

Ethnoscience Study on Sono' Cow Traditional Contest: A Conservation Strategy in Sustainable Education

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Abstract. Several cultures on Madura Island are closely related to science, but many people unaware about it, such as the traditional sono' cow contest (TSCC) in Pamekasan. This study aims to describe the results of ethnoscience research in traditional sono' cow contest in terms of scientific activities and concepts. The type of research is qualitative using an ethnographic approach. Data collection was carried out through observation, interviews, and documentation to identify scientific activities and concepts in the traditional sono' cow contest. The researcher is the main instrument in this study. The data obtained were analyzed using the triangulation method. The results of the study show that scientific activities manifested in TSCC are choosing the shape of the sono' cow based on the size and standard units, determining the sono' cow to be contested based on the characteristics and peculiarity of superior cows, making herbal medicine, determining equipment and materials that meet material properties, and contest procedures that involve harmony and balance. Meanwhile, there are scientific concepts in TSCC such as size and units, characteristics and classification of living things and biodiversity, material properties, ecosystems and their interactions, ethnobotany, conservation, and body regulation systems. It can be concluded that the traditional sono' cow contest can be used as a strategy for conserving superior Madurese cow germplasm in sustainability education as a source of science learning. This study suggests strengthening local wisdom culture in sustainability education through the integration of local content in the curriculum.

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1 Introduction

Indonesia has various traditions that must be preserved and passed down from generation to generation, including in Madura. Several cultural traditions on Madura Island are closely related to science, such as Sapi Sono. Sapi Sono is an Indonesian cultural tradition originating from Madura, East Java. In this sapi sono, a pair of female cows compete to prioritize beauty, harmony, and skill in appearance and demonstration [1]. The beauty and integration of the rhythm of the female cow's movements complete with jewelry trinkets accompanied by the dance of the shaman dancer attracts the public's eyes [2] [3]. In the future, it can become an icon of village cultural tourism. Indeed, this tradition was passed down from ancestors as a preservation of folk arts [4], maintaining the plasma nutfah of superior Madura cattle seeds [5] [6], and can provide added economic value for village communities [7].

The preservation of the sono cow art began to be contested for the first time in a simple way by H. Achmad Hairuddin (Former Head of Dempo Barat Village, Pasean District) in 1964 and has continued to be developed until now officially by the Pamekasan Regency Animal Husbandry Service as the opening event for the Bull Race which is held annually [9]. In its development, the preservation of sono cows is centered in West Waru [2]. This sono cow is positioned as local wisdom [10].

West Waru Village has potential that is developing and continues to be preserved in the tourism sector, namely nature tourism, cultural and historical tourism, and special interest tourism. The category of cultural and historical tourism includes sono cows which are supported by the village livestock sector with the main commodities of beef cattle, beautiful cows, buffalo, goats, native chickens, and ducks.

Previously, the potential for local wisdom in West Waru Village, Pamekasan Regency had not been optimized. This village is located on the central side of Madura Island. It has regional potential in the agricultural, livestock, plantation, and tourism sectors and is very suitable as a partner in implementing the MBKM program. In particular, the tourism sector policy of Pamekasan Regency emphasizes the arrangement of tourist attractions that are directed to attract tourists so as to create jobs that can support development. The orientation of tourism development policies increases regional cultural tourist attractions [11]. This is where the role of universities is very necessary.

The study of the scientific aspects of sono cattle reviewed from the perspective of local cultural wisdom is part of ethnoscience. Ethnoscience is a learning approach that applies regional culture or local wisdom as an object of scientific learning [12] [13] [14] [15] [16]. It is a knowledge tool owned by a community/ethnic group that is obtained by using certain methods and following certain procedures as part of the traditions of a particular community, and its truth can be tested empirically [17] [18]. This sono cattle is closely related to the concept of science discussed in Ethnoscience.

The urgency of this research is that sono cattle can be seen from culture, sociology, politics, and education in the context of metaphysics, physics, and ethnoscience, which are closely related to various disciplines and can be integrated into education and learning. For example, preliminary research has been produced through ethnoscience courses on the relationship between local wisdom and the concept of science [19]; scientific literacy [20] [15], scientific communication [21]; scientific reasoning [22]; conservation character [23]. This shows that ethnoscience contributes to the preservation of local wisdom in certain areas. The research on sono cattle is also important because its characteristics are reviewed from the local wisdom of Madura in preserving the plasma nutfah of superior Madura cattle. However, not a few people from Madura and Indonesia do not know about it.

