

Making the bio-economy more inclusive: The role of community forestry and agro-forestry

Die Rolle von gemeinschaftlicher Waldbewirtschaftung und Agroforstwirtschaft für eine inklusive Bioökonomie

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Summary

The bio-economy represents a shift from a fossil fuel-based to a bio-based economy in the pursuit of sustainability. In this paper, we contend that the current conceptualization of the bio-economy is too narrow to allow it to achieve its sustainability goals. We therefore draw attention to the notion of an “inclusive bio-economy” that vouches for also emphasizing the social justice and livelihood dimension. In so doing, we draw on two inclusive and environmentally responsive models from the forestry sector, namely, community forests and agroforestry, that could inform the bio-economy debates to make it more inclusive.

Keywords: bio-economy, sustainability, community forestry, agroforestry, livelihoods, smallholders

Zusammenfassung

Die Bioökonomie stellt einen tiefgreifenden industriellen Wandel dar, von einer fossilen, hin zu einer, auf der Nutzung biologischer Ressourcen basierenden, nachhaltigen Wirtschaft. Die vorliegende Arbeit beruht auf der Argumentation, dass die derzeit vorherrschende Konzeption einer Bioökonomie zu kurz greift, um ihre eigenen Nachhaltigkeitsideale umfassend zu erfüllen. Daher setzen wir am Begriff einer „inklusive Bioökonomie“ an, welche für die Berücksichtigung einer sozialen, auf die Erfüllung von Lebensunterhalt abzielenden, Dimension plädiert.

Dies illustrieren wir am Beispiel von zwei inklusiven und umweltverträglichen forstwirtschaftlichen Modellen: gemeinschaftliche Wald-

bewirtschaftung und Agroforstwirtschaft, welche, in Bezug auf den Aspekt der Inklusion, zur Debatte um die Bioökonomie beitragen können.

Schlagworte: Bioökonomie, Nachhaltigkeit, Gemeinschaftliche Waldbewirtschaftung, Agroforstwirtschaft, Lebensunterhalt, Kleinbauern

1. Introduction

The global community is showing an increasing commitment to decarbonize the fossil fuel-based economy. To that end, a number of micro- and macro- level initiatives are currently underway. For example, the concept of the bio-economy, defined as an economy that primarily relies on biomass to meet human needs related to, for example, food, materials and energy (EC, 2012; OECD, 2009), has emerged as a key initiative. At its core, the bio-economy entails that countries develop strategies and policy frameworks to enhance biomass usage in the production of goods and services (STAFFAS et al., 2013).

The bio-economy emphasizes new growth opportunities in traditional bio-based sectors, such as forestry and agriculture, through product innovation and industry transformation (SCARLAT et al., 2015). The use of biomass is also increasingly geared towards applications in the life sciences, through advances in biotechnology and genomics (LEVIDOW et al., 2012). These developments have ushered in a new era for the forest industry and are now viewed as key to bring about the forest industry's renewal (TOPPINEN et al., 2017). The agricultural sector has also similarly benefited as farm based biomass is used not only to produce bioenergy but also a variety of biomaterials (e. g., industrial oils, biopolymers, fibers) (LANGEVELD et al., 2010).

While these new newly opened sectors for bio-based applications are poised to generate a range of environmental and economic benefits, there are growing concerns that such a conceptualization of the bio-economy – by virtue of its focus on large-scale industrial processes – remains generally unresponsive to local sustainability goals (MCCORMICK and KAUTTO, 2013).

In this paper, we first outline fundamental shortcomings in the current conceptualization of the bio-economy. We then present community forestry and agroforestry as two models that could offer pathways to an

“inclusive bio-economy” that would integrally encompass a social and livelihood dimension. To better explain our suggested points of departure from traditional conceptualizations of the bio-economy to our proposed inclusive bio-economy, we compare the two on a few key criteria. We conclude the paper with a call that, while community forestry and agro-forestry models offer rich insights on how to make the bio-economy more inclusive, future research is needed.

2. The bio-economy concept: current focus and shortcomings

Discussions concerning the bio-economy concept have been progressively increasing in policy, industry and academic realms, particularly since the publication of a global roadmap for the use of biotechnology in industrial and agricultural applications as a response to global challenges, such as resource depletion and climate change (OECD, 2009). The underlying premise of this framework was based on the assertion that a mix of scientific knowledge and technical expertise will bring about insights on the use of biological processes for the creation of products and services with reduced environmental impacts. Subsequent documents, such as “Innovating for Sustainable Growth: A Bioeconomy for Europe” and the “National Bio-Economy Blueprint” of the United States, have maintained a strong focus on successful market uptake of biotechnological innovations (MCCORMICK and KAUTTO, 2013). While the promise of the bio-economy concept has been widely acknowledged, there are at least two prominent streams that serve as cautionary caveats.

