BrasilAgro:

Organizational Architecture for a High Performance Farming Corporation

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Invited case study prepared for presentation at the Agricultural and Applied Economics Association's 2013 AAEA and CAES Joint Annual Meeting, Washington, DC, August 4-6, 2013.

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Companhia Brasileira de Propriedades Agrícolas S.A. (BrasilAgro), headquartered in São Paulo, Brazil is a publicly traded company listed in the Bovespa stock exchange with American Depositary Receipts (ADRs) traded in NYSE. Its 2006 IPO raised R$ 584 million from investors based on a business plan and a promise "to create value by acquiring, developing and operating properties through sustainable and innovative practices." It did not have any assets and employed only 2 managers at the time of listing. Since then, it has become one of the leading agricultural real estate development and farming companies in South America. With the capital raised in the IPO, BrasilAgro acquired 11 farms in agricultural frontier regions throughout Brazil. In May 2013 its land portfolio included 8 farms totaling 180 thousand hectares. Three farms had already been sold allowing the firm to realize capital gains above 100%.

The core business of BrasilAgro was the acquisition, development, operation and sale of rural properties suitable for agricultural production. The company sought to acquire rural properties offering significant potential for cash flow generation and value appreciation. Once BrasilAgro acquired a rural property, it invested in infrastructure, facilities and technology necessary for efficient farming activities. It then engaged in high productivity agricultural operations aiming to maximize cash flow per area. BrasilAgro selectively divested of a farm when it reached its optimal value thereby capturing capital gains. The company combined the returns generated from land value appreciation and farming operations, while mitigating production risks with geographic diversification. Its vision was "to be the leading platform for investing in and developing farmland in Brazil."

Julio Piza joined BrasilAgro as CEO in April 2008, when the firm was harvesting its first crop. With formal training in agriculture (Bachelor's degree, University of São Paulo) and business (MBA, Columbia University), Julio had prior professional experience in farm management and as a consultant at McKinsey. Julio focused on executing the company's business plan, while also developing an organizational model to achieve high performance. He learned from economists Douglas Allen and Dean Lueck of past failures in corporate farming models in North America (Allen and Lueck, 2002). Their theory suggested that the family farm was the dominant form of organization in agriculture because it economized on agency costs from hired labor and management. However, it had some major disadvantages such as foregone specialization and capital constraints. Julio's goal was to implement a model to minimize agency costs and thereby allow BrasilAgro to expand with low-cost equity capital from outside investors. He also wanted to benefit from specialization gains and economies of scale and scope.

As the company continued to expand, Julio and his senior management team constantly debated the assumptions that they used to develop the company's business model and organizational architecture. In particular, they asked themselves what factors could limit the company's future growth prospects. They also questioned if the company should continue to invest capital in acquiring and developing land or if it should consider leasing land instead. Lastly, they wondered if the business model developed by the company in Brazil could be used for international expansion in South America and perhaps in other continents.

The World's Market for Land

Starting in the mid-2000s, the world witnessed big increases in agricultural commodity prices – which reached historical highs in 2008 and again in 2012 – with significant implications to poverty, hunger, geopolitics and the market for farmland. In particular, the increased demand for

land and the resulting land price appreciation were attributed to a growing world population, raising incomes in developing countries and consequent demand pressures in the markets for food and bioenergy. As farmers struggled to produce more food to a growing and more affluent population, they faced higher input prices and increasing natural resource constraints. In addition, there was mounting societal pressure for farmers to be better stewards of the environment. Future increases in farm production could not occur at the expense of deforestation and natural resource degradation. In short, society expected farmers to continue to increase crop yields, while reducing natural resource use and environmental impacts.

