Chapter 9
The Politics for a Fairer Bioeconomy

Abstract Bioeconomies are yet to meet their sustainable development potentials. Thus far, mostly unsustainable production has prevailed, due to reasons on four different levels. First, domestic regulatory and economic incentives have favored conventional, input-intensive monocultures and big agribusiness-controlled systems. Second, some norms have been crucial in underlying those policies: (i) the economic but not political inclusion of smallholders and low-income countries; (ii) the preeminence of climate and wild biodiversity conservation over other sustainability issues, assuming "renewable" to mean "sustainable" and disregarding the performance of bio-based production on other social and environmental criteria; and (iii) an implicit urban bias that limits rural development strategies and prioritizes the provision of resources to cities. Third, state and private agroindustry agents who espouse those norms have formed winning coalitions to concretize policy beliefs held in common. Ultimately, there are feedback loops between agency, governance architectures, and allocation and access patterns. Therefore, the prevailing production patterns' very distributive outcomes can be identified as a cause underlying their dominance. As such, social equity reveals to be not just a normative goal but also a key determinant of governance. To not aggravate inequalities and be more sustainable, bioeconomy promotion needs policies that reconfigure allocation patterns and promote structural change.

Keywords Bioeconomy · Biofuels · Emerging economies · Inclusiveness · Social equity · Value chains

9.1 Introduction

This book began with the observation that sustainable development's social pillar, with its considerations on equity and other human dimensions of environmental change, has been systematically marginalized, both in scientific research and in sustainability policy. Biofuels, an emerging bioeconomy sector *avant la lettre*, has been no exception to that.

Still, despite remarkable growth, worldwide political and economic engagement, and significant global impacts on people and the environment, bioeconomy sectors

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mostly continue to be blind spots of governance analyses. Assessments of biofuel social impacts have hardly examined links to the institutional and political contexts in place. Although scientists and multilateral agencies for years have pointed out the high stakes of large-scale biofuel production, its expansion continues unabated and mostly unchanged, and now broader bioeconomy strategies are emerging and seeking to build on top of the existing sectors. To draw lessons from experience thus far, this book has asked *why certain biofuel production patterns have prevailed at the expense of others.*

This chapter draws on the in-depth assessments in this book to answer that question. It will also provide recommendations for institutional redesign and further research. The next section discusses some main conclusions; it characterizes the social sustainability of prevailing biofuel production systems, delves into bioeconomy governance politics, explains how agents operate and why these new sectors remain a non-regime at the international level. The chapter also expounds on the relevance of access and allocation patterns to understand governance and why certain (unsustainable) strategies have prevailed. Later, the chapter discusses how bioeconomy strategies can become more equitable, including specific policy design recommendations and governance lessons. It ends with recommendations for further research and some final considerations on adequately taking on board social dimensions for a fairer bioeconomy.

9.2 Unraveling the Politics of Bioeconomy Governance

9.2.1 The Prevalence of Conservative and Unsustainable Agri-Food-Biomass Systems

Although the various biofuels and bioeconomy products are diverse from a technical standpoint, their prevailing production systems have been remarkably similar and rather conservative. For one, biofuels have brought about moderate innovation to energy systems: they maintain conventional fuel distribution and transportation infrastructure while replacing oil products with renewable energy. However, they have merely added technologies and new markets to pre-existing agricultural systems upstream in the production chain.

Agricultural or feedstock cultivation systems have undergone little to no structural changes. They have also maintained nearly all their pre-existing environmental impacts, skewed power relations, and uneven allocation patterns. Agri-food systems may have become agri-*fuel*—sometimes agri-food-fuel or, more generally, agri-food-biomass—systems. They are about to increasingly become biomass-based "value webs," where multiple chains coexist to deliver a plethora of goods (Virchow et al. 2016; Scheiterle et al. 2018). Nevertheless, there has generally been no change regarding who owns, does, or gets what. (The "what" has somewhat changed, but the "who" has not. The winners and losers remain mostly the same.) The expansion of

these systems has often meant further land dispossession and reduced access to water or food for vulnerable groups such as rural communities and indigenous peoples. Rather than tackled, structural socio-economic inequalities have been fueled and reinforced by thriving new bioeconomy markets.

Industry-controlled monocultures and contract farming schemes have been the two main production arrangements currently undergirding the bioeconomy. The former are vertically integrated systems where agribusiness directly controls both feedstock cultivation and bio-based production. Especially as crop mechanization advances, such vertically integrated production systems become increasingly socially exclusive. If the rural poor participate, it is merely as plantation workers, often without job security. Although such jobs may *alleviate* poverty, the latter's structural causes are maintained. The industry gains from all bioeconomy value-chain—or value-web—development while dispensing only minor benefits in the form of low-paid rural jobs. In reality, the poor often have been left worse off due to insecure and health-degrading work conditions. Meanwhile, the impacts on and eventual erosion of small-scale mixed farming are not accounted for, even though it usually creates far more employment. Mixed farming also generates higher economic value per hectare and tends to be more sustainable, yet it hardly receives attention in the form of political, financial, or R&D support (IAASTD 2009; HLPE 2013a).

Conventional contract farming, in turn, has been nearly as inequitable. Despite keeping nominal control over the land and other production resources, smallholders effectively lease it to the contracting industry. Contracts are often negotiated on an individual basis, with knowledge imbalances and frequently in contexts of monopsony (i.e., only one buyer available) and vulnerability from smallholders in poverty—conditions that give the industry disproportionate bargaining power. Farmers are "hired" but usually without safety nets or any standard employee rights, such as collective negotiation. They can easily be laid off after a contract, although getting back to mixed farming after shifting to input-intensive monocultures may prove very challenging if not impossible. Besides, farmers become dependent on a single cash-crop—in the bioeconomy case, a crop that might not have any alternative use as either food or fodder (e.g., jatropha, castor bean). Such an exclusive dependence makes smallholders even more vulnerable to market fluctuations and to a single buyer that may not respond well to such economic volatility. The COVID-19 pandemic, for instance, laid bare such vulnerability by throwing many Indonesian oil palm farmers into a "survival crisis" as markets turned off (Chu and Das 2020).