The first caveat criticizes the current conceptualization of the bio-economy for its oversimplification. Here, critics argue that proposed solutions are not a panacea and that they merely reflect what some have dubbed the “waterbed effect” – one can control it here, but things then get out of control elsewhere. PFAU et al. (2014) conclude that the promise of the bio-economy is overshadowed by a range of unintended ecological and social implications arising out of increasing use of biomass.

For example, conflicts arise between groups that benefit economically from the extended cultivation of biomass (e.g. increased monoculture of corn and soy) and those that feel deprived of their economic rights, and/or aesthetic, ecological and social values resulting from changing

landscapes and land use patterns (MÜLLER and KNIERIM, 2012). In a similar vein, OLLIKAINEN (2014) stresses that the bio-economy omits the fact that the use of biomass for a low-carbon economy is not infinitely secured and provides temporally limited solutions.

The second, and perhaps an even stronger, caveat criticizes the bio-economy for its narrow view of sustainability; one that largely overlooks the social dimension (SCHMID et al., 2012). This criticism is rooted in a larger discourse about the importance of indigenous communities and smallholders (small farm and forest landowners) in protecting natural resources globally. PÜLZL et al. (2014) argue that the current conceptualization of the bio-economy does not recognize natural resources within their wider social, cultural and ecological contexts. The authors further maintain that this is problematic and responsible for an unfortunate situation, wherein sustainable forest management, carbon storage or illegal logging are taking a back seat in the current discussion around the bio-economy, while the optimism regarding global usage of biomass prevails in an unabated, unbalanced manner. As a response, new coalitions among researchers, policy makers and civil society organizations are beginning to emphasize the limitations inherent in the dominant concept of the bio-economy. Emergent literature demands a closer monitoring of potential benefits and trade-offs associated with increased uses of biomass and suggests ways to foster rural development – through smallholder engagement – with the ultimate aim of broadening the bio-economy concept and making it more comprehensive and inclusive (PFAU et al., 2014; SCAR, 2015). This paper advances that literature by articulating the potential role of community and agro-forestry for a broadened understanding of the bio-economy.

3. Community forestry and agro-forestry as part of the bio-economy

Community forestry refers to decentralized forms of forest ownership and governance in the hands of local communities, smallholders and indigenous peoples, who manage their forests sustainably – beyond just a profit motive – for multiple cultural, ecological and social benefits (HAJJAR and MOLNAR, 2016). As of 2013, over 15% of global forestlands was in the control or legal ownership of local governments and authorities (RRI, 2014).

The increasing popularity of community forestry enterprises (CFEs) provides guidance on how to incorporate local, needs-based, forest governance into multiproduct based, small-scale timber production that serves markets for sustainably sourced forest products. Compared to conventional business organizations, CFEs are rooted in the collective management of commonly held forestlands, affording them unique characteristics related to shared community risks and benefits. This encourages cooperative behavior, which has been shown to result in positive impacts on a variety of public goods and services. CFEs also create social capital through building alliances with neighboring communities. The combined effect of enterprise activity, forest stewardship and deeply rooted communities is, thus, seen to favour resilience and long-term sustainable outcomes in these organizations (ANTINORI and BRAY, 2005).

For example, in Oaxaca, Mexico, joint ventures between CFEs have vertically integrated from forest silviculture operations through furniture production and distribution, accompanied by the development of a franchising system, ultimately resulting in a competitive advantage for CFEs selling into domestic and national markets. These market-competitive CFEs are, thus, able to create livelihood and even leadership opportunities, especially for women. Profits from CFEs are distributed for public good, such as providing subsidized lodging for public schools and low interest loans for community members (VILLAVICENCIO VALDEZ et al., 2012). Similar community benefits have been created by South East Asian CFEs, which have grouped together and adopted agro-forestry models, allowing them to supply markets for sustainably certified high-end teak furniture (HAJJAR and MOLNAR, 2016).

Agro-forestry is an approach to land-use that combines growing trees and agricultural crops to provide for food, fuel, shelter and income (NIJHOFF and JUNK, 1982). This approach is deemed promising to meet global needs for food security (GODFRAY et al., 2010) and biodiversity conservation (DE BEENHOUWER et al., 2013).