Along with the era of globalization, the local cultural heritage of the Madurese community must be preserved. Therefore, synergizing local wealth (localization of society),

the influence of the global world (globalization), and continuing education must be aligned. The most important thing is how to optimize the three concepts so that they run sustainably and synergize domestically. For this, synergy is needed between globalization, localization, and continuing education. This concept must be introduced, developed, and implemented gradually. Efforts are needed to maintain local knowledge and balance globalization, localization, and continuing education in the ethnoscience proposed in this study.

Preservation efforts must come from various parties, including universities. Currently, there has been no research on the Sono' Madurese cattle that identifies and explores its study scientifically. This situation encourages researchers to conduct research on the sono cattle. Through ethnoscience studies on the traditional Sono Cow contest, this research will help make village development programs a success, preserve the local wisdom heritage of the Madurese community, and at the same time want to describe conservation strategies in continuing education. "Think globally, act locally" is an expression that can be used to represent the research that has been done. One of the efforts that can be made in the field of education is to explore the potential of Madura's local wisdom that exists and integrate it with science education and learning by adjusting to global developments. Therefore, a study was conducted on ethnoscience studies on the traditional sono' cattle contest: a conservation strategy in sustainable education. The main objective of this study is to describe the results of ethnoscience research in the traditional sono' cattle contest in terms of activities and scientific concepts as a conservation strategy for preserving Madura cattle germplasm in sustainable education. This research is expected to provide a contribution to improving knowledge and skills in sustainable education, both in science learning and green economy at early childhood, elementary and secondary education levels, as well as higher education.

2 Method

This research is qualitative using an ethnographic approach. Descriptive qualitative research emphasizes the observation of a phenomenon or condition that will be described as a problem about ethnoscience found in Madurese Sono' cow as a source of learning for junior high school science [24; 25; 26]. This research was conducted in August-September 2024 in the Madurese Sono' cow conservation area located in West Waru District, Pamekasan Regency. The subjects of this study were the managers/conservation actors of Madurese Sono' cow and the surrounding community. The purposive sampling technique was used in selecting research subjects, namely using certain criteria in determining informants. The criteria in question are that the informants are conservationists/managers of Madurese Sono' cow and the surrounding community who know Madurese Sono' cow in terms of form, characteristics and distinctive features, equipment, procedures. The instruments used in this study were observation, interviews and documentation. The data collection techniques used were observation, interviews and documentation. The instruments used in the study were observation used to observe the ethnoscience of Madurese Sono' cow in terms of form, characteristics and distinctive features, equipment, procedures, and interview guidelines used to obtain information from subjects or informants and questionnaires. Documentation is used as evidence of the research that has been carried out. The data analysis technique used in this study used data collection, data reduction, data triangulation, data presentation, drawing conclusions and verification such as Figure 1. [26].

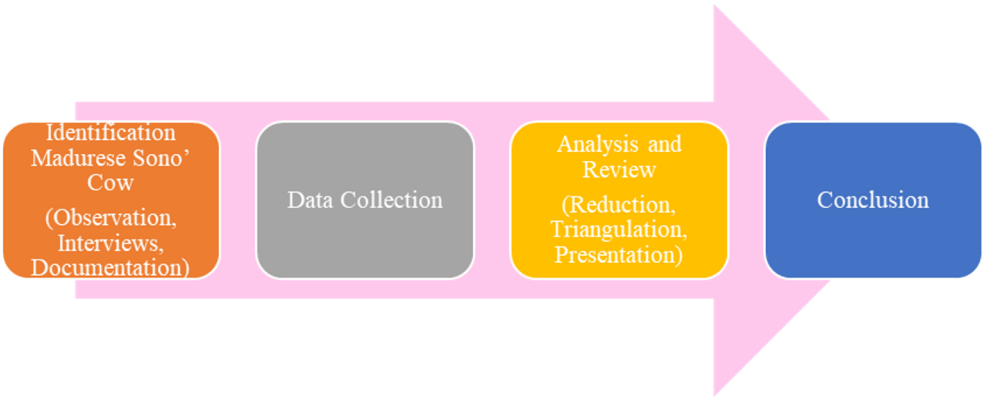


Fig. 1. Research Procedure

3 Results and Discussion

The results of the study consist of 3 things, namely the results of the ins and outs of Madura sono' cattle, the results of observations and interviews of ethnosience studies in the traditional Madura sono' cattle contest, and the reconstruction of continuing education in the traditional Madura sono' cattle contest. These three things will be described below.