In the best-case scenario, contracted farmers are to perpetually remain raw material providers, producing under terms dictated mainly by the industry while the latter benefits from all value-added. In practice, however, industries have abandoned thousands of smallholders due to uneconomic biofuel production. Many contracts for feedstock cultivation have thus configured cases of "adverse incorporation," i.e., inclusion where poor farmers end up worse off, sometimes with both their food and economic security compromised (see Hickey and Du Toit 2007).

Both approaches have been conservative in the sense that they do not tackle the existing unequal distributive patterns and power relations of conventional agri-food systems—they instead expand on them. They constitute forms of what Moore

(1966) seminally termed "conservative modernization," i.e., updating some technical and economic arrangements without challenging existing social or political inequalities. Instead, the process of (technical) change, guided by the winning side of those relations, precisely maintains those advantages—and, thus, the inequalities they produce—in place. We can therefore identify a dominant paradigm of *conservative ecological modernization* in current bioeconomy promotion.

However, unsustainability has not arisen only from the social pillar. The overall environmental performance of large-scale biofuel production, too, has overall been rather negative. Although fossil fuel substitution helps with climate change mitigation and can improve air quality, the expansion of industrial agriculture for feedstock cultivation has fueled numerous environmental issues such as soil, freshwater, and (agro)biodiversity depletion. While biofuels' *use* seems beneficial, their production patterns have been grossly unsustainable from social and ecological standpoints.

9.2.2 Institutional Causes Behind Unsustainable Bioeconomy Development

The prevalence of unsustainable bioeconomy development, such as socially and environmentally unsound biofuel production, is inextricably linked to its governance. Institutions have been crucial for the thrust and prevalence of specific biofuel expansion patterns in at least three ways. First, national public policies have driven and largely shaped how biofuels are produced and consumed. They have been determinant both to the failures and to more successful cases. Second, biofuel expansion has counted on a surprisingly supportive institutional environment at the international level, despite public controversies. Third, some underlying norms at both national and international levels have been particularly critical for the bioeconomy's current limitations on promoting equity and sustainability. It is worth fleshing out each of these causation links.

Despite its global dimension, one cannot sufficiently understand the current biofuel expansion without reference to national policy frameworks. Public policies have enabled, financed, and largely steered biofuels and other bioeconomy sectors so far. Even if additional drivers such as foreign market demands have sometimes been at play, domestic regulatory and economic incentives have usually been the main—and the only *sine qua non*—cause of biofuel expansion. Such incentives have included national consumption goals, blending mandates, facilitated regulations on investment, tax breaks, targeted public credit, and a range of other instruments. Without these, the current development of biofuels and other bioeconomy value chains would not have been nearly as attractive—or at all possible.

Critically, those public institutions have not only promoted but also *shaped* such value chains. Biofuel policies have systematically allocated nearly all incentives to private agribusiness while placing most burdens on public banks and state-controlled oil companies. However, that support has not always been indiscriminate. Incentives

have sometimes included social or environmental requirements, such as incorporating smallholders or avoiding deforestation. Although this has sometimes backfired, in other cases—notably that of Brazil's *social fuel seal* on biodiesel (see Chap. 5)—those requirements were crucial to improving the outcomes. In either case, public policies have been the primary determinant of the sustainability performance of bioeconomy promotion through biofuel value chains.

In contrast, an absence of rules in a lean, neoliberal framework has characterized international biofuel governance. Its norms have included: (i) an uncritical assumption that biofuels should be produced through conventional agriculture and on a large scale; (ii) the need to promote them as internationally traded commodities; and, implicitly, (iii) an understanding that multilateral rules on biofuels should be kept to a minimum, usually limiting themselves to technical standardization, thus allowing countries to freely pursue their agendas irrespective of the global impacts they might have.

Based on these norms, state and non-state actors from major producer countries have set up many new organizations (e.g., the Global Bioenergy Partnership, the International Biofuels Forum) as well as working groups within pre-existing agencies (e.g., IEA Bioenergy) to promote cooperation and also deployment in non-member countries. Meanwhile, more inclusive fora such as UN agencies have been vocal and engaged on biofuel sustainability issues, but "non-decisions" have prevailed due to the refusal of major producers to agree on any international rules that could limit their agendas. This broadly permissive institutional setting is in stark contrast with the concerns expressed internationally in scientific and policy circles (see FAO et al. 2011; HLPE 2013b). Such an international vacuum of rules has been particularly crucial to developing countries. They experience most food insecurity and land grabbing issues, and foreign investments drive most of their biofuel expansion (see Chap. 4; see also Schoneveld 2010; Smith 2010; German et al. 2011). Furthermore, the absence of an international regime has led to unilateral sustainability policy-making filling the regulatory gap via extraterritorial control over supply chains. However, besides its much more limited applicability, this arrangement exacerbates political power inequalities as producer countries become subject to sustainability rules without having a say in their making (Bastos Lima and Gupta 2014).

More broadly, three underlying norms have constrained bioeconomy governance and limited the potentials of value-web development. First, the involvement of weaker actors such as smallholders or low-income countries has been a prevailing norm, almost a development mission, based implicitly or explicitly on such ideas as participation, social inclusion, and empowerment. However, that has been limited to an economic understanding of these concepts. Weaker actors are included but usually not their views, interests, or preferences. Inclusion and exclusion are seen as a black-or-white dichotomy; it is assumed that inclusion is good and exclusion is bad, that inclusion always reduces inequalities, and that the excluded always want to be included (Hospes and Clancy 2011). Hence, there is supposedly no need to conduct any meaningful consultation. However, not only does this overlook the risks of adverse incorporation, but it also leads to top-down strategies where dominant actors impose their views and rules on weaker ones under uneven power relations.

The second underlying norm to bioeconomy governance to date is a limited and politically conservative view of sustainable development—in line with conservative ecological modernization and so far not going beyond it. For one, biofuels have mostly been technocratic "solutions" of reassurance to incumbent dominant actors and their arrangements. That includes reassurance to the conventional, automobile-centered transport systems, as well as to the mainstream productivist approach to agriculture, which emphasizes yields while overlooking its broader social or environmental performance (see IAASTD 2009; Horlings and Marsden 2011).

