

Ecological Intelligence In Environmentally Friendly Agricultural System

(Case Study of the Ammatoa Indigenous Community in Tana Toa Village, Kajang District, Bulukumba Regency, South Sulawesi)

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Abstract: -This research aimed to detect what kind of ecological intelligence applied by farmers in an environmentally friendly agricultural system in Tana Toa Village, Kajang District, Bulukumba Regency. This study applied a post-positivistic approach with a case study method. Data collection technique relied on observation and in-depth interviews with data analysis technique carried out since the research took place in the field, starting with collecting data optimally, followed by categorizing data, mapping and drawing conclusions. One of the competencies of ecological intelligence is understanding environmental issues and problems from the perspective of ecological balance and sustainability. For the Tana Toa indigenous people, nature is an inseparable part of their survival. For them, nature is not just for daily needs but to maintain the balance of the ecosystem and for ritual purposes. So that indigenous communities remain imbued with actions that prioritize the environment and its balance in everyday life

Keywords: Ecological Intelligence, Organic Farming System, Ecological Adaptability.

I. Introduction

Humans and the environment are a bound entity. Humans were created as creatures with the gift of reason. The mind is actually used to continue to adapt so that it can survive optimally with changing environmental conditions. The human ability to live cannot be separated from the existence of the environment. However, there is no denying that the problem that arises is the exploitation of the environment to fulfill human needs[1].

Ecological intelligence is human ability to adapt to the environment. Ecological intelligence possessed by individuals is based on knowledge, awareness, and life skills in harmony with the preservation of nature. An ecologically intelligent person is a person who understands that every behavior and action not only have an impact on himself and others but also on the natural environment in which he/she lives. This is built on the understanding that the nature in which he/she lives must always be maintained so that it remains capable of supporting life. himself and others[1]. Ecology means understanding organisms and their ecosystems, while intelligence is the capacity to learn from experience and deal effectively with the environment. Ecological intelligence is an understanding of hidden ecological impacts and solutions to improve them[2].

Agricultural sector in the Indonesian economy, this sector needs to be developed with a big vision. namely environmentally sound development so that it can be sustainable in the future. Environmentally friendly agricultural cultivation or better known as environmentally friendly agriculture continues to be developed. This can be seen in the Ammatoa indigenous community. The majority of Ammatoa indigenous people work as farmers. The AmmatoaKajang indigenous community is an indigenous community that lives in Tanah Toa

Village, Kajang District, Bulukumba Regency. The uniqueness of this traditional community lies on the behavior and daily life of its people who still adhere to the noble values and traditional beliefs of AmmatoaKajang. The traditional area is within the administrative area of Tanah Toa Village, Kajang District, 56 km from Bulukumba City. To enter the Ammatoa Traditional Area, you must first go through the entrance wearing the typical black Kajang traditional clothing. The core residential area of the Kajang community is 800 m from the gate, which can be reached on foot. Capra, Clark, & Cooper explain the knowledge aspect as a core competency of ecological intelligence which includes understanding of environmental issues and problems from the perspective of ecological balance and sustainability, assessing the impact of human actions and the application of technology on the environment, and being able to calculate the long-term consequences in making decisions. Environmental quality and efforts to reduce environmental damage are currently still tasks that must be continuously pursued by central and regional governments as well as components of society.

In the explanation above, it could be concluded that ecological intelligence in an environmentally friendly agricultural system is the community's understanding of the surrounding environment, being able to adapt and solve ecological problems to improve and develop the ecological health of their surroundings by considering their adaptability to local circumstances/conditions. Considering the existing of agricultural system in Kajang, it is included in an environmentally friendly agricultural system with a cultural approach in which an environmentally friendly agricultural system is combined with environmental culture. According to Dahlia Sarkawi, environmental culture can be defined as a complex of patterned activities and actions of humans in society relating to their environment. The Ammatoa indigenous people themselves still adhere to their culture closely. The Ammatoa indigenous people still uphold their existence, there are values of the relationship between humans and the environment, so that the position of humans and the environment are equal. For the AmmatoaKajang indigenous community, preserving the environment means also protecting yourself, destroying the environment means destroying yourself.

The culture of the Ammatoa indigenous people who attach great importance to nature. This was different from the research conducted by Raras, et al, in which he conducted the research about agrotourism. The Ammatoa indigenous people still uphold their noble values, so they still adhere to the beliefs of their ancestors. Their daily existence and work are very closely tied to their culture.

