Agroforestry systems in the semi-arid region of Minas Gerais

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ABSTRACT
Environmental education plays a fundamental role in contributing to the formation of conscious citizens who can understand the relationship between humans and the natural environment. To achieve this, it is important to have the necessary means tobuild effective changes that contribute to the autonomy of the population in the Semiarid region. In view of this, university extension plays an important role in the inclusion of values, skills, knowledge, responsibilities and aspects that promote improvement in the quality of life of society. In this context, the objective of this report is to describe the activities carried out in the workshop "Agroforestry Systems in the Semiarid Region of Minas Gerais" held at the Tabocal Agricultural Family School (EFAT) in the municipality of São Francisco-MG. The workshop was conducted by undergraduate students from the Federal University of Minas Gerais' Agronomy program, and the following topics were covered: the definition of Agroforestry Systems (AFS); the difference between AFS and agricultural intercropping; the importance of AFS for food production; advantages and disadvantages; and management and implementation. The workshop was conducted dynamically and with active participation from the students, through questions and ideas raised, facilitating more in-depth discussions on the subjects.

Keywords: University Extension, Agrobiodiversity, Soil conservation, Environmental education.

1 INTRODUCTION

Environmental education is of fundamental importance because it contributes to the formation of conscious citizens, who can understand the relationship between men and the natural environment, the ways to conserve and preserve it and manage its resources properly (UNESCO, 2005 p. 44). In this sense, in relation to the Brazilian semi-arid region, characterized by presenting climatic adversities, associated with other historical, geographical and political factors, it is necessary to develop actions that promote behavioral changes.

To this end, it is important to have the necessary means to build effective changes that contribute to the autonomy of the population living in the semi-arid region. In this way, university extension plays an important role with regard to the inclusion of values, skills, knowledge, responsibilities and aspects that promote improvements in the quality of life of society.

The extension identifies social demands, promoting exchange between the knowledge of the university and society, benefiting both sides, as stated by Rodrigues et al. (2013). Therefore, this work allows the dissemination of the knowledge produced in the university while enabling academics to absorb the teachings and culture existing in external communities (CORRADI et al., 2019). Providing them with personal and professional development based on observation, questioning and the search for solutions to existing social problems.

It is worth mentioning the posture that extension workers should adopt in the face of educational activities aimed at the external community. For there to be an environment in which the exchange of knowledge takes place, it is necessary that respect and dialogue between the parties prevail. In this sense, in order to achieve the intended knowledge about agrobiodiversity in the semi-arid region, it is important to know the reality of the place, identifying collective potentialities and methodologies that will solve the problems experienced.

In view of these assumptions, the objective of this work was to describe the workshop "Agroforestry Systems in the Semiarid Region of Minas Gerais", developed with students from the Tabocal Agricultural Family School (EFAT) in São Francisco, MG. In view of the importance of this system for food production and nutritional security of low-income families, as well as for soil conservation and biodiversity.

2 METHODOLOGY

The workshop was planned and executed by undergraduate students of the Agronomy course at the Institute of Agrarian Sciences of the Federal University of Minas Gerais (ICA-UFMG), as part of the Rural Extension course. The workshop entitled "Agroforestry Systems in the Semi-arid Region of Minas Gerais" was held at the Tabocal Agricultural Family School (EFAT), based in the municipality of São Francisco – MG, on June 29, 2023. The target audience was high school students from the technical course in agriculture.

To teach the theoretical content, posters were made addressing the topics to be discussed. These posters featured various images, to make it easier for students to understand. An easel was used to support and present the posters.

Initially, the concept of Agroforestry Systems and its contribution to mitigating the negative effects caused by climate change and combating desertification was presented. For this, a poster

containing an image of an environment in the process of desertification was used, asking questions in relation to the actions that caused changes in that environment.

Then, the difference between Agroforestry Systems and agricultural consortia was addressed, emphasizing the importance of agroforestry for food production and the tree component for the system. Then, the main advantages and disadvantages of SAFs were presented.

Subsequently, aspects related to the management of SAFs were presented, such as the choice and disposition of species, irrigation, tree pruning and reuse of organic matter from the system itself to improve physical attributes and maintain soil fertility.