The biofuels case corroborates several critiques leveled against the prevalent ecological modernization praxis (see Chap. 1). It provides a telling illustration of how such a narrow view of sustainability indeed leads to unsustainable practices. Capital-intensive approaches have privileged wealthier agribusiness actors. While overlooking power relations, they have exacerbated inequities; and by favoring only expert-based scientific rationality, they have supported the one-way treatment dispensed to smallholders and the dismissal of their traditional knowledge.

Moreover, there has been a nearly exclusive emphasis on climate issues—what one could term a "climate eclipsing" of nearly all other environmental issues—and *wild* biodiversity conservation, that is, ignoring biodiversity *within* farming systems. Biofuel policies have systematically overlooked issues such as the depletion of agro-biodiversity, soil, and freshwater caused by industrial feedstock cultivation. "Sustainable" becomes thus reduced to being a synonym of "climate-friendly," "climate-smart," or of "low-carbon" development.

Finally, underlying most biofuel production strategies as an implicit norm is a bias towards urban-centered development. Despite the prevalent rural development discourse, its promotion has generally been limited to giving incentives for feedstock cultivation. Biofuel policies have hardly included any instruments to promote rural entrepreneurship, local value addition, or to address rural energy poverty. Instead, rural areas' natural and human resources have been mobilized to provide more energy to urban centers and mostly to higher-income motorists. Environmental pollution and resource depletion from feedstock cultivation are felt primarily in rural areas, while highly skilled work and resource consumption mostly benefit city dwellers. This norm remains implicit, but the reality is that bioeconomy promotion thus far has almost invariably widened the rural-urban divide.

9.2.3 The State-Agribusiness Nexus in Bioeconomy Value Webs

Institutions usually do not come about spontaneously. Those prevailing norms, policy frameworks, and even the absence of an international bioeconomy regime have resulted from dominant actors' agency—and, therefore, mainly represent their views. In this regard, the biofuels case offers a significant example of conflation between state and agribusiness interests. Far from being absent or relegated to the background

as scholarly emphasis on "agency beyond the state" may suggest (see Cashore 2002; Pattberg 2007; Biermann et al. 2009; Biermann and Pattberg 2012), states have shown to be the principal agents of bioeconomy promotion, particularly in emerging countries (see also Schmalz and Ebenau 2012; Van Apeldoorn et al. 2012). In these countries, the private sector has worked mostly *through* the state rather than independently. Instead of advocating for deregulation or focusing on private governance mechanisms, agribusiness in bioeconomy matters has devoted most resources to influencing public policy. For instance, palm oil producers walking out of the Europe-led Roundtable on Sustainable Palm Oil (RSPO) in Indonesia did not launch their certification mechanism. Instead, they have supported government-made certification: the Indonesian Sustainable Palm Oil (ISPO).

Strong coordination between states and agribusiness around the bioeconomy stems from at least two reasons. For one, both sets of actors have shared some common norms (e.g., urban-centered development, sustainability understood as ecological modernization, economic but not political inclusion of weaker actors) and policy-core beliefs. In the case of emerging economies, both agribusiness and states have also been keener on pursuing economic growth, technological innovation, increased geopolitical influence, and catching up with developed countries—in short, "equalizing development" (see Chap. 8)—than on fixing domestic inequities or protecting the environment. Moreover, resource complementarity between state and agribusiness has made them interdependent. While agribusiness has depended on public regulations and economic incentives for producing biofuels and bioproducts, emerging economy states have not been able to fulfill their aspirations without resorting to the private sector's material capabilities such as technologies, investment capital, and—notably in Brazil's case—farmland.

Still, states are not monolithic entities. Democratic governments, in particular, must respond to multiple pressures and may accommodate the interests of different social groups (Poulantzas 1978; Jessop 1990; Gallas et al. 2011). Nevertheless, bioeconomy governance has largely excluded more critical views and actors from the agenda-setting processes. The interests of weaker stakeholders (e.g., rural communities, indigenous peoples) have been regularly underrepresented. Agribusiness' superior material capabilities explain that imbalance to an extent, but not entirely. Such a lack of government responsiveness and democratic representativeness, which illustrates the limited political strength of more critical actors, arguably also owes to their limited connection with the ruling political parties and civil society.

States are not machines—people and political groups with particular views and policy beliefs staff public apparatuses. Various non-state actors may influence policy-making, but policies still depend mostly on what the political parties in power want and decide (Hibbs 1977; Allern and Saglie 2012; Pedersen 2012; Nelson 2013). Among the analyzed cases, only in Brazil have critical actors been able to play a meaningful (albeit limited) role in bioeconomy governance. That resulted from the close links between smallholder movements and the Workers' Party, which ruled from 2003 to 2016 and introduced inclusion-oriented policies, giving Brazil's biodiesel program its social hues. It was representative of Latin America's broader left-wing turn—or "Pink Tide"—with social policy improvements and achievements in reducing poverty

and inequality in the 2000s (see Castañeda 2006; Schmalz and Ebenau 2012; Hogenboom and Jilberto 2014). As that lost steam by the mid-2010s and many governments of more pro-business inclinations came to power in the region, it remains to be seen how that state-agribusiness nexus will evolve.

Concerning civil society support, one must regard the prevailing discourses that state-agribusiness coalitions have put forth and used to secure their dominance in democratic systems (see Falkner 2009; Williams 2009; McMichael and Schneider 2011). While highlighting employment creation and the macroeconomic benefits of the bioeconomy, private agroindustries also depict themselves as national champions in a competitive international market, in a nationalistic appeal for public support. In practice, they adapt the (self-serving) claim that "what is good for General Motors is good for the United States", offering contemporary bio-based versions of it in emerging economies. That nationalistic emphasis continuously underscores their discourses and, if anything, it has become even stronger as national-populist governments came to power in countries such as Brazil and India. Also elsewhere, governments and agribusiness have mostly framed large-scale biofuel production in terms of public interests such as job creation, energy security, and climate change mitigation. In contrast, critical discourses have lacked sufficient penetration within civil society at large. Critiques or alternative formulations for the bioeconomy have remained relatively marginal. During government elections, they usually hardly constitute a challenge to dominant discourses.

