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Ownership versus management: the role of farming networks in Argentina

Special issue: Agroholdings and mega-farms in a global context

REVIEW ARTICLE

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Abstract

Agroholdings are 'horizontally and vertically integrated agricultural and agribusiness enterprises, which often have an explicit holding structure consisting on quite a number of legal entities'. This might be true in the countries the authors evaluated, but it certainly is not the case in Argentina, where horizontal and vertical coordination (rather than integration) is the norm. During the last 25 years the institutional environment impacted the way farming is organized in Argentina, mainly by using contracts between different players and service providers. The agricultural production sector increasingly shifted from a low to medium and to a large-scale business model, and production units expanded horizontally by means of land leases (coordination) and purchases (integration) in order to increase the scale of production and dilute fixed costs in an attempt to generate higher margins. In that sense this paper arises four questions: (1) why is it that in Argentina large-scale farming is predominantly done via contracts instead of vertical and horizontal integration?; (2) why have large-scale farming networks recently stalled or even declined in terms of area growth?; (3) how and why do these networks vary their scale of production, locations and strategies?; and (4) what can we expect in terms of evolution of different types of large-scale farming? It is observed that in Argentina there were different institutional contexts, sometimes with clearer and more stable conditions and low levels of uncertainty, sometimes with higher intervention policies and transaction costs. The paper discusses how new organizations emerged during different periods and scenarios, in a context of increased international demand for agricultural commodities. The most relevant conclusions drawn from this analysis are that, in Argentina's agriculture, there is a continuous shift from ownership to management, although consolidation towards larger scale entities has slowed down due to the existence of institutional and policy restrictions.

Keywords: hybrid forms, agroholdings, innovation, institutions, adaptation
JEL codes: D23, L14, Q13

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1. Introduction

Agroholdings, as defined by Balmann *et al.* (2013), are 'horizontally and vertically integrated agricultural and agribusiness enterprises, which often have an explicit holding structure consisting on quite a number of legal entities'. This might be true in the countries the authors evaluated, but it certainly is not the case in Argentina, where horizontal and vertical coordination (rather than integration) is the norm.

In Argentina, farming traditionally took place in small and medium-sized family farms, mostly by means of their own land, labor, capital (which would entail a full integration) and entrepreneurship. Farmers owned enough equipment to cope with all required activities of the production cycle. This traditional family farm model is the dominant organizational form in agriculture in almost every country (Allen and Lueck, 1998).

Over the past 25 years, different institutional changes have impacted the way farming is organized in Argentina. The agricultural production sector increasingly shifted from a low to medium and to a large-scale business model, and production units expanded horizontally by means of land leases (coordination) and purchases (integration) in order to increase the scale of production and dilute fixed costs in an attempt to generate higher margins.

Several different hybrid organizational forms (Ménard, 2004) in agriculture emerged, which significantly changed the nature of relationships between the participants involved in Argentina's agri-food system. Some landowners and farmers without land invested in modern machinery and leveraged their knowledge and resources on new leased lands, controlling larger farming operations, with higher technological levels, which helped reduce costs. Added to this, some agents specialized in custom agricultural services (such as seeding, spraying and harvesting) and invested in modern farming equipment and machinery. Therefore, agents involved in agriculture were becoming specialized in a few activities or services, which created the need for coordination.

Various authors indicate that a high percentage of agricultural production in Argentina is carried out via some form of horizontal or vertical coordination. Vilulla and Amarilla (2011) state that this figure stands at over 60%, Pengue (2014) establishes it around 60-65%, Hernández and Muzlera (2016) from 70-85%, while Bisang *et al.* (2008) identify several different percentages of services supplied to farmers by third parties, ranging between 60 to 95%, depending on the type of service.

We expand on the definition proposed by Balmann *et al.* (2013) (*op. cit*.), by creating three categories of agroholdings that help to better show the diversity of arrangements within the broader concept. With the evidence provided by the argentine case, we define an agro-holding as the concentrated management of over 20 thousand hectares, while defining the three previously mentioned groups as: (a) Private enterprises or corporate farms, where integration is predominant; (b) Network of networks, in which a company acts as a coordinating node that generates contracts with local agents; and (c) Investor-oriented hybrids, where an agricultural company is created by pooling financial resources from various partners, while keeping a centralized coordination of the enterprise. It becomes clear from the existing literature that the first category has been the main subject when dealing with agroholdings (e.g. Chaddad, 2014; Deininger and Byerlee, 2012). This paper builds upon the concept of agroholdings by exploring the latter two categories. Its main addition to the study of agroholdings comes from the particularities in their development in Argentina, where increasingly agriculture is organized based on management (and coordination) rather than ownership, with an array of hybrid forms dominating agriculture as a result.

As a result, the questions posed by this paper are: (1) why is it that in Argentina large-scale farming is predominantly done via contracts instead of vertical and horizontal integration?; (2) why have large-scale farming networks recently stalled or even declined in terms of area growth?; (3) how and why do these networks vary their scale of production, locations and strategies?; and (4) what can we expect in terms of evolution of different types of large-scale farming?

The paper is organized as follows. In the next two sessions, we outline the theoretical framework and methods used in the paper. Subsequently, the emergence and evolution of agroholdings in three different periods are described and analyzed. Then, the paper introduces a discussion on the interplay between the institutional and organizational environments and how this generated the need for adaptation by agroholdings since 1990. The last section includes conclusions, recommendations and queries for future research.

2. Theoretical framework

The analysis of the recent evolution of the farming sector in Argentina is based on the new institutional economics (NIE). Hoff *et al.* (1993) state that traditional neoclassic economic theory does a good job of explaining economic systems when markets 'work' reasonably well, but it fails in the presence of 'missing markets' within those systems. This is the reason why the price mechanism cannot regulate transactions on its own. In business models, where gaining scale and efficiency are of great importance, the precepts proposed by NIE scholars explain reality in a more adjusted way. In particular, the paper follows two NIE pathways introduced by Joskow (1995, 2004) and Williamson (2000): the institutional analysis and the governance structure analysis (Table 1).

