INNOVATION IN AGROPUBLISH AS STRATEGIC TOOL IN DEVELOPMENT OF
THE SECTOR IN THE STATE OF MATO GROSSO DO SUL

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ABSTRACT

Objective: The objective was to inquire about publications and calls for proposals aimed at the development of agribusiness in Mato Grosso do Sul from an innovation perspective.

Method: This study is of a basic research nature, and its methodology is based on a literature review. Additionally, an investigation was conducted into research and innovation stimulus bases related to agribusiness, with a focus on Fundect, Embrapa, Agraer, and public universities in the state.

Results and conclusion: In conclusion, the current scenario is not ideal; however, these types of fiscal incentives and government policies yield positive results. As for innovation in agribusiness, it presents significant growth potential and is gradually becoming one of the main strategic tools for achieving economic and sustainable competitiveness in this sector.

Research implications: This study sheds light on the multifaceted role of innovation in agribusiness, particularly within the specific context of Mato Grosso do Sul, Brazil. It underscores the significance of collaborative efforts among government entities, research institutions, universities, and industry stakeholders in driving innovation within the agricultural sector.

Keywords: Agribusiness, Innovation, Competitive Advantage, Incentives.

A INOVAÇÃO NO AGRONEGÓCIO COMO FERRAMENTA ESTRATÉGICA NO
DESENVOLVIMENTO DO SETOR NO ESTADO DO MATO GROSSO DO SUL

RESUMO

Objetivo: O objetivo deste artigo consistiu em analisar as publicações e editais voltados ao desenvolvimento do agronegócio em Mato Grosso do Sul na perspectiva da inovação.

Método: O estudo teve como caráter de pesquisa básica e sua metodologia baseia-se em revisão de literatura. Além disso, foi realizada investigação sobre bases de estímulo à pesquisa e inovação relacionadas ao agronegócio, com foco na Fundect, Embrapa, Agraer e universidades públicas do estado.

Resultados e conclusão: Concluindo, o cenário atual não é o ideal; no entanto, estes tipos de incentivos fiscais e políticas governamentais produzem resultados positivos. Quanto à inovação no agronegócio, apresenta um potencial de crescimento significativo e está gradualmente a tornar-se uma das principais ferramentas estratégicas para alcançar a competitividade económica e sustentável neste sector.

Implicações da pesquisa: Este estudo lança luz sobre o papel multifacetado da inovação no agronegócio, particularmente no contexto específico de Mato Grosso do Sul, Brasil. Sublinha a importância dos esforços colaborativos entre entidades governamentais, instituições de investigação, universidades e partes interessadas da indústria na promoção da inovação no setor agrícola.

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1 INTRODUCTION

Agribusiness refers to all activities associated with producing and distributing agricultural goods, encompassing operations from manufacturing to storage and distribution (Guilhoto, 2004; King et al., 2010). Erroneously, the term agribusiness was equated with agriculture (Davis & Goldberg, 1957). This association is no longer valid. According to the president of Embrapa, agribusiness is the result of innovation in agriculture, distinguishing itself in its production and information society relations (Crestana & Silva, 2006).

Agribusiness, in particular, plays a fundamental role in the Brazilian economy. In 2003, 30.6% of the country's total income came from agribusiness (Guilhoto, Silveira, & Azzoni, 2004). Historically, the significance of this sector for structuring Brazil's economy is evident. However, this scenario has persisted and evolved, becoming increasingly robust for the economy. Recent data from the Brazilian Institute of Geography and Statistics (IBGE) further confirm this picture. According to these data, Brazil's Gross Domestic Product (GDP) grew by 2.7% in 2011 compared to the previous year (IBGE, 2012). During the same period, the GDP of agriculture and livestock grew by 3.9%, surpassing the overall economy (CNA, 2012).

Given Brazil's stage of development, this significant contribution of agribusiness makes the country one of the most competitive nations in the world concerning the production of agricultural commodities (Casarotto, 2013). According to Guilhoto, Silveira, and Azzoni (2004), Brazil leads the global market for several agricultural products, especially in agriculture. This context is unlikely to change, as agribusiness continues to play a strategic role in the evolution of the economy (Barros, 2013).

