

**BOVINOCULTURA FAMILIAR NO SEMIÁRIDO: O USO INTELIGENTE DE RECURSOS ATRELADOS A TECNOLOGIA DE CAPTAÇÃO DE ÁGUA****ANTÔNIO ADRIANO MOREIRA SOUSA<sup>1</sup> E FRANCISCO JOSÉ CARVALHO MOREIRA<sup>2\*</sup>**

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**RESUMO:** O presente estudo concentra-se na análise da atividade bovina de pequeno porte no semiárido cearense, através de um estudo de caso. O objetivo deste estudo é provocar uma reflexão crítica sobre a bovinocultura dentro do contexto do semiárido, destacando a importância da utilização inteligente e sustentável dos recursos naturais disponíveis. O propósito deste estudo é apresentar uma nova perspectiva sobre a bovinocultura na caatinga, mesmo diante da escassez de recursos hídricos. Práticas sustentáveis de gestão de água têm assegurado a sobrevivência dos rebanhos, discutido o emprego das cisternas calçadão como tecnologias inovadoras, que possibilitam processos adaptativos e estruturas resilientes, facilitando a coexistência com as condições desafiadoras do semiárido. Essas cisternas não apenas garantem a sobrevivência, mas também promovem o florescimento da atividade pecuária. Junto a outras iniciativas interessantes, essas práticas têm contribuído para a criação de uma nova imagem da atividade, distanciando-a da visão tradicional associada a campos inférteis e carcaças de animais mortos em meio a mandacarus (*Cereus jamacaru* DC.). Portanto, as cisternas calçadão são sim uma estratégia importante que vem mitigando e contribuindo para a atividade da bovinocultura no semiárido, contudo, seu potencial para gerar impactos positivos na vida de famílias agricultoras, depende de estruturas de gestão eficientes da água.

**Palavras-chave:** Pecuária, Cisterna calçadão, Tecnologia de captação de água.

**FAMILY CATTLE FARMING IN THE SEMI-ARID: THE INTELLIGENT USE OF RESOURCES LINKED TO WATER HARVESTING TECHNOLOGY**

**ABSTRACT:** The present study focuses on the analysis of small cattle activity in the semiarid region of Ceará through a case study. The objective of this study is to provide a critical reflection on cattle farming within the semiarid context, highlighting the importance of the intelligent and sustainable use of available natural resources. The purpose of this study is to present a new perspective on cattle farming in the caatinga. Even in the face of a scarcity of water resources, sustainable water management practices have ensured the survival of livestock, including the use of boardwalk cisterns as innovative technologies, which enable adaptive processes and resilient structures, facilitating coexistence with the challenging conditions of the semiarid region. These cisterns not only guarantee survival but also promote the flourishing of livestock. Along with other interesting initiatives, these practices have contributed to the creation of a new image of the activity, distancing it from the traditional view associated with infertile fields and dead animal carcasses in the middle of *Cereus jamacaru*. Therefore, boardwalk cisterns constitute an important strategy for mitigating cattle farming activity in semiarid regions; however, their potential to generate positive impacts on the lives of farming families depends on efficient water management.

**Keywords:** Livestock, Boardwalk cistern, Water capture technology.

## 1 INTRODUCTION

Semiarid regions have climatic and hydrogeological characteristics, and rainfall is concentrated within a few months of the year, resulting in high evapotranspiration and soils with low water retention capacity. These characteristics induce the need to store water during rainy periods to mitigate the adverse effects of long periods of drought (Pádua, 2013), which are used in various human activities.

According to Schneider (2010), the perspective of sustainable rural development constitutes an ambitious proposal where at the center of this debate are families of farmers and peasants who live around a multidisciplinary/multicultural matrix in which economics, ecology and sociology stand out.

In this sense, considering the aspects related to coexistence with the Northeast Semiarid Region, adaptation policies and coexistence with water scarcity are necessary, as are mechanisms for capturing and storing water for dry periods. Therefore, it is essential to create alternatives that contribute to sustainable development, especially for more effective water management in this region.

Thus, cattle farming, which involves raising and managing cattle for various purposes, currently faces a series of significant challenges; these challenges are multifaceted and affect both small producers and large agricultural operations. In this context, it is crucial to understand and address these challenges to ensure the sustainability and efficiency of the sector. Among the main current challenges for this farming practice, issues related to animal health, sustainable management, demand for food of animal origin, climate change and technology stand out (Silva, 2021).

