Institutional change and socioenvironmental governance: the emergence of a biofuels international market

Bruno Benzaquen Perosa, PhD Candidate EESP-FGV
Paulo Furquim de Azevedo, Professor EESP-FGV

Abstract:

This paper seeks to investigate the emergence of market institutions related to socioenvironmental requirements of biofuels production. In particular, the paper explores the relations between public regulations and private certifications emerging on the biofuel market.

The paper presents an analytical framework based on the institutional theory and applies it to investigate the experience of an analogous sector, the forest industry. Our fidings suggest that the institutional path of socioenvironmental governance mechanisms depends on each country configuration (local regulation), the industry profile (concentration and coordination capacity) and interactions between private and public standards.

On the biofuels sector, the two main consumption markets (EU and US) are taking different paths to regulate biofuels sustainability, indicating that different preferences as well as diverse political configuration are affecting the construction of the governance framework. Private certification mechanisms under development for biofuels (e.g. Roundtable for Sustainable Biofuels and Bonsucro) may interact with each other and with national regulation (cross-fertilization). The integration of public and private governance mechanisms seems to be a trend on biofuels governance development.

Keywords: *biofuels, institutional change, socioenvironmental regulation, private certification*

1. Introduction

The impacts of human activities on the environment are each day more visible. As a consequence, demand for sustainability has moved from a niche market to a claim of societies, in particular of those more affluent. These changes profoundly affected environmental regulation, as can be easily observed when comparing governance and control mechanisms available now and 30 years ago.

Among the transformations observed, a fundamental change refers to the transference of regulatory activities from public to private actors. The so-called “private governance mechanisms”

are getting more representative on many economic sectors like organic food and forest/timber activities. Socioenvironmental certification can be pointed as the main instrument to ensure sustainability of these products to consumers and even to governmental agencies, reducing the costs of traditional regulatory mechanisms. The speed and broadness of the certifications development raise questions related to the institutional configurations that made the emergence and development of these mechanisms possible.

Many characteristics of the emergence and development of new forms of governance can be characterized using an institutional perspective. Some characteristics of socioenvironmental governance allow us to classify them as institutions. Firstly, they are formed by a set of formal norms, routines and informal procedures. Secondly, these governance mechanisms have an organization coordinating it and enforcement mechanisms to guarantee its application. Finally, it generates a set of beliefs on the actors involved about how these norms will be applied and complied by individuals and organizations.

The main objective of this paper is to analyze the institutional environment influencing the emergence of private transnational governance mechanisms, as well as the way this new institutional forms overlaps with traditional regulatory instruments. This research departs from the assumption that the understanding of these interrelations is crucial to explain the determinants of changes in socioenvironmental governance and its influence on the emergence of the biofuels market institutions.

Following a methodological tradition on institutional economics literature (North, 1990; Hodgson, 1998), this research will adopt a historical-institutional approach. This methodology seeks to develop a multi-level analysis of institutions, integrating historic analysis with a broader set of theories to explain specific social phenomena. The structure of this paper is as follows. Firstly, will be presented a review of theories related to new and original institutional economics as well as some sociological economics approaches related to institutional emergence and change. This survey aims to build a theoretical framework in order to analyze the historic changes that will be presented in the next sessions. Session 3 will bring a historic analysis of the transformation taking place on socioenvironmental governance and regulation in the last five decades, with special focus on the institutional changes. Session 4 presents a case study, analyzing the institutional conditions affecting the development of private governance on the forest/timber sector. Session 5 will apply the institutional framework and historic experiences presented to analyze the development of market institutions on the biofuels sector. Session 6 concludes.

2. An Institutional Perspective to Socioenvironmental Governance

2.1 Theories of Institutional Change

One of the main challenges faced by social sciences is related to the determinants of institutional emergence and change. The institutional theory has analyzed this phenomenon by diverse lens, considering both political and functional elements affecting the choice of prevalent institutions. According to Kingston (2009), two basic traditions can be identified on the literature analyzing the process of institutional emergence and change. For a first branch, collective action/choice, the institutional changes are the result of coordinated actions from interest groups aiming to change rules in their favor. On this perspective, the process of institutional change would be firstly caused by changes in exogenous parameters affecting the gains of certain actors (Libecap, 1989). The path and speed of institutional transformations would depend on the capacity of the actors affected by these parameters' changes (winners and losers) to mobilize political resources.

Ostrom (2005) proposes an analytical framework considering four institutional layers, in which are established the "rules of the game" for negotiation in the inferior layers: 1) Meta-constitutional rules; 2) Constitutional rules; 3) Collective choice rules; 4) Operational rules. Ostrom considers the "superior" layers as fixed at the moment negotiations take place in the "inferior" arenas. Taking these rules as constraints, actors evaluate costs and benefits of changes in order to decide if mobilizing political resources are worthwhile. The need of coalitions to make changes possible would also depend of superior rules (e.g. a dictatorship - in opposition to a democracy - does not demand big efforts to implement a political change). Ostrom (2005) also emphasized that institutional mutations are originally caused by changes in exogenous parameters, for instance a technological innovation or the end of a natural resource.

Even though this perspective brings important instruments to understand institutional changes in many political processes, the collective choice school presents some caveats to analyze informal institutions, such as social conventions and its effect on the emergence and change of formal institutions. The main limitation of rational choice approach refers to incapacity of accessing the influences of informal institutions on the emergence and stability of formal rules, which are mainly analyzed as the result of a political game.

These effects are emphasized on the second branch pointed by Kingston (2009): the evolutionary theory. On this perspective, the emergence and change of institutions are the result of a decentralized process of competition between alternative institutional configurations, in which social actors have none or very reduced influence. The main idea behind this process is based on Darwin's biological evolution theory, using concepts like variation (source of change), selection (survival) and heritage (process by which "victorious" characteristics are preserved).

Authors from the Austrian School of Economics such as Hayek and important theorists from the Original Institutional Economics literature, like Veblen and Knight, are pointed as founding

fathers of this evolutionary theory of institutions. The main difference of this perspective is related to the process by which the institutions are selected to emerge. Since these authors do not consider the existence of external parameters (or superior layers like proposed by Ostrom) or mechanisms to coordinate the perceptions of actors about changes on the current rules, the process of selection becomes totally decentralized. The new rules and standards come up from the uncoordinated choices of many actors leading to equilibrium.

Hayek (1973) develops his analysis considering the process of institutional change on the social group level. Some institutions would evolve depending on the influence of the group practicing them. For Hayek, institutions are the result of a natural equilibrium and the shared beliefs and expectations about these institutions would be the basic source of order in societies. Regulations and other forms of governmental interventions would divert society from its natural equilibrium.

