Introduction

At the most recent meeting of G7 countries, the leaders of some of the most powerful economies in the world agreed to “decarbonize” the global economy by 2100. Following in the footsteps of nascent initiatives at the national, regional and international levels, this was an additional signal that the search will be ongoing over the coming decades to find an alternative to fossil fuels as a source of energy. There are many contenders, but there is no certainty as to which will emerge as the new dominant energy source.

The biofuel sector was early “out of the gate” in the race for a renewable substitute to fossil fuels, but the growth of this sector, as has been the case for competing alternatives, has raised a number of concerns and questions. The IUCN Academy of Environmental Law, a network of close to 200 law schools around the world that pursue teaching and research in environmental law, took note, early on in its existence, of the simultaneous as well as accelerating development of policies and laws in various countries on the topic. Given the dearth of law and governance analysis of biofuels policies, the Academy, with the generous financial support of the Law Foundation of Ontario and the University of Ottawa, organized a number of workshops over the years that have allowed it to identify experts in the area and to facilitate exchanges between them. This book is a direct result of these efforts as experts from around the world take an in-depth look at the challenges and opportunities emerging as the biofuels sector expands. The chapters consider the role of policies and laws, as support for, and control over, this sector. As analysis of policies and laws cuts across many disciplines, the editors invited contributions by experts from many different fields.

The contributions are wide-ranging, in terms of themes and geography. The regulatory regimes of many of the key biofuel-producing countries are covered, such as Brazil, China and the United States. The EU regime is also examined given its importance both in terms of market size and its detailed normative content. The book also covers emerging markets in Africa, as well as in other countries in South America and Asia. While a good number of the contributions highlight the legislative and regulatory measures adopted in these countries and regions, attention is also given to the norms adopted by, and the conduct of, key private actors.

The topics are organized around three themes: : (I) Sustainability and Biofuels; (II) Critical Review of Regulatory Regimes for Biofuels; and (III) Biofuels Governance and the Roles of Public and Private Actors. However, as the reader will quickly realize, these themes are interdependent so that many of the contributors to the volume, while focusing on one theme, also address the other two.

PART I SUSTAINABILITY AND BIOFUELS

Chapter 1, “Environmental risks and opportunities of biofuels”, by Annette Cowie, Alan Cowie, Sampo Soimakallio and Miguel Brandão, provides information and analysis that are key to a good understanding of all subsequent chapters. The authors explain the terminology of “biofuel generations”, which relates to the feedstock, and technology employed in converting it to biofuel products. They consider both the environmental concerns that have been raised, and the positive environmental benefits that could result from these various systems. Many past publications have focused mostly on direct greenhouse gas (GHG) emissions from the production system. In this chapter a life cycle approach is promoted in which upstream, downstream and indirect emissions are also included, such as emissions from indirect land use changes, and effects on soil and water resources. Impacts on air quality and on biodiversity are considered. Various strategies are put forward to manage risks and minimize negative impacts. The authors conclude that there is considerable promise from sustainably managed biofuel systems that can reduce greenhouse gas emissions and contribute other ecosystem services.

In Chapter 2, “The roles of public and private governance in promoting sustainable bioenergy”, Oskar Englund and Göran Berndes report and discuss findings from a study of a number of countries’ capacity to guarantee sustainable production of bioenergy as prescribed in the regime adopted by the European Union. Thirteen countries in Africa, Asia and Latin America were selected. Legislative texts were assessed to determine how they relate to the main concerns about bioenergy raised in the EU Renewable Energy Directive (RED). In addition, these countries’ enforcement capacities are assessed. These findings provide insights that will benefit governance processes and activities concerned with increasing the positive benefits and reducing the negative impacts of bioenergy. In particular, the authors note that effective governance involves multiple processes calling on public as well as private organizations and the development and implementation of both formal and informal institutional frameworks. The argument that systemic public/private

governance will be essential for effective policy emerges in a number of chapters in this book, suggesting some fundamental challenges for traditional institutions.

Biofuel projects have been associated with production regimes that endeavour to integrate marginalized populations, including indigenous farmers who continue to practise traditional forms of agriculture. However, many observers in the “Global South” perceive these initiatives as a continuation of colonial legacies that policy elites have codified. In their view, this results too often in perverse governance regimes that undermine more environmentally sustainable traditional agriculture in exchange for monoculture plantations of biofuel feedstock. Based on a case study in the Philippines, the chapter by Marvin Joseph F. Montefrio, “Confronting the ‘unproductive’ upland discourses in biofuels development in the Philippines”, not only underscores the governance challenges brought about by discourses about “unproductive” land, but also examines what improvements in the biofuels governance regimes might address these challenges. These recommended changes ultimately aim to balance the dominant discourses of policy elites with the weak smallholder discourses on the ground.