In the early 2010s, the world produced more food than was needed by 7 billion people. Four main factors, however, contributed to global food supply coming closer than ever to demand. The world population continued to grow, albeit at a lower rate than in the past 50 years. At the same time, urbanization accelerated in developing countries with large populations such as China and India. The emergence of new uses and markets for agricultural commodities – particularly as a source of energy – competed with traditional food and feed markets mainly in the developed world. In addition, water scarcity posed increasing restrictions on agricultural production increases in some regions of the world. Finally, lack of appropriate infrastructure and inefficient distribution systems led to a large amount of food being wasted or spoiled on their way from the farm to the table. These challenges suggested that, in order to keep up with a population growth of about 1.2% a year, farmers would have to double food production over the next 40 years. Crop yields continued to grow but at a slower rate than during the Green Revolution.

Taken together, these supply and demand factors were putting pressure on the demand for land around the world. More specifically, non-forested and non-cultivated farmland suitable for

rain fed cultivation was a resource expected to be at an increasing premium in the foreseeable future. In 2010, the world cultivated an area of about 1,500 million hectares (table 1). The availability of non-forested and non-cultivated farmland suitable for rain fed cultivation was around 445 million hectares. The largest concentration of available farmland was found in Africa (201 million hectares) and Latin America (123 million hectares). The availability of this land was concentrated in seven countries: Sudan, Brazil, Australia, Russia, Argentina, Mozambique and the Democratic Republic of the Congo. Agricultural land expansion for the past two decades had happened at the highest rate in Latin America. Agricultural expansion in Latin America was attributed to three main factors: technological advances, investments in infrastructure and market-friendly institutional changes. These three factors contributed to a general improvement in the costs of doing business in Latin America. These same factors continued to be the driving forces behind the current and expected agricultural growth in the coming decades.

BrasilAgro: Birth and Evolution

The seeds for the formation of BrasilAgro came from a group of investors led by Cresud, a large, diversified real estate development firm in Argentina with a business unit in farming. Its land portfolio in Argentina comprised 20 farms totaling 650,000 hectares. Cresud was considering global expansion to leverage its land development and corporate farming model in other countries. Brazil was Cresud's first bet. Several funding options were explored to introduce Cresud's corporate farming model in Brazil, including a land development fund to attract outside investors. The group decided that a publicly traded corporation would be the best structure to generate enough funding through an IPO for their land development and farming business idea. The next step was to formalize a business plan. CVM, the Brazilian capital market regulator, required an economic feasibility study for BrasilAgro before the IPO could proceed. A full-

fledged business plan was developed, but CVM only allowed the placement of shares to qualified investors as the company was not yet operational. Each share was initially valued at R$ 1,000.

On June 1, 2006 BrasilAgro went public valued at R$ 584 million and started trading in the Bovespa stock exchange (with symbol AGRO3). In 2010 the firm launched the Level I ADR program in the New York Stock Exchange and in November 2012 Level II ADRs began trading with ticker LND. With R$ 550 million available for investment (R$ 34 million was used as investment banking fees), Gustavo Lopes and Ivo Cunha (the company's two employees at the time) started to build the company from scratch. In July 2007, BrasilAgro took possession of its first farm and initiated planting operations in 22,000 hectares in September of the same year. The first harvest occurred in April 2008, the same month Julio Piza joined BrasilAgro as the new CEO.

Since then BrasilAgro built a land portfolio of 8 farms with about 180,000 hectares in total area, of which 132,000 were suitable for agricultural production. Of these, the company planted 72,600 hectares in the 2012/13 crop year. On June 30, 2011 the company generated its first positive annual EBITDA. This was an important landmark for the company as it began to generate sufficient internal funds to finance the needed investments to develop its current land portfolio. BrasilAgro generated R$ 159 million in revenues and R$ 9.2 million in adjusted EBITDA in FY 2012.

BrasilAgro in 2013

Between 2006 and July 2012, BrasilAgro had two majority shareholders – Cresud with 35.7% of outstanding shares and Mr. Elie Horn with 5.6%, through Cape Town LLC, a holding company incorporated in the U.S. The remaining shares were floated in the Bovespa stock exchange and

were held by minority shareholders. In July 2012, Cresud and Mr. Horn announced that their shareholder's agreement had been terminated. As a result, Cresud would remain as the sole controlling shareholder in BrasilAgro with a 39.6% stake in the company.