The results of the above studies proved that ecological intelligence was needed as a form of environmental preservation and was able to prosper the community and the surrounding natural resources. With ecological intelligence in environmentally friendly agriculture, it increased agricultural production in Tana Toa Village without destroying the surrounding nature, where they are still thinking about natural life and this is also in accordance with the customs that exist in Tana Toa Village which are still strong. This is also able to improve the welfare of the Ammatoa indigenous people of Tanah Toa Village without abandoning their customs, not causing damage to environment, and not violating the rules made by ancestors. In conclusion, there are several traditions, rules, and practical knowledges in the ecological intelligence values of the Ammatoa indigenous people. It is hoped that these values can be reconstructed and socialized so that they become the identity of other communities.

Therefore, researcher was very interested in conducting research entitled "Ecological Intelligence in Environmentally Friendly Agricultural Systems (Case Study of the Ammatoa Indigenous Community in Tanah Toa Village, Kajang District, Bulukumba Regency, South Sulawesi)". This research was to find out the traditional values and explain ecological intelligence in the environmentally friendly agricultural system of the KajangAmmatoa indigenous community. This research aimed to detect what kind of ecological intelligence applied by farmers in an environmentally friendly agricultural system in Tana Toa Village, Kajang District, Bulukumba Regency and what the ecological picture of environmentally friendly agriculture that applies ecological intelligence is in Tana Toa Village, Kajang District, Bulukumba Regency.

II. Research Methods

Research Approach and Method

This research approach applied a Postpositivistic paradigm. The method used was a qualitative method which produced descriptive data in the form of written or spoken words from people and behavior observed or being researched[3].

Purposive is a non-random selection technique where the researcher took informants by selecting certain identifiers that are in accordance with the research objectives and therefore were expected to react to the research case. The data was inductive/qualitative in nature and the results of qualitative research emphasized the meaning rather than generalizations. The type of research used by researchers was a single case study by examining a particular problem.

Research Sites

This research was carried out in Tana Toa Village, Kajang District, Bulukumba Regency, South Sulawesi. This research was conducted during April – May 2023.

Research Instruments

In this research, the main instrument was the researcher himself who determined the research focus, selected informants as data sources, carried out data collection, assessed data quality, analyzed data, interpreted data, and drew conclusions about his findings[4]. The role of the researcher in this research was as a key instrument in collecting data. Apart from the researcher who was the key instrument, interview drafts, observation lists and documents and literature related to the research topic were also needed.

Data Types and Sources

Source of data referred to this study was the place where the research data was obtained. The data sources were divided into two, namely: Primary data, namely data taken through the results of in-depth interviews conducted by researchers in stages and repeatedly 3-5 times with informants who are traditional leaders (Ammatoa), women farmer groups and traditional community leaders in Tana Toa Village, Kajang District, and through the results field observations obtained by researchers when conducting research.

Secondary data was obtained from literature studies related to ecological intelligence systems and environmentally friendly agricultural systems. In addition, documents related to ecological intelligence and agricultural systems were also playing a vital role as secondary data.

Data Collection Technique

Considering from the method of data collection, it was carried out by means of observation, interviews, and documentation.

Data Analysis Technique

The data analysis technique consisted of three streams of activities that occurred simultaneously, namely: data reduction, data presentation, and conclusion/verification. Data reduction is defined as a selection process, focusing on simplifying, abstracting, and transforming "rough" data that emerges from written records in the field. As long as the data collection takes place, the next reduction stage occurs (making summaries, coding, tracing themes, making clusters, making partitions, writing memos). This data reduction/transformation process continues after the field research, until a complete final report is prepared.

From the presentation, the researcher will be able to understand what is going on and what to do in further; analyze or take action based on the understanding gained from this presentation. The third important analysis activity was drawing conclusions and verification. "Final" conclusions might not appear until data collection was over. It depends on the size of the field note collections, their coding, storage, and retrieval methods used, the skill of the researcher, and the demands of the funder, but often the conclusions have already been formulated. Earlier from the start, even though one researcher claimed to have proceeded "inductively".

Data Validity Test

Data validity test was carried out to obtain valid data. For the validity of the resulting research data, a triangulation method is needed. Triangulation is a combination or combination of various methods used to study interrelated phenomena from different points of view and perspectives.

III. Result

Geographical and Administrative Conditions

Bulukumba Regency is located in the southern part of the South Sulawesi peninsula and is 153 km from Makassar (the capital of South Sulawesi Province). The area of Bulukumba Regency is 1,154.67 km² or 1.85% of the area of South Sulawesi Province.

