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# KNOWLEDGE AND PRACTICES IN COFFEE CULTIVATION IN ÁGUIA BRANCA - ES: AN ETHNOMATHEMATICAL PERSPECTIVE

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**Aldivania Alves Salvador Wernz[1] and Eulina Coutinho Silva do Nascimento[2].**

## ABSTRACT

This article sought to identify the mathematical knowledge present in the practices of conilon coffee production by family farmers in Águia Branca (ES), using the perspective of Ethnomathematics. The research, based on a visit to a rural property with a family tradition in coffee growing, aimed to analyze the integration between traditional knowledge, modern techniques and formal mathematics. The study identifies and describes the mathematical knowledge used by farmers in different stages of production, such as the calculation of the spacing between coffee trees, the estimation of production, the conversion of measurements and the use of non-conventional units, such as the "branch" to measure distances. The results demonstrate that mathematics is intrinsically linked to the daily practices of farmers, revealing a complex network of knowledge that is articulated with the local culture, family traditions and the socioeconomic context of the region. The research highlights the importance of Ethnomathematics as a tool to value traditional knowledge and promote a more contextualized and meaningful mathematics teaching for students, especially in rural areas with a strong agricultural tradition.

**Keywords:** Ethnomathematics. Family Coffee Growing. Traditional Practices. Mathematics Teaching.

[1] Master in Education, Doctorate student
Federal Rural University of Rio de Janeiro - UFRRJ
E-mail: dil.salvador@hotmail.com
ORCID https://orcid.org/0009-0001-4193-5326
LATTES: https://lattes.cnpq.br/6883384532360779
[2] Dr. in Sciences
Federal Rural University of Rio de Janeiro - UFRRJ
Email: eulina@ufrrj.br
ORCID http://orcid.org/0000-0002-8084-7126
LATTES: https://lattes.cnpq.br/4832316123512245

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## INTRODUCTION

This work is an excerpt from a broader research developed in the municipality of Águia Branca, located in the state of Espírito Santo, which has a solid tradition in the production of conilon coffee. Family coffee growing stands out as the main source of livelihood and a central element of local identity.

Ethnomathematics, as a field of study that investigates mathematical manifestations in different cultural contexts, sheds light on the knowledge, techniques and mathematical strategies developed and transmitted between generations of farmers. The research, based on a visit to a rural property with a family history in coffee growing since 1950, aims to analyze how family farmers in Águia Branca mobilize their mathematical knowledge in different stages of production, from planting to harvesting and processing of coffee.

The mathematical knowledge present in the practices of conilon coffee production by family farmers in Águia Branca (ES), from the perspective of Ethnomathematics, evidenced the integration between traditional knowledge, modern techniques and formal mathematics. It was possible to perceive the various practices that involve calculations, measurements, estimates and decision-making based on mathematical knowledge, such as the spacing between coffee trees, the estimation of production per plant, the calculation of the number of bags per hectare, the conversion of volume to weight after drying the product and valuing the mathematical knowledge that is intrinsically related to the cultivation practices of conilon coffee by family farmers in this municipality

By analyzing the practices, calculations, estimates and units of measurement used by farmers, the article seeks to demonstrate how mathematics is integrated with the local culture, family traditions and the socioeconomic context of the region. The research proposed to reveal a little of the network of mathematical knowledge present in family coffee growing, considering both traditional methods and the incorporation of modern techniques, and to discuss the implications of these findings for mathematics education. The aim of this study is to contribute to the appreciation and preservation of the mathematical knowledge of family farmers, in addition to offering subsidies for a more contextualized and meaningful teaching of mathematics, in line with the reality of the field.

Understanding that the integration between traditional knowledge and modern techniques is fundamental for the development of family coffee growing and that Ethnomathematics can contribute to the appreciation and preservation of this knowledge, the results of this research were applied in the classroom. This integration offered subsidies

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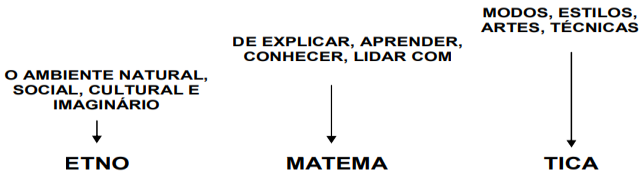
for the creation of pedagogical strategies that sought to make the teaching of mathematics more relevant to the reality of the field whose records were recently submitted to another journal.

