AGRO-SYSTEM (AGS) AS A TOOL FOR ANALYSIS, TAKING INTO ACCOUNT SUSTAINABILITY[1]

SISTEMA AGROINDUSTRIAL (SAG) COMO UM INSTRUMENTO DE ANÁLISE, CONSIDERANDO A SUSTENTABILIDADE

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RESUMO

A proposta desse artigo é apresentar o sistema agroindustrial (SAG) como um instrumento de análise que pode ser aplicado em diferentes sistemas, tais como sistema de produção de alimentos, sistema de produção de biodiesel, entre outros. A questão para esse artigo é a seguinte: Como a sustentabilidade pode ser analisada no SAG? A análise do SAG é importante porque pode apontar melhorias ou introduzir novo arranjo institucional (formas organizacionais). Entretanto, o arranjo institucional pode não ser suficiente bom quando transplantado para outro lugar e as instituições precisam ser consideradas. Por essa razão, o SAG é analisado dentro de um ambiente institucional que envolve as “regras do jogo”. Além disso, questões sociais e ambientais são levadas em consideração e fazem parte do arranjo e do ambiente institucional.

Palavras-chave: Sistema Agroindustrial; Sustentabilidade; Arranjo Institucional

ABSTRACT

The purpose of this article is to present agro-system (AGS) as a tool for analysis, considering sustainability. This tool can be applied in different system, such as agri-food, bio-diesel system and among others. The question for this article is: How can sustainability be analyzed in AGS? AGS analysis is important, since it can point improvements or even introduce new institutional arrangement (organization forms). However, an institutional arrangement might not be good enough when transplanted to other place and local institutions should be considered. For this

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reason, the AGS is analyzed within institutional environment that involves the “rules of game”. Moreover, social and environment issues are concerned and are part of institutional arrangement and institutional environment as well.

Keywords: Agro-system; Sustainability; Institutional Arrangement

INTRODUCTION

The study of agro-system (AGS) has wide application, such as in public policies design; organization analysis; strategic agents performance. The concept of AGS is in constant movement and can have different focuses due to scientific development. However, independently of diverse AGS focuses, it is used for analyzing the relations among different agents of a chain in order to design firm strategies and public policies (ZYLBERSZTAJN, 2000). The question for this article is: “How can sustainability be analyzed in SAG?”

The concept of AGS is used to analyze the relation among inputs industry, farmers, agro-industry, and consumers. The agents are inter-dependents and they are organized as an agricultural productive chain system. This systemic view for agriculture was presented on the research of Davis and Goldberg (1957) and it was named as agribusiness. In 1968, Goldberg named the concept of agribusiness as commodity system approach (CSA) and it was more complete, because it considered production system activities and the institutions, such as governmental institutions, markets, and commercial associations.

Besides American concept of agro-system, the French School of Industrial Organization introduced systemic analysis named *filière* analyse. The French and American concepts are very similar and both of them focus productive process as a system. The institutional environment (culture, traditions, legal system, behavior) is other aspect considered by both concepts and it can interfere into the system (FARINA; ZYLBERSZTAJN, 1994). However, CSA and *filière* analyze the systems in different way. On the one hand, CSA is focused towards the hierarchy and market power. On the other, *filière* considers the system as a result of market structure and external forces, such as government actions or strategic actions of associated corporations involved in the system (ZYLBERSZTAJN, 2000).

The agro-system analysis has been studied since 1950’s with the agribusiness concept and new configurations[4] of system were elaborated in order to examine the complex forms of relations in these arrangements. Moreover, other names can be found in the scientific literature about production systems, such as networks, symbiotic arrangement, supply-chain systems, administered channels, clusters, nonstandard contracts, and so forth (MÈNARD, 2004)[5].

[4] Following Mènard perspective, the term “configuration” is used rather than “theory” because not all these approaches develop a theoretical framework from which testable propositions can be derived.

[5] Mènard used all these examples to relate hybrid form, but it can be applied for production systems.