Corporate Governance

BrasilAgro was listed in Bovespa's New Market, which required high levels of corporate governance practices and transparency. Some of the New Market requirements included: (1) maintaining at least 25% of the capital in shares outstanding; (2) extending to all shareholders the same conditions obtained by controlling shareholders with the sale of the firm's control (known as "tag-along"); (3) having a Board of Directors of five or more members, with at least 20% being independent directors; (4) limiting the mandate of all members of the Board of Directors to two years; (5) not allowing the duality of Chairman and CEO roles by the same person; (6) making available annual financial statements in compliance with either U.S. GAAP or International Financial Reporting Standards (IFRS) accounting rules; and (7) using the Market Arbitration Panel to solve corporate conflicts; among other standards for transparency and fair treatment of non-controlling shareholders. With the decision to list shares in the New Market, BrasilAgro was able to raise capital at a competitive cost as it offered more security to investors.

The Board of BrasilAgro was composed of nine directors, of which three were independent. Together, the Board of Directors and the Board of Executive Officers were responsible for managing BrasilAgro. The Board of Directors was responsible for establishing long-term strategies and setting general business policies and guidelines. Professional executive officers were delegated responsibility for the day-to-day management of BrasilAgro's business following the resolutions of the Board of Directors. BrasilAgro's executive officers were elected by the Board for one-year terms with possible re-election. In 2013, the Board of Executive

Officers was comprised of four professional managers: Julio Piza (CEO), Gustavo Lopez (CAO), André Guillaumon (COO) and Mario Aguirre (CTO).

In addition to the Board of Directors, the Brazilian Corporation Law mandated a second governance body to all corporations known as the *Conselho Fiscal* (Supervisory Board). The Supervisory Board was a corporate body independent of management and the company's auditors. The Supervisory Board acted as an audit committee and its primary responsibilities were to monitor management activities, to review the company's financial statements and to report its findings to shareholders. The bylaws of BrasilAgro mandated a Supervisory Board as a permanent governance body composed of a minimum of three and a maximum of five members and their respective alternates. Following the Brazilian Corporation Law, the Supervisory Board could not include members of the Board of Directors or the Board of Executive Officers; employees of the company, a controlled company or a company under common control with BrasilAgro; and spouses or up to third-degree relatives of any of the firm's managers.

According to BrasilAgro's bylaws, its Board of Directors had the discretion to elect, amongst its members, a minimum of three and a maximum of four directors to compose the executive committee and three directors to compose the compensation committee. Additionally, it allowed the Board to create other committees with specific purposes. These committees were put in place to provide advice to the Board on an ad-hoc basis.

Business Model

Land value appreciation was the cornerstone of BrasilAgro's business model. The firm's strategy was based on the premise that land value was directly related to cash flow generated per unit of area. Therefore, the company's goal was to maximize return on investment by (i) identifying, acquiring, developing and exploring rural properties with high potential for price appreciation;

(ii) optimizing the returns and yields of rural properties by implementing agricultural technologies and practices considered industry benchmarks; and (iii) actively managing its rural property portfolio. Active land portfolio management was based on the following principles: (i) combining the returns generated from farmland development and farming operations; (ii) diversifying the risks associated with weather and commodity prices; (iii) efficiently allocating capital between investments and acquisitions; and (iv) realizing capital gains with selective divestment of rural properties. Shareholder value was thus created by combining operating cash flows from agricultural production with capital gains from land development.

BrasilAgro acquired underutilized agricultural properties with productive potential seeking to initiate agricultural production or to improve existing infrastructure and farm productivity. It aimed to transform unproductive land into high-yielding pastures, forests or crops. BrasilAgro enhanced the productivity and thus the underlying value of its agricultural properties by adopting modern technologies and sustainable farming practices including the utilization of genetically modified and high-yield seeds, no-till farming techniques, modern machinery, crop rotation, irrigation and the use of fertilizers and pesticides. It also substituted degraded pastures into cultivation areas of higher value-added crops such as grains, oilseeds, cotton and sugarcane and invested in needed infrastructure and facilities such as roads, elevators, and warehouses.