Veblen (1989) considers institutions as habits of thought used by agents facing bounded rationality to reduce the need of cognitive effort. The institutional emergence is the result of a process of selection and competition between habits of thought, winning the ones better satisfying the needs of society. Technological and demographic changes could alter equilibrium, making existent habits of thought incompatible with the new scenario. This would generate a new selection of new routines that would overcome the previous. Even considering this process of "institutional substitution", Veblen emphasizes that past habits of thought have deep influence on the ones that wins the selection process, what create an institutional dependence over time.

If, on the one hand, evolutionary perspective of institutional change considers the importance of informal institutions much more effectively than collective choice branch, on the other hand, the evolutionary approach neglects the role played by interest groups and collective action on the political process. These differences and complementarities have driven the development of new institutional theories, considering a broader set of factors. These new theories seek to explore the overlaps of spontaneous and coordinated process of emergence, persistence and change of institutions.

Although being usually identified as one of the fathers of collective choice school, North (1990) reckons the limits of this approach and presents a theoretical model that takes into account the influence of informal institutions on changing formal rules. Regardless of classifying these changes in formal institutions primarily as a collective action phenomenon, North emphasizes that the incentives for this coordinated action may originate from changes in endogenous variables, such as learning and expectations on norms enforcement. According to this author, informal institutions are an extension of formal rules that have evolved through a slow evolutionary process, on which social actors have low influence. As a consequence, informal institutions can restring formal

changes that are not compatible with social and cultural norms. It reduces the chances of revolutionary institutional changes since future institutions would be restrained by norms and beliefs from the past, leading to an institutional path dependence.

The path dependence would be a mechanism of institutional persistence caused by frictions between social or cultural norms formed on individual and organizational level and new institutions that are not compatible with these ideologies and beliefs. These frictions could lead to unexpected equilibrium and the new institutions can take a totally adverse path than planned by its proponents. Under bounded rationality conditions, this process could explain the emergence and persistence of inefficient institutions.

More recently other authors have explored more intensively the idea of institutions as equilibrium path. Aoki (2001) and Greif (2006) seek to explain institutional change and persistence using more formal modeling based on game theory analysis. Considering institutions as stable equilibriums, these authors analyze the actor's strategies in games under bounded rationality and information asymmetry.

Aoki (2001) defines institutions as a stable system of beliefs shared by individuals of a group or organization considering the expectations of others individuals' behavior. Institutions constitute the set of rules, beliefs and norms generating regularity on social behavior (Greif, 2006). On this perspective, institutions are patterns of behavior itself and not only mechanisms by which the behavior is coordinated. New rules that fail to change individuals' expectations about others' behavior are very likely to be poorly effective (Aoki, 2001).

This broader analytical framework allows considering both collective actions and evolutionary perspectives. Exogenous parameters' change, like technology or resources, and endogenous variables, such as learning and informal institutions, could affect the players' payoff and drive changes on their strategies. According to this theory, radical changes in exogenous parameters may deeply modify strategies and drive transformations on the formal rules on the short run. In contrast, incremental changes affect only informal institutions and may not be sufficient to immediately generate changes on formal rules. But this new set of modified exogenous parameters may, across time, be "endogenized" as informal rules and affect the construction of future institutions.

In order to consider this temporal relation between exogenous parameters and endogenous variables Greif (2006) proposed a new intermediary category of parameter, the quasi-parameters. This special category represents parameters exogenous in the short-run and endogenous on the long-run, changing over time. These changes could reinforce or undermine existent institutions, generating instability and competition for new rules (Aoki, 2001). What could suggest an evolutionary bias of this theory is contested by this same author, by presenting evidences of

persistence of inefficient institutions. According to Aoki, this could happen due to inter-relations and complementarities occurring in different "domains" of society. Aoki (2007) proposes a model of four domains in which institutions could emerge: 1) Economic changes; 2) Organizational changes; 3) Political changes; 4) Social changes. Since institutions in different domains are related, the strategies of actors in one domain could be affected by the outcomes received in different domains. This situation could lead to inefficient strategies when considering the pay-off in only one domain, but the complementarities could compensate the losses incurred and justify this strategy.

2.2 The social construction of markets: legitimacy and environmental governance

New economic sociology literature also develops a rich analysis of the factors affecting the emergence and change of market institutions. In a complementary perspective to the institutional economics approach, this branch emphasizes the importance of social relations based on power and meanings, arguing that market institutions do not emerge spontaneously. A process of social construction involving private and public actors is pointed by this literature as the generator of the institutions that govern markets.

Granovetter (1985) introduced the concept of *embeddness*, by which economic transactions are immersed in social relations. Market institutions such as property rights are not necessarily the outcome of efficient selection, but rather the result of a continuous and contestable political process (Fligstein, 1996). Social groups like business associations, labor unions and governmental agencies seek to influence the definition of property rights, which affects their outcomes.

Aiming to analyze how markets operate, Fligstein (1996) proposes different categories of institutions affecting actors' behavior. Initially, this author proposes a concept of governance structure[1], considering the way market relations including competition and cooperation are established. Following the classical division to define institutions proposed by North (1990), these governance structures are divided in formal laws and informal practices. On the formal laws could be included the antitrust, competition and cartel laws which define the operation of markets. On the informal group could be included the "conceptions of control", which refers to the understandings of actors about how market works. Fligstein emphasizes the importance of this category of institution towards good operation of markets, since these conceptions establish the socially acceptable actions among these actors. In a last group denominated "rules of exchange", Fligstein (1996) includes institutions necessary for transactions be carried out, like shipping, insurance, billing, exchange of money and the enforcement of contracts, which strongly depends on the State action (e.g. the judicial system).

[1] This concept differs from Williamson's definition broadly used on new institutional economics literature

Another important concept explored by sociologists to explain how market institutions and organizations emerge and change is the “legitimacy”. Cashore (2002) considers legitimacy as a necessary but not sufficient condition to establish and maintain market institutions operating. Based on organizational sociology literature (Suchman, 1995), Cashore adapts the concept of legitimacy to understand the emergence of institutions. He suggests three basic categories of legitimacy: pragmatic, moral and cognitive. The first kind refers to a self-interested rational calculation process by which actors focus their audience’s (costumers, suppliers and other economic partners) values and preferences. The moral legitimacy represents an intermediary stage when pragmatic motivations start to be incorporated to society values, guiding attitudes about the “right thing” to do. The cognitive legitimacy represents the last phase, in which these practices get embedded in cultural beliefs and generates a routine of values, which leads actors to see an institution as legitimate itself.