## ETHNOMATHEMATICS

We will point out here a little about the Ethnomathematics program, whose main representative was Ubiratan D'Ambrosio who built the name Ethnomathematics from radicals "[...] ethno [for a commonly accepted group of myths and compatible values and behaviors] + Techné [for manners, arts, techniques] + mathema [for explaining, understanding, learning]." (D'AMBROSIO, 2018, p. 28), as seen in Figure 1. As D'Ambrosio (2018, p. 28) points out, the Ethnomathematics program is a research program "to understand the ethics of mathematics in different ethnos."

Figure 1: Radicals used by D'Ambrosio in the construction of the term Ethnomathematics




Source: D'Ambrosio, 2020, p.2.

D'Ambrosio also warns that the Ethnomathematics program "[...] it should not be confused with the ethnographic approach or with what we might call an ethnic mathematics." (D'AMBROSIO, 2018, p.22). Which makes us think that all people, communities create different knowledge, based on their experiences.

According to D'Ambrosio, "The great motivator of the research program that I call Ethnomathematics is to seek to understand mathematical knowledge/doing throughout the history of humanity, contextualized in different interest groups, communities, peoples and nations." (D' AMBROSIO, 2020, p.17-18).

Furthermore, the Ethnomathematics Program seeks to involve the history of mathematics in different cultures, this is an area that also works today in mathematics education. According to Mattos (2020):

> In the 1970s, D'Ambrosio developed a questioning stance towards the teaching of school mathematics and about academic mathematics itself. He received several criticisms of his ideas from the so-called dominant group of mathematics. However, these criticisms served to propel him in the rationale of what he would propose. It

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> was necessary to seek the socio-cultural aspects to teach school mathematics. (MATTOS, 2020, p. 16)

One of D'Ambrosio's motivations came from understanding how outdated the way of teaching and learning mathematics was, with archaic techniques and without stimulating students, with practices that they can understand the discipline through things they do on a daily basis, according to each culture. In this way, the Ethnomathematics Program gives meaning to academic mathematical theories, because it accepts that students' everyday experiences can be valued.

It is salutary to reinforce that Ethnomathematics does not place itself as an antagonist to school mathematics, which in itself is also an ethnomathematics. Knijnik clarifies about the pedagogical process in the conceptualization of the Ethnomathematical approach:

> There is no exacerbated relativism, a naïve view of the potentiality of such popular knowledge in the pedagogical process. In it, the interrelations between popular and academic knowledge are qualified, enabling the adults, young people and children who participate in it, concomitantly to understand their own culture in a deeper way and also to have access to contemporary scientific and technological production. (KNIJNIK, 2002, p.59).

We understand that it is important to value students' cultural knowledge so that we can awaken their potential more broadly. Nascimento and Destefani (2022, p.101) reinforce "It is necessary to look at the student in his or her uniqueness and develop educational practices that can effectively contemplate in the curriculum the multiple ways of mathematizing the world."

It is necessary to think about the ways in which students use mathematics, their mathematical baggage, for this the teacher must be attentive, as stated by Mattos and Mattos "If school mathematics needs to be contextualized and this is essential for the student to learn, it must or can be contextualized with something that the student already knows, which is in his culture and for this reason, it is in his mental structure as an acquired knowledge". (MATTOS; MATTOS, 2019, p. 106).

D'Ambrosio (2018, p.30) simplifies and, why not say, expands the concept of Ethnomathematics by stating that "Ethnomathematics is the art or technique of explaining and recognizing in different cultural environments

The intrinsic astuteness of peasant subjects and, therefore, residents of rural areas is essential today for maintaining the homeostasis of ecosystems. More than ever, peasants

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need to use creativity to reduce the costs that can start by building their own implement and/or equipment.