When it comes to Brazil's performance in agribusiness, the country is considered capable and responsible for supplying 50% of the population's demand for the next four decades. With this significant responsibility in mind, it is necessary to maintain the success of its indicators, such as high productivity, strong competitiveness, and the use of technology (Stefano, 2007). However, it is essential to be aware of the uncertain environment in which the country operates, and therefore, it is necessary to adopt innovation strategies that help achieve a competitive edge (Padilha et al., 2010).

Nevertheless, it is essential to note that it is not just about productivity and the ability to meet the population's needs. One of the current paradigms of agribusiness is associated with social and environmental issues. This brings a new way of thinking and acting, driven by ecological consciousness and empathy for future generations. Companies that do not align with this new generation's values risk economic setbacks (Donaire, 1995). "In times of turbulence, innovation, combined with planning and management, is more than a market differentiator; it is an intelligent survival strategy" (Costa, p.15, 2010).

2 LITERATURE REVIEW

2.1 Innovation

The study of innovation as a strategic tool for market success can be classified as recent. It was only at the end of the 1960s that traces of interest in its study were found (Cassiolato &
Lastres, 2005). Many definitions seek to explain the concept of innovation, making it impossible to provide a single meaning for this term (Moreira & Queiroz, 2007). Nevertheless, all definitions converge on the idea that innovation is one of the most critical strategies for achieving a competitive advantage (Canongia et al., 2004; Cassiolato & Lastres, 2005).

Among the various definitions that encompass innovation, it is possible to divide it into two degrees: incremental innovation and radical innovation. The former refers to continuous improvements, refining existing points. In this case, changes in the product or service are almost imperceptible to consumers since the fundamental characteristics of the product remain unchanged. On the other hand, radical innovation is more drastic and revolutionary, causing deeper changes in how we perceive or use a particular item. Unlike incremental innovation, which follows a linear path, radical innovation exhibits certain discontinuity and several uncertainties (Gilbert, 1994; Santini et al., 2006; Lemos, 2002).

In general, innovation, in all its degrees and definitions, is a tool that concerns a country's competitiveness (Porter, 1999). The way institutions use or include innovation depends on their management approach or adopted strategy, thereby aligning their actions with their long-term objectives (Chandler, 1998). Despite its recognized importance, Brazil still does not exemplify its actions on innovation strategies, maintaining a rather neutral stance compared to developed countries (Crestana, 2006). This is due to the obstacles to forming an innovation system (IS) in agribusiness, associated with market economy dynamics. According to this, the structural elements of agribusiness tend to invest in innovations in the segments most representative in terms of exports, making the IS difficult and unequal (Júnior et al., 2014; Pereira et al., 2023).

Studies on innovation show that the territory is crucial for consolidating innovation actions. Innovation is understood to stem from good contacts and transactions with other research and development institutions, government agencies, and financial institutions, all of which can be facilitated or hindered by the predominant technical culture in their nearby areas (Corrêa et al., 2010; Aoyama, Murphy, & Hanson, 2011). One way to measure this influence is through indicators of territorial innovation potential (IPIT), a methodology developed by González (2006), which examines variables related to innovation distributed in the territory. Based on four variables that analyze human resources, firms with specific characteristics, and innovation rates according to selected industry and service sector activities in the innovation survey. Through this indicator, it is possible to assess the ability and potential of territories to produce innovation. However, both theoretically and empirically, it is emphasized that innovation processes depend largely on the spatial and social context in which they are located (Tartaruga, 2014).

Maturity is required to understand that innovation should not be limited to potential locations but should expand to regions that may become one. This is because the contribution of innovation to humanity, as well as to the places influenced by it, is immense. It can be considered a source of prosperity, progress, and competitiveness. It is a mutual benefit, where there is an improvement in the quality of life for individuals and the region as a whole, and specifically for companies, that capitalize on market opportunities (Alsaaty & Harris, 2009).