Considering this spectrum of legitimacy, Cashore analyzes the emergence of governance institutions dealing with socioenvironmental issues. The pragmatic legitimacy is pointed as a first step in order to increase incentives for companies and business actors to take part in programs for sustainability. In a subsequent phase, other types of legitimacy would develop in order to support this emerging governance mechanism. Aiming to illustrate this point, Cashore (2002) highlights a category of institution denominated as Non-State Market Driven (NSMD) Governance Systems, in which socioenvironmental certification schemes could be included. These schemes get their legitimacy basis from consumers’ preferences as well as from governments, who could “transfer” their legitimacy by means of specific legislations. This could be made by the mandatory requirement of private labels or by accreditation of these schemes as proof of fulfilling sustainability standards required by law. It could be advantageous to public agencies, since it may deeply reduce the costs of regulation as well as avoid diplomatic conflicts which could emerge if sustainability requirements were made to producers in different countries.

3. Socioenvironmental Transformations on the Last Decades

3.1 Socioenvironmental governance: a historical analysis

The industrial development and the expansion of agricultural frontiers on the last century have deeply impacted on natural resources and eco-systems. Even though this process was already in place from the beginning of the XX century, it was only after the 1950s that environmental issues started to be considered as a real problem and national governments drove efforts to regulate the adverse effects generated on economic activities. In developed countries, where industrialization and its environmental consequences started earlier, the first legislations dealing with environmental

regulations were approved on the end of the 1960's. USA was pioneer having approved legislation dealing with different resources like the Environmental Policy Act (1969), the Clean Air Act (1970), the Clean Water Act (1972), the Resources Conservation and Recovery Act (1976), among others.

On this first phase, the complexity of some environmental phenomena challenged regulatory authorities, facing problems to define the sustainable limits and the instruments to monitor and enforce these caps. The establishment of environmental agencies employing qualified resources to set sustainability standards and develop monitoring mechanism played a fundamental role on the development of environmental regulations. In 1970, the US government funded the Environmental Protection Agency (EPA), seeking to protect public health and restore damaged eco-systems (Lewis, 1988). Additionally, agencies like EPA allowed the formation of qualified staff to deal the complex problems that would emerge in the following years.

Analyzing the different "architectures" of environmental legislation, regulation and governance on Anglo-Saxon countries, Gunningham (2009) identified three distinct phases from 1970s to the current days. On a first moment, mechanisms of direct control like emissions caps and mandatory adoption of cleaner technologies were implemented. Despite the critics from economists due to the inefficiency and distortions caused on many industries, Gunningham argues that these mechanisms were very effective to deal with less complex environmental problems. Consequently, both developed and developing countries broadly adopted these policy instruments.

The emergence of more complex environmental problems limited the expansion of direct control mechanisms. Additionally, the liberal ideologies that dominated the regulatory debate on the beginning of the 1980s inaugurated a new era of environmental policy. "Market-based" instruments aiming to use market incentives to drive economic agents to voluntarily adopt sustainable practices were widely adopted in this period, among them voluntary programs (self-regulation) specific to industrial sectors. Even though market-based instruments were developed taking into account efficiency and economic incentives, these mechanisms have low impact on the adoption of more sustainable practices in some industries. This can be explained by the lower level of monitoring and enforcement of these policies when compared to direct control mechanisms. This created incentives for free rider actions and opportunistic behavior.

These weakness and ineffectiveness led to development of a new generation of environmental policies on the 1990s, which Gunningham (2009) denominated "smart regulation". These new instruments tried to incorporate elements from direct control and market-based instruments implemented on the previous decades. State got back a central role on these policies, being responsible by generating incentives and using its legitimacy to enforce these policies. The main objective was to increase transparence and accountability of the self-regulation mechanisms

established on the 1980s. Among the programs under this policy umbrella can be mentioned collaborative plans including public and private actors seeking to develop clean technologies, the use of positive incentives (rewards) instead of taxes and other punishments, the establishment of performance standards and the use of private certification mechanisms like ISO 14001.

Another important feature of these governance mechanisms is related to the role played by civil society organizations, such as NGOs. These actors occupied the former role of State agencies, which reduced their activities after the fiscal crises on the 1980s. Even tough, as their name suggests, NGOs are not directly related to State agencies, their legitimacy still seems very dependent on State policies. The "smart regulation" is also characterized by the transnational character of NGOs that are not delimitated by national borders.

"Smart regulation" establishes a new form of State intervention on environmental affairs. The passage from the traditional regulation, in which the State figures as the central coordinator, to more diffuse governance mechanisms, including a diversified spectrum of private actors, is a important characteristic of this new phase. Besides NGOs, it also includes companies, industry associations, and certification bodies. The private certification became a fundamental instrument of environmental governance through monitoring and information transmission to consumers. Certification became almost mandatory in sectors where the consumers are more concern about the socioenvironmental dimensions of the products. This can be seen on the forest sector and seems to be an important feature of the biofuels market emerging in the last years.

3.2 Socioenvironmental Governance: trends and interpretations

The changes on environmental governance mentioned on the previous session have been extensively explored in a political science and international relations literature. Seeking to explain the new forms of environmental governance, Falkner (2003) identifies three basic arguments commonly found on the literature: a) globalization is leading to a process of deterritorialization of markets, reducing the effectiveness of traditional regulatory mechanisms; b) the transnationalization process and the advance of new technologies of communication are favoring the emergence of a global civil society with very active participation on the governance process; c) private governance mechanisms were a being used by business groups in order to reduce the stringent of environmental regulation.

The first argument explores the geographic changes on production chains caused by the globalization, since the locus of production usually have different environmental requirements than the ones of consumptions markets. Even though importing countries may set some sustainable features, this could be seen as a non-tariff barrier and violate World Trade Organization (WTO) rules. Consequently, new governance mechanisms started to be used aiming to permit that

consumers could obtain information about production processes and products. The second point, the emergence of a global civil society, can be seen as another side of globalization, since the transnalionalization of production and political process reduced the effectiveness of national state regulation. The NGOs are the most known face of this new class of actors, demonstrating great capacity to communicate and represent interests of civil society on political arenas. The last argument, which Falkner (2003) denominates "neo-gramicinian", emphasizes the power of the regulated companies on the construction of the new private governance mechanisms. This potential capture is contested by Falkner, arguing that NGOs and other representative entities of civil society counterbalance the business interests on the new governance mechanisms.

Falkner (2003) argues that most of the literature analyzing the new governance mechanisms overestimates the role played by private actors, neglecting the bases of legitimacy supplied by governmental agencies. Falkner defends that most of the governance mechanisms compost exclusively by private actors have reduced relevance, lacking legitimacy and enforcement capacity. Therefore, this author sees a change of the role played by the State, which not necessarily imply a reduction or privatization of regulatory structures.

