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Study of Ecological, Social, Spiritual Aspects towards Sustainable Environmental Management in Wiyantri Village, Skanto Sub District, Keerom Regency, Papua Province, Indonesia

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Abstract

Sustainability research is a type of research that examines the sustainable management of natural resources and is an important part of maintaining natural resources in a sustainable manner. The increase in world population is currently high enough that it is necessary to maintain traditional values in society in protecting our environment so that it can be enjoyed by generations. For this reason, sustainability research or studies are very important to continue to develop. This study aims to determine how to assess sustainability through ecological, socio-cultural and spiritual aspects in the community in Wiyantri Village, Skanto District, Keerom Regency. To assess whether an environment is deteriorating or not in terms of ecological, socio-cultural, and spiritual aspects. The method used in this research is the Community Sustainability Assessment (CSA) and the sample is selected intentionally (purposive sampling). The results of the study in assessing community sustainability in Wiyantri Village, Skanto District, Keerom Regency. From the data that has been obtained from the ecological aspect, socio-cultural aspect and spiritual aspect, it is known that the total of each aspect shows very good progress showing sustainability with a score of 999+ on Jalan Lotus with score 1070. Then the location that shows a good start towards sustainability with a score of 500-998 is Jalan Mawar with a total score of 575.

Keywords: *Community sustainability assessment (CSA); Sustainability; Kampung Wiyantri.*

Introduction

Environmental changes affect various aspects of life. Changes that occur in humans' living environment cause disturbances in their balance because some environmental components become less functional. Current changes in forests and land are motivated by the high demand for consumption for food, clothing and shelter. The need for agricultural businesses and housing continues to increase over time, followed by high population growth. Clearing forests and land for food is always inadequate because it is more oriented towards food production. On the other hand, the current food production does not have to be obtained from large areas of land, but small areas of land can be used to produce food so that it can meet current human needs. The use of narrow land is managed by planting economic crops that have high production value. The government is currently continuing to encourage rice production from time to time so that we become a food-sovereign country. Current global conditions require technological innovation and optimal natural engineering to increase crop production. Utilization of yard land to develop economic crops can be done to meet the needs of people in villages or villages. It is known that although in our country the area of sea is dominant, the majority of Indonesian people depend on the land agricultural sector (agrarian) for their livelihoods. Agricultural activities as part of society's contribution to food have not been able to answer the food problem as a whole and in fact there is still a lack of independent food supply in our country. For this reason, developing homestead studies as an alternative to the national food security strategy with an agricultural intensification approach. Community land is intensified with food cultivation activities that can meet the community's needs for sources of carbohydrates, animal and vegetable protein, as well as the need for vegetables and fruit (horticulture). The differences in the physical and social environment of the 4 areas which have different characteristics, namely near forests, near cultural centers or historical heritage, near rice fields or agriculture and crafts and near urban areas will influence people's mindset in determining the types of plants to cultivate (Wu et al., 2020). Community activities in managing their natural environment

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can be influenced by many things, but economic, socio-cultural and spiritual aspects are the basic factors that influence society in its relationship with its natural environment (Reyes-Arroyo et al., 2021). Antoh et al. (2018) said that assessing community sustainability is influenced by 3 main aspects, namely ecological, socio-cultural and spiritual aspects. For example, the management of community yards in villages can contribute income (Antoh, 2016). Yards can also contribute income, yards can also be a fortress against the uncertainty of climate change because in the yards there are many plants that can be utilized, even if the plants are cultivated in rice fields (Avolio et al., 2020). Experienced failure (Mulyanto, 2011). Other research explains that the income of farming households in rural areas can currently reach 43% and this really depends on the size of the yard they own and the ability of the farming household's business to develop it (Guuroh et al., 2014). In other research, it is stated that farmer household income is also influenced by land typology (Zahri et al., 2018).

The community's interaction with natural resources needs to be assessed so that it can be seen how closely the community uses natural resources to meet their daily needs by conducting an assessment using the Community Sustainability Assessment (CSA) method. To assess whether an environment is deteriorating or not with a community approach called the Global Ecovillange Network (GEN). The Global Ecovillage Network (GEN) concluded that to reduce or suppress environmental damage so that it does not get worse, humans must simplify their lifestyle (Gao et al., 2022). Furthermore, it was also explained that there needs to be a new, better (simpler) way in which humans live very economically and efficiently in harmony with nature (Arifin et al., 2009; Antoh et al., 2018). Assessment in this way is to see the level of community sustainability in relation to the use of natural resources (SDA) (Nathaniel et al., 2021).

There is a threat of exploitation of natural resources including forests and degradation of forests and the environment in the Papua region, so it is necessary to collect data (documentation) of flora, especially those that can be used by humans. Most collections of flora types are based on the scientific discipline of ethnobotany which focuses on the study of the comprehensive reciprocal relationship between an ethnic or community group and its plant resources and environment (Tanjung et al., 2012).

Sustainable development is a process to increase the opportunities for individuals and communities to fulfill their aspirations and all their potential within a supportive period of time by maintaining the resilience of economic, social, environmental and institutional systems and behavior (Henderson & Loreau, 2023). In sustainable development there is a process of change in which there are resource efforts, investment direction, technological development orientation and institutional changes in harmony and efforts to increase present and future potential to meet human needs and aspirations (Ibrahim et al., 2013; Sparviero & Ragnedda, 2021).

