



Tropentag, September 20-22, 2017, Bonn

“Future Agriculture:
Socio-ecological transitions and bio-cultural shifts”

The Global Bioeconomy Landscape: What Determines National Strategic Choices?

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Abstract

An increasing number of countries worldwide develop bioeconomy strategies to promote a stronger reliance on the efficient use of renewable biological resources in order to meet multiple resource scarcity and sustainability challenges. Especially for developing countries, with a high potential of biomass production, bioeconomic strategies have been promoted to be a pathway of future sustainable development. This however has also been criticised for neglecting negative effects in terms of land and food competition, social impacts, biodiversity loss and environmental degradation. However, bioeconomies are diverse with sectors, such as agriculture, forestry, energy, paper and pulp, textiles, chemicals and pharmaceuticals as well as science and education in very different stages of development. We thus also expect large variation in the factors driving sustainability outcomes of bio-based development strategies and the appropriate strategies to promote them. Ideally bioeconomy strategies thus reflect the comparative advantages of countries in pursuing one or the other bioeconomic development pathway. We present a typology of bio-economies based on country-specific characteristics, such as 1) the relative importance of bio-based economic sectors as well as their capital and skill-intensity, 2) competitive advantages including natural resource endowments and education 3) openness to and role in international trade. We first compare the resulting bioeconomy clusters against the strategic focus and implementation status of their dominant bioeconomic development strategy. In a second step, we assess the clusters in terms of their sustainability performance using SDG related indicators. We hypothesise that distinct bioeconomy types can be identified with characteristic performance levels of key sustainability indicators and varying scope for tradeoffs and synergies. Our final discussion centres on the implications of the results for the debate on international regulatory frameworks to govern bioeconomic change.

Keywords: Bioeconomy, strategies, sustainability, typology