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GARDEN AT SCHOOL: AGROECOLOGICAL PATHS AND MULTIDISCIPLINARY DIALOGUES IN MUNICIPAL SCHOOLS IN CANAÃ DOS CARAJÁS -PA

HORTA NA ESCOLA: CAMINHOS AGROECOLOGICOS E DIALOGOS MULTIDISCIPLINARES EM ESCOLAS MUNICIPAIS DE CANAÃ DOS CARAJÁS -PA

HUERTO EN LA ESCUELA: CAMINOS AGROECOLÓGICOS Y DIÁLOGOS MULTIDISCIPLINARIOS EN LAS ESCUELAS MUNICIPALES DE CANAÃ DOS CARAJÁS -PA

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Abstract: This work presents the university extension actions, carried out by the Federal University of the South and Southeast of Pará, in schools of the municipal elementary and high school network included in the "Horta nas Escolas" Project, located in the municipality of Canaã dos Carajás - PA. We deal, especially in this article, with the implementation of

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agroecological demonstration units for vegetables such as plain, curly, American and purple lettuce, arugula, kale, parsley and cilantro in a sustainable and organic way with the objective of providing students with multidisciplinary living laboratories in order to complement the teaching and learning of the students. The implementation of the first agricultural agroecological units in schools in the municipal network had promising results in relation to the implementation of multidisciplinary and agroecological teaching, impacting about 2,000 students, 35 elementary and high school teachers, in addition to 56 higher education students in Agronomy.

Keywords: horticulture, organic production, recreational activities, sustainability.

Resumo: Este trabalho apresenta as ações de extensão universitária, realizadas pela Universidade Federal do Sul e Sudeste do Pará, em escolas da rede municipal de ensino fundamental e médio inseridas no Projeto "Horta nas Escolas" , localizado no município de Canaã dos Carajás – PA. Tratamos, especialmente neste artigo, sobre a implantação de unidades demonstrativas agroecológicas olerícolas como alface lisa, crespa, americana e roxo, rúcula, couve, salsinha e coentro de modo sustentável e orgânico com objetivo de proporcionar aos estudantes laboratórios vivos multidisciplinares a fim de complementar o ensino e aprendizagem dos à alunos. A implantação das primeiras unidades agroecológicas olerícolas em 8 escolas da rede municipal teve resultados promissores em relação a implantação do ensino multidisciplinar e agroecológico, impactando cerca de 2.000 estudantes, 35 professores de ensino fundamental e médio, além de 56 alunos do ensino superior em Agronomia.

Palavras-chave: olericultura, produção orgânica, atividades lúdicas, sustentabilidade.

Resumen: Este trabajo presenta las acciones de extensión universitaria realizadas por la Universidad Federal del Sur y Sudeste de Pará, en escuelas de la red municipal de educación fundamental y secundaria incluidas en el Proyecto “Horta nas Escolas”, ubicadas en el municipio de Canaã dos Carajás - PA. En este artículo abordamos especialmente la implementación de unidades demostrativas agroecológicas de hortalizas como lechuga lisa, rizada, americana y morada, rúcula, repollo, perejil y cilantro de forma sustentable y orgánica, con el objetivo de brindar a los estudiantes laboratorios vivos multidisciplinarios con el fin de complementar la enseñanza y el aprendizaje de los estudiantes. La implementación de las primeras unidades de cultivo de hortalizas agroecológicas en 8 escuelas municipales tuvo resultados prometedores en relación a la implementación de la enseñanza multidisciplinaria y

agroecológica, impactando a cerca de 2.000 estudiantes, 35 docentes de enseñanza fundamental y media, además de 56 estudiantes de enseñanza superior de Agronomía.

Palabras clave: cultivo de hortalizas, producción orgánica, actividades recreativas, sostenibilidad.

INTRODUCTION

Agroecology is a science, a way of farming, and a social movement all rolled into one (SILVA & SANTOS, 2016). When it comes to the scientific side of agroecology, it's a method that pushes academics to look into farmer knowledge and skills, as well as construct agroecosystems that don't rely on agrochemicals or external energy sources.

Agroecology is defined as an alternative model of food production to the current method, defending each nation's or region's ability to preserve and improve its ability to produce basic food crops using an equivalent variety of cultivars, with this right serving as the foundation of sober agriculture. Agroecology is also a social movement since it protects the independence of producers and consumers from the capitalist system, as well as the struggle against environmental injustices, which includes the fight for food security (ALTIERI, 2010).

