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ETHNOMATHEMATICS IN MEASURING RICE FIELD AREAS IN ONE OF THE AREAS IN INDRAMAYU

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Abstrak

Etnomatematika penting dalam pembelajaran matematika. Etnomatematika adalah suatu pendidikan matematika yang mengintegrasikan nilai-nilai kultur dalam pembelajaran matematika perlu menggagas integrasi secara nyata nilai-nilai kultur. Masyarakat Jawa Barat adalah salah satu provinsi di Indonesia yang memiliki beragam etnomatematika salah satunya Indramayu. Masyarakat Indramayu umumnya memiliki mata pencarian sebagai petani sehingga sebagian besar wilayah Indramayu merupakan lahan pertanian, bahkan bisa ditemukan persawahan walaupun berada di pusat kota Indramayu. Pada artikel ini dikaji etnomatematika dalam cara mengukur luas sawah di Indramayu. Metode penelitian ini adalah etnografi dengan partisipan sebanyak dua orang yaitu seorang laki-laki dengan usia 59 tahun dan seorang perempuan berusia 51 tahun berasal dari Indramayu. Hasil penelitian ini adalah adanya rumus luas sawah yang digunakan oleh masyarakat di wilayah Truwali Indramayu.
Kata kunci: etnomatematika; geometri; luas; pembelajaran matematika.

Abstract

Ethnomathematics is important in learning mathematics. Ethnomathematics is a mathematical education that integrates cultural values in mathematics learning needs to initiate a real integration of cultural values. West Java Society is one of the provinces in Indonesia which has a variety of ethnomathematics, one of which is Indramayu. The Indramayu community generally has a livelihood as a farmer so that most of the Indramayu region is agricultural land, even rice fields can be found even though it is located in the center of Indramayu city. In this article, ethnomathematics is examined in the culture of measuring rice field area in Indramayu. This research method is ethnographic with two participants, a 59-years-old man and a 51-year-old woman from Indramayu. The results of this study are the existence of rice field formulas used by the Truwali Indramayu community.
Keywords: area; ethnomathematics; geometry; mathematics learning.

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INTRODUCTION

Ethnomathematics has been written by Ubiratan D'Ambrosio, for ten years, he has written regularly and explicitly (Barton, 1996). In terms of ethnomathematics is mathematics practiced among identifiable cultural groups such as tribal-national societies, groups of workers, children of certain age brackets and professional classes (D'Ambrosio, 1985).

In Indonesia, there have been many studies on ethnomathematics because they are important in learning mathematics in schools. Ethnomathematics is a program that aims to study how students to understand, articulate, process, and finally use mathematical ideas, concepts, and practices that can solve problems related to their daily activities (Wahyuni, Tias, & Sani, 2013). Ethnomathematics as a mathematics education that integrates cultural values in mathematics learning needs to initiate a real integration of these cultural values (Sirate, 2015). In the mathematics education curriculum, mathematical concepts are taught by considering local aspects that develop in the community around the student environment (Hartoyo, 2012).

In previous studies (Aulia & Rista, 2019) identify mathematical concepts through ethnomathematics activities of rice farmers in Aceh. (Aprillianti, Sunardi, & Yudianto, 2019) reports on ethnomathematics in the activities of Temuasri Sempu Banyuwangi village cocoa farmers as teaching material for students. Fadlilah, Trapsilasiwi, and Oktavianingtyas reported the results of the identification of ethnomathematics activities of rice farmers in the Javanese community in the village of Setail (Fadlilah, Trapsilasiwi, & Oktavianingtyas, 2015). In this article, ethnomathematics will be examined in how to measure the rice field area in Indramayu.

One of the provinces in Indonesia is West Java which has a variety of ethnomathematics. Indramayu is one of the regencies in West Java Province which originates from the name Nyi Endang Darma Ayu, one of the founders of Indramayu, with an area of 2,000.99 km2 inaugurated on October 7, 1527, with a population in 2007 of 1,795,372 inhabitants (Wikipedia, n.d.). The following is a map of the locations of the Indramayu Regency. Map of Indramayu is in figure 1.

Figure 1. Indramayu Regency Location Map (Wikipedia, n.d.).