That said, the case studies have shown how failure from the part of private industries to meet government expectations (e.g., smallholder inclusion) has occasionally led to counter-movements from the state. In Brazil, the state increasingly used its prerogatives as a major financier to set additional rules on biofuel value chains. In both Brazil and India, it also started engaging directly in biofuel production, taking market share from the private sector, while in Indonesia it has increasingly attempted to do so. This pattern shows an expansion of the typical state dominance in emerging economies' energy markets (see De Graaff 2012), from oil to renewable fuels and now also in the agribusiness sector. Such an expanded role is in tune with the perceived prominence of a "neo-developmentalist"—as opposed to neoliberal—state in those countries (Morais and Saad-Filho 2012; Schmalz and Ebenau 2012; Van Apeldoorn et al. 2012), and with its similar strides in other strategic areas such as mining. However, this in itself has not (yet) meant a challenge to the neoliberal global order (Schmalz and Ebenau 2012; Van Apeldoorn et al. 2012). On the contrary, the recent past shows that, in times of increasing protectionism, emerging economies may sometimes be strong advocates of free trade at the international level.

9.2.4 *Strategic State Behavior and International Non-regimes*

Non-regime and non-governance cases remain as large blank spots in the governance and institutional analysis literature (Biermann et al. 2009; Biermann and Kim 2020). As Dimitrov et al. (2007) noted, regime analysis has focused extensively on policy areas where regimes have surfaced. However, insufficient attention has been paid to areas where no regimes have been formed, creating a lack of control cases. Moreover, non-regime cases can shed light on the political dynamics that underlie regime formation. This section uses the case of biofuels—arguably a non-regime (Bastos Lima and Gupta 2013)—to explain how such instances come to be and consider what seems to prevent regime formation.

First, it is useful to observe that biofuels make a case where the literature would have predicted international regime formation. The sector is marked by interdependence among countries, market failures, negative externalities from domestic policies, and potential for mutual gains from multilateral cooperation—all of which are factors known to contribute to regime formation (Keohane 1984; Young 1989; Hasenclever et al. 1997; Dimitrov et al. 2007). Nevertheless, only a thin neoliberal framework has emerged in biofuel governance (Bastos Lima and Gupta 2013). While it has provided some interstate cooperation, there are no mutually agreed rules and, therefore, no rule-consistent behavior—defining requirements for a regime (see Chap. 3).

In a preliminary assessment of non-regimes, Dimitrov et al. (2007) identified three possible impediments to regime formation: the absence of reliable scientific information, value conflicts among states, or internal conflicts within domestic politics. However, none of these factors seems to explain the absence of a biofuels regime satisfactorily. There has been plenty of scientific information on their economic or environmental impacts. Multilateral cooperation on biofuels shows that value conflicts among states are not too significant in this area. Although there are conflicting views on biofuels within countries, these have generally not been strong enough to undermine or destabilize the countries' central positions and agendas on the issue, as the case studies in this book have shown.

Instead, three other interrelated reasons may help explain the absence of an international regime in the case of biofuels: (i) strategic economic and geopolitical interests, (ii) lack of political consensus[1] about the externalities of domestic policies, and (iii) national sovereignty concerns. Countries engaged in large-scale biofuel production have perceived it as central to their national energy security interests, geopolitical ambitions, and job creation in agriculture—employment always a significant item in government agendas. These domestic policies have likely had global impacts, but they mix with other drivers, and thus the causality is not clear (see Bastos Lima and Gupta 2014). This debate has led to nuanced views and a lack of consensus among policy- and decision-makers, even if scientists and multilateral organizations

[1]This does not refer to scientific consensus, but to consensus among policy- and decision-makers.

seem closer to such a consensus and have long called for changes in those domestic policies.[2]

International regimes that put reins on domestic policies, although hard to negotiate, are not nonexistent, as the Kyoto Protocol and its emissions caps showed—among various other examples. However, while global ecological impacts are more easily seen as "negative," transnational economic impacts such as those of domestic biofuel policies on agricultural commodity prices are much more nuanced despite the clamor made about "starving the poor to fuel cars." While there is a fairly broad consensus about the desirability of, say, mitigating climate change and avoiding biodiversity loss, the idea of keeping agricultural commodity prices low is not nearly as consensual. Furthermore, restrictions on crop or land diversion to biofuels would mean, in practice, compelling major agricultural countries to stick to producing and exporting food. They would have to forgo the development of other crop-based industries and a bioeconomy "just" to keep international agricultural commodity prices at a certain level because other countries have become dependent on (cheap) food imports. It can certainly be asked why the latter have become so vulnerable to international price volatility and dependent on food imports (see Clapp 2009). If anything, the COVID-19 pandemic has brutally exposed the need for addressing structural vulnerabilities of access to food in the neoliberal food security order (Clapp and Moseley 2021). However, requesting producer countries to refrain from a broader utilization of their crops, multipurpose agriculture, and bioeconomy development would affect their national sovereignty to a degree they are generally unwilling to accept.

To what extent are these factors specific to biofuels, and to what extent can they be generalized to regime formation in other areas? Issue-area specificity is a crucial debate in non-regime theory (Dimitrov et al. 2007). Still, some generalization may be possible. Arguably, national interest and sovereignty concerns are relevant to any issue-area considered to be strategic. In strategic areas, the country's economic status or geopolitical power is at stake, as seen in global energy governance, international climate change negotiations, or discussions about the liberalization of agriculture. For instance, despite the crucial importance of energy production, trade and consumption for economies or to the environment on a planetary scale, global energy governance remains weak, scattered and, for most practical purposes, nonexistent (Florini and Sovacool 2009; Gupta and Ivanova 2009; Lesage et al. 2010). Even rules of the World Trade Organization (WTO) generally exempt oil and gas sectors (Abdallah 2006; Cottier et al. 2010). As such energy resources are strategic both for economic and geopolitical interests, countries are hardly willing to compromise in this area—except when international institutions are perceived to be non-intrusive and to work in the best interest of all participants, as in the case of the Organization of the Petroleum Exporting Countries (OPEC) (see Kaufmann et al. 2004; Carey 2009; Karlsson-Vinkhuyzen 2010). For instance, in international climate negotiations, US

[2] See FAO et al. (2011) for a joint statement by several multilateral organizations against large-scale biofuel production based on food crops, and HLPE (2013b) for the call of a high-level panel of experts gathered by the FAO for further sustainability policy-making on biofuels.

unwillingness to compromise has been credited partly to its decreasing status as a world power and fears of being overtaken by emerging economies, notably China (Gupta 2010; Hurrell and Sengupta 2012; Roberts 2011). Finally, agriculture, too, is perceived by many countries as a strategic sector for employment creation, foreign exchange earnings, or cultural and landscape conservation (see Potter 2006; Piketty et al. 2009). Unsurprisingly, it has hindered advances in the Doha Round of negotiations under the WTO, which is ongoing since 2001 (Clapp 2006). Therefore, even though environmental changes and an increasingly interdependent economy have turned energy and agricultural sectors into global concerns, their strategic nature has curtailed international regime formation attempts.