The Ethnomathematics program is not closed, but shows possibilities for interdisciplinarity in various areas of knowledge, as Mattos states

> It is commendable to recognize that the Ethnomathematics Program is not closed in on itself, quite the contrary. It is open to the contributions of different scholars in different areas of knowledge. And it is allowed, because it is in motion, to be unfinished, dialectical and dialogical. (MATTOS, 2020, p.29)

The search for aligning the practices of our daily lives with mathematics and other curricular components, valuing the knowledge that they learn from father to child, in the community, are knowledges full of knowledge that need to be better used by the school. Unfortunately, it is still possible to find various forms of exclusion in the school environment, whether because the student is black, because of sexual choice, because of religion, because of their social class and also when their traditions are not respected or valued.

## METHODOLOGY

This research is based on the theorizations of Ethnomathematics, with a qualitative approach that allowed us to observe, describe and understand a phenomenon from the perspective of the people who constituted it." D'Ambrosio (2020) refers to Ethnomathematics as a Research program, which he called the Ethnomathematics Program. D'Ambrosio reinforced "By insisting on the name Ethnomathematics Program, I seek to show that it is not a matter of proposing an epistemology, but of understanding the adventure of the human species in the search for knowledge and the adoption of behaviors." (D'AMBROSIO, 2020, p.18)

The qualitative approach of Ethnomathematics values the local and traditional knowledge that communities have. This includes recognizing the mathematics embodied in activities such as agriculture, crafts, trade, and rituals, and how this knowledge is passed down from generation to generation, involving the analysis of mathematical practices in everyday contexts. This can include observing and recording how people use numbers, measurements, geometry, patterns, and other mathematical concepts in their daily activities.

For this research, we adopted the interview as an instrument, which is a research technique that offers a direct and qualitative approach to collect information and data. The

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questions to the interviewee were aimed at obtaining knowledge, opinions, experiences, perceptions or information about coffee production. Through the semi-structured interview, it was possible, in addition to a set of questions, to explore topics in a more flexible way and adapt the questions according to the interviewee's answers. We do not restrict ourselves to asking questions, in many moments we leave the producer free to talk and tell about his trajectory in coffee cultivation.

This study had a favorable opinion from the Ethics Committee for Research with Humans and followed all the precepts of research ethics.

## RESULTS AND DISCUSSIONS

### COFFEE: THE MAIN SOURCE OF INCOME FOR THE MUNICIPALITY

When we talk about income, coffee is one of the most important and valuable agricultural commodities in the world. For the reality of the municipality of Águia Branca, it is the product that drives the economy. We seek to examine the coffee production process, the role of producers, cultivation, harvesting, and the way they carry out this process.

The love of coffee is an integral part of many cultures, as well as being one of the most consumed beverages in the world. It is a symbol of hospitality, social interactions, present in various cultural rituals. The stories and narratives of people who have a deep relationship with coffee, such as the coffee producer, have provided us with insights into how coffee transcends its functional role and becomes an affective element.

The tradition in coffee cultivation and consumption is often rooted in deep cultural traditions. Tradition influences coffee cultivation and harvesting practices, as well as the way it is prepared and consumed.

Empirically, the city of Águia Branca (ES) has an economy focused on agriculture, being cultivated: corn, black pepper, beans, cassava and conilon coffee, with coffee production being the main responsible for turning the economy and consequently the main source of income for the municipality.

We sought the path of farmers' knowledge and by investigating the social, cultural and economic contexts of producers inspired by Ethnomathematics, we identified coffee production as a traditional food present daily on the table of Brazilians.

The State of Espírito Santo stands out in the production of conilon coffee (Coffea canephora), and here the regional dialects are not few, such as: this year the production "poquez", that is, it produced a lot. Here they will not harvest the coffee, here in Espírito

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Santo they are "panha". The word "Panha" as being Colheita, time of coffee harvest (in ES). When workers go out to harvest coffee in the state of Espírito Santo, they say they go to the coffee "panha".

As we said earlier, from planting to marketing, there is a long way to go. They have stages that contain knowledge of Mathematics practiced by producers, transmitted from generation to generation, aiming at the preservation of history, maintenance of a tradition and contribution to the economic income of families.