Geographically, Indramayu Regency is at 107 "51'-108" 36 'East Longitude and 6 "15' - 6" 40 'South Latitude. The area is located in the northern part of the province of West Java which is directly adjacent to the Java Sea. Indramayu Regency is about 52 km northwest of Cirebon, 144 km from Bandung via Sumedang and 205 km from Jakarta to the east. The whole area is from the lowlands to the coast. Even though Indramayu is located in West Java, namely Pasundan land that is cultured and speaks Sundanese, but most Indramayu residents use the Javanese Cirebon language Indramayu dialect which is called the local community is Berm Dermayon. Indramayu art includes Wikipedia mask dance, shadow puppets, Mapag goddess Sri, Sintren, Genjring acrobatics, theatrics, ribbons, and others. The souvenirs are Paoman batik and embroidery craft. The typical food is Pedesan entog, Indramayu porridge, Rumbah, Nagasari, Koci, mango chips, shrimp crackers, shrimp paste, Cimplo, Melinjo chips, and mango Dodol. Indramayu's agricultural products are rice, mangoes, oil and gas. Although Indramayu is not the biggest rice producer, Indramayu people generally have a livelihood as farmers, and most of the Indramayu region is agricultural land, even rice fields can be found even though it is in the center of Indramayu city.

METHOD

This research is qualitative research with an ethnographic approach. Ethnographic design is a qualitative research procedure to describe, analyze, and interpret the patterns of behavior, beliefs, and language shared by cultural groups that develop over time (Creswell, 2013). Information obtained by interviews, field notes, and observations.

The place of this research is one of the regions in Indramayu, namely the Truwali area. Readers can see the area clearly on the google map. The participants of this study were two people, a man, aged 59 years and a woman aged 51 years. The first participant was a resident of Indramayu who was often asked to measure the rice field area in one of the areas in Indramayu. Measuring rice fields is carried out if there are transactions for buying and selling rice fields.

Data is collected by triangulation, namely interviews, documentation, and theory. The interviews were conducted three times on different days, namely two interviews with the first participant and two interviews with the second participant. Taking the documentation after the interview to see the form of rice fields in Indramayu. Then the interview results are analyzed and translated by the author. Themes for data collected in this study were made primarily based on findings. Then the themes are categorized and concluded.

RESULTS AND DISCUSSION

The following are the results of the interview interviewer (researcher) with the source (participant). I for interviewer and S source on September 19, 2018. The participant's photo is in figure 2.

Figure 2. Participant

I: *Priwen cara ngukur luas sawah?* (How to measure rice fields?)

S: *Ngukure karo cengkal sing digawe pring dawae telu koma pitung puluh meter.* (Measure it with cloves made of bamboo which are three-point seven five meters long).

I: Pringe sing endi? (Where's the bamboo from?)

S: Gawe dewek. (Make it by me)

I: Terus? (Then)

S: Pringe diukur karo meteran dawae telu koma pitu lima meter. Terus dikeret-keret dibagi sepuluh. Sing sekeret arane sebolang. Dadi sing sebolang telung puluh pitu koma lima senti meter. Sebata pada karo telu koma pitu lima meter kali koma tujuh lima meter. Satus bata pada karo sepuluh bata kali sepuluh bata. Sehektar pada karo pitungatus bata. Sebau iku limangatus bata. (The bamboo is measured using a meter that is three point seven five meters long. Then drag it into ten rows. A line of his name *sebolang*. So, that's thirty-seven point five centimeters. Equivalent equal to three point seven five meters times seven five meters. One hundred bricks are equal to ten bricks times ten bricks. One hectare is equal to seven hundred bricks. That is five hundred bricks).

I: Sapa bae sing ngukur sawah? (Who measures rice fields?).

S: Wong sing bisa bae. (People who can).

I: Sing ngukur sawah wong pira? (Who measures the rice fields how many people?).

S: Paling beli wong loro. (At least two people).

I: Tugase apa bae? (Tugasnya apa saja?).

S: Sing siji gojegi cengkalan sing siji gawa pedang. (One person holds a cloak and the other holds a sword).

I: Pedange kanggo apa? (What is the sword for?).

S: Kanggo nebasi galeng petite cengkal kanggo tanda. (To cut the dike edges are curved as a sign).

I: Ambae galeng pira? (What is the width of the dike?).

S: Kira-kira patang puluh senti meter. (About forty centimeters).

I: Pirang menit baka ngukur? (How many minutes do you measure?).

S: Limalas menit pragat. (Fifteen minutes did have done).

I: Terus ngukur sawae priwe?. Baka sawae segi tiga? (Then how to measure the fields?).

S: Alas kali tinggi bagi loro. (The size of the base times height divided by two).

I: Baka persegi? (Square).

S: Sisi kali sisi. (Side length times side length).

I: Baka persegi panjang? (Rectangular?).

S: Panjang kali lebar. (The size of the length is multiplied by width).

I: Baka trapesium? (Trapezium?).

S: Jumlah sisi-sisi sejajar dibagi loro kali tinggi. (The sum of the lengths of parallel sides divided two times height).

I: Baka jajaran genjang? (If the parallelogram).

S: Alas kali tinggi. (The length of the base is multiplied by height)

I: Kan tinggi angel. (The height is difficult)

S: Digulati rata-rata sisi miringe. (Wanted average the hypotenuse).