In this context, the role of the state must be taken into account, as it is an essential agent of the IS and development exercise (Júnior et al., 2014). Therefore, innovation has been encouraged by the Federal Government for some time through legal provisions. Such is the case of the Innovation Law, Law No. 10,973/2004, which aims to "establish measures to encourage innovation and scientific and technological research in the productive environment, to enhance technological autonomy and the industrial development of the country" (Brazil, 2004). Another regulatory milestone occurred in November 2005 with Law No. 11,196/05, known as the Good Law. This law aims to provide incentives to legal entities willing to research technological innovation and development (Júnior et al., 2014).
Although it may not be the ideal situation, these types of fiscal incentives and government policies have yielded positive results in terms of innovation perspective in Brazilian companies. Due to these supports, many companies have been motivated to adopt measures that include innovation as part of their organizational culture (Barbosa, 2013).

### 2.2 Innovation in Agribusiness in the State of Mato Grosso do Sul (MS)

Just as it is a recent topic in Brazilian agribusiness, innovation is also a new perspective in the state of Mato Grosso do Sul. However, given the challenges of achieving a competitive advantage in a saturated market, there is a need to explore this approach, whether through the excellence of the products provided, the sustainability of rural production, or price compatibility with competitors. In this context, innovation becomes a strategic tool for both large producers with significant technological power and small and medium-sized producers, mostly referred to as family producers.

According to Famasul (2015), the State of Mato Grosso do Sul had a turnover of 13.9 billion reais in 2014 with activities related to the agribusiness sector. Family farming is not the focus of the state's agribusiness production, and this is due to different economic development processes (Prochmann & Tredezini). However, despite representing only 2% of all the land occupied by agribusiness (Institute of Studies and Planning of the State of Mato Grosso do Sul, 1999, p. 24), this form of family organization accounts for 14% of the Gross Value of Agricultural Production (VBR) in MS. It is present on 65% of rural properties and employs 46% of people in rural areas, totaling 97,431 employees (Guilhoto et al., 2007).

Although Brazil, as well as the state of Mato Grosso do Sul, is characterized by land concentration in large estates, family farming plays a fundamental role in supplying food to Brazilian families. According to Hélder Muteia, FAO representative in Brazil: "(...) family farming is a powerful tool to ensure food security for the world's population and future generations" (FAO, 2012, p.1). In the state of MS, 60% of all food production comes from family farming (Brazil, 2011).

Among these farmers, as stated by Guilhoto et al. (2005), only a portion is involved in technological innovation. Those favored by innovation end up "monopolizing" the sector since they possess a significant competitive advantage. As a result, they acquire the assets of those who cannot withstand fierce competition, thus expanding their production structures. The difficulty in achieving prosperity in this segment also results in proactivity, i.e., the family's income is supplemented by activities not related to agriculture (Fuller, 1990).

To support and strengthen this segment of agribusiness, innovation brings in tools that encompass different aspects of rural production. The MS-based startup Agro Inteli is one such example. Its main objective is to address problems related to agrometeorology for small and medium-sized producers using technology. The software developed by the startup can provide real-time information about the weather on the farm, from rainfall forecasts to the amount of precipitation, as well as soil or leaf temperature and humidity, facilitating spray accuracy (Midiamaa, 2018).

Other alternatives include innovation fairs aimed at updating professionals, farmers, and academics on new research and technological advances in the agricultural sector. Tecnoagro is one of the largest innovation and agricultural technology fairs in MS, with this year's theme being "Innovation and Safety in Agribusiness" (Revista Attalea Agronegócios, 2019). Another prominent fair is Showtec, organized by the MS Foundation and promoted by the Federation of Agriculture and Livestock (Famasul) system. The event features products and services aimed at the agribusiness sector, bringing innovations and launches that contribute to the sustainability of rural production (MS Foundation, 2018).

To promote innovation in the country, Senar/MS (National Rural Learning Service)
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Recently developed a pilot project aimed at mapping the Innovation Ecosystem to stimulate startups focused on the agribusiness segment. Five states, representing each region of Brazil, received consultancy from the Finnish company Startup Commons in conjunction with Senar Central's Innovation and Knowledge team and its regional offices, mapping incubators in the states to try to bring them closer to potential companies (Communication Advisory Famasul System, 2019).