The AGS is analyzed under systemic view and evaluates the relation among the agents. The analysis can be micro-analytical in order to understand this mode of organization. Williamson (1996) presented this analysis and elaborated tools for exploring different "mechanisms of governance". Additionally, macro-analytical process is taken into account and it concerns the institutions interactions with agent's behavior for choosing organizational structures. The institutional environment has an impact on the AGS in general and its strategy and structure in particular (ZUURBIER, HAGELAAR, 2000).

A dynamic view of AGS performance is considered, since it can change inasmuch as the relations among the agents change. The movement of agents depends on external incentives and it concerns the global system for local strategies (BORTOT, 2001). Moreover, the agricultural production process has the influence of internal factors, such as policy; economical; financial; technology development; culture; legal rules. The dynamic of AGS is affected by institutional environment as well, which is composed by "rules of game". The change of these rules may induce to different arrangements among the agents. According to North (1990), these rules consider formal rules (constitutions, laws, property rights) and informal constraints (sanctions, taboos, customs, traditions, and codes of conduct). The role of institutions is to reduce uncertainty and to create a favorable environment for decision-making process.

This article is structured into four parts. This introduction is considered as the first part. The second part presents the alternatives approaches of AGS and considers institutions in its diverse theoretical constructs, such as transaction costs economics (TCE); contracts; property rights; collective action; sustainability. The third part focuses on conceptual model of AGS analysis, considering the static and dynamic aspects. The fourth part considers sustainability for AGS analysis.

Alternatives Approaches

Chain management

The systemic view has been extensively applied for agricultural field. It can be observed in studies of supply-chain system adopted in many industries of agri-food sector. Supply chain management is a function to manage the movement of all system. It considers the raw materials used for production process, certain aspects of the internal processing of materials into finished goods. Additionally, it considers the movement of finished goods out of the organization toward the consumers.

The purpose of supply chain management is to improve trust and collaboration among supply chain partners. Therefore, it includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. Supply chain management integrates supply and demand management

within and across companies. This process of integration implicates in formation of different models of supply chain that better satisfy customer demand, while reducing transaction costs. The reduction of transaction costs is related to the efficiency of economic relations. According to Williamson (1985, p. 18) "transaction costs are economized by assigning transactions (which differ in their attributes) to governance structures (the adaptive capacities and associated costs of which differ) in a discriminating way."

Different models of arrangements have been analyzed in order to understand the activities required to manage material movements across organizational and functional boundaries. According to Williamson (1991), specific forms of organization adopted are selected through efforts made by agents to reduce transaction costs by aligning governance structures with exchange attributes. It means "transaction cost economics assumes that the attributes of any particular transaction are held constant in deciding upon which is the least cost mode of governance" (Willianson, 2002, p.12). Therefore, the model of arrangement can change depending on attributes of transaction. For Williamson (1985), there are three principal dimensions of transaction: asset specificity, uncertainty and frequency. The first is the most important and measurable, what means that internal organization is favored where asset specificity is high. Asset specificity[6] is a specialized investment that cannot be redeployed to alternative uses except at a loss of productive value.

Governance structure is the forms of governing economic transactions, such as market, hybrid and hierarchy (vertical integration) (WILLIAMSON, 1991). Market and hierarchy are polar modes. Hybrid form is long-term contractual relation that preserves autonomy but provide added transaction-specific safeguard. Market is the arena in which autonomous parties engage in exchange and it is not necessary a previous planning. Hierarchy forms are determined when transactions are placed under unified ownership (buyer and supplier are in the same enterprise) and subject to administrative controls are managed by hierarchy.

Considering hybrid forms, it can be observed that firms are moving away from discrete transactions and focusing more on relational exchanges (ZUURBIER; TRIENEKENS, 2000). Relational exchanges are based on longer-term interactions that involve repeated transactions. Although contracts can be short-term, related to specific projects, the contractual relationships are durable, with general contractors

[6] There are several forms of asset specificity and can be classified as: "(1) site specificity, as where successive stations are located in a cheek-by-jowl relation to each other so as to economize on inventory and transportation expenses; (2) physical asset specificity, such as specialized dies that are required to produce a component; (3) human-asset specificity that arises in learning by doing; (4) brand name capital; (5) dedicated assets, which are discrete investments in general purpose plant that are made at the behest of a particular customer; and (6) temporal specificity, which is akin to technological nonseparability and can be thought of as a type of site specificity in which timely responsiveness by on-site human assets is vital" (Williamson, 1991, p. 281).

doing business with essentially the same partners (MÉNARD, 2004).

