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## Beekeeping an alternative to family farming for sustainable development

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**Abstract.** The semi-arid region is characterized by high variability in its natural conditions, in addition to long periods of drought and irregular rainfall, and sustainable practices are a way of exploiting the potential of this region. In this context, the search for alternatives is the key to living in these conditions. In this situation, beekeeping is a very rich activity when it comes to agribusiness and sustainability, with Brazil being one of the largest honey producers in the world and still having great beekeeping potential to be reached. Even with the natural conditions imposed by the semi-arid region, the potential of beekeeping in production and marketing is proving to be a profitable and sustainable activity for living with such conditions. The aim of this work is to highlight and explore the importance of beekeeping as a sustainable activity. This study describes an experience report during the beekeeping course in the Agricultural Technician course at the Colégio Agrícola Vidal de Negreiros - CAVN (2012.1 to 2013.2), but with a scientific theoretical basis, which is based on data from established works. Beekeeping is an imminent activity to be explored, and it is immeasurable for these producers to constantly seek to improve their techniques, as well as to establish a path of trust with the professional agricultural technicians they work with in this area.

**Keywords:** Beekeeping, sustainability, resilience.

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### Introduction

The semi-arid region is characterized by high variability in its natural conditions, such as topography, climate, soil type and rainfall, and the search for alternatives to deal with these natural

conditions is of paramount importance (MATA, 2013). Sustainable practices are a way of exploiting the potential of this region, allowing a reflection on its

social, economic and political characteristics (CARDOSO; MACHADO, 2017).

The population of the semi-arid region faces various environmental problems, with long periods of drought being a determining factor for their survival, since the need for water has a direct impact on agricultural production and livestock farming, sometimes limiting the living conditions of rural people (MATA, 2013). Batista Júnior (2013) points out that changing production systems is a key factor in optimizing family farming. Furthermore, according to Postelaro et al. (2021), beekeeping-related research has been growing steadily, since Brazil's natural conditions significantly favor the development of beekeeping (AGROLINK, 2019).

According to Crestana and De Mori (2015), agribusiness is one of the main sources of food production in the world, with Brazil being an international benchmark in the production and export of grains, fibers, sugar, juice, oranges, coffee, meat and other products, as well as technologies and knowledge. Its eminent progress is the result of heavy investment in technology and the search for knowledge that can be efficiently applied to natural resources, soil, biodiversity, water and the influence of solar radiation on plants.

In this context, the search for alternatives is the key to living in these conditions. Beekeeping is a very rich activity when it comes to agribusiness and sustainability. Brazil is one of the largest honey producers in the world and still has a great beekeeping potential to be achieved, thanks to its fauna and flora, which contribute significantly to the development of this activity. It is worth pointing out that from this perspective, the farmer must master the technical knowledge about the structural biology and ecological interactions of these insects, management techniques and honey collection in order to avoid waste or great stress on the development of the hive, pests and diseases that may affect the swarm, economic importance and market potential (EMBRAPA, 2003).

As part of their importance to nature, bees are extremely important agents in cross-pollination. This is an important evolutionary adaptation achieved by plants that has made it possible to increase the production of fruit and seeds, and these insects are responsible for fertilizing around 73% of plants (COUTO and COUTO, 2002; FAO, 2004). According to Keven and Baker (1983) and Proctor et al. (1996), the large number of bees distributed in nature, as well as their structural adaptation to the complex varieties of floral structures, have a direct impact on pollination efficiency.

Given the natural conditions imposed by the semi-arid region and the potential of beekeeping in the production and marketing of honey and its derivatives, it improves the conditions of rural people and is an alternative profitable and sustainable activity for living with these conditions, since the population of the semi-arid region is constantly adapting and reinventing itself. Luna (2011) also points out that the sale of Jataí colonies

(*Tetragonisca angustula*) can reach values ranging from R\$20.00 to R\$50.00, while the Mandaçaia species (*Melipona mandacaia*) can be traded for up to R\$80.00. Diniz (2017) adds that honey, jam, pollen and other derivatives can be sold as part of beekeeping. The author also emphasizes that of the 141 species cultivated in Brazil for human consumption, animal production or for the industry to produce biodiesel and fibres, 60% depend on pollination by bees, making the importance of these insects indispensable for the maintenance of terrestrial flora.

The aim of this work is to highlight and explore the importance of beekeeping as a sustainable agribusiness that allows rural people to achieve decent conditions to survive the conditions imposed by the semi-arid region.

