JPPIPA 10(6) (2026)

Jurnal Penelitian Pendidikan IPA

http://jppipa.unram.ac.id/index.php/jppipa/index

The Potential of South Sumatra Local Wisdom as a Source of Science Learning in Schools to Education Sustainable Development

Elsi Adelia Fitri[1*], Anggie Marsyaelina[2], Demi Romawina[3]

[1] Science Education Study Program, Faculty of Teacher Training and Education, Universitas PGRI Palembang, Palembang, Indonesia
[2]Vocational Education Study Program in Automotive Technology, Faculty of Teacher Training and Education, Universitas PGRI Palembang, Palembang, Indonesia
[3] Science Education Study Program, Faculty of Teacher Training and Education, Universitas PGRI Palembang, Palembang, Indonesia

Received: January 31, 2026
Revised: May 12, 2026
Accepted: July 13, 2026
Published: July 13, 2026

Corresponding Author:
Elsi Adelia Fitri
elsiadelia18@univpgri-palembang.ac.id

DOI: 10.29303/jppipa.v12i6.14475

Abstract: Local wisdom is a learning resource that has the potential to support contextual and ethnoscience-based science learning. This research aims to map the concepts of science found in typical foods based on the Musi River and the Lebak Lebung agricultural system in South Sumatra, as well as analyze the needs of prospective teacher students for their use as a source of science learning. The research uses a qualitative descriptive approach supported by quantitative data. Qualitative data was obtained through field observations, interviews, and document analysis, while quantitative data was obtained through needs analysis of 89 prospective teacher students. The results of the study show that both contexts of local wisdom contain the concept of science including heat transfer, changes in the properties of materials due to heating, fermentation, the role of microorganisms, nutritional content, hydrological cycles, characteristics of swampland, adaptation of living things, and environmental conservation. The results of the needs analysis show that most students have sufficient knowledge in both contexts, but still need learning resources that are able to connect local knowledge with science concepts. These findings are the basis for the development of contextual ethnoscience-based science teaching materials to support meaningful learning and continuing education.

Keywords: Ethnosciences; Lebak Lebung; Local Wisdom; Science learning; South Sumatra.

Introduction

Local wisdom is one of the potentials that can be used to realize Natural Sciences (IPA) learning that is contextual, meaningful, and relevant to students' lives. In the Independent Curriculum, science learning at the junior high school level emphasizes the integration of physics, chemistry, biology, and earth science concepts through phenomena that are close to the students' environment so that they are able to build conceptual understanding while increasing science literacy (Adawiah et al., 2026; Astuti & Hamdu, 2026). Therefore, local wisdom can function as a learning resource that connects scientific concepts with the social, cultural, and environmental realities of the community (Astuti & Hamdu, 2026; Putri et al., 2026; Salmia, 2024; Sholihah et al., 2026). However, the use of local wisdom in science learning requires a systematic mapping of science concepts so that they are in accordance with learning outcomes and can be applied effectively in schools (Irhasyuarna & Fahmi, 2026).

South Sumatra has a variety of local wisdom that has the potential to become a context for science learning, including typical foods based on the Musi River, such as pempek, tempoyak, shrimp crackers, and shrimp paste, as well as the lebak lebung agricultural system. Both contexts represent the relationship between society and the aquatic environment and contain various scientific

How to Cite:
Fitri, E. A., Marsyaelina, A., & Romawina, D. (2026). The Potential of South Sumatra Local Wisdom as a Source of Science Learning in Schools to Education Sustainable Development. *Jurnal Penelitian Pendidikan IPA*, *12*(6), 740–752. https://doi.org/10.29303/jppipa.v12i6.14475

phenomena that can be studied in science learning. In traditional foods, for example, there are processes of gelatinization of starch, fermentation, changes in the properties of ingredients, drying, and heat transfer that can be used to explain IPA concepts contextually (Dalidjo, 2020; Sudargo et al., 2022; Supriadi et al., 2023). Pempek utilizes fish as a source of protein, while the tempo shows the use of lactic acid fermentation as a natural preservation technique (Ani et al., 2020; Wijaya et al., 2025). Similarly, the process of making shrimp crackers and shrimp paste shows the application of drying and fermentation techniques related to physical, chemical, and microorganism activity changes (Anzelina, 2023).

In addition to traditional food, the lebak lebung agricultural system is a form of local wisdom that develops in swampy areas in South Sumatra and has been inherited from generation to generation (Rezeky, 2022). This system utilizes seasonal water level fluctuations as the basis for managing land and aquatic resources so as to support the sustainability of swamp ecosystems. The practice reflects the linkage between environmental factors, biodiversity, organism adaptation, water cycle, and sustainable natural resource management (Khotimah et al., 2025). These various phenomena are related to the learning outcomes of junior high school science so that it has the potential to become a learning context that is closer to the students' experience. Although it has great potential, the use of local wisdom as a source of science learning in schools is still not optimal. Science learning is still dominated by the use of general textbooks, so the relationship between science concepts and the local environment and culture has not been widely explored (Fitri & Arni, 2024; Imranah et al., 2026; Irhasyuarna & Fahmi, 2026). In addition, the availability of ethnoscience-based learning resources that present a systematic mapping of science concepts from local wisdom is still limited (Anita et al., 2026; Hidayati et al., 2020; Salmia, 2024). This condition causes teachers and prospective teachers to have difficulty in integrating the potential of the surrounding environment into learning in accordance with the demands of the curriculum.

The results of initial observations on prospective science teacher students in South Sumatra showed that most of the respondents were familiar with various forms of local wisdom, such as pempek, tempoyak, shrimp crackers, shrimp paste, and the lebak lebung agricultural system as part of the regional culture. However, this knowledge is generally still contextual as cultural knowledge and has not been systematically linked to science concepts and junior high school science learning outcomes. In addition, students also said that during the lecture they had not obtained learning resources that specifically mapped the relationship between South Sumatra's local wisdom and science concepts. This condition shows the need for ethnoscience-based learning resources that are able to bridge cultural knowledge with scientific concepts so that they can be used in science learning. Various previous studies have identified scientific phenomena found in traditional foods and local agricultural systems in South Sumatra, such as fermentation, changes in food properties, and swamp ecosystem management (Dalidjo, 2020; Sudargo et al., 2022; Supriadi et al., 2023). However, these studies generally still discuss the phenomenon separately according to the field of study and have not integrated the results into the mapping of science concepts that are in line with the learning outcomes of junior high school science. In addition, there has not been much research that combines the mapping of the science concept with the analysis of the needs of prospective teacher students as the basis for the development of ethnoscience-based learning resources.