A theoretical support for explaining the existence and the boundaries of supply chain management has been the use of New Institutional Economic theories and concepts (ZUURBIER; TRIENEKENS, 2000). This framework provides an understanding of "make or buy" choice (COASE, 1937). This choice refers to understand why firms internalize or externalize operations, why they perform relational exchanges instead of contracts. This analysis can be interpreted as the specific forms of organization are selected through efforts made by agents to reduce transaction costs by aligning governance structures with exchange attributes (WILLIAMSON, 1991). However, for this analysis, sustainability issues need to be taken into account. Therefore, for choosing the organizational forms, social and environment aspects need to be considered.

The importance of research on supply chains is due to contribution to practical experiences. Empirical studies can be done what allow, refute or confirm hypothesis. According to Trienekens and Zuurbier (2000), research is to develop theories and methodologies, to test hypothesis and to design new solutions, methods and tools that may add value to economic efficiency and the progress of science.

Introducing Institutions: Theoretical Constructs

For analyzing an economic system, it is relevant to consider institutions, what means that price theory is not enough and institutions influence the economic system performance. According to North (1991, p.97), "institutions are the humanly devised constraints (sanctions, taboos, customs, traditions, and codes of conduct), and formal rules (constitutions, laws, property rights)". These institutions are part of institutional environment called "rules of game" which are macro analytic level. For more micro analytic level which institutional economics works is at the level of the institutions of governance (markets, hybrids, hierarchies, bureaus) (WILLIAMSON, 1996).

Coase (2001) showed the importance of working on economic system named institutional structure of production. The analysis of internal arrangements within the organizations is important to be considered, besides what happens on the market, the purchase of factors of production, and the sale of the goods that these factors produce. Therefore, the efficiency of the economic system depends on how the organizations conduct their affairs, considering the institutional arrangements, which govern the process of exchange.

The seminal article of Ronald Coase (1937), *The Nature of the Firm*, introduces the firm theory, considering internal performance of firm instead of a firm as production function. The neoclassical theory considers what happens on the market and focuses on price, supply and demand without analyzing the internal arrangements and their contracts. On the other hand, the new

institutionalism direction is a reaction of neo-classic assumptions (ZYLBERSZTAJN, 1995). The choice set specified by the new institutional economics is both broader and narrower than that conceived in traditional neo-classical theory (NORTH, 1986).

The neo-classical theory considers pricing mechanism; however, there are costs to be considered for negotiations efforts, contracts design, coordination, and so on. These costs are named transaction costs and to take them into account implies that methods of coordination alternative to the market may nonetheless be preferable to relying on the pricing mechanism. According to Arrow (1969, p 48), transaction costs are the "costs of running the economic system". For Williamson (1985, p.2), "a transaction occurs when a good or service is transferred across a technologically separable interface". The friction of this transfer is transaction cost.

Besides Transaction Cost Economics developed by Oliver Williamson, there is other theory of firm to be considered: Measurement Costs Theory developed by Yoram Barzel (2001, 2002). For Barzel, the transactions can be decomposed into different dimensions. Each dimension of a transaction represents a property right exchange and can be identified by a measurement cost. This cost brings a specific value to agents involved in the transaction. Such value can be dispersed if the property rights are not well defined, what can be difficult to measure, hence it can become difficult to contract specific attribute of transaction (ZYLBERSZTAJN, 2005).

Barzel (1997) considers the concept of property rights closely to that of transaction costs. Transaction costs are defined by Barzel (1997, p.2) as "the costs associated with the transfer, capture, and protection of rights". Considering this assumption, according to Coase Theorem, if the transaction costs were zero, the property rights would be perfectly established and kept. Measurement Cost Theory refers the institutional arrangements to the control of the transaction efficiency loss due to the difficulty of measuring specific transaction attribute. Barzel (2002) considers the easier are the measurement and the verification of contract stipulations, the more readily can the contract be enforced. It means that inasmuch as the costs of measurement decrease, the transactors will use contracts more often instead of performing vertical integration.