3.1 The ins and outs of the traditional Madurese sono' cow contest

Madura sono' cattle are a pair of female cattle (not male) that compete in a traditional contest. The Madura sono' cattle contest emphasizes beauty, harmony, and skill in appearance and demonstration [2]. The cattle's appearance and demonstration involve a swaying and rhythmic gait. It is called a traditional contest because the Madura sono' cattle contest uses traditional equipment such as jewelry, the dance of the handler, and the traditional saronen musical instrument to accompany the swaying and rhythmic gait of the Madura sono' cattle. The beauty and integration of the rhythm of the female cattle's movements complete with jewelry accessories accompanied by the dance of the handler dancers is very attractive to the public [3] [4]. For more details, see Figure 2.





Fig. 2. Madura sono' cow traditional contest
([https://youtu.be/ Ucbnt-Ln9Q](https://youtu.be/Ucbnt-Ln9Q))


The characteristics of the traditional Madurese sono' cattle contest lie in the combination of art, tradition, and competition. In it there are elements such as tacek (cattle display), tacek column (female cattle lined up according to height), tacek stall (media for buying and selling cattle), sono cattle contest, ambhin (grand cattle clothing that carries the characteristics of each region), obhit (headdress containing a spiritual message), and anjar (garlands) [8]. In addition, there are carak (cattle caretakers), terak (supporters including cattle owners, friends, neighbors, dukhon), and saronen. Each of these terms has unique characteristics to support each other in bringing out the beauty, harmony, and skill in the appearance and demonstration of Madurese sono' cattle.

3.2 Results of observations and interviews of ethnoscience studies in the traditional Madura sono' cattle contest

The traditional Madurese sono' cattle contest as a natural and social phenomenon of society is very interesting to study more from a science perspective. This is because society has knowledge about the Madurese Sono' cattle tradition, but this community knowledge needs to be tested and proven scientifically. Testing and proving community knowledge is carried out through ethnoscience studies. The ethnoscience study of the traditional Madurese sono' cattle contest was carried out using observation and interview techniques which were compared with literature studies and scientific experiments. The results of observations and interviews of ethnoscience studies in the traditional Madurese sono' cattle contest are shown in Table 1.

Table 1. Results of observations and interviews of ethnoscience studies in the traditional Madurese sono' cattle contest

Things to Know	Observation Results	Interview Results as Indigenous Knowledge	Testing and Proof results as Scientific Knowledge
The appearance of the Sonok' Madura cow		The appearance of Sono' Madura cattle is similar to cattle in general.	The appearance of the female Sono' Madura cow is very suitable for the purpose and function of the Sono' Madura cow contest
Characteristics and distinctive features of the Sonok' Madura cow		The characteristics and distinctive features of Sono' Madura cattle have an ideal or fat body with lines on the hump, narrow eyes and black kohl, a dewlap under the neck, an oval head, and good fur. This Sono cattle is also called a beautiful superior cattle.	Sono cows have characteristics in the form of a dominant body color of light yellowish brown with a white smear on the lower leg color, and no hump. The area around the eyes is black. The direction of the short horns curves upward

Things to Know	Observation Results	Interview Results as Indigenous Knowledge	Testing and Proof results as Scientific Knowledge
			and points outward. The dominant color of the buttocks is brown and the tip of the tail is black. And the back line looks thin and short
Equipment used in the traditional content of the Sono' Madura cow		The equipment used in the Sono' Madura cow contest is taccek, taccek column, taccek stall, ambhin, obhit, anjar, carak, terak and saronen.	The equipment in the Sono' Madura cattle contest is very supportive in assessing the beauty and harmony of the Sono' Madura cattle.
Procedures for the Sono' Madura cow contest		During the Sono' Madura cow contest, they are dressed with a golden sash around their neck and chest to add to the cow's appeal. A pangonong is also attached to the cow's neck, which is a beautifully carved cow wood with a combination of red and gold. Before the event begins, several cow owners dance while herding their cows around the field. The Saronen music group consisting of three kenong players, one drum player, one gong player, two trumpet players, and two kecer players accompanies the pair of cows who walk with their heads held high like a model.	The Sono' Madura cattle competition procedure is closely related to the role of the pair of female cattle in walking and dancing according to their purpose and function.