Coffee production in the State of Espírito Santo is very present, in general students know the entire coffee production process, from planting seedlings to "panha" (coffee harvesting), due to family ties with producers. They master the procedures, recognize the utensils used for the production process, however, many do not identify the mathematics practiced by them in daily tasks. With the support of the Ethnomathematics Program, we seek to identify and help them to perceive the tactics related to mathematics that are present in agricultural activity.

## ETHNOTHEMATIC KNOWLEDGE OF THE FARMER

In 2023 we visited the rural property of a coffee production enthusiast, who here we will just call a producer, in order not to identify him. At 38 years old, the researched producer carries with him the legacy of a family tradition that began in 1950, with his grandfather. Today he is the third generation of the family to cultivate what is precious to the family and to our region. From planting to the cup of coffee, everything is carefully crafted to preserve and enhance the unique characteristics of this product that is more than special for the producer.

The producer started producing coffee at the age of ten, in the company of his father, who according to him, when he was not at school, went to the fields to help his father water the coffee seedlings. He said that in the past there was no irrigation, so it took four hose nozzles and eight people to work. The producer told us that: "In the past, coffee seedlings would be wet in the mango tree, then on Saturdays, usually my father would wet the new coffees (referring to the new seedlings), then there had to be four people at the ends of the mango trees that were watering and four more arranging." (Producer - Interview given to the authors in June 2023)

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He reported that he started dealing[3] with coffee with his father's teachings. When asked about the varieties of coffee grown, the interviewee replied that it is conilon, his grandfather used to work with Bourbon coffee, in the past, however, he was not even born.

Conilon coffee is of the Coffea Canephora species, which has adapted well in the State of Espírito Santo, and is a coffee that has 2.2% caffeine, practically double that of Arabica coffee, which is another variety produced in the state, but in colder regions. Conilon has the most bitter and striking taste. And it withstands higher temperatures.

Right at the beginning of the conversation, we were able to observe elements of Ethnomathematics, when the producer reported on the tradition of coffee in the family, in addition to the local elements and the mathematics that is present in our daily lives. When the producer refers to the adaptation of coffee varieties, such as Bourbon and Robusta, to the climate of the region. He mentioned that Bourbon does not do well in the warm region, implying an empirical understanding of the ideal conditions for plant growth. This reveals a working knowledge about the relationship between climate and coffee cultivation, which includes indirect mathematical notions such as water management. We were also struck by the comparison that the producer makes with the Conilon and Robusta varieties, he highlights the visible differences in the plants, such as height and size of the leaves.

The comparison between the varieties highlights a practical understanding of the diversity of coffee species mentioned that the Robusta variety requires a greater amount of water for its production, due to its size and size of the leaves, emphasizing the importance of practical knowledge about the water needs of different coffee varieties.

D'Ambrosio states that: "the world in which we live, although we do not realize it, has always depended fundamentally on mathematics. It has always been and is present in practically everything that surrounds us. Its applicability is relevant even in other Sciences" (D'Ambrósio, 1986, p. 31). In coffee production, we can see how much mathematics is impregnated and often because it is part of the farmer's daily routine, it is not identified.

In the dialogue with the producer, we discuss the process of planting and harvesting coffee, the producer indicates that the planting season is in April, considering it a colder period, which is beneficial for the development of seedlings. In addition, he mentions the crop renewal cycle, replacing plantations every 10 or 12 years.

The producer points out that the harvest occurs when the coffee reaches 70 to 80% of maturity, usually this happens after May 15 of each year. The level of ripeness of the

[3] Toil, work, effort, labor, labor, struggle, doing.

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grain is very important to have a quality and sweeter grain. Making it clear that time is an important factor in the production process both for planting seedlings and for the maturation of grains and even the renewal of crops.