Zylbersztajn (2005) makes a difference between transaction cost and measurement costs. The purpose of transaction cost economics is to minimize the transaction cost. For measurement cost is to maximize the value of transaction and the firm is a set of guarantees offered by a special agent who is able to offer safeguard. As a result, the agents need to have appropriate governance mechanism to monitor and enforce contractual arrangements. The choice of institutional arrangement would be done in order to minimize the transaction cost and maximize the value of transaction. When agricultural field is analyzed, hybrid form can be observed and complex forms of governance as well.

Economic agents align transactions with governance

structures to effect economizing outcomes, therefore the costs of one mode of governance are always examined in relation to alternative feasible modes (WILLIAMSON, 1996). These costs named transaction costs are *ex ante* costs of drafting, negotiating, safeguarding an agreement and the *ex post* costs as well to align and adapt the contract for situations that are not expected before. These *ex post* costs include: "(1) the maladaption costs incurred when transactions drift out of alignment in relation […]; (2) the haggling costs incurred if bilateral efforts are made to correct *ex post* misalignments, (3) the setup and running costs associated with the governance structures (often not the courts) to which disputes are referred, and (4) the bonding costs of effecting secure commitments." (WILLIAMSON, 1985, p.21)

Different modes of governance are different designs contracts performed by different participants involved in the production system (ZYLBERSZTAJN, 2005). Complex forms of organization contributed to organization economics development and its application into relation between agriculture and other sectors. Despite different modes of governance be related to transaction costs, social and environment issues might be taken into account to transaction costs for drafting, negotiating, safeguarding an agreement and to *ex-post* costs as well.

Economics of Organization: Complex Forms of Governance.

The coordination model applied to agrifood sector can be performed by different ways in order to reduce transaction costs for reaching the efficiency of economics relations. The social and environment aspects need to be concerned by all economic agents what implies to coordination in the agrifood sector. Coordination requires aligning activities of agents in more than two tiers of the production and distribution system. However, the possibilities of sustainable social-ecological system is not uniform and there are situations where some form of government ownership, privatization, decentralization, land reform, or community control of resources is an appropriate solution to a particular social-ecological problem (OSTROM, 2007). Hence, according to Ostrom (2007), it is impossible to achieve sustainability as well as predictive models of linked social-ecological system and deduce the universal solution.

Although Williamson had an important contribution on analysis of governance structure, his systematic treatment of transaction costs in explaining governance structures has never been applied to the field of environmental economics (BOUGHERARA, et.al., 2005). The challenge is to find the appropriate types of solutions for specific niches and help adapting these to particular situations. Considering the dynamic of system in agricultural field, the solutions for sustainable social-ecological system always need modification to reach the equilibrium between social and environment aspects in economical feasible way.

Additionally, environmental-related transactions might imply a high degree of uncertainty related to the complexity of environmental processes and many ways, which humans interact with natural environments.

Considering the complex forms of governance of agriculture field, contracts for vertical coordination are observed and horizontal coordination as well. Lazzarini et al. (2001) introduced the concept of netchain analysis, which studies the interdependence in networks. They determine a netchain as a set of networks comprised of horizontal relations among firms within a particular industry or group, which are sequentially based on vertical relations between firms in different layers. Network is a general term that considers all arrangements involving a set of recurrent contractual ties among autonomous entities (MÉNARD, 2004).

Network can be defined as inter-firm coordination modes. These modes regulate interdependence between firms, which is different from the aggregation of these units within a single firm. Moreover, the network is different from coordination through market signals and which is based on a cooperative game with partner-specific communication. It has different mixes and intensities both in firms and in markets (GRANDORI and SODA, 1995). Its analysis emphasizes the social structures, since it considers interpersonal relationships and individual positions occupied by agents in a network. The role of social structure influences individual or collective behavior and performance.