The advantages of hybrid (public and private) forms of governance in dealing with environmental issues in a trans-national level is highlighted in many studies. Lemos (2006) argues that besides the diplomatic advantages, these systems show more flexibility and permit the use of scientific and technological knowledge to build more effective monitoring instruments. Lemos considers a heterogeneous group of institutions as components of private environmental governance, including international climate agreements, national legislations and policies, mechanisms for management of local resources, NGOs and some other international institutions dealing with environmental issues.

Pattberg (2005) emphasizes the emergence of global environmental governance coordinated by NGOs and companies seeking to manage trans-national problems. The increasing importance of multinational companies is making "global business regulations" more relevant, reveling the central role played by these companies in dealing with environmental problems.

Considering the different forms of private governance emerging in the recent years, socioenvironemental certification is pointed as one of the most relevant and visible mechanisms due to its fast expansion and the large number of sectors covered. Different categories of certification can be identified (private *vs* public certification; 1st party *vs* 3rd party certification), among other specificities that make these institutions a very heterogeneous form of governance (Jahn et al., 2005).

On the agricultural and forest sectors, certifications are present in different tiers of production chains, making information available through production tiers to consumer markets.

Organic food was a pioneer sector for certifications development starting on the 1970s. Nowadays, organic labels are almost mandatory by consumers and even national legislations are considering private certification schemes as proof of certain sustainability requirements. The overlaps between private governance and public regulation represents an important trend on these sectors and has been analyzed by a large literature (Garcia-Martinez, 2007; Henson, 2010; Blair, 2008).

Evaluating the advantages and disadvantages of private and public certification requires the scrutiny of the following elements. The competition between private standards is regularly mentioned as an inefficiency of private labels, since this phenomenon usually reduces the capacity of these mechanisms to inform consumers. The existence of competing labels demands an additional cognitive effort by the consumers that will have to collect information about each of the available labels' credibility.

On the other hand, this competition may increase the quality of the certifications and avoid frauds on this process. Another important issue related to the competition between certifications refers to the political game defining the victorious certifications. Matters of legitimacy and power of some groups on the environmental communities seems to have deep influence on the trajectories of institutions emerging in new certified markets. In many cases, certifications operating in one market make adoptions to its standards in order to migrate to a new certification market.

The diversified kinds of certifications also bring some questions in relation to the influence of companies and other business entities on the definition of standards, which could reduce the stringency of private certifications. Even though 1st party (or self-certification) is expanding, most of the labels available are also integrated by NGOs and other civil society based organizations, reducing the probability of frauds and other moral hazard behaviors. It is also worthy to mention that none of these self-certifications have been accept by legislations as proof of sustainability.

4. Private Governance on the Forest Sector

Aiming to get insights about biofuels certification, this session brings an analysis of the forest certification experience. This choice can be justified by two basic reasons. Firstly, even though private governance mechanisms have emerged in a great number of industries and markets, the forest sector is frequently mentioned as the most successful experience involving private certifications considering socioenvironmental dimensions (Cashore, 2002), being a likely candidate for emulation by other sectors. Secondly, forest and biofuels markets present many similarities in terms of geographic scope of the externalities generated as well as the climate change dimension of these products.

A large literature has analyzed forest certification schemes as civil society regulatory institution (Meidinger, 2003), complementing national laws and occupying a regulatory vacuum

due to the absence of an international agreement dealing with forest sustainability (Bernstein, 2003; Wang, 2001). The emergence of private certification started in 1993 when the Forest Stewardship Council (FSC) was founded under the coordination of the World Wildlife Fund (WWF). FSC was the first forest certification in a global level, resulting from an articulation of environmental movements aiming to establish a framework to govern forest management activities.

This trajectory of almost 20 years has been subject of innumerous analysis on the political and environmental sciences literature. Cashore (2004) investigated how FSC developed in different regions of the planet, seeking to identify which characteristics of the industry, the consumers and the institutional environment of each country affected this process. Since FSC standards differs from a region to another, this analysis allowed the researchers to investigate the factors affecting the strategies of FSC in each country.

Cashore (2004) proposes three categories of strategy: a) information strategies – use of campaigns to inform consumers, government and industry about the relevance of certain sustainability standards; b) conversion strategies – efforts to change consumers and industry preferences about the necessity of more sustainable practices; c) conformation strategies – adaptation of standards as an answer to local specificities. This last kind of strategy brings interesting insights about how certification bodies consider local configurations, as preferences and competitions with other certifications, when setting the level of stringency and the criteria covered by its standards. The main challenge of these certifications is to balance standard's minimum levels, considering the objectives proposed, with local conditions in order to increase its market share.

Cashore also identifies the regional configurations that affected FSC expansion. A first characteristic refers to the timber industry profile, since in countries where this sector drives most of its production to external markets, the development of FSC was much faster. This process could be explained by the search for legitimacy in front of consumers in other regions with higher sustainability standards. Another relevant characteristic is related to the industry and forest production concentration (market-share) and vertical integration levels. In cases where industries manage their own forests in a vertical integrated structure, the process of certification becomes much easier due to the more effective management of the custody chain by large companies. The size of these companies also has a positive effect in terms of cost, since it generates increasing returns for certifying bigger quantities. Finally, the size of wood companies, in many cases owning brands and operations in the consumption tier, increase the visibility of these agents to environmental movements generating more incentives to build a reputation with consumers and a more harmonic relation with NGOs and governments.

Cashore's analysis indicates that non-industrial forest owners show lower wiliness to adopt certification than industrial sectors. Reduced scale of production, which increases costs, as well as

the reduced capacity to interact with other stakeholders (e.g. NGOs) could explain this behavior. Additionally, internal governance structure in FSC and other certifications bodies tend to offer lower influence to producers than NGOs and other stakeholders. As a consequence, this kind of certification faces a harder time to expand in regions where producers are organized and have more representative capacity. In this case, other certifications more in line with producers' interests may develop. Nevertheless, all certifications will have to adopt conformation strategies and negotiate with the production sector, aiming to gain legitimacy. As a result, in regions where FSC had to make concessions in order to gain legitimacy and expand its market share, the standards were less stringent.

Other factors also affected the strategies adopted by FSC. The existence of competition with other certification standards seems to be an important element on FSC's strategy. Gulbradsen (2005) considered how another important certification body, the Program for Endorsement of Forest Certification (PEFC)[2], competed with FSC in Sweden. The PEFC was founded in 1999, as a reaction from the forest sector (industry and producer), unsatisfied with the balance of power inside FSC's governance scheme. Consequently, PEFC standard seems more flexible and less stringent in many of the sustainability dimensions analyzed. This competition has induced FSC to conform their standards on Sweden market, since companies have the choice to use PEFC to accesses many international markets.