In the practical part of the workshop, seedlings of forest species were presented, including native ones such as pequi tree *(Caryocar brasiliensis*), coquinho-azedo (*Butia capitata*), jatobazeiro (*Hymenaea stigonocarpa*) and baruzeiro (*Dipteryx alata* Vog.). The importance of these for the biome, environmentally, and for the population, economically, was highlighted, since these species, in many municipalities in the North of Minas, contribute to the income of countless families.

The workshop ended with a dynamic, in which the students set up a SAF scheme, choosing the plant species and allocating them in the area according to their particular characteristics. To this end, printed figures of various vegetables, medicinal plants and tree species found in the semi-arid region of Minas Gerais were made available.

3 RESULTS AND DISCUSSIONS

The workshop was given to two classes, with 11 and 14 students, respectively, with the age group of students ranging from 15 to 17 years old, covering all years of high school.

In the development of the workshop, it was noticed that the group presented good acceptance and performance, as the participation of the students was observed throughout the discussion of the contents. The questions asked, both by the extension workers and by the students, enabled an intense exchange of knowledge and reflections on the themes.

Initially, as a means of introducing the concept and the importance that Agroforestry Systems play in the context of the semi-arid region, it was proposed that the students start thinking in front of an image that presented an environment in the process of desertification. In response, the students said, for example, that factors such as removal of native forest and erosion are responsible for this intense process of degradation.

Soon after, the concept of SAFs was built with the students, where, based on the visualization of an image, they said, based on the elements present, what characterized such systems. It was proposed to reflect on the role that trees and other elements that they identified in these images play in the prevention of degradation processes, as well as in the mitigation of greenhouse gas emissions. In this

sense, many associated, for example, that the permanence of plant species in the area favors the reduction of erosion and emission of polluting gases.

When asked what would be the differences between the Agroforestry Systems and the agricultural consortium, represented in the poster, many students answered that in the image of the SAF there was a greater variety of plants, as well as the presence of trees. The fundamental characteristic of agroforestry, which differentiates it from other agricultural crops, is the presence of a forestry component. While the association of annual plants, such as corn and beans, for example, is considered only an agricultural intercropping (GONÇALVES; MAN; MATIAS, 2016).

To complement the students' answer to the previous question, the importance of the forestry component in SAFs for income generation, biodiversity and soil conservation was discussed. The presence of woody species in agroforestry systems, as Macedo (2007) points out, plays an important role in favoring both the productivity and sustainability of these systems.

The importance of agroforestry in food production in the semi-arid region was also discussed. The group cited what can be produced for food – fruit trees, vegetables and annual crops such as corn and beans. In addition, the importance of this system for animal production was also highlighted.

The disposition of the species in the cultivation, pruning and irrigation areas was widely discussed with the EFAT students. The planting of species in rows was highlighted as being the most advantageous, as it facilitates cultural treatments, observing the peculiar characteristics of each plant component, defining spacing, intercropping and succession over time, respecting the physiology of the species and the use of resources in the environment.

In the practical part of the workshop, the seedlings of the species present in the semi-arid region were shown. Most of the students knew the species presented, demonstrating a close knowledge about the biodiversity of the semi-arid region, probably due to the fact that they all came from the region.