2.3 Projects to Support and Encourage Innovation in Agribusiness

According to Vieira Filho, Campos, and Ferreira (2005), the promotion of research and development in agribusiness can be seen in three temporal phases. Initially, there was no research in the field, leading to limited competitiveness, a phase that lasted until the 20th century. The first signs of investment appeared between 1900 and 1973, with applied research, although not very organized. The third phase of research and innovation in agribusiness began in 1973 with the establishment of Embrapa, marking greater consolidation of research in the agricultural sector. From this moment on, new research planning emerged, international competitiveness increased, and technology transfer to products advanced (ABGi Accelerating Innovation, 2016).

Currently, Embrapa actively promotes various government policies to ensure greater access to information and technology solutions developed by national research for the development of a more competitive and sustainable agribusiness (Embrapa, 2017). Other institutions specifically act in the state of Mato Grosso do Sul, of which the Agrarian Development and Rural Extension Agency (Agraer) and the Foundation for Support to the Development of Education, Science, and Technology of the State of Mato Grosso do Sul (Fundect) stand out, both supported by the State Government.

Fundect has called for proposals that support and value research in the state (Fundect, 2019). Among the calls for proposals related to agribusiness development, the following can be highlighted: the Technology Transfer and Training Program in Beef Cattle (Agroescola), the Regional Scientific and Technological Development Program (DCR), and Living Lab III.

Another important instrument for promoting innovation is business incubators. These are institutions that "provide technical, managerial support and complementary training to entrepreneurs and facilitate the innovation process and access to new technologies in small businesses" (SEBRAE, 2016). In this regard, incubators are present within public educational institutions. The Federal University of Grande Dourados (UFGD) has the Incubators Division, an agency with three different incubators that promote their management and planning. Its purpose is to encourage the academic community to engage in scientific, cultural, technological, and social research projects, benefitting society as a whole (UFGD Portal).

Furthermore, UFGD also has the Innovation and Intellectual Property Center (NIPI), which is part of the Research Coordination (COPq) of the Pro-Rectory of Graduate Studies and Research (PROPP). NIPI aims to "manage its innovation policy, meet the need to protect the University's intellectual assets, and promote the transfer of research results to the productive sector, seeking to strengthen and expand UFGD's presence in patent applications" (UFGD Portal).

The same performance of promoting research and innovation can be observed at other universities in the state, such as UFMS and UEMS. At the end of 2018, the Federal University of Mato Grosso do Sul launched the "UFMS - PPG - Innovation Program," an initiative that aims to support and encourage students and teachers to develop innovative solutions and contribute to the advancement of scientific research in the region (UFMS Portal, 2019).
3 METHODOLOGY

This research is classified as basic research and uses a literature review as its methodological approach (Lakatos & Marconi, 2003). The literature review is a study of the scientific works available, searching for approaches, theories, concepts, and ideas that deal with the same object of research. It can be understood as the systematization of scientific knowledge already produced on a given topic (Gil, 2002).

The search for sources of information was carried out through the following steps: (a) identification of publications in journals, articles, dissertations, theses, and books related to the topic; (b) analysis and selection of the most relevant sources; (c) categorization of information obtained from the selected sources.

The research also involved an investigation into research and innovation stimulus bases related to agribusiness, with a focus on Fundect, Embrapa, Agraer, and public universities in the state. The objective was to inquire about publications and calls for proposals aimed at the development of agribusiness in Mato Grosso do Sul from an innovation perspective.

4 RESULTS AND DISCUSSION

In the state of Mato Grosso do Sul, there are several projects and initiatives to support and encourage innovation in agribusiness. These initiatives aim to promote research and development, technology transfer, and the adoption of innovative practices by farmers, contributing to the growth and competitiveness of the sector.

4.1 Fundect (Foundation for Support to the Development of Education, Science, and Technology of the State of Mato Grosso do Sul)

Fundect plays a crucial role in promoting research and innovation in the state of Mato Grosso do Sul. The foundation offers various funding programs and calls for proposals to support research projects in different areas, including agribusiness.