I: Baka belah ketupat? (If it is rhombus).

S: Sisi kali sisi. (Side length times side length).

I: Baka segi tiga ora siku-siku priwe ngukure? (If the triangle is not right-angled how to measure it?).

S: Luruh garis tinggie? (Looking for the height line?).

I: Carae? (How to?).

S: Nganggo tambang. Tarik tambang sing sisi sampe titik puncak segi tiga, sampe kira-kira tegak lurus lurus tambang karo galeng. (Use the mine. Pull the mine from the side until the top point of the triangle, until it is about perpendicular to the mine with a dike).

I: Baka bentuk sawae layang-layang? (How about a kite?).

S: Langka. Sing akeh mah persegi panjang karo trapesium. (Nothing. The most numerous are rectangles and trapezium.

Figure 3. Participants who are in the Fields

The following are the results of the interview of the interviewer (I) with the participant (S) conducted on Friday, September 21, 2018. Photos of participants who are in the rice fields in Figure 3.

I: Baka ngukure ora pas priwe? (What if the measurement isn't right?)

S: Kesepatan bae karo wong sing duwe sawah karo wong tuku. (Agreement between buyers and sellers of rice fields).

I: Biasane priwe? (Usually how?)

S: Biasane baka kurang setengah bata mah dibulataken bae. Rega sawah ning kene mah mader sebata paling sejuta atawa wolungatus sewu. (Usually, if it is less than half, then it is rounded up because the price of rice fields is only around Rp800,000-Rp1,000,000.).

Based on the results of interviews with the first participant obtained about how to measure rice fields while the results of interviews with the second participant were obtained about the unit area used. Some ethnomathematics found by the authors of the two participants is as follows.

1. Tools used

   The rice paddy measuring instrument made by the farmer uses a meter which is 3.75 m long and is called Cengkal. Then the cloves are dragged (marked) divided into 10, and 1 Keret is called 1 ball. The term Galeng is dike between rice fields.

2. The unit used

   The units used by farmers in Indramayu are as follows.

   1 *cengkal* = 3,75 m

   1 *bolang* = 37,5 cm

   1 *bata* = 14 m^2

   100 *bata* = 1400 m^2

   1 *hektar* = 700 *bata*

   1 *bau* = 500 *bata*

   Based on the description there are errors which are as follows.

   1 *bata* = 3,75 m x 3,75 m = 14,0625 m^2

   The error is 0,0625 m^2

   100 *bata* = 10 *bata* x 10 *bata* = 1406,25 m^2

   The error is 6,25 m^2

   1 *hektar* = 700 *bata* = 9843,75 m^2

   There is an error of 156.25 m2 but the size of the hectare is not used in this area.

3. The process of measuring the area of rice fields

   Only certain people can measure the area of rice fields. A minimum of two people in measuring rice fields, one person holding clovers and the other one holding a sword to mark (by cutting) the edge of the clove as a sign. The time needed for one time measuring process is about 30 minutes.

4. Formulas used in measuring rice fields

   Examples of rice paddy fields are in figure 4, figure 5 and figure 6.

Figure 4. Rice field conditions in the rainy season

The formulas used in measuring rice field areas are as follows.

Area of triangle = base x height / 2.

Square area = side x side.

Area of rectangle = length x width.

The area of the trapezoid = (the number of sides parallels divided by two) and times the height.

Area of parallelogram = base x height; the height is sought on the average of the hypotenuse.

The area of the rhombus = side times side.

The area of any random triangle = base times height.

Find the high line using the mine. Pull the mine from the side to the top of the triangle, until it is about perpendicular to the mine by its side.

Figure 5. Rectangular shaped rice fields

Figure 6. Rectangular shaped rice fields

Based on the results of interviews it is known that the shape of a kite does not exist, but many are rectangular and trapezium. If the size of the area is not in the form of natural numbers, then the accuracy between the buyers and sellers of rice fields. Based on this description, it is known that all area formulas used are correct except for the parallelogram area and rhombus. The area of the parallelogram should be half the product of the perpendicular sides while the area of the rhombus should be half the diagonals.

Ethnomathematics in the region will be better if incorporated into teaching materials in schools so students can learn from the surrounding environment. The teacher can also help students get to know mathematics close to everyday fraud and they can maintain their culture. This is consistent with the findings of the researchers (Hartoyo, 2012; Sirate, 2015; Wahyuni et al., 2013) which reports that ethnomathematics is taught in learning in schools.

CONCLUSION

There is ethnomathematics in the Indramayu which can be taught in schools so that students learn the environment. This ethnomathematics study can be continued in other activities in the Truwali Indramayu region and the results of this study can be continued in the development of elementary school mathematics teaching materials.

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