The researched producer, in addition to producing conilon coffee for commercialization, produces special, roasted and ground coffee and sells it in 250 or 500g bags. The coffee considered special has special care from harvest to packaging, as it needs to follow strict quality standards, which are influenced by correct maturation, fermentation, drying and roasting. For this coffee, he tells us that the form of production is differentiated, as we will see in the following report:

> Researcher: You also work with specialty coffee. Is this maturation percentage of 70 to 80% what makes your coffee special?
> Producer: I only make 30 bags of specialty coffee, this coffee is selected, right, I pick it only after it is 95% ripe. For the special here (relating to the panhadores), he picks about three times, so I only make about 30 bags of this coffee... (Survey Data, 2023)

According to the producer, the coffee that is separated for the preparation of specialty coffee has different care with fertilization and handling. According to him, he always chooses the crop that catches the shade of the afternoon, which is cooler, in addition, when they ripen they are picked, almost bean by bean so that they can meet the requirements of a specialty coffee.

In the search to try to bring a little of what the producer brings from what he learned from his father and grandfather, we came to the interview question that investigates the drying of coffee. Today we know that coffee dryers exist, but in some properties they still use traditional drying methods such as the yard or stone slab according to Figure 02.

Figure 02: Image of the coffee drying on the stone slab

Source: Authors' personal archive (2023)

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When asked to the producer: How was the drying process in his father's time, he describes manual methods used in the past to dry the coffee, mentioning the use of a tool called "cow", which was used to pull the coffee to spread on the terrace. This process was carried out manually, with one individual pulling the rope and another pushing, which required a lot of effort and physical labor.

In addition to the "cow", the producer mentions the use of the squeegee (figure 03), a tool that is still used in the drying process of specialty coffee, on his property, mainly because the volume of coffee is smaller.

Figure 03: Squeegee used in coffee drying

Source: Authors' personal archive (2023)

This reveals to us that modernity has not yet overcome the traditional method of drying coffee and that it was necessary to adapt and combine traditional methods with more modern tools, according to the need and scale of production.

When the farmer exposes his way of working, we realize that mathematics is present in his speeches. Regarding traditional knowledge and mathematical learning, we understand that valuing what is traditional within each culture can contribute to classroom learning.

The producer mentioned the existence of a digital meter for this purpose and offers the opportunity to see and possibly demonstrate the use of the moisture meter[4], whether it is a manual or digital instrument. Indicating the importance given to precision in determining the right drying point of coffee beans.

In the past, the measurement of the drying point was more on the "eyeball". This is the traditional producer's way of measuring, its measurement goes through its visual perception of the coffee drying point. Nowadays there are moisture meters, which can be used both for coffee that dries in the traditional way on the terrace, or in the dryer.

[4] Image and information about moisture meter can be found at: https://www.gehaka.com.br/produtos/linha-agricola/medidor-de-umidade-de-graos-de-bancada/g810-ip

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The producer described the process of evaluating the drying point of coffee, indicating the use of the moisture meter to determine the moisture of the beans. He clarifies that the dryer itself does not have such a measuring device, and that the procedure is carried out manually, grinding the coffee and analyzing the humidity.

The interviewee highlighted the evolution of practices over time, mentioning manual drying on the stone as a specific technique for specialty coffee and used on his property. He also shared that he changed the drying of coffee in the shade[5], evidencing a practical adaptation and a return to ancestral practices of drying coffee.

For coffee to develop and reach a satisfactory harvest, care is needed at all stages of production, in dialogue with the producer we can highlight that soil analysis and technical monitoring are important for the development of healthy plants with good production. The producer stressed the importance of soil analysis in the process of preparing the land for coffee planting, a practice that aims to evaluate soil conditions, identify nutrients and determine if corrections are necessary, such as the application of limestone. For this analysis, the producer is accompanied by an agronomist who gives tips to ensure that agricultural practices are aligned with the specific needs of the plantation, contributing to efficiency and productivity.