Based on these conditions, this research is important because it provides a scientific basis for the development of contextual science learning resources, in accordance with the characteristics of the students' environment and the needs of prospective science teachers. The novelty of this research lies in the integration of mapping science concepts contained in two contexts of local wisdom in South Sumatra, namely typical food based on the Musi River and the lebak lebung agricultural system, with the analysis of the needs of prospective science teachers students as the basis for the development of ethnoscience-based learning resources that are in line with the learning achievements of junior high school science. Therefore, this study aims to map the concepts of science found in the two contexts of local wisdom and analyze the level of knowledge and needs of prospective science teacher students for its use as a contextual learning resource.

Method

This study uses a qualitative descriptive approach supported by quantitative data. The qualitative approach is the main approach used to identify, describe, and map the scientific concepts contained in two contexts of local wisdom in South Sumatra, namely Musi River-based specialties (pempek, tempoyak, shrimp crackers, and shrimp paste) and the lebak lebung agricultural system. The analysis aims to examine the potential of both contexts as a source of ethnoscience-based science learning. Quantitative data is used as supporting data to provide an overview of the level of knowledge and needs of prospective teacher students towards the use of local wisdom in science learning. The

research was carried out in South Sumatra Province because all the objects of local wisdom studied originated and developed in the region. The research subjects at the needs analysis stage consisted of 89 prospective science teacher students from several universities in South Sumatra. The selection of respondents was carried out using purposive sampling techniques, with criteria including: (1) students in the 3rd semester or semester 5 (or equivalent), (2) have taken science courses or science learning, and (3) willing to be respondents in the research.

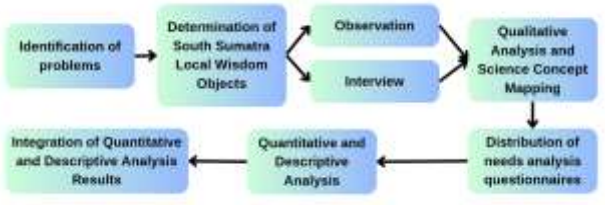

Figure 1. Research procedure

The research instrument consisted of observation sheets, semi-structured interview guidelines, and needs analysis questionnaires. The observation sheet was used to document the process of making South Sumatran typical foods, the fermentation process tempoyak, the making of crackers and shrimp paste, as well as activities in the lebak lebung agricultural system by identifying physical, chemical, biological and environmental phenomena that emerged at each stage of the activity. The interview guidelines are used to explore community knowledge, cultural practices, and local values related to the process. Based on the results of observations and interviews, a questionnaire was prepared to analyze the needs to obtain an overview of the perception of prospective teacher students on their level of knowledge about the local wisdom of South Sumatra, its relevance in science learning, and the need for ethnoscience-based learning resources. The questionnaire uses a four-level self-assessment scale, namely superior knowledge, sufficient knowledge, minimal knowledge, and no knowledge. The use of this scale aims to obtain an initial picture of students' perceptions of knowledge as part of a needs analysis, not to measure knowledge competence objectively.

Data collection was carried out in four stages. The first stage is field observation at the South Sumatra typical food manufacturing center and the Lebak Lebung agricultural area to document the production process, processing techniques, use of materials, tools, and scientific phenomena that arise in each activity. The second stage is an in-depth interview with key informants consisting of cultural actors, traditional food artisans, and local communities to obtain information about local knowledge, cultural values, and traditional practices that are still preserved. In the third stage, the results of observations and interviews were analyzed through concept mapping to identify the relationship between cultural practices and relevant science concepts based on scientific literature and science learning outcomes. The results of the mapping are then used as a basis for the preparation of needs analysis questionnaire indicators. In the fourth stage, questionnaires were distributed to respondents online to get an idea of their level of knowledge and their needs for the development of learning resources based on local wisdom.

The data from observations and interviews were analyzed in a qualitative descriptive manner through the stages of data reduction, categorization of local wisdom phenomena, mapping of science concepts, and interpretation of results. Meanwhile, questionnaire data was analyzed descriptively using percentages, frequency, and average scores on each indicator. The results of the quantitative analysis are used as supporting information to complement the interpretation of the results of the qualitative analysis regarding the potential of local wisdom in South Sumatra as a source of ethnoscience-based science learning. Thus, this research resulted in a mapping of science concepts contained in South Sumatra's local wisdom, an initial overview of the knowledge and needs of prospective teacher students, and recommendations for the development of contextual science learning resources based on local wisdom.

Result and Discussion

Local Wisdom Analysis

The typical foods of South Sumatra that are the focus of this study include pempek, tempoyak, shrimp crackers, and shrimp paste. The four foods were chosen because they are part of the local wisdom of the community that develops in the Musi River area and is still produced and consumed for generations. In addition to having cultural and economic value, these foods present various scientific phenomena that are close to daily life so that they have the potential to be used as a context for science learning. Pempek is a typical food that has become a culinary icon of the city of Palembang as well as the cultural identity of the people of South Sumatra (Rifanni et al., 2022). Local wisdom in making pempek is reflected in the use of freshwater fish, such as belida fish or snakehead fish, which is combined with tapioca flour based on the community's empirical knowledge of the composition of ingredients and processing techniques that produce a chewy texture. The tradition of serving pempek at various traditional activities, celebrations, and guest banquets also shows that this food not only functions as a food product, but

also has social and cultural values that are inherited between generations.