According to this model, the first level of institutional analysis is the social embeddedness level. 'This is where the norms, customs, mores, traditions, etc. are located' (Williamson, 2000: 596). This has a strong relation with trust, reliance and compliance to agreements between agents. North (1990) refers to this level as 'informal institutions,' generally associated to the self-enforcement of contracts and rules (with no institutional control), both for ethic and reputation purposes. In this case, social punishment is the way of controlling opportunistic behavior of agents. The frequency of change is between 100 to 1000 years, following spontaneous innovation and not related to a change driven by someone.

The second level of analysis encompasses the basic institutional environment or what Williamson calls 'the formal rules of the game'.

> At this level we define constitutions, political systems and basic human rights; property rights and their allocation; laws, courts and related institutions to enforce political, human rights and property rights, money, basic financial institutions, and the government's power to tax; laws and institutions governing migration, trade and foreign investment rules; and the political, legal and economic mechanisms that facilitate changes in the basic institutional environment. (Joskow, 2004: 10).

Table 1. Levels of analysis in institutional economics (adapted from Williamson, 2000),

Level	Frequency of changes (years)	Purpose	Discipline
L1-Embeddeness: informal institutions, customs, traditions, norms.	100 to 1000	Spontaneous	Social theory
L2-Institutional environment: formal rules of game, especially property (policy, judiciary, bureaucracy).	10 to 100	Get institutional environment right First order economizing	Economics of property rights Positive political theory
L3-Governance: play of the game, especially contract (aligning governance structures with transactions).	1 to 10	Get governance structures right Second order economizing	Transaction cost economics Agency theory[1]
L4-Resource allocation and employment (price and quantities incentives alignment).	Continuous	Get marginal conditions right Third order economizing	Neoclassical economics

[1] The authors included Agency theory at L3 due to its impact on contracts.

> This opens up the opportunity for first-order economizing: get the formal rules of the game right (Williamson, 2000: 598).

This is due to innovations in terms of norms and regulations that are aimed at reducing uncertainty and transaction costs. The frequency of change varies from 10 to 100 years, depending on the level of path dependency (North, 1990) these formal norms have.

According to North (1990), institutions matter especially when transaction costs are high. Following Kherallah and Kirsten (2001), it is important to study institutions inasmuch as their level (and the enforcement of current laws) influences economic growth and sustainable economic growth comes from important institutional changes. A fragile institutional environment often results in low levels of investment and innovation due to the uncertainty in appropriating value resulting from investments (Brunetti and Weder, 1998; North, 1990).

The third level of analysis is related to the organizational environment and how the actors interact. This is where the institutions of governance (or governance structures) are located.

> Although property remains important, a perfectly functioning legal system for defining contract laws and enforcing contracts is not contemplated ... settlement action is dealt with directly by the parties through private ordering. (Williamson, 2000: 599)

Williamson (1991: 271) suggests that 'each viable form of governance – market, hybrid, and hierarchy – is defined by a syndrome of attributes that bear a supporting relation to one another'. Williamson (1991) advances the hypothesis that each generic form of governance is supported by a different form of contract law; and that there are crucial differences between markets, hybrids and hierarchies in how they adapt to changing circumstances (related to the attributes of transaction: frequency, uncertainty and asset specificity) and in the use of incentive and administrative control instruments.

According to transaction cost economics, hybrid forms such as the farming networks analyzed in this study, are characterized by 'semi-strong incentives, an intermediate degree of administrative apparatus, displays semi-strong adaptations of both kinds and works out of semi-legalistic contract law regime' (Williamson, 1991: 281). Ménard (2004: 348) argues that 'there is indeed a great diversity of agreements among legally autonomous entities doing business together, mutually adjusting with little help from the price system, and sharing or exchanging technologies, information and know-how, capital, products, and services, but without a unified ownership'. Ménard's (2004) central proposition is that hybrid organizations form a 'specific class' of governance structures, combining contractual agreements and administrative entities or 'authorities,' with the purpose of coordinating partners' efforts to generate rents from mutual dependence while attempting to control the risks of opportunism, while facing bounded rationality (Simon, 1957) and asymmetric information (Akerlof, 1970). Under this view, hybrid forms emerge as a way of reducing uncertainty especially regarding the appropriation of property rights. Moreover, informal institutions (related to ways of doing business), combined with formal arrangements, help these hybrid forms reduce uncertainty and transaction costs.

Since this third level of analysis is where transactions are organized and actors interact, here is where agency theory (Arrow, 1963, 1968; Jensen and Meckling, 1976) becomes more relevant to explain the relationships between actors. Agency theory is based on the existence of incomplete contracts and the asymmetry of information between two people celebrating a contract (Caldentey, 1998). Jensen and Meckling (1976) define an 'agency relationship' as a contract under which one or more persons (the principal) contract another person (the agent) to carry out an activity for the benefit of him or them, thus delegating responsibility. The agency relationship involves costs related to monitoring and control by the principal, especially when attempting to gain information about the agent's performance or possible opportunistic behavior. In terms of agriculture, the larger the scale and the longer the distances, the harder it becomes for the principal to control the agent.

Contracts may offer a way to achieve these purposes due to the fact that the principal is able to select a partner, determine the duration of the relationship, specify quantity and quality requirements, lay out procedures for regulating renegotiations when ex post adaptation is required, and specify rules for distributing the expected gains from joint actions. Despite this apparent 'control' of the contractual relationship, in order to understand its success or failure, several other aspects must be taken into account, such as social structure, level of information shared between actors, frequency of transaction, level of organizational uncertainty (related to information asymmetry, opportunism and bounded rationality), level of trust, reputation and leadership, type of contracts (formal and informal), incentives and control, the specificity of assets involved in the transaction.

This paper will also take into account the literature on complex organizations. The idea is to bring to light the relevance of how dynamic capabilities (Teece *et al*., 1997) affect the performance of relational contracts. This concept explains that there are aspects of a company's or sector's competitiveness that are difficult to replicate, such as those related to processes and routines, positioning and path dependence. Regarding processes, it is considered that firms develop competitive advantage by management and organization, for instance, by non-replicable work culture. Regarding positioning, firms can create advantages by special business know-how, reputation and relationship development. Path dependence analysis consists on recovering the origin of the firm to identify capabilities that were developed through years. This is relevant because they cannot be bought in the market and are difficult to imitate. Capabilities are created inside organizations, based on their past and personal relationships, and developed through time. They are key to understand management practices.