### **Experience description**

During the course of the Technical Course in Agriculture and Husbandry (2012.1 to 2013.2) at the Colégio Agrícola Vidal de Negreiros - CAVN, located between the municipalities of Solânea and Bananeiras, in the state of Paraíba - PB, specifically in the beekeeping subject (2012. 1), it was possible to have the first contact with the respective area of study, as well as its economic importance, the biology of these insects, suitable facilities for setting up an apiary, hive management, honey harvesting, products derived from these and suitable equipment that a good beekeeper should have at their disposal.

Within the beekeeping subject, it was possible to explore this activity in an interdisciplinary way, going through different areas of knowledge, weighing up previous knowledge and adding scientific concepts, making it possible to build up a solid and diverse base of information during the course of the dialogues. In addition, it was possible to put the theoretical knowledge acquired into practice, since the institution has a large educational beekeeping sector so that students have direct contact with the activity.

### **Material and Methods**

This is an experience report on the activities developed during the period 2012.1 to 2013.2 at the Colégio Agrícola Vidal de Negreiros - CAVN during the beekeeping course. The institution's beekeeping sector has teaching units such as a laboratory with equipment for developing the activity, practical classes and an apiary sector.

It's worth pointing out that during the practical classes, the use of personal protective equipment (PPE) was used for safety reasons when entering the apiary, as well as the use of tinker equipment to help with management activities. Among the main activities carried out during the course were swarm capture, colony management, apiary maintenance, honey collection and identification of the bees' hierarchical level.

The search for alternatives to live with the natural conditions of the semi-arid region is dealt with in various scientific articles. With this in mind, this

study is an experience report, but with a scientific basis, based on data from established works. Gathering and condensing information on the subject of the study, problems and possible solutions that could contribute to the investigative process in the scientific field. The search was carried out on the "google acadêmico" database, using the following terms as criteria: "beekeeping", "semi-arid", "sustainability" and "Agribusiness".

## Results and discussion

Faced with the conditions of the semi-arid region and the search for constant alternatives that allow rural people to achieve financial independence, dignity and food security, beekeeping is an imminent activity to be explored in this context. It is immeasurable for these producers to constantly seek to improve their techniques, as well as to establish a path of trust with the professional agricultural technicians they work with in this area.

In this sense, the experience of beekeeping in the technical course in agriculture provided an intimate moment of learning by practicing and learning new experiences. Throughout the course, the importance of cleaning facilities, changing and replacing quality water, preventing natural predators, using nests, wax and its purification, preparing colonies, feeding bees and using PPE was highlighted.

According to Postelaro et al. (2021), beekeeping is closely related to family farming, and its importance within this context is constantly highlighted in the literature. Data released by the IBGE (2019) regarding the Municipal Livestock Survey (2019) highlights that due to the potential of beekeeping, many farmers have sought the opportunity to grow in this branch of agribusiness, with honey production in Brazil for 2019 being around 46,000 tons, an increase of 8.5% compared to 2018, but it is important to note that despite the growing increase, its market value suffered a considerable drop of 1.8% with a reduction of 493.7 million in the year.

Since beekeeping is an important activity with an intimate relationship with sustainability, Agrolink (2019) reveals that this has a direct impact on the quality of the honey. Martins (2020) adds that investing in beekeeping also means generating quality food, creating environmental balance and promoting equality. In addition, these insects are of irreplaceable importance to the environment, contributing significantly to minimizing the effects of the degradation of nature. The author goes on to say that in addition to these aspects, it is also possible to see their potential in terms of social development, generating income and keeping people in the countryside. In this sense, according to Epagri (2020), approximately 17 thousand people make a living from beekeeping in Brazil.

## Conclusion

The subject of beekeeping allowed for an interdisciplinary experience, based on theoretical and

practical knowledge, broadening the most distinct areas of knowledge. Taking into account the constant human activity and interaction with the environment, social demands are common. An integration of interdisciplinary research is necessary, demonstrating an understanding of everyday practice in an integrated and articulated way with the concepts worked on in science.

Experiencing the beekeeping course has made a satisfactory contribution to various aspects of personal and professional training. The knowledge and methodological steps acquired during the course go far beyond the classroom, which reinforces professional autonomy.

The experience gained during the course integrated theory and practice, which is a two-way street for training good professionals. This has culminated in a broad process of academic research, breaking paradigms and generating new technologies.

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