The results of observations show that the process of making pempek contains various phenomena that are relevant to the concept of junior high school science. At the stage of mixing ingredients and boiling, students can observe changes in the properties of ingredients due to heating, heat transfer during the cooking process, as well as the relationship between the composition of ingredients and the texture of the product produced. These phenomena can be used to explain the concepts of physical and chemical changes, heat transfer, and the properties of materials in everyday life. Scientifically, changes in the properties of the dough during the heating process are related to the gelatinization process of starch and changes in the structure of fish proteins that form the characteristics of the texture of pempek (Ma et al., 2022). However, in the context of junior high school science learning, this phenomenon is more appropriate to be introduced through the concept of changes in the properties of materials due to heating and heat transfer before being further explained at the higher education level. This shows that pempek has the potential as a source of contextual learning because it is able to connect students' cultural experiences with science concepts learned in school. This kind of integration of local contexts is expected to help students understand the concept of science in a more meaningful way while increasing appreciation of local wisdom as part of the life of the people of South Sumatra. The process of making pempek observed in this study is presented in Figure 2.

Figure 2. Pempek

Tempoyak is a typical food of South Sumatra produced through the fermentation process of durian fruit flesh with the addition of salt as a natural preservative (Mahidsanan et al., 2026). The process of making tempoyak can be seen in Figure 2. In the life of the people of South Sumatra, tempoyak is generally served as a complement to various dishes, such as catfish and various other traditional dishes. Local wisdom in making tempoyak is reflected in the use of fermentation techniques as a method of food preservation that has been passed down from generation to generation. This technique allows the community to maintain the availability of durian for consumption even though it has passed the harvest season. In addition, the manufacturing process is often carried out with family members so that it reflects the value of togetherness and the preservation of local culture. The results of observations show that the process of making tempoyak contains various phenomena that are relevant to junior high school science learning. During the fermentation process, there are changes in the properties of ingredients, increased acidity levels (decreased pH), and the activity of microorganisms that play a role in changing the taste, aroma, and texture characteristics of the product. This phenomenon can be used as a learning context about chemical changes, the role of microorganisms in life, and the influence of environmental conditions on the fermentation process. Scientifically, the process takes place through the activity of lactic acid bacteria, such as Lactobacillus sp., which produces organic acids that cause changes in the chemical properties of food ingredients (Ardilla et al., 2022). However, in junior high school science learning, the phenomenon is more appropriately introduced through the concept of chemical changes and the role of microorganisms in food fermentation that is close to daily life. This shows that tempoyak has the potential as an ethnoscience-based learning resource because it is able to connect local knowledge of the community with science concepts learned in schools. Thus, students not only understand the scientific process that occurs during fermentation, but can also appreciate the cultural values and local wisdom that underlie the traditional food processing process. The image of the tempoyak can be seen in Figure 3.

Figure 3. Tempoyak

Shrimp crackers are one of the processed fishery products that are widely produced in coastal areas and the banks of the Musi River (Jannah, 2020). The local wisdom is reflected in the use of fresh shrimp that are processed with flour, then dried using sunlight as a natural preservation technique that has been passed down from generation to generation. The observation results show that the manufacturing process contains the concept of science in the form of heat transfer, evaporation of water during drying, and changes in the properties of materials due to heating. This phenomenon is relevant as a learning context regarding physical and chemical changes in daily life. The process of making shrimp crackers is presented in Figure 4.

Figure 4. Kerupuk Udang

In addition to shrimp crackers, the people of South Sumatra also process rebon shrimp into shrimp paste as a traditional spice that has cultural and economic value (Firmansyah et al., 2021). Local wisdom in the production of shrimp paste is seen in the application of fermentation and drying that takes advantage of natural environmental conditions. The results of the observations show that the process contains the concept of science in the form of chemical changes during fermentation, the influence of temperature and humidity on the drying process, and the role of microorganisms in producing distinctive aromas (Mahidsanan et al., 2026). These findings show that shrimp paste can be used as a science learning context that connects scientific phenomena with community cultural practices. The process of making shrimp paste is presented in Figure 5.

Figure 5. Shrimp Shrimp Paste

The results of observations show that the Lebak Lebung agricultural system is a form of local wisdom of the people of South Sumatra in managing swampland that takes advantage of seasonal fluctuations in water levels. The community determines the planting time based on changes in water level, namely the rendengan season (high water) and gadu season (low tide). This local knowledge is a form of adaptation to the condition of the swamp ecosystem that has been inherited from generation to generation and is the basis for sustainable management of agricultural land. When the dry season arrives, the water level recedes so that the land can be used for agricultural activities, while the deeper part (lebung) still stores water as a habitat for fish and a source of water for the community. These conditions show the relationship between the hydrological cycle, swamp soil characteristics, plant and fish adaptation, and wetland ecosystem conservation. These phenomena are relevant to junior high school science learning outcomes regarding the water cycle, ecosystems, adaptation of living things, and the sustainable use of natural resources. This shows that the Lebak Lebung agricultural system has the potential as a context for ethnoscience-based science learning because it connects the local knowledge of the community with scientific concepts that are close to the lives of students. The agricultural conditions of Lebak Lebung during the high tide and low seasons are shown in Figure 6 and Figure 7.

Figure 6. Lebak Lebung Rice Fields at High Tide

Figure 7. Lebak Lebung rice fields in a low state

Analysis of the Concept of Science Integrated with Local Wisdom

Based on the local wisdom that has been explained above, the concept of science can be mapped to the local wisdom of South Sumatra as the context of science learning as in the Table 1.

Based on Table 1, the mapping results show that the local wisdom of South Sumatra contains various science concepts that are relevant to integrated science learning at the junior high school level. In the context of typical foods, such as pempek, tempoyak, shrimp crackers, and shrimp paste, concepts of changing the properties of ingredients, heat transfer, physical and chemical changes, the role of microorganisms in fermentation, food nutritional content, and sustainable use of natural resources are found. Meanwhile, in the Lebak Lebung agricultural system, the concepts identified include the hydrological cycle, swamp soil characteristics, adaptation of plants and fish to the environment, and the

preservation of wetland ecosystems. The results of this mapping show that each context of local wisdom not only has cultural value, but also contains scientific phenomena that are close to the lives of students. Therefore, the use of local wisdom as a context for science learning has the potential to help students connect scientific concepts with real experiences in the surrounding environment. These findings are in line with contextual learning and ethnoscience-based education approaches that emphasize the linkages between scientific concepts, local culture, and the environment as an effort to build more meaningful and sustainable learning (Anita et al., 2026; Kartina et al., 2026; Manu et al., 2026).