The company minimized exposure to weather and price risks affecting agricultural commodities by developing and maintaining a portfolio of agricultural properties in different geographic regions and by cultivating a range of different agricultural products. The firm managed the development of its agricultural properties in different stages to mitigate volatility in operating costs and in cash flows from operations and sales of properties. Finally, it utilized

market trend analysis to make investment and management decisions to allocate capital efficiently between new acquisitions and investments in existing properties, the sale of properties and to determine when it was prudent to enter into hedging arrangements to mitigate market risks.

BrasilAgro actively explored potential for synergies between land development activities and farming operations. Land development activities – such as soil clearing, leveling, and preparation; liming to correct for soil acidity; road and facility construction – occurred primarily off-season. On-farm resources were deployed in farming operations during the crop year and then redeployed to land development activities when the land was not being cultivated. In other words, there was potential for a more efficient use of equipment and labor. With crop diversification, BrasilAgro was also able to benefit from operational synergies. In certain parts of the country it was possible to double crop – for example, to plant and cultivate soybeans from November to May, when it was harvested, and then farm workers could be redeployed to sugarcane cropping activities from May to November.

Economies of Scale

In addition to these operational synergies, the business model developed by BrasilAgro enabled it to benefit from economies of scale. Farm-level economies of scale included: fixed cost dilution (such as overhead expenses and compliance costs with labor, environmental and tax laws in Brazil, which were exceedingly high); ability to attract and retain professional managers and technical staff to run each farm; efficient use of on-farm facilities and infrastructure; and operational efficiencies of modern farm equipment.

Economies of scale at the corporate level included commercial advantages in buying farm inputs (e.g. volume discounts) and in negotiating commodity prices or forward contracts (due to

higher bargaining power). In addition, its size also allowed BrasilAgro to invest in information and communication systems to develop knowledge that could be used to make better decisions regarding buying and selling positions. For example, the company could afford to hire the services of expert consultants to develop exotic hedging strategies to manage price risk or develop forecasting models that allowed for better timing of farm input purchases. Size and scale also allowed the company to attract talented human resources to its corporate headquarters. Perhaps more importantly, size and scale led to a lower cost of capital and the reduction of price and production risk due to geographic and product diversification.

Organizational Architecture

Julio believed it was possible to create a high-performance agricultural production company by means of a well-designed organizational architecture. His goal was to minimize agency costs and align incentives between shareholders, corporate managers, farm managers and employees.

Organizational Structure

The formal organizational structure of BrasilAgro comprised the central office (headquarters) in São Paulo and local offices in each farm. The central office included the top management team and staff organized by function (figure 1). Each farm was a separate business unit and profit center with its own budget and performance goals. Each farm office was headed by a farm manager, with decision making authority over farming operations, assisted by a deputy farm manager, an administrative officer and a chief of field operations overseeing a team of field staff.

This organizational architecture facilitated seamless coordination between the central office and each farm manager. VOIP and computer technology allowed direct, real time communication between farm managers and staff in the central office. In addition, each farm had a scale to weigh everything arriving at (e.g. fertilizers, seeds, chemicals) and leaving (e.g.,

grains) the farm gate to enforce a strict control of inventories of farm inputs and output. The key feature of BrasilAgro's organizational architecture was a planning and management tool called the PGP system.

PGP System: Accountability, Incentives and Performance Measurement

The management philosophy followed by BrasilAgro was to introduce best practices from other industries and to adapt them to farming. While the traditional farmer often strove to adopt new production technologies (such as new seed varieties, state-of-the-art farm equipment, etc.), BrasilAgro attempted to increase the productivity and efficiency of all factors of production (i.e. labor, equipment and land). To achieve this goal, the company recruited managers from prominent companies in other business sectors – automobile manufacturing, banking and retailing – who brought with them a diverse set of management experience to BrasilAgro.

