Glastuinbouw Nederland
growing for tomorrow today

Stichting Innovatie Glastuinbouw Nederland

Position paper

Bioeconomy

Bioeconomy is vital to achieve a climate-neutral, biodiverse, and prosperous Europe. Producing fruits, vegetables, flowers, and plants with zero waste advances this circular revolution. By valorising side streams (biomass and effluents) and fostering the reuse of residual biomass across the European economy, controlled environment agriculture (CEA) aims to become fully circular by 2050. Already in 2030, 75 per cent of all residual biomass in CEA shall find higher value applications than today's landfill or composting. Half of our growers will by then operate in new supply chains to enhance the circular use of biological resources across the European economy as well as by improving their resource-efficiency. As such, CEA wants to become the bio-integrated infrastructure of EU society. To boosting the sector as a bioeconomic growth hub, CEA welcomes the Bioeconomy Strategy.

Fruits and vegetables are not just delicious but healthy too. Europe's growing and aging population does not just more healthy nutrition in order to be fed, but also to foster its public health and well-being. Meanwhile, flowers and plants green and cool our cities, restore biodiversity, mitigate climate change, and improve people's health.

To meet year-round demand for fruits, vegetables, flowers, and plants in Europe, high-tech systems like CEA enable these crops to be grown with already the lowest footprint possible. Reusing primary raw materials in Europe across sectors to the maximum extent (e.g., nutrients or bio-based materials) and minimising the use of virgin raw materials, increases EU horticulture's efficiency and reduces its pressure on natural resources. Our growers are the catalyst of a circular economy at a regional level.

Promoting the bioeconomy

CEA could offer many solutions for a circular and climate-neutral economy, boosting the EU's prosperity and competitiveness within planetary boundaries. On the one hand by exploring less scarce and renewable resources as inputs, on the other hand by improving the reuse of raw materials from and by other economic sectors. Europe's bioeconomy could further flourish by (re)designing recycling loops for biomass by connecting sectors in a local context and opting for a regional approach.

A more circular and resource-efficient bioeconomy can be developed by connecting industrial demand for smart materials and fossil-free alternatives with professional biomass refineries and other agricultural sourcing initiatives. At the same time, zero-waste circular horticultural systems should be promoted and innovative cascading of residual biomass streams should be accelerated. This means that first water, proteins, nutrients, and sugars are extracted from the biomass. The essential oils and extracts obtained could replace synthetic chemicals in European industry, while wet juices could be processed into food and drink products or turned into fertilisers and soil enrichers. The remaining fibres could be rehashed in growing media, bio-based products or smart materials like cellulose-based nanofibers (CNFs) for natural wound healing products. Finally, the low-grade biomass left could be served as end-of-life energy generation through combustion.

To promote the bioeconomy:

- The **Bioeconomy Strategy** should bolster layered income models that combine food production, renewable energy, carbon credits, water reuse, health services, education, and biotech research. From climate-adaptive crops to living biolabs,

advancing these synergies turns CEA into economic engines of regeneration. To enable that, the EU should move from linear production to regenerative platforms and value engines. CEA can catalyse this with a diverse bundle of services: carbon offsets, nutrient recycling, water reuse, renewable energy generation, traceable food data, and community engagement. Smart ESG dashboards and dynamic performance metrics tracking impact across carbon, water, biodiversity, nutrition, and education and tying these to new finance mechanisms could ultimately reward regenerative performance with CEA at heart of the European bioeconomy.

- Considering that the bioeconomy drives mainly a regional transformation, the **Bioeconomy Strategy** shall establish integrated regional consortia linking growers with startups and incubator programmes, tech firms, shared utility programmes, universities, hospitals, and municipalities. These ecosystems shall jointly develop and scale circular solutions – anchoring CEA in broader regional innovation strategies. In short, the EU must embed CEA in regional zoning codes, taxonomy, and infrastructure financing frameworks. Treat them like district heating networks, smart energy hubs, or circular innovation centres to become a vital asset for Europe's resilience – not just for food and floriculture production.

In practice, there is yet a limited market for bio-based materials. For entrepreneurs across the supply chain, it remains challenging to formulate a successful business case. There is often too little prospect of sales as biomass can still hardly compete price-wise with raw materials. A resilient bioeconomy requires therefore a joint effort to connect various environmental objectives and industries to reshaping recycling loops for biomass.

To develop new markets:

- The **Bioeconomy Strategy** should encourage bio-based materials as a new basis for the production of bioplastics, growing media, construction supplies, and smart materials. The EU could bolster this development of new markets, for example by stipulating biomass blending. New value chains shall be developed to phase out fossil raw materials that are currently still widely applied in these sectors. Environmental performance standards of products could even more stimulate the adoption of biomass as well as public procurement.
- To finance this transformation towards a bioeconomy, the **Bioeconomy Strategy** shall introduce regenerative infrastructure funds, blended ESG bonds, and impact-linked debt instruments targeted at small and mid-scale greenhouse clusters. For a blended capital stack, financing should be aligned with EU cohesion funds, the Common Agricultural Policy (CAP) Pillar II, Horizon Europe, and local mission-driven investment vehicles.

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