Table 1. Mapping the Concept of Science in South Sumatra Local Wisdom as a Context of Science Learning

Local context	Concept of science (physics)	Concept of science (chemistry)	Science (biology) concept	Environmental concept
Pempek	Heat transfer (conduction and convection), change in form, elastic properties of the dough	Changes in the properties of the material due to heating, changes in the properties of proteins due to heating	Nutritional content of fish, structure and function of animal proteins	Sustainability of musi river fish resources and water quality
Tempoyak	Effect of temperature on fermentation rate	Lactic acid fermentation, ph changes	Bacterial activity of lactic acid and its role in fermentation	Local food utilization and reduction of crop losses
Shrimp crackers	Heat transfer, evaporation of water during drying	Changes in moisture content, browning reactions during cooking	Shrimp protein content	Sustainable use of aquatic resources
Shrimp paste	Utilization of solar energy in the drying process, the effect of humidity on the drying process	Protein fermentation, formation of aroma compounds	Activity of microorganisms and enzymes during fermentation	Sustainability of shrimp resources and the quality of the aquatic environment
Lebak Lebung Agriculture	Seasonal water level fluctuations, soil capillarity, hydrological cycles	Ph of swamp soils, nutrient cycles	Adaptation of plants and fish to swamp environments, biodiversity	Conservation of swamp ecosystems, sustainable wetland management

Table 2. The Suitability of Science Concepts in South Sumatra Local Wisdom with Junior High School Science Learning Outcomes

Learning outcomes	Learning objectives flow	Suitability of findings
Students are able to explain changes in the properties of substances and heat transfer in traditional food processing.	1. Observing changes in the properties of ingredients during the traditional food processing process. 2. Explain the heat transfer that occurs in the cooking process. 3. Relate the properties of the material to the characteristics of the product produced.	It is relevant, because the process of making pempek shows changes in the properties of ingredients due to heating, heat transfer during boiling, and changes in the texture of the dough which can be used as a context for science learning.
Students are able to explain the chemical changes that occur in food processing and preservation.	1. Identify chemical changes in local food processing. 2. Explain the fermentation process as a form of chemical change. 3. Linking changes in the properties of ingredients to the food processing process.	It is relevant, because the process of making tempoyak and shrimp paste shows the occurrence of fermentation, changes in acidity (ph), and changes in the properties of materials that can be used to explain the concept of chemical changes in daily life.
Students are able to explain the role of living things in food processing and its relationship with nutritional value.	1. Identify the nutritional content of regional specialties. 2. Explain the role of microorganisms in the fermentation process.	It is relevant, because pempek and shrimp crackers can be used to introduce animal protein sources, while tempoyak and shrimp paste provide

Learning outcomes	Learning objectives flow	Suitability of findings
	3. Linking biological processes to the quality of food products.	examples of the role of microorganisms in the food fermentation process.
Students are able to analyze the relationship between human activities and environmental sustainability.	1. Identify the use of local natural resources. 2. Explain the importance of maintaining the quality of the aquatic environment. 3. Linking the use of resources with the principles of sustainability.	It is relevant, because the raw materials for South Sumatran food come from aquatic resources, so it can be used to discuss the importance of maintaining the quality of musi rivers, the sustainability of fish resources, and the responsible use of natural resources.
Students are able to explain the relationship between environmental conditions, water cycles, and the adaptation of living things in swamp ecosystems.	1. Explain the effect of water level fluctuations on agricultural activities. 2. Identify the characteristics of swamp soils and water cycles.3 3. Describe the adaptation of plants and fish to the swamp environment. 4. Explain the importance of preserving swamp ecosystems.	It is relevant, because the lebak lebung agricultural system shows the relationship between seasonal water level fluctuations, swampland characteristics, plant and fish adaptation, and swamp ecosystem conservation as a science learning context that is close to the lives of students.

Based on Table 2, the mapping results show that South Sumatra's local wisdom has a strong potential to be integrated as a junior high school science learning context because it is relevant to the applicable learning outcomes. Various typical food processing processes, such as pempek, tempoyak, shrimp crackers, and shrimp paste, provide students with the opportunity to observe changes in the properties of ingredients due to heating, heat transfer, chemical changes during fermentation, the role of microorganisms, and their relationship with food nutritional value. Meanwhile, the Lebak Lebung agricultural system presents phenomena related to the hydrological cycle, characteristics of swampland, adaptation of plants and fish to the environment, and the importance of preserving wetland ecosystems. This shows that the scientific phenomena contained in local wisdom can be used as a learning context that is close to the lives of students so as to help them connect science concepts with real experiences in the surrounding environment (Erna et al., 2026; Lubis et al., 2026). The use of local contexts in learning not only supports the achievement of science competencies, but also contributes to fostering concern for the environment and appreciation for local culture (Nisa, 2024; Suryanti, 2021; Yuliana et al., 2021). Thus, the integration of ethnoscience-based local wisdom has the potential to create science learning that is more contextual, meaningful, and in line with the principles of education for sustainable development.

Students' Initial Knowledge related to Local Wisdom

The results of the needs analysis showed that most of the prospective teacher students had sufficient knowledge about the local wisdom of South Sumatra, while the superior knowledge category was only possessed by some respondents. These findings show that students have become familiar with various forms of local wisdom, but efforts are still needed to optimize their use as a context for ethnoscience-based science learning. The results of the need analysis are presented in Table 3.