By contextualizing theory and practice, assisting in the learning process, and resolving conflicts through the promotion of collaborative and cooperative work, agroecological horticulture in the school environment can serve as a living laboratory for the development of various pedagogical activities in environmental and nutritional education (MORGADO, 2006).

Students can focus on environmental concerns, nutritional quality, health, quality of life, and children's connections with ecological relationships in the natural setting of the school when horticulture is included as a community activity in the classroom. As a consequence, these living laboratories serve as a teaching tool for increasing fruit and vegetable intake, developing good eating habits, restoring regional and local customs, and lowering school-related expenditures (MUNIZ & CARVALHO, 2007).

The extensionist helps the school community develop, implement, and maintain horticultural systems while also educating kids about organic horticulture, composting, food consumption patterns, physical, chemical, and biological aspects of soil, and camp-city linkages, among other things. The necessity of finding answers to the world's present issues.

Instructing pupils on how to do the same in their homes, allowing for a reduction in communal waste as well as the production of food in a socially equitable and sustainable way.

The goal of this extension operation was to install agroecological gardens in schools across the municipal network of Canaã de Carajás, so that they could be utilized as instructional support for elementary and high school students, complementing practical activities of curricular subjects.

MATERIAL AND METHODS

The initiative for this extension action arose from a demand within the actions of PEPETI (Teaching, Research, Extension, Technology and Innovation Pole) of UNIFESSPA (Federal University of the South and Southeast of Pará) to leverage public policies capable of inserting students of the municipal network of Canaã dos Carajás in the context of quality education.

SCHOOL SELECTION

In the rural regions of Canaã dos Carajás, eight secondary and elementary schools were chosen. The project coordination conducted on-site interviews with faculty and students to determine their interest in participating in agroecological activities, as well as the faculty's willingness to participate in extracurricular activities such as the installation of living laboratories using agroecological concepts.

IMPLEMENTATION OF DEMONSTRATION UNITS

The olericle systems were installed and maintained with the cooperation of Canaã dos Carajás agronomy students in 2019 and 2020. The students will set up the project to implement the vegetable gardens (Figure 1) and conduct previous visits (Figure 2) in all of the schools that will be involved in the project to meet with those responsible for each school about the installation location of each vegetable garden as well as the vegetables preferred by each locality to adapt the objectives of the direction and teachers of each school.

Figure 1. Internal structure of agroecological gardens.

The schools served were: Carlos Henrique Municipal School of Elementary Education (Vila Ouro Verde); Magalhães Barata Municipal Elementary School (Vila Feitosa); Teotônio Vilela Municipal School of Early Childhood and Elementary Education (VP 20); Carmelo Mende Municipal Elementary School (Bairro Ouro Preto); Luiz Carlos Prestes Municipal Elementary School (Agrovila Nova Jerusalem); Adelaide Molinari Municipal Elementary School (Vila Planalto).

AUDIENCE TARGET

3000 students from the Elementary School II series (5th to 9th grade, with 2 classes from the 5th year, 2 classes from the 6th year, 3 classes from the 7th year, 2 classes from the 8th year, and 2 9th grade classes) of the aforementioned teaching units made up the target audience for the research actions.

Figure 2. External structure of agroecological gardens

The pedagogical application of the gardens following their implementation was discussed in meetings between the project coordination, school management, and teachers, so that the students of Agronomy de Canaã do Carajás can support the pedagogical actions agreed upon according to the uniqueness of each school.

STRUCTURE OF AGROECOLOGICAL VEGETABLE GARDENS

The gardens are 5 meters wide by 8 meters long, with a ceiling height of 2.0 meters above the ground. To support the structure, 4 struts at 2.66 m apart at a depth of 0.6 m were fastened to the ground on each side. The front facade was divided into 2 free spans of 2.5 m, with a strut in the middle dividing the spans that will be 4 m high from the ground. The joists were installed on the same longitudinal supports once the supports were fixed.

Wooden arches were used on the roof, which will connect one side of the vegetable garden to the other, and over the arches an agricultural film with 150 microns was placed, fixed at its ends with a wooden batten and a nail.

