermore, Danube Region stakeholders shall make use of, or get involved in, promising schemes for cooperation such as the S3 Thematic Platforms on Energy and Agri-Food, as well as the European Innovation Partnership for Agricultural productivity and Sustainability (EIP-AGRI).

<i>Possible steps to implement the recommendation</i>	<ul style="list-style-type: none"> ⇒ Organizing targeted workshops on bioeconomy issues ⇒ Interviewing regional "large players" in the agri-food sectors about the main challenges related to by-products use, biomass production ⇒ Looking for solutions with the involvement of the academic sector, facilitating matchmaking and project generation ⇒ Institutionalizing the transition process towards bioeconomy, also relying on existing platforms and mechanisms
<i>Target groups to be involved</i>	<ul style="list-style-type: none"> ⇒ Scientist, entrepreneurs, government representatives, academia, civil organizations
<i>Funding to be mobilized</i>	<ul style="list-style-type: none"> ⇒ National and local government support ⇒ H2020, LIFE, national OPs (ERDF) ⇒ In a later phase, investments, loans
<i>Expected change</i>	<ul style="list-style-type: none"> ⇒ Deeper understanding of challenges and possible answers provided by bioeconomy ⇒ Industrial implementation, working on real challenges, business focus

Harmonized measures shall be developed to prioritize the socio-economic development potential of Bioeconomy and enhance the competitiveness of the bio-based sector in the Danube Region. In order to underpin the new socio-economic model, particular efforts shall be invested in increasing entrepreneurial literacy and capacities, and in supporting technology transfer and innovation

A critical advantage of bio-based technologies is the possibility to be deployed on brownfields, which might be particularly relevant for relaunching the numerous dismissed or declining industrial areas of the region. However, Bioeconomy is a knowledge-intensive paradigm that requires compound efforts to actualize traditional sectors and practices, promote new disciplines and innovative technologies, and foster interdisciplinary cooperation. Far from being instinctive, such processes need to be guided and actively sustained by institutions.

The need for substantial investments in the rejuvenation of mechanization, introduction of "smart" methodologies, as well as comprehensive soft measures in support of agriculture/forestry are partially mitigated by the consistent R&I substrate that exists in the Danube Region. Academia, however, shall be supported to meet the challenges of smart specialization, including resources to further develop domestic applied research. Dialogue with industry shall be promoted to adjourn training curricula and professional education programmes, with particular attention focusing on increasing entrepreneurial literacy and capacities, in order to create the preconditions for the development/uptake of innovative models of socio-economic clustering.

Fact based awareness raising and outreach to the general public shall be deployed to enhance general knowledge and understanding of the Bioeconomy, and – consequently – consolidate market uptake.

<i>Possible steps to implement the recommendation</i>	<ul style="list-style-type: none"> ⇒ Entrepreneurial training, business thinking – updating of university curricula ⇒ Collecting ideas at universities and incubating them ⇒ Linking bioeconomy and universities to existing incubators
<i>Target groups to be involved</i>	<ul style="list-style-type: none"> ⇒ Educational institutes, universities ⇒ Start-up incubators, investors ⇒ Start-up accelerators, incubators, such as the one developed in the context of Climate-KIC (http://climatelaunchpad.org/)
<i>Funding to be mobilized</i>	<ul style="list-style-type: none"> ⇒ Financial support for the setting-up of new small-size bioeconomy enterprises ⇒ Seed money, venture capital
<i>Expected change</i>	<ul style="list-style-type: none"> ⇒ Increased entrepreneurial knowledge and experience ⇒ Open mind-set, way out of publication-focused research to actual exploitation/implementation

Action shall be taken to facilitate access to finance for activities and initiatives related to Bioeconomy. This shall include extensive awareness raising and training on existing facilities and instruments, but also exploration of innovative funding mechanisms that could accelerate deployment

Access to finance is critical. Therefore, coordinated efforts shall be undertaken at macro-regional and national levels to promote participation of research institutions and academia in EU-funded programmes, with particular regard to Horizon 2020, as well as to the calls managed by the Bio-Based Industries Joint Undertaking (BBI-JU). Networking shall be supported between EUSDR countries and beyond, aiming to include Danube stakeholders in successful consortia. Better absorption of EU funds shall be ensured also with reference to other funding streams, in particular ERDF and EAFRD (and respective IPA components).

National governments could also play an important role by engaging with IFIs in order to channel dedicated funds, as well as in contributing to prioritize Bioeconomy in the next H2020 programming period. Moreover, an important financing opportunity might be represented by PAC seed money to be made accessible through DTP calls. In addition, innovative funding schemes could be developed to facilitate the deployment of Bioeconomy.

More generally, policymakers and the industry shall establish a transparent and consistent communication channel (also through umbrella organizations) in order to create a positive business climate. Industries shall be more adaptive to constraints deriving from the use of public money. Academia and policy shall support industries by dedicated training and coaching to enhance project development capacities.