3. Methodology

This study focuses on the interplay between analytic levels 2 and 3 of Table 1; in particular, how changes at the institutional environment level in Argentina affect the design of governance structures by agents engaged in agriculture.

A qualitative and descriptive research approach is adopted to accommodate the complexity and multi-dimensionality of the research topic. The research has an explanatory level, taking into account that it seeks to develop and clarify concepts and ideas, with a view to formulating more precise problems or hypotheses that can be examined in further studies, besides having a less rigid planning, not applying quantitative techniques and being carried out with more practical concerns (Gil, 1994).

This paper uses phenomenological knowledge as its methodology for studying agribusiness, as recommended by various authors (e.g. Bonoma, 1985; Peterson, 2011; Yin, 1989). This study is designed using the discrete structural analysis approach – that is, a description of the evolution of the agricultural production sector in Argentina through the characterization of its institutional, organizational and technological environments (Williamson, 1991; Zylbersztajn, 1996, 1999).

The paper analyzes the main institutional changes in Argentina for the periods 1990-2000, 2001-2007 and 2008-2012. These periods were chosen due to the significant changes that happened at the macroeconomic and institutional levels, with some drastic changes from one period to the next, which generated significantly different 'rules of the game'. Institutional (rules of law), organizational (players and governance structures adopted) and technological (inputs and processes) environment changes in each period are used to explain subsequent changes in production, productivity and investments in the agricultural production sector.

This paper relies on primary and secondary data for the analysis. Interviews with experts were conducted in 2009 and 2014. Industry experts include participants and managers of different hybrid forms and agribusiness consultants. A total of eight experts, representing the four identified hybrid forms were interviewed. The experts are or have been directors, managers, or chief executive officers of organizations dedicated to large-scale agricultural production, such as Cazenave y Asociados, Cresud, DTA, Los Grobo, El Tejar, Salentein and UPJ. Another six interviews with farming service suppliers were conducted, in order to get information about

contracts between these actors and farm managers. Finally, interviews with 10 landowners were conducted with the purpose of understanding how land rental contracts are negotiated and what type of relationship develops between landowners and renters. The data collection instrument included general information questions regarding the development of new organizational forms in Argentina and specific questions regarding coordination and control mechanisms used in each hybrid structure. Moreover, the questionnaire included open-ended questions related to the importance of leadership in agroholdings, formality of contracts, incentives, business units, partners, and financial issues guided by the theoretical framework described above. The results obtained from the interviews allowed the authors to group, categorize, describe and define four hybrid models, which are the basis for our analysis of agroholdings in Argentina.

Secondary information, especially regarding institutional and technological innovations, was obtained from several sources including ministries[1], chain associations[2], university libraries[3], specialized magazines[4], newspaper articles[5], and postgraduate and undergraduate theses on the subject. Additionally, the papers published by Papa and Tuesca (2012), Pengue (2014), Lódola (2008), Bisang and Kosacoff (2014) and Trucco (2008) provided estimations on the importance of contracts in large-scale agriculture in Argentina.

4. Results

Overall, the analysis covers the timeframe between 1990 and 2015, which will be divided into three distinct periods due to the fact that three very different institutional frameworks were in place. The first period (1990-2000) was characterized by economic liberalization and deregulation; the second period (2001-2007) was marked by debt default, currency devaluation, and the return of export taxes; and the final period (2008-2015) was a period of great governmental intervention where institutional uncertainty was strongly increased.

Economic liberalization and the birth of hybrid forms: 1990-2000

Until 1990, the agricultural production sector in Argentina was dominated by traditional family farms and farm production was primarily marketed in the domestic market. In order to describe the institutional environment until 1990, Ordóñez and Nichols (2003) explain:

> From 1930 to 1991 Argentina alternated weak democracies with strong dictatorships, both political settings sharing a welfare state paradigm with strong state intervention, protectionism, weak rule of law, imports substitution, rampant inflation and hyperinflation ...
>
> Nevertheless, with the first socialization of wealth during this period, the model ended with a poor output, low economic growth and low volume of foreign trade ... The core issue in this paradigm was to allocate the Pampas' productivity and rents to promote urban economy: export taxes on agribusiness output transferred a huge amount of resources to the State that were re-allocated to welfare policies, promoting the local industry for imports substitution. On the other hand, export taxes pushed down agribusiness prices, forcing cheap affordable food for the working class.

This introduction has an explanation: with high levels of intervention in the economy and uncertainty, farmers had weak incentives to invest in technology, increase the scale of their farming operations and develop different organizational forms. Agricultural production did not increase at a rapid rate during the period 1950-1990 and Argentina appeared to be left out of the 'green revolution'.

[1] Ministry of Agroindustry (www.agroindustria.gob.ar), Integrated system of agroindustrial Information (www.siia.gob.ar), Ministry of Energy and Mining (www.minem.gob.ar).
[2] ACSOJA, ARGENTRIGO, MAIZAR, ASAGIR (Associations for soybean, wheat, corn and sorghum, and sunflower).
[3] Agronomy School (University of Buenos Aires), Food and Agribusiness Program (University of Buenos Aires).
[4] 50 volumes of Márgenes Agropecuarios magazine, 20 volumes of Aapresid magazine, 10 volumes of Horizonte A magazine, 10 volumes of JJ Hinrichsen Annual Reports.
[5] Over 100 newspaper clippings from Clarín Rural, La Nación Campo and Infocampo.

Institutional changes were implemented in the early 1990s in order to move away from the high levels of inflation, unemployment and uncertainty of the previous decade. More specifically, the country embarked on dramatic economic liberalization policies that can be summarized as follows:

- Privatization of state-owned companies including port and river dredging, railways, oil companies, energy facilities, communications systems, highways and road systems, with subsequent increased private investments. As a result, the country's basic infrastructure was upgraded resulting in lower costs of doing business.
- The enactment of the Convertibility Law (Law 23.928/1991) (Ministerio de Justicia y Derechos Humanos, 1991) with the implementation of the currency board that linked the local peso to the US dollar (one peso-one dollar) resulted in a less volatile scenario in terms of inflation and exchange rate.
- Agricultural markets were also liberalized with the elimination of the grain and beef boards and reduction of State intervention.
- Elimination of export taxes for agricultural commodities and reduction of import tariffs on farm inputs (e.g. fertilizers, chemicals), which resulted in significant reduction of distortions between domestic and international prices.
- The enactment of the federal law protecting plant breeder's rights, together with the creation of the Comisión Nacional Asesora de Biotecnología Agropecuaria (CONABIA – the biotech commission) and the Instituto Nacional de Semilla (INASE – the national seed institute), provided private firms with the necessary protection to develop and introduce new agricultural technologies in Argentina. In particular, new soybean transgenic events were approved.
- The regulation of the trust funds Law (*fideicomiso*), which enabled agricultural financing by using the stock exchange market.