3.3 Reconstruction of sustainable education of traditional Madura sono' cow contest

The results of interviews with Madurese Sono' cow and their conservationists/managers can be said to be indigenous knowledge or the original science of the community. Indigenous knowledge or the original science of the community is all knowledge that touches on the facts of the community about Madurese Sono' cow originating from beliefs that are passed down from generation to generation or beliefs passed down from predecessors. It needs to be proven scientifically based on validation and standardization of scientific terms, conceptualization, descriptive, and procedural declaratives through literature studies and experiments to become scientific knowledge.

The results of the reconstruction that produces scientific knowledge turn out to contain the concept of science material so that the results of the ethnoscience study of the traditional Madurese sono' cattle contest can be reconstructed and integrated into education and learning such as science for the sustainability of Madurese sono' cattle in the future. The concept of science material contained in the results of the ethnoscience study of the traditional Madurese sono' cattle contest is listed in Figure 3.

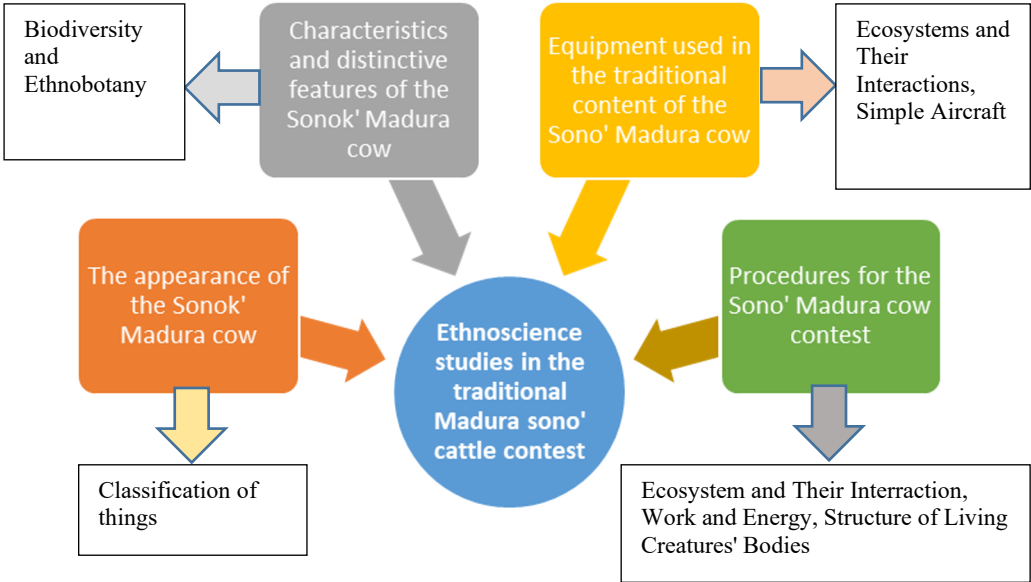


Fig. 3. The concept of science material contained in the results of the ethnoscience study of the traditional Madurese sono' cattle contest

4 Discussion and Implication

4.1 The ins and outs of the traditional Madurese sono' cow contest

Based on Figure 2, you can see the stature and characteristics of Madurese sono' cattle. Madurese Sono' cow is a pair of female cows that have ideal bodies like models who are about to strut on the catwalk. The beauty and rhythmic combination of the female cow's movements complete with jewelry accessories accompanied by the dance of the dancer's

handler attracts the public's attention [28]. This sono cow is also called a beautiful, superior cow that is strong and can help in plowing the fields and is also maintained by beautifying itself. The purpose of the Madurese Sono' cow contest is not only to be a glue for social relations, but also has the meaning of cultural tradition, technology, and is a source of pride.

The Madurese sonok cattle contest began in the 1960s. This activity cannot be separated from the agricultural culture of the Madurese people in managing agricultural land. Sonok cow itself is also a type of cow racing, but for female cows and what is competed is the beauty of the cow when walking and dressing. The characteristics and distinctive features of Sono' Madura cows have an ideal or fat body with lines on their humps, narrow eyes and there are black kohl, the dewlap under the neck, the head is oval, the fur is good. This is in line with the research of Hasana et al [29] which explains that this sono cow is also called a beautiful superior cow (Grade A type of cow). The grade of cows in Madura consists of Grade A cows (Madura sono' cows), Grade B cows (karapan cows, which are usually used for karapan cow competitions), and Grade C cows (beef cows).