This analysis thus suggests that, even in the presence of ample scientific evidence, of domestic policy externalities perceived as negative, and of possibly mutual benefits from multilateral agreements, regime formation on strategic sectors still depends on:

- Reaching a minimum level of consensus about transnational impacts *and* on whether and how to avoid them;
- A willingness to compromise on national sovereignty proportional to the desirability of avoiding those impacts and to the opportunity costs this would create;
- Accommodating for the economic or geopolitical interests associated with the strategic resource sectors being regulated (e.g., finding a substitute strategy).

As biofuels policy meets none of the requirements above, one may ask why there is any biofuel governance at all (see Chap. 4). Arguably, in contrast to regimes, governance requires just like-minded actors to share a common purpose and agree on mutually advantageous strategies (e.g., the US and Brazil seeking to establish a global ethanol market; see Afionis and Stringer 2020). Unlike regime formation, it does not necessarily require agreement on behavior rules, the balancing-out of trade-offs and compromises, or sacrifices of any sort (see Chap. 3). Therefore, non-regimes and non-governance are not determined by the same factors.

9.2.5 Consequences of Inequity: The Relevance of Allocation and Access to Governance

This book has argued that social equity is a normative goal as well as an essential determinant of vulnerability, agency, and a range of other elements relevant to governance. Thus far, the experience with actual bioeconomy development makes a compelling case for taking allocation and access issues more seriously into account.

First, biofuels have shown that lack of attention to allocation and access issues can easily lead to widespread human rights violations. Such violations include not only compromised access to essential resources such as water and food but also to exercising human rights to housing and decent work (see CESCR 1991; International

Labour Conference 2008). These have been particularly critical issues to indigenous peoples and rural communities constrained by large-scale feedstock expansion. Besides lost access to essential resources and often physical violence, under the guise of job creation many have been submitted to unsafe and insecure work conditions, frequently at the expense of their livelihoods.

Second, omission on equity has led to decreased recognition of indigenous and customary property rights. Without social safeguards, biofuel expansion has often been a process of "accumulation by dispossession" (Harvey 2004), transferring *de jure* or de facto control over land, water, and other resources from local communities to private companies or the state. As such, legally recognized land property rights of indigenous peoples are trampled, while land tenure insecurity is exploited instead of being addressed (see also Russo Lopes et al. 2021).

Third, failure to include disadvantaged actors in policy- and decision-making leaves critical knowledge gaps that can compromise bioeconomy value-web development. The jatropha and castor bean experiences showed how lack of consultation led to dysfunctional chains built on incorrect assumptions. They found support among scientists and other formal experts but proved false and would have been clarified if local knowledge had been taken into account. Such knowledge gaps refer not only to traditional know-how but also to a proper understanding of how small-scale farmers and their mixed farming systems operate.

Fourth, lack of political participation decreases social acceptance and may thus compromise bioeconomy development initiatives. The biofuels case has shown that social acceptance is crucial not just from energy consumers (see Wustenhagen et al. 2007; Sengers et al. 2010; Bronfman et al. 2012) but also from producers, who may have trade-offs to make and livelihoods at stake. Lack of acceptance or buy-in usually leads to uncooperative behavior, efficiency losses, waste of public money, and sometimes outright social conflict, as seen particularly in India's experience in "marginal lands." In contrast, participation in decision-making has shown to increase interest and engagement from local actors. They feel their views and preferences are taken into account, as seen in Brazil's earlier biodiesel experience.

Fifth, this research shows that vulnerability aggravates poverty and vice versa, as in a vicious cycle. By lacking proper access to information, capital, and legal processes—or, to put it simply, by being poor—actors are more prone to making disadvantageous bargains, risky deals, and compromises that otherwise they would likely not make. In turn, losing control over their means of subsistence and production (e.g., land, agricultural resources) and being allocated with roles that create excessive risks and dependency (e.g., on one source of income, one buyer), disadvantaged actors become even more vulnerable. Such vulnerability is not only to environmental and socio-economic change but also to making even more disadvantageous deals in the future, as if going down a vicious spiral of powerlessness.

That dynamic reveals the political implications of access and allocation patterns and their close relation to agency. Some multilateral organizations indeed highlight that one of the most noxious effects of poverty is powerlessness (UN ESCAP 2007; UNRISD 2010). Crucially, by being allocated with more burdens, fewer benefits, less control, and less advantageous roles, and eventually having their access to resources

hampered further, actors also lose some of their capacity to act. They enjoy less power to pursue their preferred development paths, advocate for policy, or resist and counter mainstream discourses. They become less capable in terms of "power to" and even more susceptible to become victims of "power over" from other, dominant actors. This connection between outcomes and power, in a way, holds the key to explaining why certain biofuel production patterns have prevailed, as discussed in the next section.

9.2.6 Unraveling the Power Spirals

Dimensions of equity, institutional architecture and human agency frequently are studied in separation from one another. However, this research has shown the importance of recognizing how they are functionally integrated and interconnected in governance. As argued in Chap. 3, systemic loops link the outcomes of all three dimensions—adding some complexity to the usual "agent-structure debate," which tends to emphasize the institutional milieu and often overlooks the influence of material dimensions on agency.

Biofuel governance demonstrates that the roots of inequity are often found in agency. Agency, in turn, frequently has an eye on the allocation and access patterns the institutions put in place will foster. Powerful actors have been shown to systematically retain most benefits, to secure the most advantageous roles (in governance and value chains or webs), and to actively keep the underlying foundations of inequality all in place. Inequity and the worsening of inequalities operate through power feedbacks. These feedbacks strengthen actors who already are in dominant positions while further undermining the remaining resources and means of action that weaker actors had so far retained (e.g., communal lands, water access, local forms of organization around their mixed farming systems). In this regard, inclusion has often meant to politically surrender their alternative development visions and preferences in exchange for immediate and otherwise unavailable benefits—a Faustian bargain—in inequitable value chains and exclusive governance arrangements.

