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Ethnoagronomic Study of Rice Plants (*Oryza Sativa* L.) Based Geographic Information System in Tanjungkerta Sumedang District, West Java, Indonesia

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Abstract. This study aims to study rice cultivation in Tanjungkerta District with an ethnoagronomic approach based on geographic information systems (GIS). This study was conducted to understand better agricultural cultural patterns, the implementation of agricultural rituals, and their relationship with specific geographical factors. The research was conducted from January 2024 to February 2024 in Tanjungkerta District. The research method involves collecting primary data through field surveys, interviews with farmers, and direct observation of agricultural practices. Geographic data is also collected and analyzed using GIS technology to map rice farming patterns and their relationship with environmental factors. The results of the study show that rice cultivation in Tanjungkerta District has its characteristics, with many traditional practices that are still maintained. The implementation of agricultural ritual culture varies depending on geographical factors, such as the availability of water sources and land topography. This study concludes that geographical factors and local cultural values influence rice cultivation in Tanjungkerta District.

Keywords: culture, geography, rice, agriculture, ritual, GIS, Tanjungkerta

INTRODUCTION

Rice cultivation in Indonesia is inseparable from ethnoagronomic values, traditions, and cultures that develop among local communities. Ethnoagronomy is an agricultural science that focuses on systematizing knowledge used by indigenous and traditional peoples. The development of technology makes the ethnoagronomic value or traditional agricultural model that develops considered low productivity, so it needs to be replaced with modern agriculture. However, the development of technology that ignores ethnoagronomic values can lead to the formation of technology less aligned with the local community's needs (Indradewa, 2021).

Ethnoagronomy distribution mapping must be carried out as an initial analysis of the implementation of agricultural modernization. Mapping in agricultural science is common

in the current agricultural era. In ethnoagronomy, mapping aims to assess the ecological relationship between the community and the local environment so that the modernization process is more precise and accurate. Mapping the distribution of ethnoagronomy can be done using geographic information systems (GIS).

GIS is a formal unity consisting of various physical and logical resources related to objects on the Earth's surface (Bafdal, 2011). A spatial information system packages information. The information produced in GIS provides a comprehensive picture and facilitates the approach to phenomena. GIS uses digital maps and attribute data as the basis for analysis (Budiyanto, 2014).

Tanjungkerta District is located in Sumedang Regency, West Java Province, with an altitude between 300-700 meters above sea level (masl) and an average temperature of 23-26oC. Tanjungkerta District consists of 12 villages where the majority of the population of Tanjungkerta District has a livelihood in agriculture, generally rice cultivation in the field of rice fields. The modernization process in the agricultural sector continues to be intensified by the government to increase productivity. Tanjungkerta District, where rice cultivation is still traditionally carried out, already has the conditions to be the target of the modernization process. Studies on ethnoagronomy must be included in the process of implementing agricultural modernization. Ethnoagronomy is a consideration in making and implementing various policies so that there is a balance, in addition to preserving cultural heritage.

METHOD

This research was carried out in Tanjungkerta District, Sumedang Regency. The research began in January-February 2024.

The methods used to obtain primary data are interviews, observations, and documentation. The data obtained are variables related to the diversity of local culture.

These variables then become the basis for assessing the category of ethnoagronomy practices.

Table 1. Ethnoagronomy Practice Assessment Category Formula

Category	Formula
Low	$x < M - 1SD$
Keep	$M - 1SD \leq x < M + 1SD$
Tall	$M+1SD \leq x$

This value was obtained from assessing the existence of ethnoagronomic practices in each village. If, at the stage of rice cultivation, there is an ethnoagronomic practice or value that is still being carried out, then at the cultivation stage, it gets 1 (one) point. At the same time, if there is no ethnoagronomic practice or value, it gets 0 (blank) point. The values for categorizing the categorization are poured into the format as shown in Table 2.

Table 2. Assessment Format for Ethnoagronomy Practice Categories

It	Village	Categories Assessment					Sub Total	Category
		A	B	C	D	Ect		

Variables A, B, C, D, etc., are obtained from the data collection results and used as assessment points to determine the category of ethnoagronomy practice.

DISCUSSION

Result

Local knowledge owned by farmers involves understanding the procedures for cultivating rice plants that they have been doing so far. This knowledge starts from planting preparation to harvesting.

Farmers in Tanjungkerta District have their own "calendar" for carrying out their agricultural practices; the "agricultural calendar" depends on the natural signs that occur. Cipanas Village, Banyuasih Village, several parts of Kertamekar Village, Mulyamekar Village, and Tanjungmulya Village experience three planting periods yearly. Areas that experience two planting periods in a year, namely Boros Village, Awilega Village, Kertaharja Village, Sukamantri Village, Tanjungmekar Village, Cigentur Village, and Gunturmekar Village. The planting period once a year occurs in the Awilega Village, Kertaharja Village, and Gunturmekar Village areas if a dry season or long drought occurs.

The tradition of determining the day to plant is still applied by farmers who generally plant three times a year. The determination of the planting day is usually by the birthday of the farmer (landowner) or in local terms called "wedal", and should not coincide with the "prohibition of the moon". The prohibition of the month is a rule not to do something big on the days of a particular month, and the calculation is based on the Hijri calendar.