Gulbradsen (2005) emphasizes that this competition has negative effects in terms of sustainability of the practices adopted in Sweden forest sector. Besides the reduction of certification standards stringency as mentioned, it could also affect the informative capacity of certifications on consumers. This is the main risk of the uncoordinated diffusion of certification standards, since it increases consumer's costs to obtain information about each certification, reducing the value of certified products. It has a dubious effect on industry: by one hand they "win" with more flexible standards; by other hand, they may "loose" with a reduction on certified products demand.

Cashore (2004) still points the stringency of local environmental laws as an important determinant of certification standards. In developed countries, the solid regulatory framework on environmental issues has supported the operation of private standards. This could explain the lower development of FSC in tropical forests when compared to temperate regions like Canada and Europe (even though consumer preferences on developed countries cannot be neglected on this process).

[2] PEFC has developed really fast being adopted by big forest owners, like governments and corporations. As a result, the area certified under this scheme is also twice the FSC's (223 million hectares and 123 million hectares, respectively).

McDermott (2008) analyzed this “cross-fertilization” process between private certifications and public regulations in different countries, verifying that many private standards are based on environmental legislations. In some cases, the certification only requires the rule of law, acting as an enforcement mechanism of public standards. This phenomenon is mostly observed in countries where law enforcement is deficient.

Generally, it is possible to see intense interaction between competing private certifications and public regulations on the forest sector. The search for legitimacy has driven certification bodies to use conformation strategies and seek a common denominator, in order to be accepted by most of the stakeholders in the market. As a consequence, private standards may low their stringency as well as public regulation may raise its requirements.

5. Emergence of Socioenvironmenal Governance on the Biofuels Market

International trade of biofuels is substantially inferior to production and consumption, and thus may be classified as a domestic market. The rationale behind this relates to the regional aspects of biofuels production and demand, strongly dependent on natural resources and the support of national programs.

In recent years, environmental concerns related to climate change raised the importance of biofuels as viable alternative to reduce Greenhouse Gases (GEEs) emissions. This new demand, which could increase the international trade of these products, is based on assumptions about sustainability of biofuels production and consumption. Some doubts have been raised on these assumptions, since information about products production is not available for consumers when buying these products. This characteristic, identified by economic theory as “credence attribute” (Barzel, 1982; Darby and Karni, 1970), makes necessary the establishment of additional mechanisms (with additional costs) in order to transmit information about the production process to consumers. In other words, even if some biofuels are produced under sustainable practices, they will only be considered a “sustainable biofuel” if these attributes are verified and accounted by a public or private certification mechanism.

Considering that a larger share of this “new” demand on biofuels have sustainability requirements (strong evidence can be found on EU renewable energy directives (RED) and the US renewable fuel standard (RFS)), the development of mechanisms to guarantee the sustainability throughout production chains, from feedstock to the final use of biofuels, seems to be a necessary condition in order to structure a biofuels international market. Even though, bilateral contracts already being used for international transactions may include socioenvironmental clauses (some already have), this sort of instrument present great limitations to govern large scale transactions involving demanders and suppliers from different regions. Multilateral mechanisms like

certifications seem more suitable to guarantee sustainability in situations like the biofuels market because, as product attributes are verified just once and provided to all potential consumers, they reduce measurement costs. This raises the main question that motivated this research: how market institutions to guarantee sustainability will emerge in the biofuels sector?

As previously mentioned, this research aims to show how the construction of these market institutions are being influenced by broader institutional context, which includes the existent environmental governance mechanisms (private certification and public regulations) as well as organizations/actors acting on this arena. In order to pursue this objective this session will briefly explore RED and RFS regulations as well as the main initiatives for biofuels certification disputing space, considering how the overlaps of these mechanisms took place in other similar sectors.

5.1 National regulation on biofuels sustainability

When sustainability questionings related to impacts on food supply and environmental damages that large scale production of biofuels could bring came up, an intensive debate started involving governments, NGOs, producers and other stakeholders (Doornbosch, 2007). As a consequence, biofuels adoption by national legislations has slowed down and search for policies accounting and monitoring sustainability dimensions gained relevance. Even though many countries are implementing policies related to biofuels, the U.S. and European Union member States deserves special attention due to their importance on the bioenergy market.

United States

In the U.S., the Renewable Fuel Standard was initially approved in 2005 and substituted by a new version (RFS-2) in 2007 implementing mandates of biofuel consumption in the U.S. territory. The mandates are divided by categories of biofuels in terms of Green House Gases emitted directly and indirectly on the production and consumption. Some aspects of this policy can be highlighted: a) GHG emissions are the only socioenvironmental dimension considered; b) the mandates are enforced by law, with related fines to those blenders that are not in compliance with the established standards; c) this legislation does not regulates private certifications. This last approach was already used in the U.S. regulation for organic food, in which the USDA developed a national label, which had the effect of reducing the demand for private certifications.

It is possible to see a domestic bias on the RFS, giving special emphasis to local production, even though the main alternative available in US, the corn ethanol, presents poor environmental performance. The only regulatory mechanism considering environmental impacts of biofuels production on this legislation is a tri-annual report prepared by EPA considering how domestic production of biofuels (mainly corn ethanol) is affecting US environment. In the first draft released

in 2010, the corn ethanol failed in five of the six environmental dimensions considered by the American environmental agency.

The state of California, by means of the California Air Resources Board (CARB) has also approved its own legislation, the Low Carbon Fuels Standard (LCFS) (CARB, 2009). The LCFS is more stringent than the RFS, considering different dimensions of sustainability besides emission's reduction. It also seeks to account for indirect effects, such as the indirect land use change (iLUC). It is not clear yet how state regulations like the LCFS would be harmonized to US national regulation. California plans to apply its broader regulatory framework to biofuels, what would exclude corn ethanol produced in the U.S.. Imported biofuels would also have to comply with LCFS in order to enter Californian market. Endres (2010) claims that California could influence other states and these standards could be applied in other regions of US and even be incorporated to the federal regulation.

European Union

Environmental sustainability is an important trend on European countries, what can be seen on the high influence of NGOs and political parties focusing environmental issues. As a result, EU has played a leading hole in climate agreements like the Kyoto Protocol, in which European nations are the main group on ANNEX 1 (countries with emission reductions targets).