Convertibility fixed the currency rate and effectively nullified the risk of inflation. A more stable environment led farmers to invest in machinery with more producing capacity. On the other hand, competition among input suppliers became much stronger. This situation, coupled with a more certain 'business environment', resulted in further relationships between different agents – farmers, land owners, service suppliers, input suppliers, etc. – and great incentives to gain in scale in order to reduce unitary costs, coupled with risk-reducing strategies, such as seeding in different regions.

This resulted in the emergence of more complex forms of organization in agricultural production, especially designed to benefit from economies of scale and scope and to take advantage of profitable investment opportunities in the agri-food sector. Consequently, the structure of farming enterprises in Argentina shifted from traditional small and medium scale, family-owned farms to a large-scale model of agricultural production based on horizontal growth by integration and contracts.

One such model is that of private companies or corporate farms, in which growth happened mostly by integration. This meant that these companies purchased farmland in order to grow scale and internalized most of the processes such as seeding, harvesting and spraying. Some of these companies also rented land, but mostly as a way to better utilize idle capacity of machinery (Figure 1).

Some other organizational structures, which emerged at this point, focused on gaining scale by renting land and adding specialized services, including seeding contracts, custom contracts for specific farming activities, harvesting contracts, marketing contracts, future markets contracts, crop insurance contracts, among others. These are known as hybrid forms, which initially took two basic forms: (a) informal hybrid form; and (b) network of networks. Informal hybrid forms basically consist of short-term contractual relations, based on informal or verbal agreements, in which farmers participate in a number of transactions for services related to grain and oilseed production (land leases, production inputs, sowing services, weed and insect control, harvesting, commercialization and storage) (Figure 2).

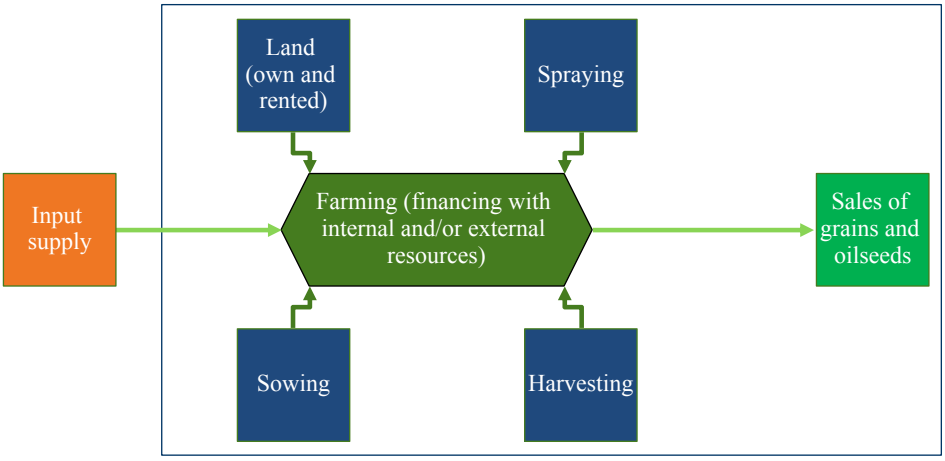

Figure 1. Corporate farms.

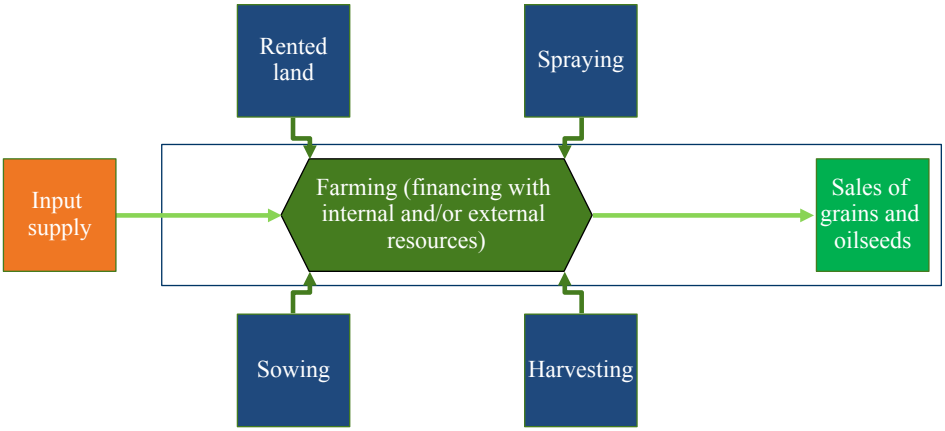

Figure 2. Informal hybrid forms.

The network of networks (agroholdings) is based on a network of contracts with local partners with specific knowledge, called 'contractors.' Generally, the whole network is kept in a specific area of influence, but this model has been spread to other regions beyond traditional ones (Figure 3).

The coordinating node acts as a central planner, coordinating activities between different network peripheral nodes. Some of these networks have subsequently expanded to other neighboring countries, including Brazil, Paraguay, Uruguay and Bolivia (e.g. Los Grobo and El Tejar). The main characteristics and differences between informal networks and the network of networks are described in Table 2. Local coordinators are players that have a tradition in the location where the expanding farmers enter. Reputation, knowledge about the region, potential new players to incorporate to the organization and leadership are especial skills these actors should have.

The common variable between all these organizational forms was the economies of scale achieved by them. In the case of the informal hybrid form, larger scale provided the possibility of heavier use of machinery, thus amortizing the investment in a quicker fashion and gaining in bargaining power with suppliers and landowners.