Table 1. Needs assessment results in the context of local specialties

Statement	Superior Knowledge (%)	Sufficient Knowledge (%)	Minimum Knowledge (%)	Lack of Knowledge (%)
I know various types of South Sumatran specialties based on the Musi River, such as pempek, shrimp crackers, shrimp paste, and tempoyak.	20.40	72.00	7.00	0.00
I know that these special foods are part of the local wisdom of the people of South Sumatra.	25.90	68.40	5.10	0.00
I often get information about South Sumatran specialties through daily life, education, and information media.	22.30	63.70	13.40	0.00
I understand the main raw materials used in making South Sumatran specialties.	27.20	69.00	3.80	0.00
I know the main stages of making special foods such as pempek and shrimp paste.	40.50	58.90	0.60	0.00

Statement	Superior Knowledge (%)	Sufficient Knowledge (%)	Minimum Knowledge (%)	Lack of Knowledge (%)
I learned that the process of making these typical foods requires skills that are passed down from generation to generation.	38.00	61.40	0.60	0.00
I learned that the main raw materials for these special foods are easy to obtain in the South Sumatra region.	22	72	5	1
I know that South Sumatran food has economic value for the community.	35.40	60.80	3.80	0.00
I know that these special foods are part of the cultural identity of the people of South Sumatra.	37.60	55.40	7.00	0.00
I know that the tradition of making and consuming typical foods can strengthen people's social relationships.	29.90	67.50	2.60	0.00
I learned that South Sumatran food can be used as a context for learning science in schools.	30.60	66.90	2.50	0.00
I think that science learning that integrates local specialties will be more contextual and interesting	44.30	55.70	0.00	0.00

Based on Table 3, the results of the needs analysis show that most of the prospective teacher students have sufficient knowledge in the category of South Sumatran typical food based on the Musi River. As many as 72.00% of respondents were in the category of sufficient knowledge and 20.40% in the category of superior knowledge in recognizing various typical foods, such as pempek, tempoyak, shrimp crackers, and shrimp paste. This shows that these specialties have been well known as part of the cultural identity of the people of South Sumatra, although a deeper understanding is still shared by some respondents. This initial knowledge is an important capital in developing contextual science learning because students can more easily relate scientific concepts to phenomena they are familiar with in their daily lives (Alatas, 2023; Asiyah, 2021). In the aspect of knowledge about the origin of typical foods, as many as 68.40% of respondents were in the category of sufficient knowledge and 25.90% in the category of superior knowledge. These results show that students have become familiar with the cultural background of South Sumatran's typical food, so that this context has the potential to be used as an introduction to ethnoscience-based science learning. Through the context of traditional food, teachers can relate everyday phenomena to science concepts that are in accordance with learning outcomes in schools. The results of the analysis also showed that 58.90% of respondents had sufficient knowledge and 40.50% had superior knowledge about the stages of making typical foods. In addition, most of the respondents understood the economic value (60.80% of the adequate category; 35.40% of the superior category) and cultural values (55.40% of the adequate category; 37.60% of the superior category) inherent in the typical food of South Sumatra. These findings show that students not only know typical foods as culinary products, but also understand their role as part of the social, cultural, and economic life of the community.

In the aspect of utilization in learning, as many as 66.90% of respondents were in the category of sufficient knowledge and 30.60% in the category of superior knowledge that typical South Sumatra foods can be used as a context of learning in schools. In addition, 55.70% of respondents have sufficient knowledge and 44.30% have superior knowledge that learning that integrating local specialties will be more engaging and contextual. These results show that prospective teacher students have a positive perception of the use of local wisdom as a learning context. However, the dominance of the knowledge category is enough to indicate that there is still a need for learning resources that are able to connect local wisdom with science concepts more systematically so that they can be implemented in the learning process.

Table 2. Needs assessment results in the context of lebak lebung agriculture

Statement	Superior Knowledge (%)	Sufficient Knowledge (%)	Minimum Knowledge (%)	Lack of Knowledge (%)
I learned that the people of South Sumatra have a traditional agricultural system known as Lebak Lebung.	25.30	71.50	3.20	0.00
I learned that the agricultural system of Lebak Lebung takes advantage of seasonal changes in water level.	34.80	62.70	1.90	0.60
I know that the Lebak Lebung agricultural system has been inherited from generation to generation by the community.	34.20	64.60	0.60	0.60
I know the traditional techniques used in the management of Lebak Lebung's land.	17.10	70.30	12.00	0.60
I know the types of plants that are commonly cultivated on the Lebak Lebung land.	19.60	70.90	8.90	0.60
I learned that planting time is determined based on changes in water conditions in the swampland.	22.20	66.50	11.40	0.00
I know that the Lebak Lebung agricultural system is part of the culture of the people of South Sumatra.	17.50	71.50	10.10	0.60
I know the values of local wisdom applied in the management of Lebak Lebung agriculture.	28.5	67.1	4.4	0.0
I know that the Lebak Lebung agricultural system provides economic benefits for the community.	34.8	63.3	1.9	0.0
I know that the Lebak Lebung agricultural system plays a role in preserving the swamp ecosystem.	26.6	72.8	0.6	0.0
I know that the Lebak Lebung agricultural system can be used as a context for science learning.	29.7	684	1.9	0.0
I learned that the Lebak Lebung agricultural system can be used to study the relationship between humans and the environment.	31.20	68.80	0.00	0.00

Based on Table 4, the results of the needs analysis show that most of the prospective teacher students have sufficient knowledge about the Lebak Lebung agricultural system. As many as 71.50% of respondents have sufficient knowledge and 25.00% have superior knowledge that the people of South Sumatra have this traditional agricultural system. These results show that Lebak Lebung has been known as a form of local wisdom, although a deeper understanding is still held by some respondents. In terms of the characteristics of the agricultural system, as many as 62.70% of respondents have sufficient knowledge and 34.80% have superior knowledge that the agricultural management of Lebak Lebung is influenced by seasonal changes in water level. In addition, 64.60% of respondents have sufficient knowledge and 34.20% have superior knowledge that this agricultural system has been inherited from generation to generation. This shows that

students have known the basic principles of swampland management as part of the local knowledge of the people of South Sumatra.