Granovetter (1985) uses the term *embeddedness* to explain that social relations affect the behavior of economic agents and institutions. It happens because individuals are embedded by ties, what build a network of interpersonal relationship. The *embeddedness* argument considers the role of personal relations and structures of such relations that create trust and decrease wrongdoing. On the one hand, the *embeddedness* can be strong when the relations are long-term and it considers effort, trust and reciprocity. On the other, it is weak when the transaction is instantaneous and the reputation and trust of agents have not been created yet.

Complex form of governance can focus on different types of interdependencies that are arranged either vertically or horizontally. For vertical coordination, it is considered the coordination among agents such as inputs industry, farmers, agro-industry, and consumers that were observed on the AGS. This coordination is performed by contracts what avoids the costs related to the market organization or vertical integration.

For horizontal coordination, it considers the relation among the farmers in order to cooperate to each other. The horizontal coordination represents transaction among the same layers. There are diverse terms to refer to cooperation among the agents, such as collective action; joint action and collaboration. Collective action requires the coordination of efforts made by more than one individual. Therefore, there is interdependence among the agents that can result into advantages, since they can combine competitive

differentiation to reduce costs because they optimize common use of resources. The agents share benefits and costs and access to new markets and technologies. Olson (1965) analyzed individual rationality and examined the extent to which the individuals that share a common interest find it in their individual interest in order to support the cost of the organization effort.

The collective action can be observed in cooperatives organizational, since the cooperative members share the benefits and costs and optimize common uses. Agricultural cooperatives might be a competitive organizational form to acquire the necessary risk capital to implement these growth related strategies (CHADDAD and COOK, 2002). According to Chaddad and Cook (2002, p.2), "cooperative models are defined by a set of organizational attributes, including ownership structure, membership policy, voting scheme, governance structure, characteristics of residual claims, distribution of benefits, and competitive strategy".

Another example of collective action in agricultural field is collective organization of producers, like producer's groups or interprofessional associations. The role of collective organization, such as cooperatives, producer's group, marketing board and so on play an important role to modern agriculture, since they facilitate the development of production process and the organization of market channels. Additionally, an appropriate design of contract law to support collective organization of producer might reduce transaction costs that can be reduction of *ex ante* contracting costs, for instance information search, negotiation and writing of contracts, since it can be done between a large number of economic agents; and *ex post* costs for adapting the contract and enforcement costs (MAZÉ, 2005).

The interprofessional agreement is formalizing a process of agreements among all representative professional organizations of one specific sector that includes farmer's union, cooperatives, large and small retailers, agroindustries and manufacturers. These interprofessional organizations set up rules to frame inter-firm transaction and they negotiate collectively their agreements. In general, these agreements define quality standards and pricing rules what includes incentive scheme (BROUSSEAU and RAYNAUD, 2006).

In interprofessional agreement, the reputation of agents is concerned and it facilitates the self-enforcement. Moreover, the interprofessional agreements for coordination production consider private institutions represented by informal rules (sanctions, taboos, customs and code of conduct). Formal and informal institutions set rules that clarify the rights and duties of the various parties involved in the production system, and allow them to avoid having to clarify all the details of their bilateral relations (BROUSSEAU and RAYNAUD, 2006). The advantages for collective organization are the reduction of administration costs for the functioning of formal organization needed to implement appropriate information and multilateral reputation mechanism. Furthermore, it provides small farmers participation into market, what can respond the demand of social issues of

sustainability. On environment aspects, considering collective actions facilitate monitoring small farmers, environment is easier controlled as well.

Conceptual Model

How can sustainability be analyzed in AGS? How important is the model of governance analysis? Building a conceptual model tries to answer these questions. AGS analysis is important, since it can point improvements or even introduce new institutional arrangement (organization forms). However, an institutional arrangement might not be good enough when transplanted to other place. For instance, countries might adopt policy institutions from other countries, in order to improve the performance or the legitimacy of their own institutional structures. Institutional transplantation is no new phenomenon and it was often imposed on conquered territories and populations (Mamadouh, et.al., 2003).