The producer pointed out that in the last 10 years, the planting did not need to put limestone on his land, a sign that the soil has the nutrients at the right point. When asked if during flowering[6] he could already identify if he was going to have a good harvest or not. He replied:

> Already... If the flowering is good, you identify if you will have a good harvest. But here comes the precautions, right... When the flower starts to dry it gives a caterpillar, then we need to take care of it. And if the flowers open on the verganta from the inside to the outside and it is all in bloom, then you can already see that it will make a lot of coffee. (Producer - Interview with the authors, 2023)

The producer brought us important information related to the phenology of the coffee and the necessary care during the flowering phase, such as the seasonality of flowering, which usually occurs in September, but in this year 2023 there was an advance due to climatic variations. The influence of the climate on flowering is a point that the producer highlights, he even associates this anticipation with recent rain, reducing the sensitivity of the life cycle of plants to environmental conditions.

[5] Screen that regulates the amount of sunlight that plants receive for drying on the stone.
[6] When the flowers appear on the verganta.

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During flowering, care must continue because caterpillars may appear when the flowers begin to dry and they need to be attentive to combat them to ensure a good harvest. According to the producer, when the coffee plant blooms it is an indication of the future harvest.

He mentioned the observation of the flowers, especially the opening of the "verganta" (stick), as a sign of a promising harvest. Asked what would be verganta, illustrated in Figure 04, he clarified that it refers to the stick or branch where coffee fruits grow.

Figure 04: Verganta (Rod) of flowering coffee

Source: Authors' personal archive (2023)

It was also possible to perceive the integration of mathematical practices and practical observations in the management of coffee cultivation, highlighting the relationship with Ethnomathematics, which emphasizes the wealth of traditional knowledge of the producer in coffee production.

In the practices related to coffee production we were able to identify the presence of ethnic elements, we explored aspects of the agricultural practice of the coffee producer, seeking to understand the presence of traditional techniques and mathematical elements in production.

When asked about the harvest, the producer confirmed the use of sieve and tarpaulin, which are traditional methods. The discussion turns to the calculation of production, revealing a combined approach of visual estimates before harvest and formal calculations per hectare after harvest. The producer highlights the ability to visually estimate the production per plant, emphasizing the integration of practical knowledge in the agricultural activity

The analysis of the production per coffee tree takes into account the variation in the characteristics of the plants, such as the number of branches, this view of the producer

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recognizes the complexity of this variation and the direct influence on production. We perceive the marked presence of mathematics in agricultural practices, revealing a light and positive appreciation of this knowledge in everyday activity, which shows how Ethnomathematics is present in agricultural practices, integrating traditional and mathematical knowledge in coffee production.

The producer highlights the remarkable presence of mathematics in his agricultural activity, mentions the expressive amount of calculations involved in coffee production, from the number of liters harvested per area to the mathematics present in the planning of the plantation, such as the spacing between coffee trees.

When asked about the importance of school mathematics, the producer recognizes that it helps a little, but points out that a lot of knowledge is acquired in the daily practice of agriculture. He suggests a more practical and regionalized approach to school mathematics, adapted to the specific needs of agriculture in the region. As we can see below:

> Researcher: In your opinion, is school mathematics important in the calculations you perform for coffee production?
> Producer: It helps a little. But we know a lot of things to do here on a daily basis. The one at school could be different, right... It should be different in each region, here it could be focused on agriculture to make it easier. (Producer - Interview with the authors, 2023)

This point of the interview is in line with our thinking that values and includes a more contextualized approach to mathematics, recognizing that it would be more meaningful to students.

Regarding the measurements used for spacing between one coffee tree and another, the producer explains that, currently, they use a branch as a measure, the branch according to the producer measures between 50 and 60cm, as illustrated in Figure 5.

The producer also pointed out that his father was the first in the region to adopt this spacing and that it is a practice of densifying coffee to increase production, something implemented after the Conilon Eficiente program, which is a program of the cooperative in the region.

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Figure 05: Measurement of the Verganta used in the spacing between one coffee tree and another

Source: Authors' personal archive (2023)

From these statements, we can see how mathematics and unconventional measurements are integrated into the producer's agricultural practices, both in quantitative calculations and in decisions related to the spacing between coffee trees. In addition, the discussion on school mathematics reveals the need for a more practical and regionally adapted approach so that it is more relevant to farmers in the region.