In the case of corporate farms, the incentive was to spread and diversify farming area (reducing risk) and reduce unitary costs. The network of networks model also took advantage of the benefits reaped by corporate

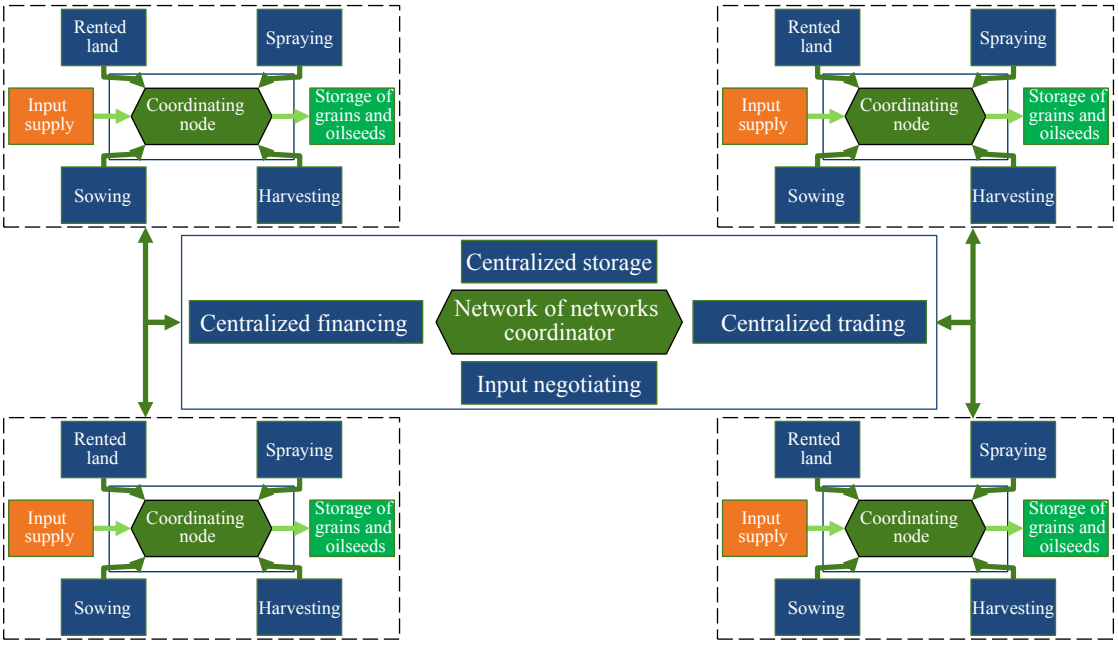

Figure 3. Network of network organization.

Table 2. Main characteristics of the informal hybrid form and network of networks (adapted from Chaddad *et al.* (2009) and supplemented with information from interviews).

	Informal hybrid form	**Network of networks**	**Corporate farms**
First appearance in Argentina	1990	1995	1990
Contract type	Informal, relational	Both formal and informal (based on trust)	Vertical and horizontal integration
Contract duration	Short term (1-3 years)	Short and long term (more than 5 years)	–
Actors involved	Farmers and service suppliers	Coordinator, land owners, service suppliers, banks, outside investors	Manager/director/ CEO; local managers; administrative support.
Sources of finance	Farmer's own capital and credit from input suppliers	Internal and external, including banks, external investors and input suppliers	Internal and external, including banks and external investors.
Average production area	1000 to 5,000 hectares (owned and leased land)	20,000-350,000 hectares (mostly leased land)	20,000-350,000 hectares (mostly owned land)
Organizational uncertainty	Medium	Very low (importance of trust)	Medium-low (determined by agency costs)
Leadership	Not really important	Very important (central coordinator and local managers)	Very important (centralized decision-making)
Incentives	Low (due to the impossibility of long term contracts)	High (participants must fulfill agreements)	Medium (due to vertical integration, although monetary incentives are attempted as solution)
Relationship-specific assets	Low (know-how)	High (know-how, reputation of actors, technology)	Low

farms, while adding an interaction with different types of partners (not only contractors, but also storage service companies).

It is important to note that both these hybrid forms and corporate farms co-exist, even though some informal hybrid forms evolved into networks of networks. What is clear is that, out of the two hybrid types, only the network of networks model has grown to a size where we can define them as agroholdings. Most of the informal hybrid forms have remained in relatively small scale (not more than 5,000 hectares), due to the financial and organizational challenges. The comparison can be observed in Table 2.

The technological environment also saw great innovations with the introduction of no-till farming practices and intensive use of fertilizers, agrochemicals and genetically modified seeds. Moreover, industry players, such as transnational companies ADM, Cargill, Bunge, Dreyfus, Nidera and some other domestic companies, such as AGD and Vicentín, also made new investments in modern, large scale sunflower and soybean processing plants, resulting in higher processing capacity primarily destined for export markets.

Economic crisis and currency devaluation: 2001-2007

The late 1990s witnessed significant economic turmoil in emerging economies culminating with the 1998 currency devaluation in Brazil, which followed Mexico's 1994 crisis. Both of them significantly affected Argentina's competitiveness and ability to export. In addition, the federal budget sustained a deficit of about 2.5% of the gross domestic product. The government decided to raise tax rates and to adjust the convertibility system pegging the Argentine peso to a currency basket with a 50-50 combination between the US dollar and the Euro. Investors understood that this adjustment could lead toward currency devaluation and short-term interest rates immediately jumped, while a 'silent' run on banks (with significant reduction in bank deposits and increasing withdrawals) began in September 2001 (Saxton, 2003).

New and abrupt institutional changes occurred by the end of 2001. The president's resignation, followed by a sequence of 5 presidents in 2 weeks, created a chaotic political scenario. Debt payment to foreign and local bondholders was suspended, characterizing a massive sovereign debt default. On January 1 2002, Eduardo Duhalde assumed the presidency, determined to reverse free market policies, in particular the convertibility system (Saxton, 2003). Under the Law of Public Emergency and Reform of the Exchange Rate Regime of January 6, 2002 and related measures, the government:

- Ended the convertibility system, in effect confiscating $14.5 billion in foreign reserves that, under the convertibility system, were held in trust for the Argentine people and other holders of pesos.
- Devalued the peso from the previous rate of 1 per dollar to 1.40 per dollar, and later floated the exchange rate, allowing further currency depreciation. The peso peaked at $4 per dollar and stabilized at around $3 per dollar.
- Forcibly converted bank deposits and loans denominated in US dollars into pesos (*pesificación*). Deposits were converted at 1.40 pesos per dollar loans, at 1 peso per dollar. Interest rates were frozen at pre-devaluation levels.
- Forcibly prolonged time deposits (the Spanish name for this measure is the *corralón,* or big corral, to distinguish it from the earlier *corralito*). Depositors were unable to freely access their bank accounts and cash withdrawal limits were set at 250 Argentine pesos per week.
- '*Pesified*' contracts in dollars at 1 peso per dollar.
- Imposed exchange controls with restrictions on buying foreign currencies.
- Suspended bankruptcy proceedings.
- Established a variety of new taxes and regulations, such as export taxes on agricultural commodities and State controls on exports (similar to those implemented before the 1990s).