Bulukumba Regency consists of 10 (ten) sub-districts, namely Ujungbulu District (Regency Capital), Gantarang, Kindang, Rilau Ale, Bulukumpa, Ujung Loe, Bontobahari, Bontotiro, Kajang and Herlang. Regionally, Bulukumba Regency is in four dimensions, namely the highlands at the foot of Mount Bawakaraeng-Lompobattang, the lowlands, the coast and the open sea. Bulukumba Regency is located between 05°20' - 05°40' South Latitude and 119°58' - 120°28' East Longitude with boundaries namely:

To the north it borders with Sinjai Regency

To the east, it borders with Bone Bay and Selayar Island

To the south it borders with the Flores Sea

To the west it borders with Bantaeng Regency

The hilly area in Bulukumba Regency stretches from West to North with a height of 100 to. Above 500 meters above sea level includes parts of the Kindang District, Bulukumpa District and Rilau Ale District.

Bulukumba Regency is divided into 10 (ten) districts and has an area of 1154.7 Km². The district that has the widest area is Gantarang District with an area of 173.5 km² with a percentage of the total area of 15.03%. Meanwhile, the sub-district which has the smallest area is Ujung Bulu Sub-district with an area of 14.4 Km² with a percentage of the area of 1.25%.

Topographic Conditions and Slope Slope

The natural landscape or morphological form of the Bulukumba Regency area consists of; mountainous morphology (500 - >1000 m asl), hill morphology (100–500m asl), wavy morphology (25–100 m asl) and plains morphology (0–25 m asl).

Mountain Morphology

This morphological area has the characteristics of high topographic relief, rough topographic texture, the constituent rocks are dominated by Lompobattang Volcanic Rocks, this regional unit is around the Lompobattang Mountains (BuluSunggang) and the northern part of the Kindang District.

Hill Morphology

This morphological area has the characteristics of moderate topographic relief and topographic texture, the constituent rocks consist mainly of the Lompobattang Volcano rocks and the Baturappe Formation and the Walanae Formation, found in the districts of Kajang, Herlang, Bontotiro and Bontobahari.

Wavy Morphology

This morphological area has the characteristics of low to moderate topographic relief and fine to moderate topographic texture, its constituent rocks are mainly Walanae Formation rocks, Limestones and Volcanic Rocks. In the local limestone there is a morphology of steps, this morphological area is found in the Kajang, Bontotiro and Bontobahari Districts.

Plains Morphology

This morphological area has the characteristics of very low topographic relief and fine topographic texture, its constituent rocks are dominated by Alluvium deposits, found in the Ujungbulu and Bontobahari Districts.

Population Number and Population Density

The population in Bulukumba Regency in 2014 amounted to 398,531 people or an increase of 3,263 people compared to 2010 with a population of 395,268 people. Spread over 10 (ten) districts. Of the 10 (ten) districts, Gantarang District has the largest population, namely 71,141 people, then Bulukumba District with a population of 51,252 people and Ujung Bulu District with a population of 48,518 people and the smallest is Bontotiro District with a population of 23,004 people.

Overview of Kajang District

Geographical and Administrative Conditions

Kajang District is one of the sub-districts in the administrative system of Bulukumba Regency, in terms of its location/position within the Bulukumba Regency area, Kajang District is located on the eastern part of the Bulukumba Regency area, with a total area of 129.06 km² and a population in 2013 of 47,467 people. Administratively, Kajang District has the following boundaries:

To the North: it borders with Sinjai Regency

To the east: it borders with Bone Bay

South: it borders with Herlang District and Ujung Loe District

West side: it borders with Bulukumpa District

Kajang District is divided into 19 (nineteen) villages and wards. Judging from the aspect of the area of each village/kelurahan, the Tambangan Village with an area of 13.00 Km² and Malleleng Village with an area of 11.10 Km² are the largest village areas compared to other villages/kelurahan in Kajang District, while the village/kelurahan which has an area of the smallest are Pantarra Village and Losisang Village with an area of 4.00 Km² each.

Topography

The topographic conditions of Kajang District include flat, undulating and hilly areas. Kajang District itself is located at various altitudes, namely between 0-150 meters above sea level with slopes ranging from 0–15% with slope gradients ranging from 0–2%, 2–5%, 5–15. The slope of the slopes in Kajang District is generally dominated by a slope of between 0-2%, 2-5%, so that development in the area so far has tended to follow flat land relief with a flat and not steep slope.

Based on the results of field surveys, it shows that flat areas with a slope of 0-5% are still dominated by built-up land such as settlements and other facilities, shrubs, forests and ponds, while undulating areas, hilly to mountainous areas (5-15%) are non-settlement areas. such as forests and bushes, but some have been used as plantation cultivation areas.