At the core of the organizational architecture was a focus on formal systems and processes geared to foster a culture of accountability and meritocracy. The CAO (Gustavo) and his team were in charge of developing a management control system based on formal processes and protocols called the PGP – the acronym for Production Planning and Management. In the PGP system, each activity conducted by the company, from land acquisition to land development and farming, was standardized in a formal process with steps and key performance indicators (KPIs). For example, KPIs for a corn field included distance between seeds, number of seeds planted per row meter, fertilizer weight applied per row meter, number of drops per cm^2 (for pest chemical control) and corn weight loss per hectare. This formalization and standardization of all farming activities served as the basis for planning, budgeting, control, incentive and performance evaluation systems.

Planning of farm operations was the first step in the PGP system. Planning was the responsibility of the top management team with input from farm managers. First, the COO (André) and the CTO (Mario) planned operations for each farm from a technical perspective following best agronomy practices. The first draft of the plan was discussed with each farm manager in order to receive their input and buy-in. From this interactive process emerged the operations plan for each plot on each farm along with a budget. The operational plan and budget for each farm then received the input from the CEO (Julio) and the head of BrasilAgro's new business development team (José Humberto). They reviewed the technical plan from a strategic perspective focusing on expected margins and profitability for each crop. In other words, they considered economic variables to maximize expected returns on each farm. The outcome was an operational plan and budget that sought to maximize cash flow generation for each plot in each farm considering the constraints imposed by technical feasibility. The operational plan included the crop to be planted in each plot of land, the use of inputs and technology, and a detailed agenda for each activity to be performed on a field (with dates and KPIs) from soil preparation to harvesting.

Each farm manager led a team of field staff responsible for the execution of farming operations following the operational plan and the budget. According to Julio, "the beauty of our PGP system is that each farm plot has an owner" since the PGP described operations and KPIs for each farm plot. Execution of the plan was monitored in real time by the central office staff with the use of information and communication technologies. When an operation was performed, the responsible field staff for that operation needed to update the PGP system. As a result, central office had real time information about operations carried out in every plot of every farm. Field staff was also responsible for making decisions on the field if any change to the operational plan

was required. For example, if weather was not appropriate for a certain scheduled operation, field staff had the decision-making power to postpone it – for example, to delay crop spraying when it rained. But a decision to change the operational plan due to some unforeseen contingency needed to be justified in the PGP system. Since BrasilAgro invested in weather stations in each plot, central office staff had up-to-date weather information to monitor and control execution of operations. Taken together, the operational plan and this control system fostered a culture of accountability among field staff.

Another key feature of the PGP system was that the operational plan was tied to a budget. Each farm operation was linked to a required quantity of inputs (such as seeds, fertilizers, chemicals, fuel, etc.) and machinery use. The field staff responsible to perform an activity (e.g. corn seeding) requested the necessary materials (e.g. corn seeds, tractors, seeding machine, diesel, etc.) from the farm office to perform that operation. Based on a SAP system integrating each farm with the central office, the use of requested materials for a given activity triggered a reduction in inventories and an update to the budget. While the PGP system enabled physical control of operations, the SAP system provided financial control. The central office consolidated all these pieces of information from the PGP system for control and reporting purposes.

Procurement and payment of farm inputs were the responsibility of central office staff but buy orders were made by each farm manager according to the operational plan and the budget. This decentralized system made the procurement department more efficient as it generated economies of scale without losing control. The PGP system also allowed the central office to identify farm managers that closely followed the plan and the budget or that often requested budget supplementation. This information was used as a performance indicator for each farm manager.

Meritocracy

The introduction of the PGP system was a significant cultural change for farm managers and field staff in Brazil, who were not used to follow standard operating procedures. Over time BrasilAgro was able to achieve significant buy-in to the system among its staff. It was first developed as a pilot project at one farm in the 2010/11 crop year and it was rolled over to all other farms in 2011/12.