For model transfer process of institutional arrangement, institutional environment of each place must be considered. It means both legal and cultural complication should be taken into account. Hence, this conceptual model might be available to be applied in different environment. For building a conceptual model will be considered macroeconomic and microeconomic analysis, since both of them are interconnected (fig. 1).

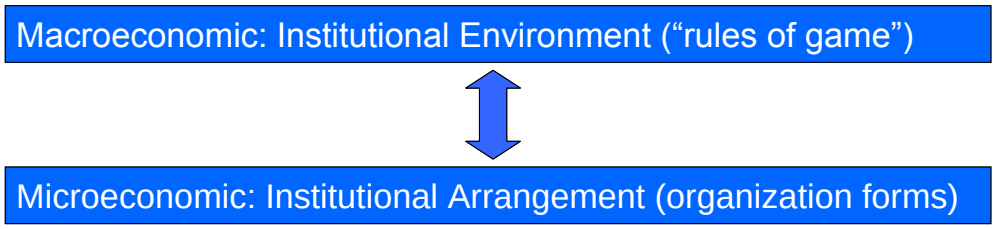

Fig. 1. Macroeconomic and microeconomic analysis

AGS’s conception considers as fundamental elements for its analysis such as agents, relation among them, sectors involved in the chain, staff and institutional environment (Zylbersztajn, 2000). Moreover, sustainability is considered part of institutional arrangement and institutional environment as well. Hence, sustainability is part of AGS’s analysis in all system and it is represented in fig.2.

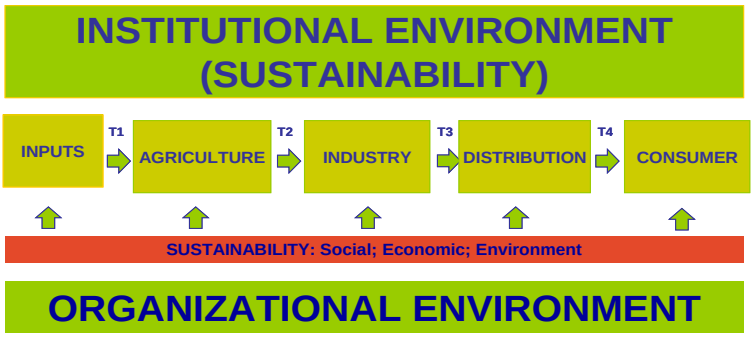

Fig. 2. Sustainable Agribusiness system and typical transaction
Adapted from Zylbersztajn (1995)

The sustainability comprehends three different components such as the economic development, the environment and the social aspects. Therefore, the analysis is not only focused on products, but environment friendly production system and improvement of life quality are also taken into account. Considering sustainable aspects, the benefits may not be limited to the agents of AGS, and positive externalities might come from coordinated and sustainable transactions among all agents of chain (Neves and Castro, 2008). When all agents are coordinated there is an assumption that they will answer better for new environment and the adaptation will happen in a costless way.

The organizational structure that describes AGS is not static, because chains are rarely linear and monolithic and different subsystems dealing with the same product can appear, but with different mechanism of coordination (Zylbersztajn; Farina, 1999). Therefore, the SAG is constructed by a set of contracts whose design depends on the alignment of the transaction characteristics. However, different types of adaptation are necessary to correct eventual misalignment. For alignment can be considered the efficient design of contract arrangements that minimizes production and transaction cost, considers the institutional framework of these arrangements, and social and environment aspects as well.

Building blocks

Who are the actors?

It is essential to understand how the chain is organized to have a view of the processing stages of the product. There are alternative ways of organizing relationships among economic units in order to take advantage of the division of labor and economize on bounded rationality and safeguarding parties against contractual hazards (Ménard, 2005, p.282). These institutional arrangements are named institutional

structure of production (Coase, 1992) or mechanisms of governance (Williamson, 1996). “An institutional arrangement is an arrangement between economic units that governs the ways in which these units can cooperate and/or compete.” (Williamson, 1991, p.287).