Schuler (2002) identified the most pressing problems to be addressed in order for the country to restore economic growth: the currency, the financial system and the tax system. Because economic agents did not trust the currency or the banking system, people were not conducting ordinary transactions such as buying,

selling, saving and investing, which are necessary to generate economic activity (Ordóñez and Nichols, 2003). On the other hand, funds available for credit were almost nonexistent.

Despite this chaotic scenario, the agricultural system benefited from currency devaluation. However, by 2002 export taxes were implemented again for the major farm commodities. Because land and trade credit markets froze, financial constraints were widespread among agricultural producers and networks. Margins in agriculture became interesting not only for farmers or contractors, but also for outside investors who did not trust the banking system. This situation opened the possibility for agricultural production ventures to offer them investment opportunities. These were private investors, not necessarily linked to agriculture, who required additional organizational changes to participate in funding agricultural production, be it hybrid forms or corporate farms.

As a result, farmers and financial agents developed more complex arrangements and business relationships involving contractors, landowners, input suppliers, processors, exporters and outside investors. Contracts in agriculture provided the level of enforcement that was necessary to attract new partners but also to expand and develop the sector.

Two organizational hybrid forms evolved and gained market participation following the 2001 crisis: (a) agricultural trust funds; and (b) investor-oriented hybrid forms. An agricultural trust fund is a contractual-legal figure enforced by National Law 24,441/1995 (*Ley de Fideicomiso* or Trust-Fund Law) (Ministerio de Justicia y Derechos Humanos, 1995). This entity includes an investor and a group of actors linked to an investment capital receiver (the coordinator of the organization). There is, in turn, a third party (generally a financial institution) that guarantees that the coordinator fulfils contractual obligations to the other trust fund parties unquestionably (Figure 4).

The investor-oriented hybrid form emerged as a mechanism to organize agricultural production using financial resources from several partners. Although often associated with common investment funds, investor-oriented corporate structures appear more private, between producing parties and investing parties (Figure 5).

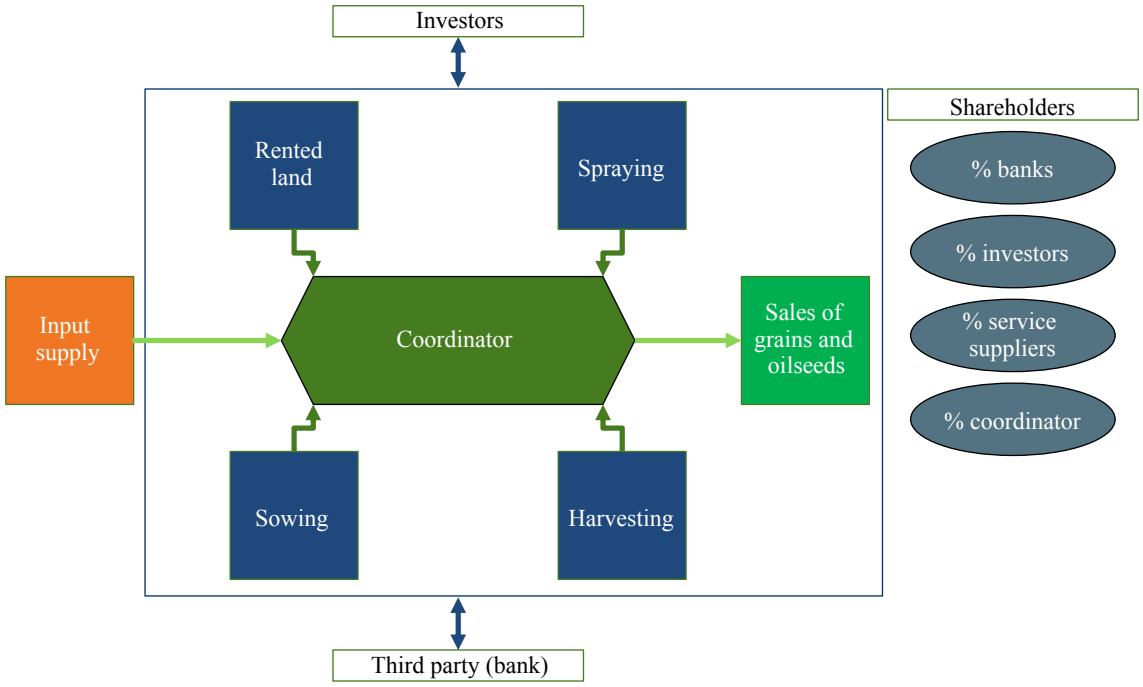

Figure 4. Agricultural trust funds.