<i>Possible steps to implement the recommendation</i>	<ul style="list-style-type: none"> ⇒ Elaborating a joint position of the Danube Region and lobbying for region-specific calls for the following 2 years H2020 Work Programmes: strengthening and harmonizing positions of the Danube countries in the relevant bodies of the Commission to better convey ideas for region-specific calls ⇒ Exploring the possibility of reaching an agreement between Danube Region countries and BBI (see Poland as a best practice in this sense: http://biconsortium.eu/sites/biconsortium.eu/files/publications/Lodz_Press_Release_20161006.pdf)
<i>Target groups to be involved</i>	<ul style="list-style-type: none"> ⇒ Country members of EC Working Groups for H2020 Work Programmes ⇒ Policy actors responsible for agriculture, biomass, bioeconomy ⇒ BioEast initiative to build on
<i>Funding to be mobilized</i>	
<i>Expected change</i>	⇒ Danube Region-specific calls and more bioeconomy-related projects targeting the Danube Region

Regional quantitative biomass assessments shall be performed periodically to ensure sustainability. Policymakers, academia and stakeholders along the bio-based value chains shall enhance cooperation to optimize existing monitoring practices and indicators. Dialogue with the bio-based industry shall be fostered in order to assess specific needs and innovate methodologies to better respond to the challenges of Bioeconomy

The growth of the Bioeconomy beyond laboratories and demo plants is entirely dependent on the supply of biomass that shall be constant in time, stable in price and consistent in quality. Biomass as a commodity can be sourced everywhere in the world; however, to maximize the socio-economic and environmental benefits of new value chains, priority shall be given to domestic feedstock, thus creating positive loops.

The Bioeconomy community assumes that the Danube Region is an immense reservoir of untapped biomass resources. While several studies have been implemented at national and EU level, there is still the need to invest in shaping reliable quantitative biomass assessments. This holds particularly true for the Danube Region, which encompasses countries with different approaches and assessment methodologies. Capitalization on past endeavours is necessary (e.g. S2BIOM), yet with a more specific geographical scope.

Therefore, Danube Region relevant governmental bodies shall be prompted to elaborate a joint monitoring methodology that would allow building a credible representation of available feedstocks, while considering strict sustainability criteria. If not tackled, the lack of such knowledge might entail consequences: underestimation would deter investors; overestimation could lead to depletion of natural resources, while "business as usual" would allow for anything from status quo to "biomass grabbing". Recurrent quantitative biomass assessments would provide fact-based information to potential investors and create a sound framework for biomass mobilization and trade.

<i>Possible steps to implement the recommendation</i>	<ul style="list-style-type: none"> ⇒ Launching a joint platform of bodies of the Danube Region countries that either have ever assessed biomass potential and/or own necessary data (biomass production, GIS databases, etc.) ⇒ Harmonizing methodologies and databases for compilation of biomass maps ⇒ Developing and visualizing a Danube Region-wide biomass map
<i>Target groups to be involved</i>	⇒ Governmental, academic and private intuitions with experience and/or data relevant for biomass assessments
<i>Funding to be mobilized</i>	⇒ National and EU funds
<i>Expected change</i>	<ul style="list-style-type: none"> ⇒ More realistic planning and decision-making ⇒ Harmonized and sound base for biomass potential assessment, publicly open visualization of potential

Policymakers, academia and stakeholders along the bio-based value chains shall enhance cooperation to elaborate shared innovative soft- and hard-measures to favour the shift to Bioeconomy. While increasing the competitiveness and resilience of agriculture, forestry and ecosystem services, this is expected to enhance sustainability and foster rural development

In order to pave the way to the shift towards the Bioeconomy, it is paramount that the new paradigm is metabolized by mainstream sectors of the economy, and that – consequently – relevant policies implemented at all levels of governance incorporate measures that would favour the transition.

So far, the Bioeconomy discourse had a distinct top-down character, with substantial primacy given to industry as the privileged actor, capable of implementing the shift through massive uptake of R&I results. It is now of utmost importance to promote industrial symbiosis, in particular through B2B interaction.

Getting closer to real life, however, the role of the primary sector shall be accentuated: not only it is necessary to involve farmers and foresters in order to develop consistent biomass markets, but also efforts shall be invested into overall strengthening of the sector through a combination of hard and soft measures.

In the Danube Region, there is the need to invest in agricultural mechanization and rural infrastructures, and to deploy capacity-building activities to transfer novel concepts and facilitate the uptake of innovative practices. In particular, sustainable intensification, smart breeding and precision farming have been indicated as essential for resolving the conflict between providing additional biomass resources for various purposes. At the same time, clear and stringent sustainability criteria shall be developed at macro-regional level, taking into account interdependencies in a transnational water-food-energy nexus perspective.