Population

The population in Kajang District in 2014 was 47,080 people. The urban village with the highest population of 6,037 people is in Tanahjaya Village, while the lowest population of 1,170 people is in Possitanah Village.

Facilities

In general, all office facilities in Kajang District are concentrated in Tanah Jaya Village, from government agencies to the private sector. The average government agency offices are located in Kelurahan Tanah Jaya, including the Kajang sub-district office, the Office of Religious Affairs, a multipurpose building, and other government agency offices starting from banking, and PLN offices, etc. Apart from that, in every village and sub-district there are each village office and sub-district office. The existence of government agency offices in

one area will greatly assist the government in providing services to the community effectively and efficiently.

Kajang District as a developing area, until now has several good health facilities/facilities that have regional service levels such as the health center and posyandu. In Kajang District there are several educational facilities including 1 unit of Kindergartens, 7 units of Elementary Schools, 1 unit of Junior High School and 1 unit of Senior High School.

Based on data, in Kajang District there are 93 worship facilities in the form of mosques and 2 prayer rooms. In Kajang District there are various types of sports facilities, including 10 football fields, 21 volleyball fields, and 2 badminton courts spread across various villages and sub-districts.

Infrastructure

The existence of clean water is not only a basic human need in carrying out daily life, but the availability of clean water will also greatly determine the quality of the population's health. Until now, in Kajang District, clean water management has been managed using piping and pumping systems. Apart from that, there are also households that still use several other sources of clean water such as pumps, wells, springs and rivers.

In the electricity infrastructure in Kajang District, electricity has become a basic need for every household, and has even become an individual need. Particularly in Kajang District, the availability of electrical energy is very adequate, this is evident from data showing that most households have used or been served by PLN electrical energy. However, there are also several households that use petromax and lamps as well as other sources of electrical energy to carry out their household activities that require electricity.

In addition, there is also telecommunications infrastructure. In Kajang District, a telecommunication system is available in the form of a wireless telephone network/mobile phone operator, several signals from good and smooth cellular phone operators, some of which are Telkomsel and Satelindo.

In Kajang Sub-District, the common waste disposal sites used by the community consist of public trash cans, dumping in pits/burning, and rivers/lakes/gutches. However, the dominant waste disposal system used by the community is by throwing it in a hole or burning it.

Community Farming Overview

The Kajang tribe itself is part of the Tanah Toa Village administration with an area of 29 ha. The total area of Tanah Toa Village is 972 hectares with various uses, namely 169 hectares for residential land, 93 hectares for rice fields, 30 hectares for plantations, 5 hectares for graves, 95 hectares for yards, 1 hectare for offices, 5 hectares for infrastructure. General, and the forest area is approximately 331 hectares.

Administratively, Tanah Toa Village is bordered by Batunilamung Village to the north, Bontobaji Village to the south, Malleleng Village to the east, and Pattiroang Village to the west. The distance from Tanah Toa Village to the capital of Kajang District is ± 25 kilometers, from the capital of Bulukumba Regency ± 57 kilometers and from the city of Makassar ± 270 kilometers.

Based on its fertile natural conditions, the main livelihood of the population is the agricultural sector. The agricultural system of the Ammatoa indigenous people is the intercropping system. The results of environmentally friendly agricultural systems found in Kajang include corn and rice.

The results of interviews conducted with indigenous peoples, farmer groups and a spokesperson for the Kajang customary tribe said that in Kajang only a few of the indigenous people still preserve local wisdom, namely the rice fields of the Kajang indigenous people still maintain their local wisdom by way of buffalo plowing the fields and before planting rice seeds The system planted by the Kajang customary community is to carry out rituals.



Land being plowed The rice plant is the parent plant Rice plants being moved

There are several customs carried out by the indigenous people of Kajang in farming, from planting preparation to post-harvest. That is, the seeds are soaked in buckets allowed to stand for 3 days on the middle pole of the house then drain the water while the seeds are put in sacks while waiting in the nursery 2 days then the seeds are sprinkled in the fields for seedlings for 14 days, in the process of breeding rice fields, the indigenous people of Kajang still absorb the fields using 2 cows or buffaloes but some indigenous people of Kajang have also used tractors if the community uses animals to absorb rice fields, then chunks of land when plowed are small and the impact on the soil is small, while tractors large chunks of land so that they affect the soil when plowing fields, not only there, but the community has a custom, namely the second custom, A 'patumbu' rice began to be taken to start planting in the fields the day before planting 7-10 days are taken to see the progress and see sufficient water flow. The next ritual, namely Baca Doang, is held at home, leaving the remaining seeds in the factory. Cooked to read as a form of gratitude for a successful harvest. This ritual aims to pray for safety for plants to avoid pests and disease.