In the aspect of agricultural practice, the majority of respondents were in the category of sufficient knowledge about land management techniques (70.30%), the types of crops cultivated (70.90%), and the determination of planting time based on water conditions (66.50%). This result shows that students are familiar with the basic agricultural practices of Lebak Lebung, but it is still necessary to strengthen their understanding of the relationship between these practices and relevant science concepts. These findings are in line with research Fahlevi et al. (2020) which shows that traditional farming systems are a form of community adaptation to swamp environmental conditions that develop through local experience and knowledge. In the social, cultural, economic, and environmental aspects, most of the respondents are also in the category of sufficient knowledge. As many as 71.50% of respondents knew that the Lebak Lebung agricultural system was part of the community's culture, while 67.10% understood the values of local wisdom inherited in the agricultural practice. In addition, 63.30% of respondents knew the economic benefits of the Lebak Lebung agricultural system for the community, while 72.80% understood its role in preserving the swamp ecosystem. These results show that students have recognized the function of Lebak Lebung not only as an agricultural production system, but also as part of efforts to preserve the local environment and culture (Hartini, 2018).

In terms of utilization in learning, 68.40% of respondents have sufficient knowledge that the Lebak Lebung agricultural system can be used as a context for science learning, while 68.80% know that this context can be used to study the relationship between humans and the environment. These findings show the potential for the use of local wisdom as a learning context that is able to connect people's cultural experiences with science concepts. However, the dominance of the knowledge category is enough to indicate that there is still a need for ethnoscience-based learning resources that can help prospective teacher students integrate local knowledge with science learning more systematically. This is in line with (Handayani et al., 2018; Hikmawati et al., 2021; Ningsih, 2020; Sari, 2020). which states that local experience can be an effective context to build a more meaningful understanding of scientific concepts.

Table 3. SWOT Analysis of South Sumatra Local Wisdom as a Source of Science Learning

Aspects	Description
Strengths	South Sumatra's local wisdom, such as typical food based on the Musi River and the Lebak Lebung agricultural system, contains various science phenomena that are relevant to the learning outcomes of junior high school science. This context is close to the lives of students so that it has the potential to be used as a contextual learning resource and support ethnoscience-based learning.
Weaknesses	The results of the needs analysis show that the knowledge of prospective teacher students is still dominated by the sufficient category, so there is still a need for teaching materials and learning guides that are able to connect local wisdom with science concepts systematically. Documentation on the integration of local wisdom in science learning is also still limited.
Opportunities	Learning policies that encourage contextual learning provide opportunities to integrate local wisdom into science learning. The results of concept mapping in this study can be the basis for the development of teaching materials, modules, e-booklets, and ethnoscience-based learning media that are in accordance with the characteristics of students.
Threats	The modernization and dominance of general learning resources has the potential to reduce the use of local wisdom in learning. In addition, the reduction of local cultural practices and the lack of scientific documentation regarding local wisdom can make it increasingly difficult to pass on this knowledge to the next generation.

Based on Table 5, the SWOT analysis shows that South Sumatra's local wisdom has strong potential as a source of science learning because it contains various scientific phenomena that are relevant to the learning outcomes of junior high school science and are close to the daily lives of students. The results of the concept mapping show that typical foods based on the Musi River and the Lebak Lebung agricultural system can be used as an ethnoscience-based learning context that connects science concepts with local culture and environment. On the other hand, the results of the needs analysis show that the knowledge of prospective teacher students is still dominated by the sufficient category, so there is still a need for teaching materials and learning guides that are able to integrate local wisdom with science concepts systematically. This condition is also an opportunity to develop ethnoscience-based teaching materials that support contextual learning and education for sustainable development. However, the use of local wisdom also faces challenges in the form of declining local cultural practices, limited scientific documentation, and the dominance of general learning resources.

Therefore, the results of this research can be the basis for the development of science teaching materials based on local wisdom that are more contextual, systematic, and in accordance with the characteristics of students.

Conclusion

Based on the results of the research, it can be concluded that South Sumatra's local wisdom, which includes typical foods based on the Musi River (pempek, tempoyak, shrimp crackers, and shrimp paste) as well as the Lebak Lebung agricultural system, has potential as a context for ethnoscience-based science learning at the junior high school level. The mapping results show that the two contexts contain various science concepts that include physical, chemical, biological, and environmental aspects. In the context of typical food, the most dominant concepts include heat transfer, changes in the properties of materials due to heating, fermentation, the role of microorganisms, nutritional content, and the sustainable use of local resources. Meanwhile, in the Lebak Lebung agricultural system, prominent concepts include the hydrological cycle, characteristics of swampland, adaptation of plants and fish to the environment, and the preservation of wetland ecosystems. The results of the needs analysis show that most prospective teacher students have sufficient knowledge about the two contexts of local wisdom. Although the respondents have known the typical food and agricultural system of Lebak Lebung as part of the local culture, the results of the study show that there is still a need for learning resources that are able to connect local knowledge with science concepts in a more systematic manner so that they can be easily implemented in learning. The SWOT analysis shows that the main strength of South Sumatra's local wisdom lies in its proximity to the lives of students and its relevance to science learning outcomes. However, the limitations of ethnoscience-based teaching materials, the dominance of knowledge in the sufficient category, and the lack of scientific documentation on local wisdom are still challenges in its implementation. On the other hand, policies that encourage contextual learning provide opportunities to develop ethnoscience-based science teaching materials that integrate local culture with scientific concepts. This research contributes in the form of mapping science concepts to the local wisdom of South Sumatra combined with the analysis of the needs of prospective teacher students as the basis for the development of ethnoscience-based science teaching materials. These findings are expected to serve as a reference in the development of more contextual learning resources, support the preservation of local wisdom, and strengthen the implementation of meaningful and education-oriented science learning (Education for Sustainable Development).

Acknowledgments

The author also expresses his gratitude to the Faculty of Teacher Training and Education, Universitas PGRI Palembang, and the LPPKM (Research and Community Service Institute) of Universitas PGRI Palembang for their services. Furthermore, the author expresses his gratitude to the University of Lampung for serving as a research location, particularly in the Elementary School Teacher Education Study Program.

Author Contributions

Conceptualization, E.A.F.; methodology, E.A.F. and A.M.; validation, E.A.F., A.M., and D.R.; formal analysis, E.A.F.; investigation, E.A.F. and A.M.; resources, E.A.F.; data curation, E.A.F. and D.R.; writing—original draft preparation, E.A.F.; writing—review and editing, E.A.F., A.M., and D.R.; visualization, E.A.F.; supervision, E.A.F.; project administration, E.A.F.; funding acquisition, A.M. All authors have read and agreed to the published version of the manuscript.