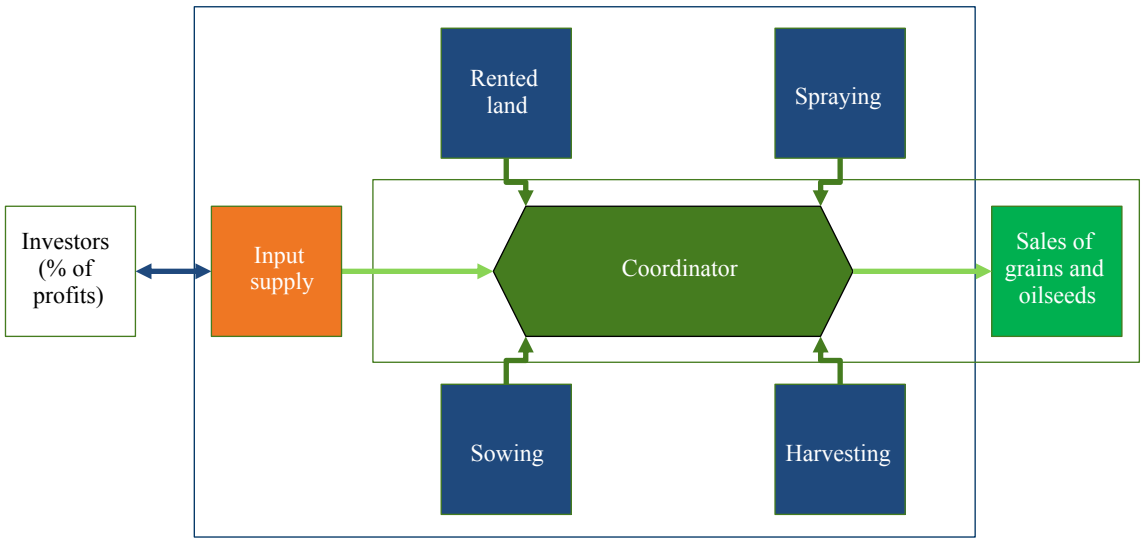

Figure 5. Investor-oriented hybrid form.

The main characteristics of and differences between agricultural trust funds and investor-oriented hybrids are described in Table 3. The common attribute between both hybrid forms was the necessity to attract risk capital from investors, which led them to arrange transparent and enforceable contracts that could incentivize investors to participate. Agricultural trust funds and Investor-oriented hybrids co-existed during this period, while the Informal hybrid and Network of networks forms also continued to operate in farming.

Within the technological environment, there were also significant innovations between 2001 and 2007 with widespread implementation of no-till cropping systems, precision agriculture, intensive use of fertilizers, agrochemicals and genetically modified seeds in the major agricultural regions. The soybean and sunflower crushing capacity continued to expand during this period and so did agricultural commodity exports. With these innovations, producers were able to overcome the financial constraints that followed the 2001 economic

Table 3. Main characteristics of Agricultural trust funds and Investor-oriented hybrids networks (adapted from Chaddad *et al*. (2009) and supplemented with information from interviews).

	Agricultural trust funds	**Investor-oriented hybrids**
First appearance in Argentina	Early 2000s	Late 1990s
Contract type	Formal	Formal and informal (friends and relatives are part of the business)
Contract duration	Short to medium term (1-3 years)	Short term (1 year)
Actors involved	Banks, lawyers, financial organizations, coordinator (administration company) of service and contracts with farmers, service and input suppliers	Coordinator of services-contracts-inputs, capital investors, lawyers, accountants
Sources of finance	Institutional and private investors	Private external investors
Average production area	5,000-10,000 hectares (mainly leased land)	10,000-100,000 hectares (leased land)
Organizational uncertainty	Low	Low
Leadership	Medium	Low
Incentives	High	High
Relationship specific assets	Medium (know-how, reputation of actors)	Medium (know-how, reputation of actors)

crisis. In doing so, they attracted risk capital from investors and thus benefitted from the commodity boom of the 2000s.

Increased government regulation and uncertainty: 2007-2015

By the end of 2005, the national government started to regulate agricultural markets and placed restrictions on exports, particularly on bovine livestock (beef and dairy products) and subsequently on wheat. However, the agricultural sector did not suffer significant changes at the institutional level until 2007.

In 2007 and 2008 the international price of soybean (Chicago Board of Trade (CBOT)) – Argentina's main agricultural product and export – exceeded US$ 500 per ton. International commodity price increases led the government to establish significant changes in export taxes for all agricultural products with Resolution 125 in 2008. This resolution included the implementation of variable export taxes on commodity exports, thus installing *de facto* maximum prices for farmers. For instance, when the price of soybean in CBOT was lower than 450 US$/ton, the export tax stood at 35%. From that point on, export taxes would vary based on international prices: the higher the CBOT price, the higher the percentage of the export tax. After many protests and strong resistance from agricultural leaders, the resolution was sent to Congress, where the measure was annulled.

Despite the return of export taxes and the fall of international commodity prices following the 2008 world financial crisis, interventionist measures on commodity markets continued, including restrictions on wheat and corn exports. Additionally, further institutional changes included the recently sanctioned National Forest Law and Labor Law, which have set clearer boundaries for deforestation and protection of natural forests on the one hand; and new requirements for employers with heavy restrictions on temporary labor on the other. All these interventions on agriculture resulted in higher overall uncertainty and lower incentives for investment. As a result, risk capital supplied by outsider investors was substantially reduced. Companies, banks and individual investors decided not to continue investing in farming, or even reduce their level of investments, due to the higher institutional uncertainty and lower commodity prices.

During this period, the hybrid forms that continued to operate in Argentina included the network of networks (agroholdings) and informal hybrid forms, shifting to short-term contracts. The other hybrid forms decreased in importance as farming in the late 2000s did not offer sufficiently high returns given the exceedingly high levels of uncertainty, especially for outside investors.

Macroeconomic policy generated an increase in production costs (energy, labor costs, fuel, supplies, etc.) and tax about 40%. At the same time, the emergence of weeds with resistance/tolerance to glyphosate, has also generated an increase in production costs, with more spraying per hectare, using costlier products.

The drop in the price of commodities and on farm margins occurred at the same time that the cost of management, administration and control in the network began to have a significant weight in the total cost structure. The increased costs of controlling the contract system, in remote areas away from the central node of production, to keep transaction and agency costs low, reduced farm profitability even further. As a result, the large networks reduced their expansion or even decreased the area in which they operate, even though total sown area in the country has not decreased. Currently, most of them are only farming on the most productive areas, attempting to reduce uncertainty and transaction costs.

5. Discussion

An analysis of the institutional, organizational and technological environments allowed us to understand the evolution of farming and agribusiness in Argentina during three different periods.

As Joskow (2004: 10) states, 'laws and institutions governing migration, trade and foreign investment rules; and political, legal and economic mechanisms facilitate changes in the basic institutional environment'. Changes in terms of norms and regulations can reduce or increase uncertainty and transaction costs. Observing argentine institutional evolution, there appears to be a strong relation between the level of institutional uncertainty and investments by agricultural players, which has a direct impact on the type of farming carried out in the country. This, of course, plays a major role in defining the type of agroholdings present in Argentina, which are predominantly hybrid forms of horizontal and vertical coordination. Only big (international and local funds) investors with local dynamic capabilities (Teece *et al.*, 1997) as know-how, reputation and relationship play a minor role in vertically integrated, large-scale farming.

