

INSIGHTS ON VALUE CREATION IN A NATIONAL BIOECONOMY, BASED ON ANALYSIS OF GOOD PRACTICE

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AGRICULTURE ACADEMY

Need for Bioeconomy Development

Long-term projections by OECD (2015) and European Commission (2015) suggest that the current trends of increasing global population as well as economic growth and development will have serious impacts on natural resources and the ecosystem, unless policy changes deviate the current path of development.

The current societal and environmental changes are responded inter alia by *redirecting the economy from the use of fossil fuels to biomass*. The trend fosters *increasing demand for biomass*, enhanced by the increasing need for food and feed, bioenergy and other bio-based products.

Demand for bioresources, especially for bioenergy, is largely driven by political targets and subsidies [3].

Bioeconomy-related Strategic documents

Importance of bioeconomy development is reflected by the direct strategic goals, and by the accordingly allocated resources to finance their implementation on local, regional or international scales.

Since the beginning of this decade, the European bioeconomy has gained political momentum and strategic importance, reflecting in the EU long-term strategic targets.

Up till today, more than 12 European, 5 American, 10 Asian and 6 African countries have strategic documents on bioeconomy. 49 countries worldwide have created policy strategies related to bioeconomy development, 15 of which, including the European Union and the West Nordic Countries, have developed dedicated bioeconomy policy strategies – with the trend rising [4].

Bioeconomy contribution to better value-creation

Typical approaches that can be adopted to measure the *bioeconomy contribution to a country's economy* include the value added/GDP approach; Input-Output (I-O) and Social Accounting Matrix (SAM) analysis; Computable General Equilibrium (CGE) Model; Partial Equilibrium (PE) Model and other economic models and tools [5].

Some countries measure the contribution of bioeconomy by means of disaggregated indicators, like turnover, GDP, employment, resource use, primary production of biomass, Import of biomass to the country, land use for biomass based consumption in the country, production of bio-based products, price of biomass and bio-based products, consumption of bioeconomy products, trade flows [6].

Further indicators focus on the drivers of innovation, such as investments and spending in R&D, or intellectual property.

Economy-specific determinants of value creation in a national bioeconomy

Studies of the EU and Norwegian country experiences in bioeconomy development [7] showed that the value creation in the bioeconomy depends on:

- Market conditions of inputs
- Production technology
- Market conditions of final products (including barriers to entry)
- Existence of bioeconomic value chains
- The share of the value chains created nationally
- Prioritising the parts of the value chains, creating higher value added
- Availability of efficient infrastructure

Society-specific determinants of value creation in a national bioeconomy

- Altering consumer needs or customer orientation to develop a more resource-efficient and sustainable society
- Acquiring public support to the desired innovation processes, including product and technology innovation development and implementation
- Minding market specific differences as regional societal contexts are relevant factors in a transforming society
- New product development should be based on mutually beneficial collaboration between suppliers and customers in the value chains and reaching over sectorial boundaries.

Environment-specific determinants of value creation in a national bioeconomy

- Biomass should be treated as a *limited resource*, hence Innovations inducing socio-technological changes, driving the more efficient, *cascading use of biomass*, substitution of fossil-based products, improved primary-sector productivity, and high-value technologies, should be promoted [9, 10].
- *Biomass production is limited* by the land footprint and environmental impacts [3], thus economic calculation and planning is necessary.
- Improving *ecosystem services* contribute directly and indirectly to human well-being.

Political and institutional guidelines

- National institutions need to solve issues of the drafting, implementation and monitoring of the bioeconomy strategy and strategies of the related sectors. There is a need for cross-institutional cooperation on bioeconomy-related policies.
- Needs of bioeconomy development support, especially those focusing on research and innovation, stakeholder networking, development and implementation of biotechnologies should be prioritised.
- Politicians and institutions should engage in cooperation, promoting national, regional and international action – creation, development of value networks and their internationalisation.
- Promoting the cooperation between business and science, knowledge and technology sharing; encouraging the development of clusters and integration into international value creation networks [7].

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