The case study chapters detailed how dominant agents utilize both short and long power feedback loops. Through the former route, agents have directly promoted activities that primarily benefit themselves without recurring to institutional entrepreneurship, i.e., without attempting to change the existing institutional setting. That has included agribusiness' unilateral use of material capabilities—or of "power to"—to expand over others the agri-food-biomass systems it controls. Similarly, the direct actions or infrastructural warfare (e.g., land invasions, destruction of crop fields, buildings, or other property) of either agribusiness or peasant movements undermine each other's strength and thereby the impacts created by their activities (see Chap. 5; see also Russo Lopes and Bastos Lima 2020). Meanwhile, long feedback loops, through the institutional setup, have also been extensively present in the emerging bioeconomy governance. They involve various forms of institutional entrepreneurship and policy advocacy (e.g., producing public incentives for the preferred forms

of biofuel production). Long feedback loops also work through discursive strategies to sway public opinion and retain governmental support in democracies, such as framing the expansion of large-scale feedstock monocultures as serving national interests.

The conclusion is that prevailing institutions not only reflect the preferences and policy beliefs of dominant actors. They also create a self-reinforcing system involving inequitable distribution, uneven power relations, and biased institutions designed to perpetuate such inequity *ad aeternum*. At least until external factors or transformative innovations break the loops. However, these transformative institutional innovations have been scarce in bioeconomy value webs, as the sector so far has concerned itself mostly with technical improvements (Sanz-Hernández et al. 2019).

In the emerging economies analyzed, the multi-layered explanation of why unsustainable biofuel production patterns have prevailed can thus be synthesized as the following. The main culprit has been domestic public policies underpinned by two fundamental biases: (i) a bias towards urban-centered development, and (ii) norms that fail to account for social equity or environmental concerns other than climate change mitigation and wild biodiversity conservation. In turn, these institutions result from the superior agency of powerful private actors (notably agribusiness) who benefit from the status quo and from the dominance of state actors who prioritize (international) equalizing development over domestic equity promotion or environmental protection. This prioritization should not be simplistically regarded as the pursuit of economic growth or "development." Rather, it emerges from clusters of economic and political ambitions of historically disadvantaged countries in an unequal international context. These ambitions also include promoting endogenous technological innovation, reducing vulnerability to price shocks and undue foreign control, and gaining greater geopolitical influence. However, for that, states have frequently depended on private agribusiness to provide financial, technological, and production capacity to attain those goals. Thus, biofuel production in emerging economies helps bridge the gap that separates them from developed countries, but unsustainably and with a great deal of elite capture. Without intervention, this is likely to remain unchanged in any further bioeconomy development.

9.2.7 Implications for Bioeconomy Promotion

Bioeconomy strategies are likely to become increasingly prevalent. While biofuels may be just a stepping-stone towards more advanced renewable energy technologies, a transition towards multipurpose agriculture and the development of biomass-based industrial sectors arguably are here to stay (Bastos Lima 2018). Biofuel policies and production, therefore, are all the more critical as they establish the basis and create path dependencies for all future bioeconomy development.

The experience with biofuels shows that not only environmental change but also the strategies devised to address this change produce unequal outcomes with clear

winners and losers. This ongoing experience already offers both technical and political lessons. The technical lesson is that, without explicitly incorporating social equity requirements and multiple environmental criteria, labeling development initiatives as "green" or as part of a bioeconomy is likely to give undue legitimacy and thrust to unsustainable practices. The main risk is to overemphasize the issue that helps drive the "green" strategy (as climate change has done to biofuel production or marine pollution could do for bioplastics) and overlook all the rest. This risk also exists in other forms of renewable energy promotion, frequently assumed to be automatically sustainable. Social dimensions are particularly vulnerable because economic inclusion without political participation is likely to be on terms that favor the stronger actors who set the agenda. As the focus has been on absolute standards (i.e., poverty reduction or eradication) rather than relative ones (i.e., equity), inequitable power and economic relations can remain unaddressed or may even be fostered.

The political lesson is that the predominance of such a biotechnology-centered, conservative ecological modernization disproportionally benefits some actors while marginalizing alternative sustainable development views. As such, it should not be regarded uncritically as something politically neutral. However marketed as driven by altruistic interests in poverty reduction, global development or the environment, large-scale biofuel production has been promoted mainly by actors who economically and politically benefit from it. While promoting that reformist approach of conservative ecological modernization, these actors have limited the expression of more radical views by either co-opting or robbing weaker actors of their material *and conceptual* means of staking claims and advocating for alternatives. That includes access to natural resources and public finances as much as "tamed" interpretations of initially critical concepts such as social inclusion, empowerment, and participation.

Without a change of course, the promotion of a bioeconomy is likely to exacerbate social and political inequities. From an environmental perspective, purported "solutions" might turn out worse than the problems they aim to solve. The way ahead does not require rejecting the bioeconomy per se but how it has been promoted, without taking social equity and political dimensions into account. Only by integrating these dimensions can governance institutions be redesigned to promote full-fledged, socially transformative sustainable development.

9.3 Promoting a Fairer Bioeconomy

9.3.1 Better Institutions for Sustainable Bioeconomies

Institutional redesign can substantially improve the sustainability of biofuel production and other emerging bioeconomy sectors. It requires shifting policy incentive

patterns *and* the underlying norms that have shaped the development paths considered (see Finnemore and Sikkink 2001). This section starts with general recommendations for sustainable bioeconomies, then it narrows down to rural and agricultural contexts, and finally to biofuels specifically.

First, to improve equity in governance and production processes, sustainable development theory may need to express its social requirements more clearly. That might be particularly key for emerging bioeconomy sectors, which have sustainability at heart almost by definition. The concepts of allocation and access offer a useful analytical framework, but clear normative principles are also needed. Such principles are particularly necessary for allocation, as access (in its absolute terms, i.e., as minimum standards) already counts on a human rights framework that is widely accepted (even if insufficiently implemented). In contrast, there are no such widely embraced principles on tackling inequality, except through taxation of the rich and subsidies for the poor—and still facing widespread resistance in low- and high-income countries alike. Globally, official development assistance tries to deal with some inequality elements, but it is far from sufficiently addressing the problem.