For AGS’s analysis, a complex form of organization is considered and it involves different agents. Some of them are directly involved in the transactions of production system, i.e. companies of farm supply sector, farmers, agro-industry, wholesale, retail, and the facilitators - transport companies, insurance companies, and others (fig.3).

Fig. 3. Production System

Additionally, there is the organizational environment as well which is formed by agents who indirectly participate in the production system (fig.5). They are important for chain operation, but they are not the agents of production system, despite being part of the AGS. In this sense, educational and research institutions, financial institutions, public and private bureaus as named by Williamson (2002), and others are part of organizational environment. For this level, bureaucracy is considered, what means “the support staff that is responsible for developing plans, collecting and processing information, operationalizing and implementing executive decisions, auditing performance, and, more generally, providing direction to the operating parts of a hierarchical enterprise.” (Williamson, 1996, p.377)

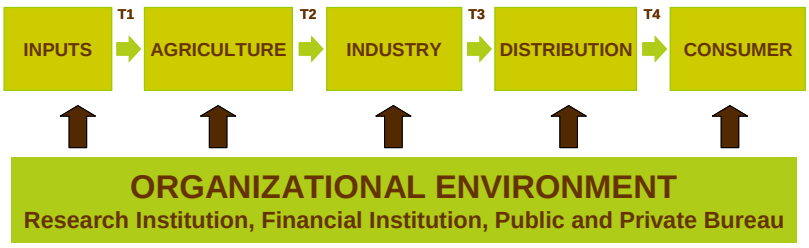

Fig. 4. Organization Environment

Institutional environment: Formal and informal institutions

Institutions are rules that provide a set of incentives and disincentives for individual. They arise and evolve because of the interaction of individuals (North, 1986). Hence, the institutional environment is the

"rules of game" that are formed by formal and informal institutions. In other words, institutional environment is: "The rules of the game that define the context in which economic activity takes place. The political, social, and legal ground rules establish the basis for production, exchange and distribution." (Williamson,1996, p.378). According to Greif's conception (2005), the distinction of formal and informal institutions can be considered public and private institutions, respectively. For public institutions, sanctions provided by State are considered. While private institutions are economic and social sanctions defined and applied by economic agents.

These institutions enforce the transaction performance among the agents of chain. For formal institutions, rules such as constitutions, laws, property rights are considered; therefore the State is involved as the source of coercion. However, the self-enforcement can be practiced by private agents, through codes of behavior or conduct, sanctions, taboos, customs, and traditions (North, 1990).

Self-enforcement can be observed in long-term relation. For Goldberg (1976, p.432): "The longer the anticipated relation and the more complexity and uncertainty entailed in that relation, the less significance will be placed on the price and quantity variables at the formation stage." The rules established will emphasize the governance of relationship and reputation will be taken into account. In this sense, reputation is a form of contract enforcement and it is not necessary public rules for coercing contract performance. However, when the agents have not created a reputation yet the private rules might not be enough to enforce a contract performance and the State intervention will be necessary.

The distinction between public and private institutions is not so clear. This aspect can be verified on AGS's analysis which transactions are performed in long-term contracts that involves the reputation of transactors. For Goldberg (1976, p.53), "[…] the line between private and public rules (restrictions) is blurred, and that to achieve desirable results society will have to erect a set of barriers or restrictions (transaction costs) to channel behavior; this set of barriers will establish a complex admixture of public and private jurisdictions." The difficult is not only to define the difference between public and private rules, but in what is being regulated and not in the act of regulation itself (Goldberg, 1976, p.426).

Considering AGS as an institutional arrangement, the agents are interconnected. Private institutions can perform the relation and agents can solve conflicts as well. These informal institutions are more flexible what allow the agents make renegotiation and a better adaptation for a dynamic environment. On the other side, there are formal institutions as well. We could make an assumption that when there is no rule established by State, private mechanisms will provide guarantee for contract performance. Using this assumption, private mechanisms will be applied when there is no juridical security or when there are high costs for reaching legal mechanisms.