Cattle producers in semiarid regions, for example, need to adopt management practices adapted to local conditions, such as the sustainable use of water resources, soil conservation techniques and animal feeding strategies that consider forage availability; this has encouraged genetic improvement programs and good management practices that are,

overall, essential to improve the productivity and resistance of local herds (Paes; Góes; Conrado, 2023).

This study focuses on small-scale cattle farming in the semiarid region of Ceará through a case study. The aim of this study is to promote a critical reflection on cattle farming in the context of semiarid regions, emphasizing the importance of the intelligent and sustainable use of available natural resources. The use of sidewalk cisterns was addressed as an innovative technology that allows adaptive processes and resilient structures that can facilitate coexistence with the challenging conditions of semiarid regions, allowing not only survival but also the flourishing of livestock activity.

The aim of this study is to present a new image of cattle farming in the Caatinga, which, despite the scarcity of water resources, has managed to ensure the survival of livestock through sustainable water management practices and, together with many other interesting initiatives, has created a new image that is now somewhat distant from infertile fields and dead animal carcasses among mandacarus trees. Through this case study of small family-run animal production in Ceará, it was possible to visualize the integration of these aforementioned elements and the possibility of the economic viability of cattle farming with environmental sustainability, thus contributing to regional development and food security.

The Caatinga is one of the most specific biomes in Brazil, with a predominantly semiarid climate, and, owing to its peculiarity, tends to be stereotyped in the popular imagination as an infertile and unproductive biome, as it is located mainly in Northeast Brazil, in a semiarid region with specific environmental characteristics that directly influence animal husbandry. With this case study, we will outline the theme of cattle farming in the Caatinga in an attempt to present it; in the following section, we will provide an overview of the theme in the scenario of our investigation, making notes from the scientific literature reflecting on the innovations brought to the scenario, such as the use of cisterns to aid cattle raising in this unique biome.

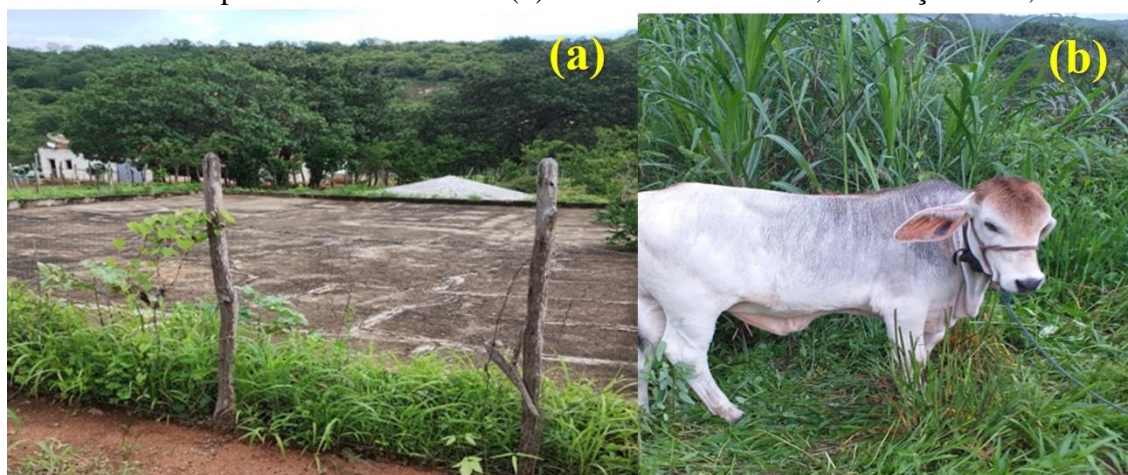
With respect to the coexistence of distinct production structures with the Northeast China semiarid region, policies to confront and rationally coexist with water scarcity are necessary. In view of this, creating alternatives that contribute to sustainable development is essential, especially for more appropriate management of the water collected and stored in this region.

In this sense, the objective of this research was to inspire a critical reflection on cattle farming within the context of the semiarid region, highlighting the importance of the intelligent and sustainable use of available natural resources.