Many CFEs themselves adopt agro-forestry models, for example, in the bio-energy sector, particularly in developing countries (LANGEVELD et al., 2010). Illustratively, many South East Asian CFEs have succeeded in replacing environmentally degrading slash and burn practices with ecologically sound agro-forestry systems. In addition to the revenue that

they generate from their combined agriculture and forestry activities, local CFEs contributed to the replacement of kerosene with the provision of leaves and twigs as a locally available bioenergy resource. These combined forms of sustainable practice allowed CFEs to offer multiple land-use alternatives, which serve to alleviate concerns about conversion of forests to agricultural land (JUHAR et al., 2016). Canada offers another example where many CFEs use wood waste from their local logging operations to provide heat for their surrounding community and sell biomass in open markets (MACARTHUR, 2016).

This unique feature of community forestry and agro-forestry models to link rural livelihoods with carbon storage benefits brings them closer to the bio-economy realm. Since communities often have a strong sense of reverence for local resources, they typically tend to restrict their consumption of forest resources, thereby contributing to increased carbon storage (CHHATRE and AGRAWAL, 2009).

The examples discussed above indicate that community forestry and agro-forestry models could serve as excellent reference points for attempts to infuse community inclusion and livelihood generation in conceptualizations of the bio-economy. Although the notion of inclusion is increasingly brought into the literature on the bio-economy (BRYDEN et al., 2017), an explicit use of the term, “inclusive bio-economy”, which we argue is essential to fully capture sustainable development opportunities contained within the bio-economy, is currently missing in the literature.¹

The current conceptualization of the bio-economy tends to be techno-scientific in nature because it emphasizes technological developments and their rapid, large-scale industrial uptake (PÜLZL et al., 2014) while ignoring required changes in social institutions. This situation ignores potential changes within local, small-scale operations and only focuses on large-scale industries. (PFAU et al., 2014). As a case in point, biomass-to-liquid fuel technology typically focuses on existing fuel distribution and transportation infrastructures as opposed to empowering local economies through decentralized systems (LEVIDOW et al., 2012). In

¹ Notably, the term is used in a recent call in the EU Horizon 2020 specific program entitled, „innovative, sustainable and inclusive bio-economy“. The web link to the call is available under: (16.03.2017).

Table 1 below, we draw on the extant literature to contrast a techno-scientific conceptualization of the bio-economy from a conceptualization of an inclusive bio-economy along five key criteria: Scope, innovation, knowledge focus, perspective on resource use, and forms of organization.

Tab. 1: Comparison of fundamental tenets of a techno-scientific bio-economy versus an inclusive bio-economy

Criteria	Techno-scientific bio-economy (approach which lacks social dimensions)	Inclusive bio-economy (an additional, more inclusive, approach which adds to the techno-scientific perspective)
Scope	Private industry and cutting-edge science clusters (focus on developing marketable and patented products)	Local governance and management of commonly held resources (collective approach to secure livelihoods)
Innovation	Technically engineered process innovation	Social innovation
Knowledge focus	Rational scientific paradigm with a focus on bioengineering	Traditional knowledge systems of forest dependent communities
Perspective on resource use	Growth and harvest of biomass for capital intensive industries and application in laboratories	Manage forests for multiple usage (CFEs, biodiversity, carbon storage and sequestration)
Forms of organization	Top-down steering of strategic innovation for biomass applications across industry sectors	Bottom-up effort to scale-up local small-scale operations, redistribute gains with respect to social and ecological objectives

Source: OWN TABLE

The comparison of these two approaches (techno-scientific and inclusive) demonstrates that, in order to move the bio-economy concept forward in its aim to achieve substantive change towards a low-carbon economy, it would be prudent to bring smallholder initiatives into the picture. In the realm of forestry, wood based bio-energy markets and ecological services in form of transfer payments for carbon storage are two areas with a particularly strong potential to link smallholders to international bio-economy markets (HAJJAR and MOLNAR, 2016). A

better understanding of the opportunities and challenges related to how small-scale community forestry and agroforestry initiatives can scale their operations in these markets is necessary.

4. Conclusions

A comprehensive, inclusive conceptualization of the bio-economy warrants a shift from large-scale industry level initiatives to small-scale initiatives that are rooted in local communities. Here, we suggest community forestry and agroforestry as viable models for the advancement of an “inclusive bio-economy”. However, further research is needed to examine how these small-scale operations could be scaled up in size and scope without compromising their community character. We contend that, without bringing the world’s poorest communities into the folds of the bio-economy phenomenon, its core sustainability goals will remain utterly unrealized.

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