In 2003, a first version of the Renewable Energy Direction (RED) was approved establishing targets for consumption: biofuels should respond by 2% fuel used on transportation in 2005 and 5,75% in 2010. The second version of RED in 2005 included more ambitious targets, like a reduction of 20% of GEE's emissions and 10% on the use of oil products for transportation use until 2020. In 2009 a new version of RED recognized biofuels as one of the main pillars of European Union emissions reduction policies, establishing directives for governments to push demand and production of biofuels in the union. On the consumption side, the main number on this document is related to necessary reduction of emissions in biofuels life cycle when compared to fossil fuels: 35% until 2013, 50% in 2017 and 60% in 2018, what could only be possible considering the use of second generation biofuels from cellulosic materials (EU, 2009). Even though European commission showed concerns with social sustainability standards, this category of standard was not considered due to potential problems with WTO rules (Cardwell, 2010). So far, these ambitious targets were not achieved, mainly because of the slower development of second generation biofuels.

On the production side, RED (EU, 2009) created special conditions for biofuels production on the member countries. Under the Common Agricultural Policy (PAC) mechanisms, subsidies for producers of biofuels feedstock can reach 45 Euros per hectare. It was also authorized the use of

idle lands for these feedstock production, what was not allowed if producers wanted to apply to PAC subsidies. As a result, most of the biofuels consumed in Europe is produced domestically using local raw materials (75% of European consumption is biodiesel and only 26% of this amount is imported (Schnep, 2006)).

The incentives mentioned above represent the general directives of European legislation. Nevertheless, RED authorized and created incentives for national governments of member states to implement their own regulations, provided that it does not contradict the union directives. Netherland United Kingdom and Germany can be mentioned as leading on biofuels regulations, taking different directions that US's RFS legislation. In Netherlands, the Cramer Commission (2007) produced a detailed report considering how private certification mechanisms available could provide information about biofuels sustainability, proposing a regulatory framework to work integrated with private mechanisms. Under this structure, six relevant themes were considered on biofuels sustainability: a) Greenhouse gas emissions; b) Competition with food and local applications of biomass; c) Biodiversity; d) Environment; e) Prosperity; and f) Social well-being.

This framework inspired UK's Renewable Transport Fuel Obligation (RTFO, 2008) and German Biofuels Sustainability Ordinance (BSO, 2007). RTFO established mandates for blenders in a similar way of RFS, specifying the volume (% of fuels used in transportation) and the emissions of these products (in comparison to the alternative fossil fuels). The targets were too ambitious in terms of volumes (3,5% in 2010; 4% in 2011; 4,5% in 2012 and 5% in 2013) and emissions reductions (45% in 2010 and 50% in 2012), not being achieved (Bolwig, 2009). Besides the emissions' reductions, the RTFO also considers four environmental dimensions (not harming biodiversity, soil, water and air preservation) and two social criterions (complying the labor legislation in production countries and with international labor standards).

The main innovation of RTFO is related to the enforcement mechanism, since the importers (blenders) are required to report to the Department of Transportation about the sustainability of all chain of custody of the biofuels entering the UK territory. They have to hire certification companies to verify the RTFO's requirements from feedstock production and report this to UK's renewable fuels agency. This mechanism is still under implementation, letting these companies declare "nothing to report" until the beginning of 2011.

RTFO also allow importing companies to use existent private labels to comply with these requirements. The meta-standard approach works as an umbrella of accreditation for private certifications classified in different categories: minimum general principles; supporting minimum criteria and performance indicators. For instance, the FSC label could be used by a company to prove that wood used to produce biofuels did not cause environmental impacts on forests. In most

cases, the existent private standards comply only partially with the regulatory requirements (Endres, 2010).

In Germany, a similar legislation was adopted introducing mandates and reporting mechanisms to guarantee the sustainability of biofuels domestically produced and imported by the country. The Biofuels Quota Act predicts 6,25% of biofuels blended until 2009 and 8% until 2015. The Biofuels Ordinance establishes both minimum levels for emissions reduction in comparison to fossil fuels (30% until 2010 and 40% in 2011) and more specific sustainability requirements, including protection of natural habitats and use of sustainable agricultural practices to produce feedstock used for biofuels. The emission's reductions are calculated by the German governmental agency using a specific methodology considering Greenhouse Gas Potential, which do not includes indirect effects, like iLUC (UN, 2008). The specific sustainability requirements must be complying with international standards for sustainable agriculture, fishing and forest management as well as European Union renewable energy directives (Scarlat, 2008). It is noteworthy that all national standards must adopt cross-compliance mechanisms in order to keep in line with RED requirements (EC, 2009).

Although the mandates adopted by BSO and RTFO have a crucial role for the development of these markets, by a governance perspective, the accreditation of private labels in order to prove the sustainability requirement can be pointed as the most innovative aspect of these regulations (Endres, 2010). In the German case, Agency for Renewable Resources (FNR) has worked together with other stakeholders like NGOs and industry association to develop a private certification scheme, the International Sustainability and Carbon Certification (ISCC).

5.2 Private Certification for Biofuels

The emergence of private standards has fast expanded after the 1990s and became an important mechanism for socioenvironmental governance in various sectors, with special emphasis to the ones directly related to natural resources as agriculture or forests. In the biofuels sector, this process seems even deeper, since international demand for these products is generally subjected to the sustainability of production. Therefore, mechanisms for transmitting this information constitute a necessary condition for these transactions to take place.

Among the many multi-stakeholders initiatives seeking to guarantee biofuels sustainability, some certification schemes deserve special attention. The Roundtable of Sustainable Biofuels (RSB) was founded in 2007 under coordination of EPFL (École Polytechnique Fédérale de Lausanne) and includes several NGOs, governments and companies, seeking to develop a general sustainability framework for all kinds of biofuels. The large number of raw materials and processes

involved in biofuels production represents a huge challenge to develop standards and criteria for sustainability.

Even featuring a large infrastructure and a heterogeneous set of participants, the operational aspects of such broad spectrum make the implementation of RSB even more complex when compared to specific raw material schemes, such as Roundtable of Sustainable Palm Oil (RSPO) and Better Sugar Initiative (BSI-BONSUCRO). The RSPO has developed mostly in Asian countries producing biodiesel from palm oil and has gained international acceptation from importing countries.

BONSUCRO is a multi-stakeholder initiative dedicated to guarantee social and environmental sustainability on sugarcane production for sugar, ethanol and other uses like electricity cogeneration and polymers. The scheme is coordinated by WWF and has the participation multinational companies like Coca-Cola, BP, Raizen, Bayer Crop Science, Toyota; and sugarcane production associations like UNICA. In Brazil, where largest producers of sugarcane ethanol are located, BONSUCRO is seen as the most viable alternative for biofuel certification. BONSUCRO is the only ethanol certification already in operation (a Raizen mill was already certified in June 2011), probably due to its simpler criteria and, as a consequence, lower costs. Some critics argue that BONSUCRO is too flexible and producers/companies have excessive influence on the scheme's internal governance, what could explain the strong preference of these actors for this mechanism. Exactly for this reason, BONSUCRO seems to be the main certification mechanism to succeed on sugarcane based biofuels.