Funding

This research received no external funding

Conflicts of Interest

The authors declare no conflict of interest.

References

Adawiah, R., Nakjah, S. N. S., Anggriani, N. K., Surajuddin, & Hadiprayitno, G. (2026). Reconstruction of Physics Concepts from Indigenous Knowledge in the Sasak Arak-Arakan Besunat Tradition Using Praje to Support SDG 4 (Quality Education. *Jurnal Penelitian Pendidikan IPA*, *12*(5), 875–884. https://doi.org/10.29303/jppipa.v12i5.15102

Alatas, F. (2023). Ethnoscience-based physics of Indonesian Betawi culture. *AIP Conference Proceedings*, *2595*. https://doi.org/10.1063/5.0123875

Ani, K. D. K., Yunindyawati, Y., & Lidya, E. (2020). Keberdayaan Perempuan Pelaku Usaha Pempek dan Kemplang Udang Di Desa Sungsang II Kabupaten Banyuasin. *Jurnal Empirika*. https://doi.org/10.47753/je.v5i2.92

Anita, M., Syarifuddin, & Santosa, M. A. (2026). The Urgency of Developing Local Wisdom-Based E-Modules to Improve Literacy of Elementary School Students. *Jurnal Penelitian Pendidikan IPA*, *12*(2), 367–374. https://doi.org/10.29303/jppipa.v12i2.14336

Anzelina, D. E. (2023). Potensi kearifan lokal sumatera selatan sebagai basis media pembelajaran kontekstual biologi SMA. *Journal of Nusantara*

Education. https://doi.org/10.57176/jn.v2i2.51

Ardilla, Y. A., Anggreini, K. W., Puri, T., & Rahmani, D. (2022). Peran Bakteri Asam Laktat Indigen Genus Lactobacillus Pada Fermentasi. *Berkala Ilmiah Biologi*, *13*(2), 42–52. https://doi.org/10.22146/bib.v13i1.4619

Asiyah. (2021). Construction Ethnoscience-Based Learning Environment Material in Scientific Knowledge. *IOP Conference Series: Earth and Environmental Science*, *1796*, *Numb*. https://doi.org/10.1088/1742-6596/1796/1/012034

Astuti, H. W., & Hamdu, G. (2026). Analysis of Teacher Needs for the Development of Ethno-ESD-Based Science Modules in Elementary Schools. *Jurnal Penelitian Pendidikan IPA*, *12*(5), 155–161. https://doi.org/10.29303/jppipa.v12i5.14801

Dalidjo, N. (2020). *Rumah di Tanah Rempah-Penjelajahan Memaknai Rasa dan Aroma Indonesia*. Jakarta: PT Gramedia Pustaka Utama.

Erna, M., Nazhifah, S., Haryati, S., Wulandari, P. A., & Rahmatullah, M. I. (2026). Ethnoscience Based Durian Acid Product Development for Sustainable Chemistry Education: A Project Based Study on Prospective Chemistry Teachers' Creativity. *Jurnal Penelitian Pendidikan IPA*, *12*(2), 642–654. https://doi.org/10.29303/jppipa.v12i2.13884

Fahlevi, R., Jannah, F., & Sari, R. (2020). Implementasi karakter peduli lingkungan sungai berbasis kewarganegaraan ekologis melalui program adiwiyata di sekolah dasar. *Jurnal Moral Kemasyarakatan*. https://doi.org/10.21067/jmk.v5i2.5069

Firmansyah, W., Nuraini, Y., & Aji, D. L. S. (2021). Kinerja Produktivitas Usaha Perikanan dan Sistem Penyuluhan Perikanan di Kecamatan Sungai Menang, Provinsi Sumatera Selatan. *Jurnal Penyuluhan Perikanan Dan Kelautan*, *15*(2), 151–167. https://doi.org/10.33378/jppik.v15i2.247

Fitri, E. A., & Arni, Y. (2024). *Harmoni Ilmu Integrasi Etnosains dan STEM di tanah Sumatra Selatan*.

Handayani, R. D., Wilujeng, I., & Prasetyo, Z. K. (2018). Elaborating indigenous knowledge in the science curriculum for the cultural sustainability. *Journal of Teacher Education for Sustainability*, *20*(2), 74–88. https://doi.org/10.2478/jtes-2018-0016

Hartini, S. (2018). The development of physics teaching materials based on local wisdom to train Saraba Kawa characters. *Jurnal Pendidikan IPA Indonesia*, *7*(2), 130–137. https://doi.org/10.15294/jpii.v7i2.14249

Hidayati, N. A., Waluyo, H. J., Winarni, R., & others. (2020). Exploring the Implementation of Local Wisdom-Based Character Education among Indonesian Higher Education Students. *International Journal of Instruction*, *13*(2), 179–198. Retrieved from https://eric.ed.gov/?id=EJ1249134

Hikmawati, Suastra, I. W., & N M Pujani. (2021). Local wisdom in Lombok island with the potential of ethnoscience for the development of learning models in junior high school. *Journal of Physics: Conference Series*, *1816*(1), 12105. https://doi.org/10.1088/1742-6596/1816/1/012105

Imranah, A., S., A., & Elvira. (2026). Exploring Ethnoscience through Dodol Pangi: Context-Based Learning in the Soppeng Community. *Jurnal Penelitian Pendidikan IPA*, *12*(4), 381–391. https://doi.org/10.29303/jppipa.v12i4.13538

Irhasyuarna, Y., & Fahmi. (2026). Integrated Science Learning Design Based on Local Wisdom of Wetlands to Improve High-Order Thinking Skills (HOTS) of Junior High School Students. *Jurnal Penelitian Pendidikan IPA*, *12*(5), 628–635. https://doi.org/10.29303/jppipa.v12i5.14960