The assessment in the Sonok Cow contest is not only based on the beauty of the walk but also the clothes worn by the cow pair. which determines the harmony of the pair of cows when they reach the finish line, the front legs of both pairs of Sonok Cows must simultaneously climb onto the altar made of wood and that is what determines whether they win or lose the contest. After reaching the finish line, the cow owners immediately danced with the singers to express their joy and did not forget to give sawer to the singers who danced accompanying their proud cow partners [30, 3]. The purpose of holding the traditional Madurese sono' cow contest is none other than to maintain plasma nutfah and superior seeds of Madura cattle. Therefore, the surrounding community is very involved in the sustainability of Sono' Madura cattle until now.

4.2 Results of observations and interviews of ethnoscience studies in the traditional Madura sono' cattle contest

The traditional contest of Madurese sono' cows studied ethnoscientifically shows that there is a match between the results of observations and interviews as indigenous knowledge with scientific testing and proof. The results of ethnoscientific studies are visible in the classification of living things, community techniques in caring for and preserving germplasm, conservation and rehabilitation of Madurese sono' cows carried out by the local communities. So that this scientific science strengthens the indigenous knowledge of the community that has been passed down from generation to generation. In line with the research conducted by Irawan & Muhartati [23] dan Suliyanah et al. [15] identified a local wisdom and then studied the ethnoscience contained in the local wisdom

The Madurese Sono' cow tradition as a natural and social phenomenon of society is very interesting to study more from a science perspective. The local community is very involved in ensuring the sustainability of Madurese Sono' cows so that their germplasm and superior seeds are maintained. Do not bring and cross-breed Madurese Sono' cows with foreign cows to maintain the purity of plasma nutfah and superior seeds [2, 4]. The Sono' Madurese cow tradition can also provide added economic value for village communities [8] and become an icon of village cultural tourism [5].

4.3 Reconstruction of sustainable education of traditional Madura sono' cow contest

Based on Figure 3. there is continuity between the results of the ethnoscience study of the traditional Madurese sono' cow contest and the concept of science material. The results

of the ethnoscience study are connected and closely related to science concept material according to the curriculum, namely material for the classification of living things, biodiversity and ethnobotany, ecosystems and their interactions, simple machines, work and energy, and the structure of living things.

The Sono' Madura cow tradition has an ecological function, namely providing natural and social phenomena as a place of learning, one of which is as a direct learning source for students to understand concepts in the field of science [30, 31, 32, 33]. The existence of this ecological function can make the Sono' Madura cow have an educational function, namely as a learning source. Research conducted by Ayuni et al. (2021) stated that cultural diversity has not been widely developed as a learning source, many teachers have not utilized regional culture or local wisdom as a source of science learning. This will add to the important role of integrating local wisdom such as the traditional Madurese sono' cattle contest into education and learning for the sustainability of Madurese sono' cattle in the future, both in terms of preservation and tourism and economic development.

Education for Sustainability faces inherent challenges rooted in the inadequacies of traditional knowledge-based approaches to instigate transformative action. This includes a pressing need for adaptive and participatory leadership models and the acknowledgement of country-specific factors shaping students' awareness and accountability concerning sustainability issues [1]. Integrating local wisdom into education for sustainability offers a strategic framework to enhance students' citizenship by fostering active engagement and responsibility toward sustainable practices [33, 34, 35].

The integration of citizenship in education for sustainability underscores the development of environmental citizenship, a construct highlighting a robust connection between environmental stewardship and active civic participation. It emphasizes the cultivation of values, knowledge, and skills that empower individuals to understand the interdependencies between human actions and environmental impacts. Further to the pedagogical aspects, the integration of citizenship within sustainability education promotes experiential learning methodologies, encouraging students to engage in real-world sustainability projects and community initiatives.

5 Conclusion

Based on the research, it can be concluded that the traditional sono' cow contest can be used as a strategy for conserving superior Madurese cow germplasm in sustainability education as a source of science learning. This study suggests that science learning by raising local wisdom, such as the Sono' Madura cow, becomes an experience for students to learn about themselves and the surrounding environment. It is expected that research on Madurese local wisdom will continue to be used as context and content for contextual science learning.

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