On the other side, opportunistic behavior might exist and State coercion would be an option for

avoiding it. For Eggertsson (1990), government regulation would induce specialized investments and motivate long-term contracts, because there is State guarantee. However, in the absence of government regulation, the agents use other mechanisms to protect their specialized investments. On the other perspective, private and public institutions can coexist and they can be considered as complementary instruments (fig. 7). The complementarity view suggests the use of public and private institutions because they provide more efficient outcomes than the use of each institution individually (Klein, 1992, Mazé, 2005). This complementarity between the existence of contract law and the reputation as mechanism for private contract enforcement can be observed on the AGS's analysis.

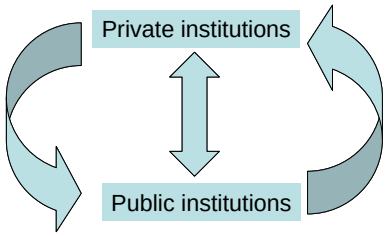

Fig. 5. Institutions dynamic: public and private institutions

Analysis of feasible forms of institutional arrangement considers institutional environment (fig.8). In this sense, institutional arrangement takes into account different ways of contract enforcement. However, sustainability aspects are part of institutional environment and institutional arrangement. Therefore, contracts performance also concerns sustainability aspects.

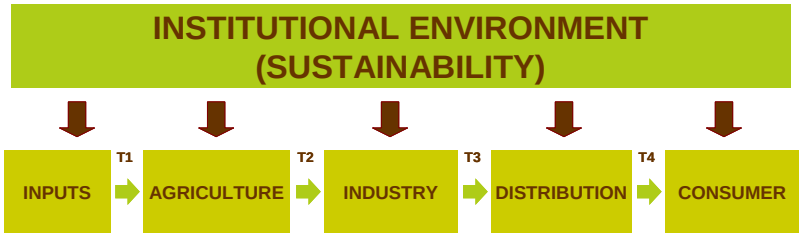

Fig. 6. Institutional Environment

In case transactions are performed spontaneously, considering sustainability aspects, private institutions would be enough. It means there is equilibrium between the agents, they concern ecological environment, and promote social improvement. However, if agents do not have incentives for sustainable practice in a spontaneous way, it will be necessary State coercion. It can be observed the dynamic of institutions between private and public rules described above.

In case of Brazil, for ecological environment preservation, farmers

must obey Forest Code that establishes rules for land use. This regulation distinguishes three areas in all property: A) areas of permanent preservation which include the areas along rivers and other water bodies, steep slopes, top of hills and mountains. These areas are prohibited be used economically and removed their vegetation. B) legal reserve, that private landowner are obligated to keep 20% of their land in native forest, if it is located in the south and southeast region of the country, 35% for savannah in the northern region, and 80% in the Amazon forest. C) the third area is the remainder of the land and can be used freely. The environmental interests would not be able to achieve these levels, if the point of departure had been the complete absence of legislation (Mueller and Alston, 2007).

Other example of sustainability issue is social inclusion into biodiesel chain. Considering private rules are not enough for promoting incentives to include family farmers into biodiesel production system, it is necessary public rules. In this sense, the Ministry of Agrarian Development created the “Social Fuel” seal. This seal certify that biodiesel industries use source from small farmers.

CONCLUSION

A framework for analyzing interactions and outcomes of linked social-ecological system can be considered for AGS’s analysis. For sustainable aspects, the analysis should consider aspects such as environmental friendly, job creation, social development, regional development, work conditions. The AGS faces the changes in the business environment and it responds through continuous innovation. Environment and social issues are concerned besides economical performance of organization. The growing concern of consumers regarding the environmental impact of their purchases calls for new ways of developing, producing and marketing products. Therefore, new ways of organization and the relation among the agents involve the sustainability concern. On the other side, the markets deserve more efficient mechanism that mobilizes all the competencies of AGS. The challenge for analyzing AGS is to build an arrangement in order to reach the efficiency and consider the environment and social issues as well. For this reason, there is a need to understand and design the relationships between environment and the governance structure of the actors involved into the AGS. Sustainability issues are observed by all agents involved in the production system. Moreover, institutional environment takes them account as well.

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