One of the programs offered by Fundect is the Technology Transfer and Training Program in Beef Cattle (Agroescola). This program aims to promote the transfer of technology and knowledge to beef cattle farmers in the state. It provides funding for research projects that address key issues in beef cattle production, such as genetics, nutrition, and management practices. The goal is to improve the productivity and sustainability of beef cattle farming in Mato Grosso do Sul.

Another program offered by Fundect is the Regional Scientific and Technological Development Program (DCR). This program provides funding for research projects that contribute to the development of the state's regions. Researchers from different fields, including agribusiness, can apply for funding to support projects that address regional challenges and opportunities.

Fundect also supports initiatives like Living Lab III, which focuses on promoting innovation in agribusiness. This initiative brings together researchers, farmers, and industry stakeholders to collaborate on innovative projects. It provides a platform for testing and implementing new technologies and practices in real-world agricultural settings.

4.2 Embrapa (Brazilian Agricultural Research Corporation)

Embrapa is a key player in promoting research and innovation in agribusiness in Brazil. The organization conducts research in various agricultural sectors, including crop production, livestock farming, and agroforestry. Embrapa's research efforts aim to develop sustainable and...
innovative solutions for the agricultural sector.

One of Embrapa's initiatives is the development of new crop varieties and cultivation techniques that improve crop yields and reduce environmental impacts. Embrapa researchers work closely with farmers to test and adopt these innovations in the field.

Embrapa also collaborates with other research institutions, universities, and industry partners to advance agricultural research and technology development. The organization's research centers in Mato Grosso do Sul focus on topics such as soil management, crop protection, and livestock production.

4.3 Agraer (Agrarian Development and Rural Extension Agency of Mato Grosso do Sul)

Agraer plays a vital role in promoting innovation and technology transfer in rural areas of Mato Grosso do Sul. The agency provides extension services and technical assistance to farmers, helping them adopt innovative practices and improve their agricultural operations.

One of Agraer's key initiatives is the dissemination of information and knowledge related to agribusiness. The agency organizes training programs, workshops, and field days to educate farmers about best practices in crop production, livestock management, and agroforestry.

Agraer also collaborates with other agricultural research institutions and universities to facilitate the exchange of knowledge and technology. These organizations can develop and promote innovative solutions for the agricultural sector by working together.

4.4 Universities

Public universities in Mato Grosso do Sul also play a significant role in advancing research and innovation in agribusiness. These institutions conduct research projects, offer agricultural-related courses, and provide technical expertise to farmers and agribusinesses.

For example, the Federal University of Grande Dourados (UFGD) has established the Innovation and Intellectual Property Center (NIPI) to manage its innovation policy and promote the transfer of research results to the productive sector. NIPI works to protect the university's intellectual assets and support innovative projects developed by students and faculty.

The collaboration between universities, research institutions, and government agencies creates a dynamic ecosystem for innovation in agribusiness. Researchers and students have the opportunity to work on cutting-edge projects and contribute to the development of sustainable and competitive agricultural practices in the state.

5 CONCLUSION

Innovation is a crucial strategy for achieving competitiveness and sustainability in agribusiness, both at the national and regional levels. In the state of Mato Grosso do Sul, various projects and initiatives aim to support and encourage innovation in the agricultural sector. These initiatives involve government agencies, research institutions, universities, and industry stakeholders working together to advance agricultural research, technology development, and knowledge transfer.

Fundect, Embrapa, Agraer, and public universities in the state play key roles in promoting research and innovation in agribusiness. They provide funding, technical expertise, and extension services to farmers and agribusinesses, helping them adopt innovative practices and improve their productivity and sustainability.

The collaboration and partnership among these organizations create a dynamic innovation ecosystem in which researchers, farmers, and industry stakeholders can work
together to develop and implement innovative solutions for the agricultural sector. This collaborative approach is essential for addressing the challenges and opportunities in agribusiness and ensuring the sector's continued growth and competitiveness in Mato Grosso do Sul.

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