PART II CRITICAL REVIEW OF REGULATORY REGIMES FOR BIOFUELS

This part explores the regimes put in place at the national and regional levels to regulate biofuels. The first chapter focuses on the country that is perceived as the real pioneer in the rise of biofuels: Brazil. In Chapter 4, “Biofuels’ legal and political framework in Brazil: a critical review through a sustainable development lens”, Priscila Periera de Andrade differentiates past and recent policy developments to promote ethanol and biodiesel production and use. She analyses, through a sustainable development lens, the variety of instruments deployed in laws, decrees, regulations, resolutions and institutional mandates. She argues that since sustainable development in the Brazilian biofuel industry is a recently identified challenge, it is perceived differently for the ethanol and biodiesel industries. The lack of a legal and political framework to stimulate second-generation (lignocellulosic) biofuels, which certainly are more sustainable from both an environmental and social perspective, is also addressed. In her view, despite having one of the most advanced legal and political frameworks regulating biofuels, Brazil needs to take additional measures if it wants to maintain its current leadership position and do so in a sustainable manner.

Chapter 5, “United States law and policy and the biofuel industry”, by Kristina S. Dahmann, Lara B. Fowler and Paul M. Smith, considers the biofuel policy environment in the United States. It recalls and comments on the development of US biofuels laws and policies at the federal and state levels over the last half century. It also targets the most current and most active federal and state biofuels policy developments, and addresses the role that biofuels might play in the aviation industry.

The growth of the biofuels industry was supported in the United States by the adoption of the Renewable Fuels Standard (RFS). However, the implementation of the RFS has not gone smoothly, as explained by Melissa Powers in Chapter 6, aptly titled, “Lessons from US biofuels policy: the Renewable Fuels Standard’s rocky ride”. Oil companies have pushed back against blending increasing quantities of ethanol into their fuels as overall US fuel consumption has declined – due, in part, to other federal policies that mandate vehicle efficiency. Moreover, although the RFS requires increased production of advanced, low-carbon biofuels, biofuel producers have struggled to meet the RFS targets. Likewise, it appears that the RFS has not yet achieved its GHG emissions reductions goals. This chapter explores the implementation of the RFS, whether it can incentivize development of advanced biofuels, and whether it will meet its low-carbon goals.

The EU, over the years, has developed one of the most comprehensive regulatory regimes regarding biofuels. Anita Rønne and Birgitte Egelund Olsen, in Chapter 7, “The EU legal regime for biofuels”, have taken on the complex task of examining the EU approach and, on the basis of the existing regime, of analysing its constraints and opportunities to reach the EU objective of a sustainable reduction of GHG emissions. The contribution of biofuels towards this objective has been expected to be significant, and therefore biofuels have been the policy focus in the EU since the mandatory targets for renewable energy in the EU transport sector were adopted in 2009. This chapter first introduces the EU policy for biofuels, which forms part of the comprehensive EU Climate and Energy Package. This is followed by a comprehensive examination of the current legal regime for biofuels in the EU. The authors raise many important issues, including sustainability requirements, the efficiency of the control system, the relevance of co-regulation by public and private actors and the compatibility of the regime with WTO law.

While in the previous chapter the authors broadly address the issues of compatibility between the EU biofuels regime and WTO law, in Chapter 8, “Belgian and French biofuel support measures in light of Argentina’s challenge under the WTO Subsidies Agreement”, Alexandre Genest focuses on recent cases where aspects of this regime

were challenged by other states. One of the interesting questions raised by these cases relates to the sustainable development criteria adopted by the EU.

China, as in many other energy sectors, is fast positioning itself as one of the most important producers and consumers of biofuels, and this in just a few short years. In Chapter 9, “The current legal framework on biofuels in China”, Lei Guo and Frank Maes summarize relevant biofuel legislation and policy, identify problems and suggest opportunities for reform. In their view, China has to adopt a long-term biofuel development strategy that gives more weight to environmental and social impacts and that facilitates better enforcement.