Figure 3. Complete structure of agroecological gardens

CONSTRUCTION OF BEDS

Six beds, each measuring 1 m broad by 3 m long x 20 cm high and positioned 50 cm apart, were built. For the bed's foundation, the soil was turned around to a depth of 20 cm at the bed's location, and then cow dung and organic matter were added to produce a material combination. On the outside, a flower bed with the same proportions was erected for the growing of chives, which will be on a structure with a 50% shade screen cover.

PLANTING

To prepare the seedlings, a tray-type seedbed with square cells filled with organic substrates was used, which will be suspended inside the garden. The transplanting of the seedlings to the bed was manually obeying the age and vigor of the seedling.

- 1 outdoor bed chive beds spaced 20cm x 20cm
- 1 bed for planting cabbage 40cm x 40cm
- 2 beds for lettuce spaced 20cm x 20cm
- 1 bed for planting coriander (parsley) in juices spaced at 20cm
- 1 bed for planting eggplant, among others.

Holes measuring 40cm x40xmx40cm were dug on the outer sides of the garden, filled with the same material as the bed where peppers, cucumbers, okra and zucchini were planted.

CULTIVATION

For the maintenance of the bed parallel to the construction of the vegetable garden, an organic compost bin was also made, which should be assembled with vegetable materials such as bean straw, rice straw, fruit husks, sawdust, green leaves of engar feet, this material was collected in the region in the community. It was tanned to be used during planting management from the 2nd cycle onwards as the main source of nutrients.

Figure 4. Beds in agroecological vegetable gardens are being cultivated.

PEST CONTROL

Natural products such as: tobacco syrup, garlic extract, hot pepper extract and cow urine were used to control fungi, mites, mealybugs, caterpillars and aphids. are products used in adequate and balanced proportions.

ACTION TO DELIVER AGROECOLOGICAL GARDENS TO THE SCHOOL COMMUNITY

Following the building and adaption of the agroecological cultivation units, the agronomy students and project coordinators held an inauguration of the agroecological gardens for teachers and students from elementary and secondary schools in the municipality of Canaã dos Carajás. Students and instructors from the benefitting schools, as well as the municipal education department, were present for the inauguration. The first planting of vegetables by primary school pupils with the assistance of Agronomy students symbolizes the inauguration.

RESULTADOS E DISCUSSÃO

In the fields of olericulture, phytotechnics, phytopathology, rural constructions, and rural extension, the impollantation of agroecological gardens played a critical role in the education of agronomy students.

Figure 5. Agronomy students building agroecological gardens.

Student involvement in the project has resulted in professional development in a variety of areas within agronomic sciences, including the establishment of students and means of differentiated learning, particularly in project management and multidisciplinary teamwork, as

well as interrelationships with basic education professionals and elementary and secondary school students.

The involvement of students from the Agronomy course in the project has a fundamental relevance in terms of developing multidisciplinary skills and knowledge across the course's curriculum, allowing students to gain skills and knowledge in a variety of areas within the agricultural sciences.

Because the themes can be contextualized and prioritized, the curriculum gains flexibility and openness. According to MORGADO (2008), the development of pedagogical activities resulting from the contextualization of theory and practice in the management of the garden has aided in the teaching-learning process and strengthened relationships by encouraging collective and cooperative work among the social agents involved.

The educational dimension of an agroecological school garden extends the didactic book, creating new interactions between students, instructors, and the school community, all of whom participate actively and cooperatively in the construction and dissemination of existing and new knowledge. The project impacted around 2,000 students, 35 elementary and high school teachers, in addition to 56 higher education students in Agronomy.

Figure 6. Agronomy students planting in agroecological gardens.

An agroecological school garden's pedagogical dimension goes beyond the textbook instrument, establishing new relationships between subjects, students, teachers, and the school community, who take active and cooperative roles in the process of building and disseminating existing knowledge and new knowledge arising from praxis. Pedagogical dialogue Rural schools have this crucial instrument in the teaching-learning process, including agricultural activities into their internal environment.

The activities in the agroecologically oriented school garden, in turn, helped pupils comprehend the dangers of pesticide usage to human health and the environment. It taught students about the need of preserving the school environment while also building collaboration and cooperative skills.

Figure 7. Agronomy students performing organic fertilization and cultural treatments in agroecological gardens.