5.3 Private and Public governance on Biofuels

The integration of private certification schemes and public regulations represents an important governance institution under construction on the biofuels international market. The development of governance mechanisms on the biofuels arena follows a similar path of other sectors where sustainability represents a critical issue. Like the forest sector, the absence of an international mechanism to guarantee sustainability in production and trade has driven the development and adaption of existent private certifications for biofuels demands. In the same way, industry/producers profile and characteristics of national institutional environment such as labor and environmental laws may affect the diffusion of these private mechanisms in each region.

Furthermore, the "competition" among RSB, BONSUCRO and other certification schemes on the biofuels market presents some common characteristics to dispute on the forest sector, including FSC, PEFC and others. While schemes like RSB are predominantly composed by NGOs and smallholder producers, BONSUCRO is more business oriented and shows more flexibility to cover the relevant standards for ethanol sustainability. This advantage may drive RSB to turn its

criteria more flexible and seek to increase business actors' participation on the scheme's internal governance. This kind of conformation strategy could happen in both ways and BONSUCRO may also be driven to increase the stringency in some standards, if required by national regulations.

Besides the advantages of being more specific to one feedstock, the more integrated chain structure of sugarcane sector has also played a central role in favor of BONSUCRO adoption, since the highly coordinated structures reduces costs of building a chain of custody and the larger operation of these companies also reduces the costs of adopting a certification scheme due to scale economies. Furthermore, the increasing participation of oil companies on the ethanol production increases the incentives for adopting certification by two reasons. Firstly, since these companies operate internationally and are more exposed to public opinion in Europe and the U.S., adoption of sustainability schemes may be of greater interest than it would be to Brazilian ethanol producers. Second, these companies tend to focus more on the biofuels international market, what strongly depends on the implementation of certification schemes of guarantee sustainability on the production tiers.

Even though the U.S. regulatory framework does not show this kind of public-private interactions, European Union has given strong signals of how private standards may be integrated to regulatory mechanisms governing biofuels production and imports on the member States. In July 2011 European Commission approved 7 voluntary certification schemes in order to comply with Renewable Energy Directives. RSB and BONSUCRO developed a special scheme for European Union, which includes some extra criteria to the existent standards. RSB-EU was approved to comply with all RED criteria, while BONSUCRO-EU lacks the "provision on highly biodiverse grasslands" criterion. It is not clear yet how this lacking standard may be supplied by BONSUCRO certified producers.

Some advantages of this integrated governance approach certification schemes in comparison to public-only regulatory mechanisms are related to costs and to potential conflicts with international institutions, like the WTO rules. According to Van Dam (2008), while mechanisms establishing minimum standards for environmental sustainability faces a medium risk of infringing WTO rules, criteria establishing a certain level of economic prosperity or local populations welfare certainly would break these rules. Even though private mechanisms face some of these limitations (FSC had to satisfy some conditions to be approved by WTO), these caveats are substantially minor than the ones faced by national regulations. In the forest sector the use of private schemes constitute the main governance mechanism on international transactions.

6. Concluding remarks

The emergence of global environmental problems, the transformations on the geography of production chains and profound changes on global politics can be pointed as important elements to understand transformations on socioenvironmental governance on the last decades. State actors, from the national to the international spheres, have switched their coordination roles and private actors became central players on the new governance mechanisms.

The emergence of public and private governance mechanisms dealing with sustainability seems to an important trend on the biofuels international market. The new demand for these products is restricted by socioenvironmental requirements; therefore, effective mechanisms to monitor and transmit sustainability information to governments and consumers are fundamental in order to establish a large scale multilateral market. Even though regulations are seeking to cover more complex sustainability criteria (mainly indirect effects like the land use change), different certification schemes are disputing space to monitor social and environmental dimensions of biofuels production and use. The European Union regulatory approach shows an interesting effort to integrate public regulation with private certification in order to develop a cost-effective framework to access biofuels sustainability.

When analyzing the expansion of a certification body over other mechanisms, political and economic elements seems to matter. Firstly, the capacity of a scheme to transmit relevant information to consumers in a cost-effective manner is crucial to a certification succeed. Secondly, the expansion of a label and its acceptance by markets tend to increases the value generated by this certification. The positive network externalities generated on this process can explain why an incumbent certification may avoid new, and in some cases more effective, certifications to expand. Thirdly, a political process for building a scheme's legitimacy with relevant audiences also affects its capacity of expansion. Certification bodies with diversified connection to stakeholders, like governments, NGOs and other consumer representative organizations present an advantage to be accepted and expand its market share.

Environmentally sensible sectors presented a fast expansion of governance mechanisms coordinated by non-state actors like NGOs, industries associations, etc.. The biofuels market seems to follow a similar path then other sectors, such as the trade of forest products. The competition among certification schemes as well as the overlaps of these private mechanisms and national and international regulations are influencing the design and expansion of private standards. The search for legitimacy represents a fundamental challenge to private governance mechanisms aiming to expand the market share on the supply and demand side. Usually, certification bodies face a trade-off between reducing stringency to be more accepted by industry and loosing legitimacy with NGOs and consumers. This could result in reducing acceptance of the label and ineffective results in terms of improving the sustainability of production practices on the industry.

As the forest sector case shows, the profile of the industry and the local regulations may affect the expansion of private mechanisms governing the sustainability on the biofuels market. A more integrated and exporting oriented industry make certification cheaper and more valuable, increasing the adoption. This seems to be the case on Brazilian sugarcane sector, increasing the potential for expanding certifications on this sector. The coordination capacity of UNICA and the entrance of international oil companies on this segment also increase the chances of certifications to expand. These conditions are playing an important role on sugarcane ethanol certification and bring hope that this product will be the first certified biofuel available in large scale.

References

AOKI, M. *Towards a Comparative Institutional Analysis*. Cambridge: MIT press. 2001

BARZEL, Y. *Measurement Cost and the Organization of Markets*. Journal of Law and Economics, 25(1), 27-48, 1982

BERNSTEIN, S. *The Elusive Basis of Legitimacy in Global Governance: Three Conceptions*, 2003.

BERNSTEIN, S.; CASHORE, B. *Non-state global governance: Is forest certification a legitimate alternative to a global forest convention?* In J. Kirton & M. Trebilcock (Eds.), Hard choices, soft law: Combining trade, environment and social cohesion in global governance (pp. 33-63). Aldershot: Ashgate, 2004.