## 2 METHODOLOGY

The research was carried out in the district of Bueno, in the municipality of Irauçuba-CE, during the year 2023. The study covered 8 families of small farmers who benefit from sidewalk cisterns and who have been using this technology for 11 years. This is a case study that collected information about small family production. The family raises cattle and uses the sidewalk cistern to meet the water needs of the animals. In addition, they developed a production cycle in which the same water is used to irrigate a vegetable garden for domestic and medicinal consumption and is grown on fertilizer produced from cow manure prepared by the farmers themselves for this purpose.

**Figure 1.** 200 m<sup>2</sup> sidewalk cistern and 52 thousand liter storage tank (a) and one of the producer's cows accompanied in the research (b) in the Bueno district, in Irauçuba-CE, 2024.



Source: Author.

m<sup>2</sup> space for collecting rainwater and a reservoir with a capacity of 52 thousand liters. Its purpose is to store rainwater for the production of food, medicinal plants and watering animals (Figure 1B), enhancing productive backyards. These structures aim to provide access, management and appreciation of water as an essential right to life and citizenship, as a fundamental element in the production of food for self-consumption and increasing family income, expanding the understanding and practice of sustainable and supportive coexistence with the semiarid ecosystem (Pádua, 2013).

All activities ensure food security for the family and keep small businesses in the region afloat. The analysis was carried out on

the basis of notes and field observations.

## 3 CHALLENGES OF CATTLE FARMING

Maintaining livestock health is an essential pillar in cattle farming management, especially in the face of diseases such as foot-and-mouth disease, brucellosis, and tuberculosis, which represent significant threats to both the economy and food security. The emergence of antimicrobial resistance reinforces the need for rigorous management practices and the adoption of effective veterinary protocols (Silva, 2021). According to Luna et al. (2020) and Silva (2021), it is essential to implement a health control plan that includes preventive measures against diseases

on the basis of the identification and analysis of the specific risks of each property.

The implementation of comprehensive disease prevention and control programs is vital to ensure herd health and the sustainability of livestock farming. Silva (2021) highlighted the importance of preventive health programs, such as vaccinations, which are regulated by the Ministry of Agriculture, Livestock and Food Supply (MAPA) (BRASIL, 2024) and state health defense agencies. These measures aim to ensure the health and well-being of animals, in addition to acting on public health by preventing the spread of zoonoses and foodborne diseases.

In the district of Bueno, the municipality of Irauçuba-CE, these management practices are taken very seriously by families of small producers, who, strictly following the agenda of the Secretariat of Rural Development and Environment of the municipality and the Agricultural Defense Agency of the State of Ceará (ADAGRI), have kept their animals healthy and feeding a small cattle farming cycle in their region.

Cattle farming in semiarid regions faces the challenge of adopting more sustainable management practices in response to the increasing recognition of the environmental impacts of these activities. This involves effective waste management, the conscious use of natural resources, and the conservation of fragile ecosystems. The transition to sustainable production systems is crucial for meeting market expectations, which demand animal products that are ethical and environmentally friendly.

In this context, the use of the sidewalk cistern in beef production in semiarid regions represents an authentic and scientific approach to mitigate the challenges faced by cattle ranchers in this region (such as follow-ups, in this specific case).

By collecting and storing rainwater in specific structures, such as water tanks, cattle ranchers can ensure continuous access to water during periods of prolonged drought. This practice not only reduces producers' dependence on external water sources but also promotes environmental sustainability by preserving local water resources. Furthermore,

the implementation of scientifically validated techniques, such as the appropriate sizing of water tanks and the efficient management of stored water, contributes to maximizing the economic and social benefits of cattle production in semiarid regions, ensuring the long-term viability of livestock farming in these regions.

## 4 FINAL CONSIDERATIONS

From this survey, it is clear that climate change represents another significant challenge for cattle farming. Variations in climate conditions can affect the availability of pastures and access water and increase the risk of extreme weather events, such as droughts. This requires the adaptation of production systems, investment in climate-resistant technologies and the implementation of management practices that promote herd resilience in the face of environmental changes.

Therefore, considering the semiarid climate, which is characteristic of the backlands, it is important that animals and hydration and feeding systems are designed to survive in hot environments where only the rainy season predominates.

In conclusion, sheep farming faces complex challenges that require integrated and sustainable approaches. The search for solutions must involve cooperation between producers, researchers, government authorities and society in general. The adoption of innovative practices, investment in research and the formulation of appropriate policies are essential to ensure that cattle farming continues to play a crucial role in the responsible and sustainable production of food in semiarid regions.

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