Jannah, M. J. (2020). Analisis Titik Kritis Keharaman Produk Pada Umkm Kerupuk. *Jurnal Agroindustri Halal*, *6*(2). https://doi.org/10.30997/jah.v6i2.2564

Kartina, D., Rayendra, Z., Z., & Hidayati, A. (2026). Integrating Deep Learning into STEM-Based E-Modules: Advancing Quality Education (SDG 4) in Junior High School Science. *Jurnal Penelitian Pendidikan IPA*, *12*(2), 587–593. https://doi.org/10.29303/jppipa.v12i2.14035

Khotimah, K., Taqwa, F. H., Wijayanti, M., & Jubaedah, D. (2025). Potential of Fish Farming in Floodplain: A Systematic Literature Review. *Journal of Global Sustainable Agriculture*, *254–260*. https://doi.org/10.32502/jgsa.v5i3.1355

Lubis, J. A., Siddiq, A., Rahim, I. A., Hasibuan, T. A., & Muda, S. (2026). Implementation of the Tulak-Tulak Script–Based Deep Learning Approach in Animal Life Cycle Learning as an Effort to Digitize Cultural Heritage. *Jurnal Penelitian Pendidikan IPA*, *12*(2), 246–253. https://doi.org/10.29303/jppipa.v12i2.13795

Ma, H., Liu, M., Liang, Y., Zheng, X., Sun, L., Dang, W., Li, J., Li, L., & Liu, C. (2022). Research progress on properties of pre-gelatinized starch and its application in wheat flour products. *Grain & Oil Science and Technology*, *5*(2), 87–97. https://doi.org/10.1016/j.gaost.2022.01.001

Mahidsanan, T., Srinamngoen, P., & Sittisart, P. (2026). Unraveling microbial diversity and physicochemical hazard level in Thai traditional fermented shrimp paste (Kapi. *PeerJ*, *14*, *e20864*. https://doi.org/10.7717/peerj.20864

Manu, T. S. N., Daud, Y., & Nulik, E. A. (2026). Kajian

Etnosains Tradisi Bunuk Masyarakat Desa Loli, Kabupaten Timor Tengah Selatan Sebagai Sumber Belajar Biologi. *Jurnal Penelitian Pendidikan IPA*, *12*(5), 752–761. https://doi.org/10.29303/jppipa.v12i5.14747

Ningsih, P. (2020). Ethnoscience knowledge of indigenous community in Sigi District-Central Sulawesi. *Journal of Physics: Conference Series*, *15*. https://doi.org/10.1088/1742-6596/1521/4/042088

Nisa, K. (2024). Ethnoscience-Quizizz test to measure problem-solving skills: a Rasch analysis. *International Journal of Evaluation and Research in Education*, *13*(6), 4247–4255. https://doi.org/10.11591/ijere.v13i6.28075

Putri, A. R., Aqilah, A. R., Hardiani, N. F., Adhiyasa, C., & Salsabila, S. (2026). The Impact of Modernization on Local Wisdom among the Baduy Luar Community in Lebak Regency, Banten, Indonesia. *Jurnal Penelitian Pendidikan IPA*, *12*(5), 8–18. https://doi.org/10.29303/jppipa.v12i5.14388

Rezeky, S. M. (2022). Kerentanan Masyarakat dalam Pengelolan Rawa Lebak di Desa Tapus Kabupaten Ogan Komerin Ilir. *Muqoddima Jurnal Pemikiran Dan Riset Sosiologi*, *3*(1), 49–60. https://doi.org/10.47776/mjprs.003.01.04

Rifanni, R. D., Kevinandai, A., & Misnawati, D. (2022). Perspektif Destination Branding Kampung Kreatif Pempek Tanggo Rajo Cindo sebagai Wisata Kuliner di Kota Palembang. *Journal of Syntax Literate*, *2*(1). https://doi.org/10.36418/syntax-literate.v7i6.7407

Salmia. (2024). Effectiveness of Local Wisdom-Based Independent Curriculum Teaching Modules in Improving Learning Outcomes Indonesia. *Journal of Ecohumanism*, *3*(6), 1719–1726. https://doi.org/10.62754/joe.v3i6.4131

Sari, F. P. (2020). Development of physics comic based on local wisdom: Hopscotch (engklek) game android-assisted to improve mathematical representation ability and creative thinking of high school students. *Revista Mexicana de Fisica E*, *17*(2), 255–262. https://doi.org/10.31349/REVMEXFISE.17.255

Sholihah, F. I., Fatikha, S. Z., Haviz, M., & Vebrianto, R. (2026). Development of Ethnomathematics-Based Modules Assisted by the Canva Application to Improve Understanding of Scientific Literacy and Mathematical of Pirie-Kieren Theory. *Jurnal Penelitian Pendidikan IPA*, *12*(5), 25–33. https://doi.org/10.29303/jppipa.v12i5.14990

Sudargo, T., Wahyuningtyas, R., Prameswari, A. A., & Aulia, B. (2022). *Budaya Makan dalam Perspektif Kesehatan*. Yogyakarta: Gadjah Mada University Press.

Supriadi, A., Saputra, D., & Priyanto, G. (2023). *Pempek Palembang: Strategi dan Basis Modernisasi*. Retrieved from https://repository.unsri.ac.id/112463/1/PEMPEK PALEMBANG.pdf

Suryanti, S. (2021). Ethnoscience-based science learning in elementary schools. *Journal of Physics: Conference Series*, *1987*, *Numb*. https://doi.org/10.1088/1742-6596/1987/1/012055

Wijaya, A. P., Darmawijoyo, D., Somakim, S., & Julaiha, E. (2025). Integrating ethnomathematics into mathematical modeling: Development of student worksheets based on the Bidar Boat festival. *Al-Jabar : Jurnal Pendidikan Matematika*, *16*(1), 271–292. https://doi.org/10.24042/ajpm.v16i1.26854

Yuliana, I., Cahyono, M. E., Widodo, W., & Irwanto, I. (2021). The effect of ethnoscience-themed picture books embedded within contextbased learning on students' scientific literacy. *Eurasian Journal of Educational Research*, *2021*(92), 317–334. https://doi.org/10.14689/ejer.2021.92.16