The promotion of biofuels as renewable energy and a sound substitute for, or complement to, fossil fuels is a global trend embraced by a number of Andean countries (Bolivia, Columbia, Ecuador and Peru). Since 2000, the industry in that region has reached significant production milestones as a result of laws and policies adopted by national governments. Environmental goals and standards, however, remain uncertain or lack a clear regulatory framework. In Chapter 10, “Biofuel policy in Colombia: strong fiscal incentives but weak environmental and social standards”, Victor M. Tafur considers the evolution of policies and legislation in Columbia on the supply-promotion side of the biofuels industry from 2000 to today, as well as the environmental policies and regulations aimed at promoting an environmentally sustainable path.

In some regions of Africa, the regulatory landscape for agrofuel use and production is quietly nascent. This is the case of East Africa. In his chapter on this region, “Agrofuel law and policy in East Africa: assessing avenues for sustainability”, Robert Omondi Owino examines agrofuel legal and policy regimes in some countries in that region to underscore sustainability challenges arising from weak or absent law and policy. By surveying agrofuel sustainability trends globally, the author explores options for well-thought-out internal sustainability criteria in these countries rather than reliance on “imported” sustainability criteria which bear little connection to national contexts.

Odile Juliette Lim Tung looks at another region of Africa, South Africa, in Chapter 12, “Biofuels, GMOs and food security: the South African legal and policy framework”. In that country biofuels production as alternative transport fuels has been identified as part of the renewable energy package. She considers the various initiatives taken to develop the biofuels industry in order to make it financially attractive. She focuses on the challenges that will result from the anticipated expansion of soya crops, 80% of which is genetically modified (GM), and which is likely to be the crop of choice for biofuels production. What will the likely environmental and

socio-economic implications of the use of “first generation” and “second generation” GM crops be? What regulatory changes are needed to anticipate and avoid the negative consequences from such a choice? These are some of the questions explored in this chapter.

PART III BIOFUELS GOVERNANCE AND THE ROLES OF PUBLIC AND PRIVATE ACTORS

In the first chapter focusing on governance issues, “Unpacking the complexities of biofuel policy”, Paul Martin and Elodie Le Gal, using the regulation of invasive plants potentially associated with biofuels, explain why natural resource governance law needs to be re-imagined to be more creative and cost-effective. It suggests the need for some caution as well as innovation in designing national governance arrangements, and reinforces the necessity, raised in earlier chapters, of engaging industry in the co-development and implementation of biofuel governance. The chapter highlights that biofuel governance is representative of a relatively new class of eco-social challenges for which traditional public governance regimes are ill-suited.

Governments have invested heavily in the biofuels industry for a number of reasons, including environmental concerns, rural economic development and energy security. In Chapter 14, “Trends in government incentives for biofuels”, Warren E. Mabee, Lauren D. Malo and Ashton R. Taylor compare the approach taken by Canada and the United States to develop agricultural biofuels. A review of policy shows that growth in these countries throughout the 2000s, particularly in the ethanol industry, relied heavily on synergistic policies. They warn that the recent removal of producer incentives in both countries has probably slowed development of advanced biofuels which potentially have lower GHG emissions and less impact on food supplies.

In Chapter 15, “An industry perspective: government policies to accelerate the development and commercialization of advanced biofuels in Canada”, Marie-Hélène Labrie assesses, from a private sector point of view, what types of government incentives have enabled Canada to become one of the leaders in the biofuels industry. In particular, she notes that policy measures that maximize the economic value of renewable fuels by monetizing reduced carbon emissions should be considered.

As Jeremy de Beer points out in Chapter 16, “Network governance of biofuels”, the development of the biofuels industry and its future will be shaped by the connections within a multi-level, networked governance

system. He surveys some of the key elements within this complex system, including domestic laws and policies, private intellectual property rights and international trade rules. This partly mirrors the arguments made in the first chapter in this section of the book, and is picked up in the following chapter.

Maha Mansoor, Inge Stupak and Tat Smith turn the lens on the role of private actors in the last chapter, “Private regulation in the bioenergy sector”. They provide an overview of the types of private regulation that have been developed to demonstrate compliance with various bioenergy sustainability criteria, and discuss their potential benefits and challenges. They also discuss the possible interaction between private and public regulation mechanisms, and how private regulation can contribute to ensuring that bioenergy deployment potential is realized sustainably at scales that will contribute significantly to reducing GHG emissions globally.

This chapter is a fitting end to a volume that, throughout, has explicitly or implicitly signalled the importance of the role of both public and private actors in the development of the biofuels industry. Effective governance is required to ensure that biofuels deliver net benefits, that trade-offs are well understood, and that biomass and land resources are used wisely. The nature of the relationship between public and private actors in the future will determine whether this new source of energy is a key element of the long-term solution humanity is seeking in order to satisfy its energy needs.

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