The PGP system also served as the basis for BrasilAgro's incentive system. For example, the variable pay of the COO, the CTO, farm managers and field staff was partially based on how well the operational plan and the budget were executed. More specifically, the performance of each farm manager was assessed by the executive committee based on several objective and subjective performance indicators, including: operational yield (hectares planted and productivity per hectare) compared to budget; SMS (safety, environment and health); adherence to the PGP system including participation in the planning phase, execution of activities according to the operational plan and entry of information about activities performed in the fields into the PGP system; actual vs. budgeted costs; and a qualitative assessment of dedication, effort and creativity. The performance of field staff was also evaluated on the basis of SMS (safety, environment and health) and adherence to the PGP system. The compensation package of farm managers and field staff was based on a fixed salary (65% of total compensation) and a variable pay (35% of total compensation) based on formal performance evaluation. Julio expected to increase variable pay to 65% of total compensation when the PGP system was fully consolidated.

Outsourcing Activities to Service Providers

The execution of the operational plan was carried out by both BrasilAgro employees and third-party contractors. Some farm operations were outsourced to independent service providers,

especially those requiring large machinery such as land clearing, crop spraying and harvesting. For some operations, like crop seeding, BrasilAgro used both own equipment and service providers. The hiring and supervision of service providers were the responsibility of each farm manager but based on central intelligence and guidelines provided by headquarters.

This outsourcing system was initially developed in Argentina in the 1980s and consolidated in the 2000s with a well-functioning market for outsourced, custom farming operations. But such a market was still in its infancy in Brazil in the early 2010s. Differently from the Argentinian model, where contracts were informal or based on handshake agreements, BrasilAgro outsourced farming activities to service providers based on formal contracts (known as service level agreements). These contracts clearly laid out acceptable performance levels for each farm operation. For example, the contract for seeding operations was based on 23 KPIs.

Service providers were paid according to performance achieved in each KPI. Performance levels of each farm operation were monitored by internal and external auditing processes. In addition, BrasilAgro shared with service providers performance indicators for each machinery operator on a daily basis, which allowed them to compare how they ranked relative to peers and to make necessary adjustments. Service providers also competed for bonuses based on their relative performance. This system for contracting and incentivizing service providers had been working well for BrasilAgro since 2008.

Challenges and Opportunities

As BrasilAgro consolidated its business model and expanded by acquiring and developing more farmland in Brazil, it could challenge the paradigm of family farming in agriculture. But will this experiment in corporate agriculture succeed? Julio and his senior management team constantly

debated the assumptions they used to develop the company's business model and organizational architecture. In doing so, they challenged themselves with an intriguing set of questions:

1. What are the limits to growth? Did the current model allow BrasilAgro to grow indefinitely? If not, what factors could pose limits to future growth?
2. The business model adopted by BrasilAgro comprised both land development and farming operations. That is, a substantial share of the company's capital was invested in land acquisition and development. Should BrasilAgro lease land instead and focus the investment of financial resources in farming operations? What were the benefits and costs of land ownership?
3. As the model consolidated in Brazil, should BrasilAgro consider farming in other countries? Was the model appropriate for international expansion?

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Table 1. Potential Land Availability in the World (1,000 hectares)

	Total Area	Forest Area	Cultivated Area	Suitable non-cropped, non-protected*	
				Forest	Non-forest with population density of <25/km^2
Sub-Saharan Africa	2,408,224	509,386	210,149	163,377	201,540
Latin America & Caribbean	2,032,437	933,990	162,289	290,631	123,342
East Europe & Central Asia	2,469,520	885,527	251,811	140,026	52,387
East and South Asia	1,932,941	493,762	445,048	46,250	14,341
Middle East & North Africa	1,116,118	18,339	74,189	209	3,043
Rest of the World	3,318,962	863,221	358,876	134,700	50,971
World Total	**13,333,053**	**3,706,457**	**1,503,354**	**775,211**	**445,858**

* "Suitable" means that at least 60% of possible yield can be attained for any of the 5 rain-fed crops (maize, soybean, wheat, sugarcane, oil palm).
Source: Fischer and Shah (2010).

Figure 1. Organizational Chart of BrasilAgro