Another relevant aspect of the implementation of gardens in the school environment is inserted in the context of urban agriculture (MENDONÇA, 2012) by enabling the debate of issues inherent to the environment, sustainability and income generation of populations under social and economic risk conditions.

This type of experience enables work to form the school community (teachers, volunteers and students) in the area of the environment through the themes of quality and rational use of water, recycling and composting of organic waste, ecology and forms of ecological agriculture, sustainable cities, pesticide poisoning, environmental contamination and its risks to human life.

Agroecologically based production systems are increasingly recognized and adopted as pillars for improving living conditions and sustainability in peasant family farming, but they are also equally important for the agroecological transition in other spaces, such as public

schools and intra-urban agriculture, which is located within the rural urban area of municipalities and has characteristics of both (AZEVEDO et al, 2020).

Figure 8. Agronomy students performing biological pest control in agroecological gardens.

ACTION TO DELIVER AGROECOLOGICAL GARDENS TO THE SCHOOL COMMUNITY

A favorable and multidisciplinary contact was noticed between students and instructors of elementary and high school with Agronomy academics at the time of the launch of agroecological gardens in schools.

When planting seeds and seedlings with the help of Agronomy students, elementary school students demonstrated a positive pedagogical response. These students were able to experience in practice and intuitively applications of their disciplines such as Mathematics, Science, and English within the living laboratories that are the agroecological gardens.

Figure 9. Multi-didactic identification plate of agroecological gardens.

The vegetable garden serves as a living laboratory for a variety of educational activities. Its installation offers a number of benefits to the school community, including addressing environmental and health education issues through nutritional and food components.

The school garden can influence changes in values and attitudes by providing a space for training and information in the school, as well as content learning by encouraging the student's involvement in the daily life of social issues, allowing him to intervene in local reality and contribute to the reformulation of the actors' thoughts (FREIRE, 2008).

Capra (2005) describes the school garden space as a site capable of reconnecting children to the basics of food while also integrating and enriching all school activities. The garden awakens as a result of this, not to desecrate, but to maintain the environment and follow the paths that lead to long-term development.

Figure 9. Multidisciplinary interaction between agronomy students and high school and elementary school teachers and students in agroecological gardens.

As observed in the experience of this extension project and observations in other schools visited during the execution of the activities, using gardens in schools as an educational tool has shown to be a difficult challenge when only teachers, students, and school management are involved. This is due to the hectic work dynamics of professionals at the day care center where we work in caring for children.

The activities generated in agroecological gardens have the potential to build essential play skills to the development of basic abilities within the student's curriculum, particularly in elementary school, where interaction and engagement were higher than in high school. At the time of the introduction of productive agroecological units, the entire school community responded positively.

Figure 10. Playful activities developed in agroecological gardens involving the community benefited from the extension action.

According to Andrade (2000), challenges to the execution of such initiatives include the size of the school, teachers' desire to participate in training, and the director's readiness to undertake an environmental project that may need a change in the school routine.

Elementary and high school students who are participating in the actions of the agroecological olericule units show above average interest and portray that they are better understanding the subjects proposed in the classroom and additionally reported that after participating in the project, schools are building small gardens in their homes with the help of their fathers, mothers, grandmothers and other family members. On the other hand, high school teachers and fundamentals reported that their classes became more dynamic, productive and interesting to students. Additionally, in the view of agronomy students, involvement in the project allows them to practice the contents of disciplines such as: horticulture, phytotechnics, rural constructions, phytopathology and agricultural entomology in practice concomitantly with the questions proposed in the classroom

The 'Garden in Schools' project is still in process; so far, the project's coordination, in collaboration with Agronomy professors, has provided 8 agroecological vegetable production units to the community of Canaã de Carajás, with plans to build 5 additional units in elementary and secondary schools. So far, the results have been favorable, and with the continuation of cultural treatments and pest control operations, as well as the start of instructional activities, the project will be able to consolidate even more in the perspectives of interdisciplinary agroecological production.

FINAL CONSIDERATIONS

Based on the findings of this study, it is feasible to infer that the presence of an agroecological garden in the school setting is an essential tool for learning and the development of a socio-environmental culture. sustainable. Higher education academics, as well as elementary and high school students, are trained in agroecological and transdisciplinary practices in the field of agro-social sciences through the construction of agroecological production units.

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