<i>Possible steps to implement the recommendation</i>	⇒ Creating example value chains and finding enabling industries (see Finland as a best practice: http://bioproductmill.com/about-the-bioproduct-mill) ⇒ Launching industrial symbiosis platforms
<i>Target groups to be involved</i>	⇒ Industries along the bio-based value chains
<i>Funding to be mobilized</i>	
<i>Expected change</i>	⇒ More effective use of resources, cooperation, implementation of circular practices

Policymakers, academia and stakeholders along the bio-based value chains shall enhance cooperation to optimize existing, and elaborate innovative (smart), logistical concepts for sustainable mobilization of biomass. This shall reduce the impact of infrastructural weaknesses and significantly broaden the areas benefiting from the transition to Bioeconomy

Collection and mobilization of biomass is among the most critical non-technical barriers hindering the development of innovative bio-based value chains. This owes mainly to the fact that the raw material is generally bulky and is scattered on an extremely fragmented patchwork of medium and small proprieties.

The conventional paradigm states that the maxim radius for efficient collection of agricultural residues is about 40 km. This entails that a very complex network of collection points or storages will have to be set up in the Danube region in order to exploit the feedstocks, with far-reaching implications on road infrastructures, emissions, security of storage, etc. Therefore, in order to unlock the biomass potential, it is urgent to develop smart logistical concepts that will facilitate the mobilization of biomass feedstocks.

To this end, it would be beneficial to capitalize on the experience of several EU-funded projects, but also to improve dialogue with farmers and logistic operators. Spatially explicit optimisation models can help identify promising regions for future Bioeconomy clusters. Within the Danube Region, the ports along the Danube and main tributaries could become important hubs for biomass transport and handling, as well.

<i>Possible steps to implement the recommendation</i>	⇒ Developing smart logistics concepts ⇒ Mapping potential users and suppliers (supply-demand maps probably linked to potential assessment)
<i>Target groups to be involved</i>	⇒ Agriculture, processing industries
<i>Funding to be mobilized</i>	⇒ Private funds
<i>Expected change</i>	⇒ Better use of resources, rural development

Policymakers, academia and economic operators shall enhance cooperation to define shared methodologies to assess new technologies deployed along the Bioeconomy value chains. This is expected to promote technology neutral decision-making and objective cost-benefit benchmarking

The Bioeconomy being an extensive paradigm that applies to a vast range of value chains, it entails the deployment of a multitude of innovative technological solutions. Moreover, in most value chains there are several technologies available and competing, and more are expected to be developed in the future.

Selecting a technology shall clearly be a prerogative of the investor; however, it might be beneficial if the scientific community elaborated technology neutral guidelines for assessing most perspective technological solutions applied to the specific environmental and socio-economic conditions of the Danube Region.

This would facilitate the policymakers in endorsing most perspective projects, while giving financial institutions firmer grounds for decision. As well, it could represent a useful instrument to reassure the civil society regarding the safety and environmental impact of deployed technologies. Such assessments could identify promising options by comparing and assessing the techno-economic and ecological efficiency of different technologies, and analyse their impact on the climate, soil fertility, biodiversity and water use.

<i>Possible steps to implement the recommendation</i>	⇒ Developing evaluation criteria
<i>Target groups to be involved</i>	⇒ Funding agencies
<i>Funding to be mobilized</i>	
<i>Expected change</i>	⇒ More sound and strategic decisions on RDI funds

Policymakers, academia and stakeholders along the bio-based value chains shall enhance cooperation to develop shared approaches to promote market pull for bio-based products, with particular regard to certification schemes, quality controls, labelling and consequent awareness raising. This is expected to foster internal demand for domestic products and promote high added value exports

The Bioeconomy debate has long been focusing predominantly on technologies and, to a more limited extent, to biomass availability, while seldom devoting proper attention to assessing the market penetration perspectives of bio-based products. Such optimism might be – to a certain extent – reasonable in high-income countries, where larger segments of the population can meet the expenses of reducing their own environmental footprint.

Apparently, the circumstances are significantly different in most countries of the Danube Region. For some bio-based products market penetration could be “seamless” for consumers, i.e. when bio-based products will complement existing value chains (e.g. fuel blending). However, in most cases action shall be taken at appropriate level of governance to support uptake of bio-based products, while limiting the appeal of traditional petrol-based alternatives through ad hoc legal tools (taxes, bans, subsidies, incentives, etc.)

This shall be complemented with extensive public awareness, mimicking, for instance, healthy lifestyle campaigns. An important contribution could come from the definition of transparent sustainability criteria and quality assurance protocols, as well as from labelling, standardization and certification, as consumers shall be reassured on the safety of bio-based materials and the use of bio-based products in e.g. the food chain. Additional Joint development of such measures and schemes would as well ensure that the costs of Bioeconomy shift are spread equally.

<i>Possible steps to implement the recommendation</i>	⇒ Implementing labelling for bio-based products ⇒ Promoting labels, raising awareness
<i>Target groups to be involved</i>	⇒ Industries producing bio-based products ⇒ Consumers
<i>Funding to be mobilized</i>	⇒ Resources from the industries, as it is of business interest to get premium prices
<i>Expected change</i>	⇒ More conscious consumer decisions, conveying the added value of bio-based to markets