The first hybrid organizational forms (with higher scales) emerged during the first period of analysis (1990-2000) in order to take advantage of the higher capacity of machinery and to reduce costs (especially fixed costs). But these contracts became possible only because of the low institutional uncertainty and low transaction costs that prevailed at that time. Following Coase (1998) low uncertainty laid the groundwork for stronger and more transparent relationships between economic agents, thus facilitating the emergence of new organizational forms that were markedly different from the traditional family farm. The 'network culture', which arose in this period, made it possible for new participants with no previous knowledge or experience to be included in the business, thus kick-starting the second wave of hybrid forms. The average production area was between 1000 and 5,000 hectares. The 'network culture' was born and, which would set the stage for the emergence of contract-based agroholdings some years later. So, how have organizational structures developed in the agricultural sector in Argentina over time?

Abrupt institutional change occurred by the end of 2001. Debt payment to foreign and local bondholders were suspended, characterizing a massive sovereign debt default. Despite the chaotic scenario, the agricultural system benefited from currency devaluation. However, by 2002 export taxes were implemented again for most agricultural and agroindustrial commodities.

As stated before, the financial system and the tax system are pressingly important, while at that point in time, economic agents' lack of trust in the currency and the banking system, caused that ordinary transactions such as buying, selling, saving and investing were not taking place ordinarily. This freezing of land and trade credit markets generated widespread financial constraints among agricultural producers and networks. The combination of lack of trust many investors had in the financial system, coupled with financial needs for producers created an opportunity for a bond between this demand and supply of financing. This situation opened the possibility for agricultural production ventures to offer common investors investment opportunities associated with agriculture. This necessitated additional organizational changes to create organizational structures that would allow for participation in funding agricultural production, be it hybrid forms or corporate farms. Informal institutional environment (culture, ethic and tradition) played an important role to reduce transactional uncertainty. These were private investors, not necessarily linked to agriculture, who required additional organizational changes to participate in funding agricultural production, be it hybrid forms or corporate farms. Informal institutional environment (culture, ethic and tradition) played an important role to reduce transactional uncertainty.

New contracts emerged enabling expansion into new areas and diversification of risk by investors. As a result, farmers and financial agents developed more complex arrangements and business relationships involving contractors, landowners, input suppliers, processors, exporters and outside investors. Contracts in agriculture provided the level of enforcement that was necessary to attract new partners but also to expand and develop the sector. As a result, Agroholdings in Argentina started to develop all around the territory with the particularities that they were mainly organized based on management (and coordination) rather than ownership, with an array of hybrid forms dominating agriculture as a result.

Organizational adaptation in a context of institutional uncertainty explained why Argentina kept on growing its agricultural sector despite institutional constraints until 2008. These hybrid forms provided the organizational

framework necessary to reduce transaction costs and build trust among agents in such fashion that contracts and economic exchange could continue to occur in a highly uncertain institutional environment. They emerged to create order and enforce property rights among agri-food system participants, which in turn, enabled them to benefit from relatively higher commodity prices and profitable investment opportunities.

Hybrid forms constitute autonomous specialized nodes that work in a coordinated fashion assisted by modern information and communication technologies, trust, a shared vision, and the capacity to coordinate different agricultural processes. These organizations are more competitive because they enjoy aligned incentives, flexibility, and adaptability. Some of these hybrids grew in area and production, due mostly to the capacities built at the management level, with some organizations becoming what we currently understand as agroholdings.

Starting in 2008, a process marked by strong institutional changes, increased government intervention and high inflation rates started, which made agriculture much more challenging. Margins were reduced, while uncertainty and agency costs increased, resulting in higher transaction costs for the whole system. A process of area reduction and downsizing by the larger hybrid forms took place. Incentives started to decline and opportunism and micro transaction costs started to increase. From 2008 up to the present, the agricultural area has kept on growing, although at a lower rate than the previous period. Despite this continued growth, the share of farmland operated by agroholdings has decreased due to relatively lower commodity prices, higher production costs and, especially, increasing transaction and agency costs. Interestingly, agroholdings have indeed reduced the farming area at a larger rate than the smaller (informal) hybrid forms. This is due to the reputation and trust built among participants in these hybrid forms, which in practical terms, create informal institutions with a lower degree of uncertainty than the formal institutional framework to govern transactions and enforce contracts. In fact, in marginal production areas, these hybrid forms have taken vast areas operated by agroholdings in the past. It would appear that in this period, the increasing degree of uncertainty has been inversely related to the size of agroholdings. Concordantly, this particularly uncertain stage appears to have favored flexibility over scale.

The companies that maintained the scale in which they operate were those able to mitigate agency costs, such as Cresud, which has a high share of own land in the area they operate (but also rents area in order to reduce risks and increase margins). Agroholdings that operate mostly on rented land have had their degree of success determined by the coordinator's leadership and managing capacity; something that not all players had and which in turn, helps to explain their declining relative participation in total agricultural area.

This did not affect corporate farms and smaller hybrid forms so strongly, which remained stable. At this point, some organizations decided to increase their participation in farming in other countries. It would appear that the introduction of technology was not sufficient to overcome the challenges posed by an ever-changing institutional environment, and the agency costs that arose from managing such large operations.

6. Conclusions

This paper described and analyzed the evolution of the institutional, organizational and technological environments in argentine agriculture since the 1990s. During this period, there were different institutional contexts, sometimes with clearer and more stable conditions and low levels of uncertainty, sometimes with higher intervention policies and transaction costs. The paper discussed how new organizations emerged during the different periods and scenarios, in a context of increased international demand for agricultural commodities.

The final thought on this topic would be that in Argentina, over the past 25 years, agroholdings have been developed not by ownership (integration), but by management of contracts (horizontal and vertical coordination). This has been the defining characteristic of these organizations, which is something that differs from countries such as Brazil, USA or FSU.

The future research agenda on this topic is aimed at deepening the knowledge on certain aspects of how these organizations function. We believe that further research is needed on the role of agency costs in hybrid forms. Also, there is some interesting research to be conducted in understanding why some agroholdings have decreased area and expanded to other businesses, such as mills or input supply. Finally, analyzing how the new institutional framework that was announced by the new administration in December 2015, and which includes reductions and eliminations in export taxes affects these organizations would be a necessary update to this paper.

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