The selection of seed varieties used for planting depends on the culture in the respective village. Boros Village is one village that still uses the selection of seed varieties for rice cultivation based on ancestral culture. Boros Village does not use seeds from agricultural stores or government assistance but seeds called "Oon" locally. Meanwhile, other villages in Tanjungkerta District use

seed varieties sold at nearby agricultural stores or government assistance, such as Inpari and Ciherang.

Farmers generally have two planting patterns in cultivating rice plants. The planting pattern is "cloth", that is, all planting points in each row are planted without exception. Then, the Legowo row planting pattern is a planting pattern that is two or more intervals with one empty row. Kertamekar Village, Tanjungmulya Village, Mulyamekar Village, and Banyuasih Village are villages that apply the legowo row planting pattern because the topography of the village supports the planting pattern.

Rice plant maintenance, such as fertilization and pest and disease control, has no special treatment or culture.

Traditions and rituals still practiced in the cultivation of rice plants are Nyalin and Gemyung or Ngaruwat. Nyalin is an offering to ancestors that ensures the harvesting process runs safely and yields high yields. The offerings were food and cultivation equipment placed in a studio on the edge of the rice field. Gemyung is a ritual carried out using music and sinden, and there are offerings in the form of drinks, food, produce, and various types of plants. Another term for gemyung is ngahurip or ngaruwat. Gemyung is carried out in a certain period, for example, every year, once every 10-15 years. Geographically, local farmers who have spring water sources in their villages, such as Kertamekar Village, Banyuasih Village, Tanjungulya Village, and Cipanas Village, periodically carry out the gemyung tradition.

The results of categorizing ethnoagronomic practices in rice cultivation, based on the variables, observation results used as assessment standards are as follows. Based on the assessment category in Table 3, a mean value (M) or average of 3 and a standard deviation value (SD) of 1. Based on the standards in Table 1, the category of ethnoagronomic practices in each village can be obtained. The categories of ethnoagronomic practices in each village can be seen in Table 3.

Discussion

The results of this study showed a close relationship between geographical factors, ethnoagronomy practices, and rice crop production. The more geographical factors that support ethnoagronomic practices, the higher the ethnoagronomic value and the higher the rice production in the region. This can be seen from the integration between rice

cultivation and the environment, such as spring water sources, slopes, water availability, and administrative location.

Table 3. Assessment of Rice Crop Ethnoagronomy Practice Category

No	Village	Categories Assessment						Sub Total	Category
		A	B	C	D	And	F		
1	Awilega			1	1			2	Keep
2	Boros	1	1	1	1	1		5	Tall
3	Kertaharja			1	1			2	Keep
4	Tanjungmulya	1		1	1		1	4	Tall
5	Kertamekar	1		1	1		1	4	Tall
6	Mulyamekar			1	1			2	Keep
7	Banyuasih	1		1	1	1	1	5	Tall
8	Sukamantri			1	1			2	Keep
9	Tanjungmekar	1		1	1			3	Keep
10	Cigentur			1	1			2	Keep
11	Cipanas	1		1	1		1	4	Tall
12	Gunturmekar			1	1			2	Keep

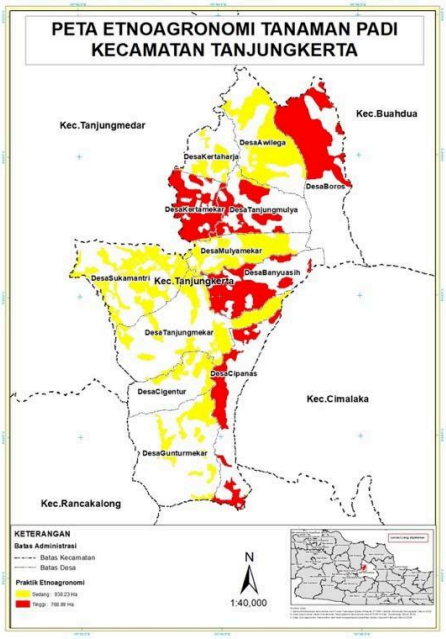

Figure 1. Ethnoagonographic Map of Rice Plants in Tanjungkerta District

Ethnoagronomic practices in the medium category are 938.23 Ha and the high category is 768.89 Ha. This area shows rice fields that still have cultural or ethnoagronomic values in implementing agriculture.

Good integration between rice cultivation based on local wisdom and geographical factors allows farmers to achieve optimal productivity. They can effectively use natural

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potential and use cultivation techniques suitable for their environment that have been for generations. This can increase overall production, ultimately improving farmers' welfare and food security in their areas.

CONCLUSION

Ethnoagronomic practices in rice cultivation in Tanjungkerta District are still an integral part of the implementation of cultivation—ethnoagronomic practices with medium category 938.23 Ha and high category 768.89 Ha.

Geographical factors that greatly affect the implementation of rice cultivation include; the existence of spring water sources, administrative locations, and slopes.

SUGGESTION

Further research related to GIS-based ethnoagronomy should be carried out in collaboration with local governments, relevant research institutions, and local communities to develop agricultural programs based on local knowledge and modern technology and provide public education regarding the importance of cultural preservation.

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