Therefore, as argued in Chap. 3, Rawls' (1971) principles of difference and redress—stating that inequalities are only acceptable when to benefit disadvantaged ones and that undeserved inequalities invite redressing—could well serve to underscore sustainability policy. In practice, this also requires changing the prevailing norm of seeking economic without political inclusion and limiting empowerment to economic empowerment (i.e., poverty reduction). For in their political senses, inclusion and participation require gaining a measure of *control* over resources and governance institutions from which actors were previously excluded (Stiefel and Wolfe 1994, p. 5; Cornwall and Brock 2005; Cook et al. 2012; UNRISD 2016). Likewise, empowerment requires reconfiguring power relations to reduce vulnerabilities and inequities (Zimmerman 2000; Cornwall and Brock 2005; McEwan and Bek 2006; Cook et al. 2012; UNRISD 2016). That means including weaker actors in agenda-setting and decision-making positions, realizing they have particular preferences, worldviews, value systems, and a right to self-determination. Participation would thus empower them to improve control over the resources on which their livelihoods depend. Similarly, it would enable them to pursue their preferred development paths and "varieties of environmentalism" (Guha and Martínez-Alier 2000) rather than adopt and follow alien approaches based on others' norms and interests. This application of Rawls' principles at the political level to redress historical political disempowerment can, in turn, lead to the embodiment of equity also at the economic level through production systems that genuinely benefit the poor.

Besides incorporating such equity considerations, more sustainable outcomes would also require that bioeconomy policies broaden their considerations of environmental issues. Issues such as agrobiodiversity, soil degradation, and impacts on the nitrogen cycle have been comparatively overlooked in mainstream sustainable development parlance and policy-making. That has led to unsustainable energy and agricultural production that, nevertheless, gets labeled as "green" or environmentally sound solely based on being renewable and because of their anticipated (but not

always confirmed) climate benefits. It should be clear that "renewable" is not necessarily a synonym for "sustainable." Environmental assessments and green profiling need to take multiple criteria into account, such as perhaps the whole set of "planetary boundaries" (Rockström et al. 2009)—or of the "planetary doughnut," inclusive of social issues (Raworth 2017)—rather than seeking legitimacy based only on one or two indicators. The UN Sustainable Development Goals have tried to represent this plurality of concerns to be regarded even if they, too, have been markedly vulnerable to cherry-picking by actors who then claim to be addressing the whole of sustainability (Siegel and Bastos Lima 2020).

In the specific case of agriculture, it is crucial to shift its current productivist orientation and the prevailing urban bias. It is well-known that sustainability requires a transition from input-intensive monocultures towards agroecology and mixed farming, potentially building upon indigenous and peasant systems (Tilman et al. 2002; IAASTD 2009; Altieri and Toledo 2011; Horlings and Marsden 2011). More recently, the global assessment report by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services has made vividly evident the need for transformative change in agriculture (IPBES 2019). Furthermore, sustainable rural development requires that rural areas be developed not as corporate-controlled resource pools drained for urban consumption but as living places with decent employment, infrastructure, and access to services. That requires enhancing both physical and institutional capacities in rural communities. It means expanding the focus from productivity gains to promoting local value-added and various forms of environmentally sound rural industrialization. Effective bioeconomy strategies can lift smallholders from the condition of mere raw material providers and also improve non-agricultural jobs in the countryside, which already constitute relevant income sources but are frequently sub-standard (Renkow 2000). In parallel, farmer cooperatives can provide the necessary institutional and local organizational capacity, facilitating knowledge sharing, collective bargaining with government and private actors, and political agency. Such an inclusive and equitable bioeconomy agenda could significantly contribute to promoting sustainable food security and healthy communities in the countryside (see Bastos Lima 2008).

States have vital roles to play—and democratic duties to fulfill—financing and supporting that transition. However, their willingness and capacity are both limited. Emerging economies, in particular, will hardly let go of their aspirations to equalize with highly industrialized countries. To meet sustainability demands without compromising production capacity and trade, the transition could be gradual and first reduce large-scale agricultural production's negative impacts. Private certification systems seek that, but to work at scale and have greater effectiveness such requirements would need to be turned into public policy and become conditions for incentives (Lambin et al. 2018). Still, developing states often depend on (frequently foreign) private agribusiness's material capabilities, and the latter is unlikely to foster alternative agricultural systems that empower small farmers (Bastos Lima and Persson 2020). That is particularly the case for value-adding technologies. Therefore, a way forward would be to increase investments in publicly owned technologies—as has been done to protect other public goods such as healthcare. As such, agribusiness dominance

may be checkered for the public interest in the same way done to big pharmaceutical companies by developing generic drugs—approaches that emerging economies such as India and Brazil are very familiar with (see Brezis 2008).

9.3.2 *Policy Lessons for Sustainable Agri-Food-Biomass Systems*

The bioeconomy offers a significant opportunity to promote sustainable rural development. That, however, requires shifting policy incentives away from corporate-controlled feedstock monocultures and towards diverse agri-food-biomass systems. Ideally, such systems should be based on agroecology and equitable allocation of rights, roles, benefits and burdens that favor disadvantaged actors such as rural communities. In practice, that requires: (i) organizational support and the political inclusion of smallholders in bioeconomy value-web governance to ensure due representation of their views and preferences; (ii) mixing food and feedstock cultivation for greater agroecological and economic diversification, as well as to safeguard local food security; (iii) locally controlled value-added, such as local ethanol distilling, vegetable oil extraction, and biofuel or bioproduct manufacturing, to promote technological development and distribute benefits more equitably. Value-added processing would give farmers higher revenues and leave them with co-products (e.g., oilseed cake, glycerin) that can be used locally or sold in other markets. In time, this could be complemented with new bio-based downstream industries to increase the bioeconomy's benefits even further.