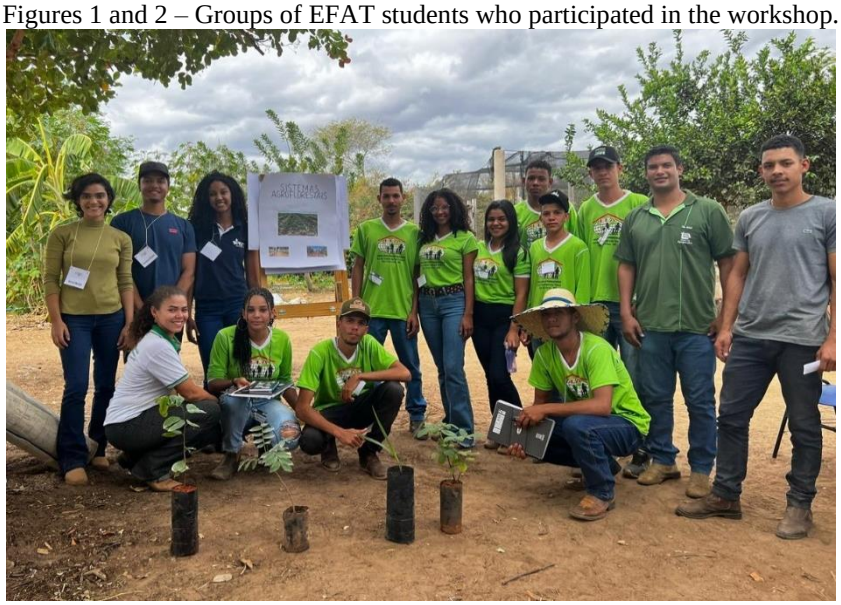
At this time, there was also a questioning of the interaction between species in agroforestry. One of the students questioned the fact that other plants hardly develop near the mastic tree (*Myracrodruon urundeuva* Allemão). In this way, the allelopathic effect related to this plant on some cultivated species was explained. Bonadio et al. (2014), for example, found a negative allelopathic effect of the extract of the leaves and stems of *M. urundeua* on the germination and development of *Urochloa decumbens* and *U. brizantha*.

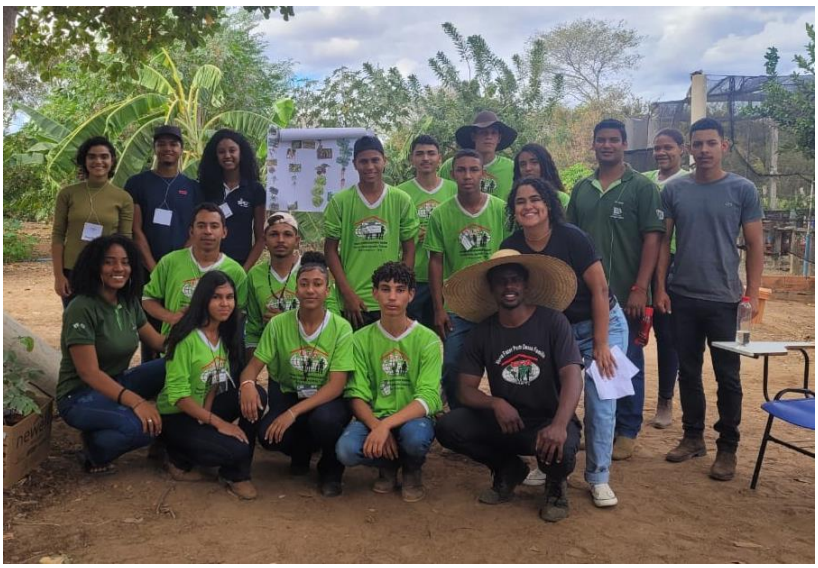
In addition, the role of universities and scientific research in the investigation of factors related to phenomena similar to the one raised in relation to allelopathy was also emphasized. Thus, university extension shows the importance of the relationship between institution and society, as it enables the generation of new knowledge and identification of society's needs and desires, for the creation of new research modalities (SANTOS et al., 2016).

At the end of the workshop, the dynamics in which the students actively participated in the assembly of a SAF. It was possible to observe the understanding they obtained about the theme of the workshop, especially with regard to the disposition of the species in the cultivation area aiming at the best reuse of resources.

In the extension activities that are developed, the students have the opportunity to associate theory and practice, presenting the knowledge acquired in the classroom and absorbing the popular knowledge rooted in the communities. In the workshop in question, the extension workers were able to obtain new perceptions on subjects related to this theme, which served as a basis for the improvement of knowledge and teaching methodology.

Figures 1 and 2 – Groups of EFAT students who participated in the workshop.





Source: Jordan (2023)

4 FINAL THOUGHTS

The workshop "Agroforestry Systems in the Semi-arid Region of Minas Gerais" was developed with intense participation of students, who interacted through questions and answers to the questions raised. It was also possible to observe the knowledge that the students already had about some of the subjects addressed in the workshop, which may be related to their insertion and coexistence in the semi-arid region.

In addition, the academics involved in conducting this workshop had the opportunity to share knowledge and increase their personal and professional experiences through the dialogue provided, based on respect, questioning and observation. Seeking, in this way, ways that contribute to the solution of existing problems.

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