By exploring quantitative aspects of coffee production on the producer's property, it was possible to identify perceptions about the mathematics involved in agricultural practices, the producer reveals that the average coffee production per hectare on his property is 80 bags. When seeking more details about the harvest, ask how many bags of coffee are harvested daily during the harvest season. The producer replied that the average is 12 bags per day.

At this point we directed the conversation to the measurements used in the harvest, asking if the measurement is made directly on the bag, and the producer said: *Yes. Bag of four 20 liter brass.* (Producer interviewed). Mentioning that the bag has the capacity of four cans of 20 liters each, totaling 80 liters, later we ask about the transformation of this measure to weight after drying and processing, the farmer highlights the change in volume to 60 kg per bag.

By exploring the transmission of knowledge, questioning how the producer passes on his work method to the collaborators, we can see the Ethnomathematics associated with the transfer of traditional knowledge, where the producer shares not only the agricultural techniques, but also the measurements and calculations necessary for efficient production. As observed in the producer's report:

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> Researcher: As this knowledge is passed on to those who work with you, do you pass on your way of working to them?
> Producer: We already have a group that has been working with us for more than 8 years. You're used to my way, but in the beginning I passed everything as it should be: don't break branches, don't leave coffee on the floor, the bag fills up to the stripe.
> Researcher: Does every bag have this stripe?
> Producer: Yes. Already buy it with the stripe. Even the stripe is 80 liters.
> Researcher: Have you ever taught someone else, since your child is still small, have you passed on your knowledge about coffee production to other people?
> Producer: Already... For many people, sometimes people come to ask the question of specialty coffee... About production, fermentation... And then what I know, I pass on. (Producer - Interview with the authors, 2023)

Regarding the transmission of knowledge, Freire (2013) points out that "True communication does not seem to us to be in the exclusive transfer or transmission of knowledge from one subject to another, but in its co-participation in the act of understanding the meaning of meaning. This is a communication that is done critically". (Freire, 2013, p. 70). Freire highlights the importance of interaction and collaboration in the communication process. It is not just the act of teaching, but a reciprocal exchange in which both the communicator and the receiver are involved in the construction of meaning. The farmer, when passing on to his employees the way he works, he values what he learned from his grandparents and parents.

The producer mentioned during the conversation that he would like teaching to be practice-oriented and regionalized, valuing what each space has in its culture. In addition, he highlighted the importance of transmitting this knowledge to ensure satisfactory production. We realized that the exchange of knowledge can show how mathematics is incorporated into the daily practices of coffee production, from the estimation of production per hectare to the measurement and conversion during harvest.

He also reported that he has already passed on to many people much of what he knows about coffee production to his employees. Among the precautions they must take with production, he always teaches his employees that they cannot break the branches and that when they go to pick up the coffee and fill the bag that is used as a measure, it must be filled to the list that has the bag. He has a standard for the measure, according to the producer when he arrives on this list the content reaches 60 kg.

The visit to the farmer made it possible to identify how much mathematical knowledge is impregnated in the daily practice of the rural producer. Thus stating that there are many possibilities to develop pedagogical practices based on the experience of students.

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## CONCLUSION

The study identified the presence of mathematics in different stages of production, such as the calculation of the spacing between coffee trees using non-conventional units, the estimation of production based on plant observation, the conversion of volume measurements to weight after drying, and the planning of agricultural activities considering the life cycles of plants and climatic conditions.

The research highlights the importance of Ethnomathematics as a tool to value the traditional knowledge of family farmers and integrate them into formal mathematics teaching. By recognizing and using the knowledge present in agricultural practices, mathematics teaching can become more contextualized and meaningful for students, especially in rural areas with a strong tradition in coffee growing.

Ethnomathematics, by investigating the mathematical knowledge present in cultural practices, offers subsidies for the creation of pedagogical strategies that make the teaching of mathematics more relevant to the reality of the countryside, promoting the appreciation of traditional knowledge and the development of a fairer and more inclusive education.

In this work we identified producers' own knowledge, which can be used as a teaching and learning strategy within the classroom with students who share the same experiences, since they will be able to use what they already know from their daily lives in the classroom.

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