Such goals require public financial, technological, and logistical support. As biofuel and other biomass production systems already rely heavily on public policies, it becomes a matter of tuning such incentives. For one, public R&D could diversify from its nearly exclusive focus on agribusiness crops for large-scale production and also develop suitable technologies for small-scale farmers. In turn, extension services could complement science with traditional knowledge rather than continuously attempt to replace it in a quasi-missionary fashion. Economic incentives could become conditional on meeting specific social and environmental standards based on equitable smallholder inclusion and agroecological indicators (e.g., local capacity enhancement, income generation, water conservation, nutrient cycling).

Furthermore, decentralized biofuel production systems may deserve more exploration. They include small-scale manufacturing for local fuel consumption and collectively owned biofuel industries to feed into the market. Joint, collaborative ownership and control are not unusual to farming sectors in developed countries. Such endeavors would not necessarily require direct subsidies, but they certainly demand credit to cooperatives, technical support for meeting fuel quality standards, and public investments in infrastructure. Similar arrangements can exist for other bioproducts, too. However, sustainable bioeconomy value webs anchored on agri-food-biomass systems need careful design and sufficient experimentation with feedstock crops

before promoting them commercially to smallholders to avoid exposing the latter to unnecessary risks.

Agency to achieve such policy changes will invariably depend on the opportunity structures of each context. Nevertheless, a rule of thumb is that critics of mainstream biofuel production are unlikely to succeed without offering alternative ways of providing for renewable energy and rural development needs. Ideally, such actors should conceive, test, and replicate ideas and designs for sustainable bioeconomy value webs. For that, they need to form coalitions and seek resource complementarity with other like-minded actors. Contender coalitions must carefully shop for the best venues available and exploit windows of opportunity—both regular political opportunities and fortuitous events—which may give them additional visibility (Huitema et al. 2011).

9.3.3 Improving International Bioeconomy Governance

Biofuels are *not* a case of non-governance (Bastos Lima and Gupta 2013). A fledgling bioeconomy governance therefore exists. However, the absence of a regime and the narrow treatment of such products purely as economic goods have left a large governance vacuum that can be problematic in the face of the severe social and environmental issues at stake. Despite extensive lip service paid to sustainability issues, these have, in reality, all been left to the market or individual countries to resolve—however limited their capacity may be. That may prove dangerous because it does not account for the global impacts of domestic biofuel policies. As argued in Chap. 4, food-insecure countries can do little if bioeconomy policies from major agricultural producers affect international food prices (see Clapp 2009). Other global environmental impacts, such as the cumulative effects of land-use change, may need greater governance attention (see Rockström et al. 2009). At the same time, addressing sustainability issues unilaterally as the EU has tried to do seems paternalistic and biased towards European priorities. Arguably, such extraterritorial control is also unfair to those who are affected but have no say in the drafting of sustainability policy (Bastos Lima and Gupta 2014).

Still, as argued earlier in this chapter, a multilateral biofuels regime is unlikely to be formed any time soon. As such, rather than attempt to detain the inevitable transition towards multipurpose agriculture and the bioeconomy, governance efforts may be more effective—and find higher political viability—focusing on *adaptation* measures that address the vulnerability of poorer countries. Adaptation is vital not only in the face of ecological changes but also of the socio-economic changes underway (in this case, possibly higher agricultural commodity prices). Non-staple cash crops such as coffee, cocoa, cotton, or flowers have long diverted resources away from food production without being vilified for that. Instead, and especially given that most of the world's poor live in rural areas, governance attention seems much more needed on promoting sustainable bioeconomy systems. In this sense, for the sake of greater resilience, too, it is critical to promote agri-food-biomass systems that reduce rather

than augment smallholders' exposure to price fluctuations (see Clapp and Moseley 2021).

9.4 Avenues for Further Research

Although this book has globally appraised the phenomenon of biofuels expansion as the most advanced proxy for the bioeconomy, its in-depth analysis has focused principally on emerging economies. Further research may use this analytical framework to assess how biofuel or bioeconomy politics has varied in highly industrialized countries or less developed countries. That would give information on those particular contexts and help point out differences and similarities between these country groups—offering an up-to-date understanding of the current global context beyond simple North-South bipolarity.

Further research could also expand the scope of socio-political analysis to next-generation biofuels and other novel bioproducts such as bioplastics. So far, these newer products have been assessed mostly in technical terms and, to a lesser extent, ecological and economic ones. However, their expansion requires research on what related institutions are emerging, the agents behind their promotion, and the impacts of their eventual large-scale uptake on allocation and access. These sectors can be examined within themselves and in terms of the socio-political feasibility and implications of a broader bioeconomy transition.

Lastly, there is a clear need for more research on the socio-political dimensions of sustainable development governance. The spread of a sustainability paradigm and bioeconomy promotion makes that need even more urgent, as a focus limited only to technical "solutions" might create worse cures than the diseases they aim to address. It is critical to know who controls those cures. In other words: who owns, does, and gets what in each of the various emerging "green" sectors within the bioeconomy and beyond.

9.5 Final Considerations

Although biofuels and the bioeconomy offer significant sustainable development opportunities, this book has argued that the agenda has been "locked" by dominant state and agribusiness actors down on an unsustainable path. It has shown that allocation and access issues cannot be dissociated from agency and governance architectures, for those issues feed back into agency and architectures, and significantly influence them. Therefore, any development approach—irrespective of labels such as "green" or "sustainable"—must also be understood as a political project. Pretended political neutrality silently maintains the status quo by reducing critical concepts such as participation and empowerment to a purely economic sense and sustainability to superficial technocratic refurbishing. In truth, dominant coalitions are hesitant to

cede political power to subordinate actors, fearing losing their privileged positions and control over the agenda. That fear is justified, for other actors would indeed do things differently.

However, the global expansion of biofuels may have made "disguised unsustainability" stretch too far. By aggravating mainstream agriculture's negative social and environmental impacts, biofuel policies have helped highlight giant elephants in the room. There is no reason why the more substantial scrutiny dispensed to feedstock crops should be limited to these markets and not extended to other agricultural sectors—or even to the same crops when used for other purposes. Biofuels and the bioeconomy thus offer a window of opportunity for a ripple effect towards greater sustainability. The cure may turn out not worse than the disease but reveal larger problems that need addressing—a wake-up call. All this, therefore, may be just the start.

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