Corn plant

For corn plants, 3 days before planting, the corn seeds are stored on the center pole of the house. The Kajang indigenous always people perform a ritual with the aim of the corn growing well. The Ammatoa indigenous community still uses a hoe or wood to plant corn. After 2 months, the indigenous people adopted the custom of doing Baca Doang like an offering at the time of corn harvest and used corn as a staple food that was processed.

IV. Discussion

The Kajang custom of carrying out farming activities has been a tradition passed down from generation to generation. There are several habits carried out by the Kajang traditional community in farming, from preparation for planting to post-harvest. Having a ritual that aims to ask for safety for plants to avoid pests and diseases that can cause damage to them, shortages and even loss of harvest[5].

The agricultural system of the Ammatoa indigenous people is the intercropping system. Intercropping is a form

of cropping pattern that cultivates more than one type of plant in certain periods of time. This intercropping is an effort from an agricultural intensification program with the aim of obtaining optimal production results and maintaining soil fertility[6]. Furthermore, Jumin2002 in Marliah, Jumini, Jamilah, 2010 stated that the aim of the intercropping system is to optimize the use of nutrients, water, and sunlight as efficiently as possible to gain maximum production[7].

Corn and rice are two of the most useful agriculture in the Bulukumba region. The Kajang tribal people use corn and rice as staple foods consumed by the Kajang indigenous people. In its implementation, indigenous communities create and use the tools/objects and procedures needed by a sustainable society by implementing practical, effective actions based on ecological concern.

Ecological intelligence requires humans to apply what they experience and learn about the relationship between human activities and ecosystems. Ecological intelligence forges humans into an ecosystem that organizes emotions, thoughts, and actions in responding to the universe. This is supported by the theory put forward Goleman, 2010 that ecological intelligence is the human ability to adapt to the environment where humans are located[8].

One of the competencies of ecological intelligence is understanding environmental issues and problems from the perspective of ecological balance and sustainability. For the Ammatoa indigenous people, nature is an inseparable part of their survival. For them, nature is not solely for daily needs but to maintain the balance of the ecosystem and ritual interests. So that indigenous peoples are still colored by actions that prioritize the environment and its balance in everyday life.

The next ecological intelligence competency is understanding ecological principles. One of the principles about ecology is the dependence between one another. This principle is applied by indigenous peoples where they realize their dependence on nature so they protect nature well. Beside it, they protect nature because they are afraid that nature will be angry with them.

The next ecological intelligence competency is to provide attention, empathy, and respect for others and other living things. Indigenous communities maintain unity and peace with other living creatures where indigenous communities live together and help each other in carrying out activities such as farming, carrying out traditional rituals together, and making traditional decisions.

According to Suwanto 2019, environmentally friendly agriculture has four principles, namely health, ecology, justice and protection. In agriculture, indigenous communities use environmentally friendly systems and minimize the use of dangerous chemicals so that they are safe for health and ecology. In addition, the community indirectly fulfills the principles of justice and protection because they use nature wisely[9].

A person who has good ecological intelligence will take action that can have a positive impact on the environment, so that a person will have environmentally friendly behavior. If someone has a good attitude regarding ecological intelligence, it will raise awareness within themselves to be able to protect the surrounding environment by behave environmentally friendly. As explained by Ali 2013, values and lifestyle can also influence environmentally friendly behavior[10].

Conclusion

Based on the results and discussion, it can be concluded that For the Tana Toa indigenous people, nature is an inseparable part of their survival. For them, nature is not just for daily needs but to maintain the balance of the ecosystem and for ritual purposes. So that indigenous communities remain imbued with actions that prioritize the environment and its balance in everyday life. The next ecological intelligence competency is understanding ecological principles. One of the principles of ecology is the dependence between one another. This principle is applied by the Tana Toa indigenous people where they realize their dependence on nature so they protect nature well. Apart from that, they protect nature because they are afraid that nature will be angry with them. The next ecological intelligence competency is to provide attention, empathy, and respect for others and other living things. The Tana Toa traditional community maintains unity and peace with other living creatures where the

indigenous people live together and help each other in carrying out activities such as farming, carrying out traditional rituals together, and making traditional decisions. Corn and rice are two of the most useful agriculture in the Bulukumba region. The Kajang tribal people use corn and rice as staple foods consumed by the Kajang indigenous people. In its implementation, indigenous communities create and use the tools/objects and procedures needed by a sustainable society by implementing practical, effective actions based on ecological concern.

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