BETTER SUGAR INITIATIVE (BSI-BONSUCRO), *BSI Standards and Rules. Access on May 2010. Available at: <http://www.bettersugarcane.org/>*

BLAIR, M.; WILLIAMS, C.; LIN, L. *The Roles of Standardization, Certification and Assurance Services in Global Commerce*. Vanderbilt Law and Economics Research, (12), 08-16, 2008.

BOLWIG, S., GIBBON, P. *Biofuel sustainability standards public policy: a case study of Swedish ethanol imports from Brazil*. Report for the OECD-Trade and Agriculture Directorate; Joint Working Party on Trade and Environment, 2009. Available at: http://www.dtu.dk/Service/Telefonbog.aspx?lg=showcommon&id=252846

CARDWELL, M. *European Union Agricultural Policy And Practice: The New Issue of Climate Change. Working paper presented on October 2010 at Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign.*

CASHORE, B. W.; AULD, G.; NEWSOM, D. *Governing through markets*. New Haven. Yale University Press, 2004.

CASHORE, B. *Legitimacy and the Privatization of Environmental Governance: How Non-State Market-Driven (NSMD) Governance Systems Gain Rule-Making Authority*. Governance, 15(4), 503-529, 2002.

CRAMER COMISSION. *Testing framework for sustainable biomass (final report)*. February 2007. Available at: <http://www.lowcvp.org.uk/assets/reports/070427-cramer-finalreport_en.pdf>

DARBY, M. R.; KARNI, E. *Free Competition and the Optimal Amount of Fraud*. The Journal of Law and Economics, 16(1), 67, 1973.

DEPARTMENT OF TRANSPORT (UK). Renewable transport fuel obligation – RTFO: *Carbon and Sustainability Reporting Within the Renewable Transport Fuel Obligation.* January 2008.

DOORNBOSCH, R.; STEENBLIK, R. *Biofuels: is the cure worse than the disease?* Paper prepared for the Organisation for Economic Co-operation and Development (2007). Available at: www.oecd.org/dataoecd/15/46/39348696.pdf

ENDRES, J. *Clearing the air: the meta-standard approach to ensuring biofuels environmental and social sustainability*. Virginia Environmental Law Journal, February, 2010.

ENERGY INDEPENDENCE AND SECURITY ACT OF 2007 (EISA*), Pub. L. No. 110-40, §201, 121 Stat. 1492, 1519-22 (2007).* Available at : http://www1.eere.energy.gov/femp/pdfs/eisa_femp.pdf

EUROPEAN COMMISSION – EC. *Establishing a template for National Renewable Energy Action Plans under Directive (2009/28/EC).* Available at: <http://ec.europa.eu/energy/renewables/doc/nreap__adoptedversion__30_june_en.pdf>

FALKNER, R. *Private Environmental Governance and International Relations: Exploring the Links*. Global Environmental Politics, 2003. 3(2), pp. 72-87.

FLIGSTEIN, N. *Markets as Politics: A Political-Cultural Approach to Market Institutions.* American Sociological Review, 61(4), 656, 1995.

GARCIAMARTINEZ, M.; FEARNE, A.; CASWELL, J.; HENSON, S. *Co-regulation as a possible model for food safety governance: Opportunities for public–private partnerships*. Food Policy, 32(3), 299-314, 2007.

GUNNINGHAM, N. *Environment law, regulation and governance: Shifting architectures.* Journal of Environmental Law, 2009, 21(2), 179-212

GRANOVETTER, M. *Economic Action and Social Structure: The problem of Embeddedness.* American Journal of Sociology, 91(No. 3), 481-510, 1985.

GREIF, A. *Institutions and the Path to the Modern Economy*, Cambridge: Cambridge University Press. 2006

HAYEK, F. A. *Law, Legislation and Liberty*, vol. 1: Rules and Order, Chicago: University of Chicago Press, 1971.

HENSON, S.; HUMPHREY, J. *Understanding the complexities of private standards in global agri-food chains as they impact developing countries*. The journal of development studies, 46(9), 1628-646, 2010.

HODGSON, G. M. *The approach of Institutional Economics*. *Journal of Economic Literature*, *36*(1), 166-192, 1998.

JAHN, G.; SCHRAMM, M.; SPILLER, A. *The reliability of certification: quality labels as a consumer policy tool*. Journal of Consumer Policy 28, 53–73, 2005.

KINGSTON, C.; CABALLERO, G. *Comparing theories of institutional change*. Journal of Institutional Economics, 5(02), 2009

LIBECAP, G. D. *Contracting for Property Rights*, Cambridge: Cambridge University Press. 1989

CALIFORNIA AIR RESOURCES BOARD - CARB. *Low carbon fuel standard sustainability workplan*. Transportation plan (pp. 1-8), 2009.

MCDERMOTT, C. L., NOAH, E.; CASHORE, B. *Differences That "Matter"? A Framework for Comparing Environmental Certification Standards and Government Policies*. Journal of Environmental Policy & Planning, 10(1), 47-70, 2008.

MEIDINGER, E. *Environmental Law for Global Civil Society: The Forest Certification Prototype*. In E. E. Meidinger, C. Elliott and G. Oesten, eds., Social and Political Dimensions of Forest Certification. Forstbuch, Remagen-Oberwinter, 2003.

NORTH, D. Institutions, Institutional Change and Economic Performance, Cambridge: Cambridge University Press. 1990

OSTROM, E. *Understanding Institutional Diversity*, Princeton: Princeton University Press. 2005.

PATTBERG, P. *The Institutionalization of Private Governance: How Business and Nonprofit Organizations Agree on Transnational Rules*. Governance, 18(4), 589-610, 2005.

SCARLAT, N.; DALLEMAND, J. F. *Biofuels certification schemes as a tool to address sustainability concerns: status of ongoing initiatives.* Proceedings Second International Symposium on Energy from Biomass and Waste" Venice, Italy; 17-20 November 2008.

SCHNEP, R. European Union Biofuels Policy and Agriculture: An Overview (CRS Report for Congress, March 16, 2006) 4-5.

SUCHMAN, M. *Managing legitimacy: Strategic and institutional approaches*. Academy of Management Review 20 (3): 571–610, 1995

UNITED NATIONS – UN. *Making certification work for sustainable developmet: the case of biofuels*. 2008. Report available in <http://www.unctad.org/en/docs/ditcted20081_en.pdf>

VAN DAM,; JUNGINGER, J. M. *Overview of recent developments in sustainable biomass certification.* Biomass and Bioenergy 32(8): 749 - 780, 2008.

VEBLEN, T. *The Theory of the Leisure Class: An Economic Study of Institutions, New York: MacMillan, 1899.*

WILLIAMSON, O. *The New Institutional Economics: Taking Stock, Looking Ahead. Journal of Economic Literature 38: 595-613, 2000.*