For this reason, research and studies on flora and fauna including yard plants in Wiyantri Village, Skanto District, Keerom Regency are important to carry out because in community yards there is a diversity of plant types so that yard biodiversity studies and environmental assessment from ecological, socio-cultural and spiritual aspects are important research can be done.

Research Methodology

This research was conducted in the village of Skanto Dsitrict, Keerom District, Papua Province, Indonesia and was conducted for approximately five months (Figure 1).

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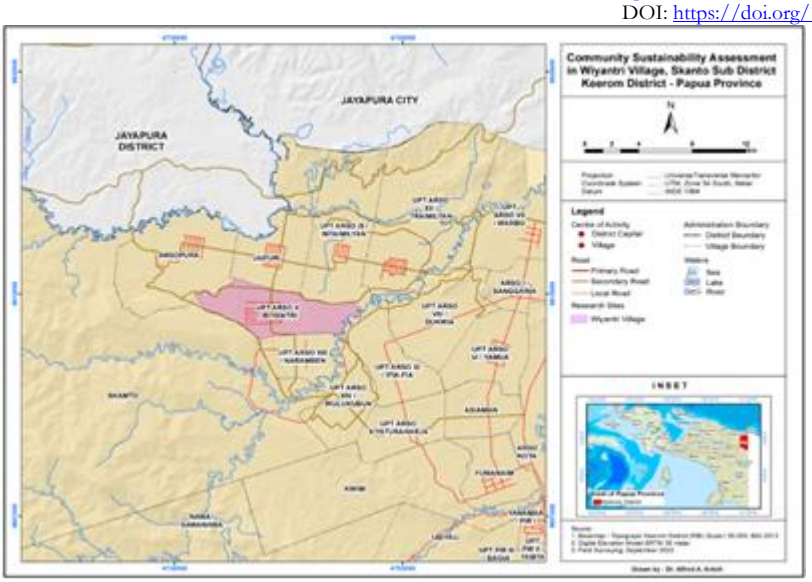

Figure 1. Location of data collection in Wiyantri village, Skanto Sub District, Keerom Ditrict, Papua Province, Indonesia (source: primary data processing 2020).

Data collection was carried out through surveys and interviews using the Community Sustainability Assessment (CSA) questionnaire (Jain, 2021; Knott et al., 2022). The interview technique used was a sample of 10 respondents deliberately selected, namely: indigenous community leaders (1 person), religious leaders (1 person), women leaders (1 person), youth leaders (2 people), village government officials (1), farmers (2 people) and Agricultural extension (2 people). The interview technique is to invite respondents in a room by means of a questionnaire held and asked together to get answers to data and information collected from selected respondents. This technique is intended so that each respondent can /complement the answers asked and can explain in detail to get an accurate answer. In addition, observation of location and coverage to the field by making photo documentation. The measured community sustainability is related to 3 aspects: ecological, socio-cultural and spiritual (Table 1).

Table 1. Community sustainability assessment variables in Wiyantri Village, Keerom District.

No	Variables	Weight
	Ecological Aspects	
1.	The meaning of the place of residence	0-50+ (*)
2.	Food availability (production and distribution)	0-50+ (*)
3.	Infrastructure (buildings and transportation)	0-50+ (*)
4.	Pattern (consumption and management of solid waste)	0-50+ (*)
5.	Water (source, quality and usage patterns)	0-50+ (*)
6.	Management (liquid waste and water pollution)	0-50+ (*)
7.	Energy (source and use)	0-50+ (*)
	Total A	$333^{+}<$ (**)
	Socio-cultural aspects	Value
1.	Openness (Trust and security; shared space)	$0\text{-}50^{+}$ (*)
2.	Communication (ideas and information flow)	0-50+ (*)
3.	Network (achievements and services)	0-50+ (*)
4.	Social sustainability	0-50+ (*)
5.	Education	0-50+ (*)
6.	Health services	0-50+ (*)
7.	Economic sustainability (health of the local economy)	0-50+ (*)

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No	Variables	Weight
	Total B	333+< (**)
	Spiritual aspects	Value
1.	Cultural sustainability	0-50+ (*)
2.	Arts and recreation	0-50+ (*)
3.	Spiritual sustainability	0-50+ (*)
4.	Community related	0-50+ (*)
5.	Community resilience	0-50+ (*)
6.	New holographic (world or global view)	0-50+ (*)
7.	Global peace and thought	0-50+ (*)
	Total C	333+<C (**)
	Total A+B+C	999+ (***)

Total A+B+C 999+ (***) Note:*=score of 1 variable, **=score of 1 aspect, ***=score of total 3 aspects. Source: Antoh et al. (2018)

The value of community sustainability obtained from the assessment is then summed to obtain a value. The summed parts are: the value of the component aspects or variables, the value in 1 aspect, and the total value of 3 aspects to obtain the value of community sustainability in the village of Wiyantri.

Table 2. Community sustainability assessment variables in Wiyantri Village, Keerom District.

Rating Level	Score	The condition of community sustainability
Variable/ (*)	50^{+}	Demonstrated very good progress towards sustainability
	25-49	Shows a good start Continuity
	0-25	Indicates action must be taken to be sustainable
Aspects (A,B,C)/ (**)	333^{+}	Demonstrated very good progress towards sustainability
	166-332	Shows a good start Continuity
	0-165	Indicates action must be taken to be sustainable
Total of each Aspects (T)/ (***)	999^{+}	Demonstrated very good progress towards sustainability
	500-998	Shows a good start Continuity
	0-449	Indicates action must be taken to be sustainable

Note: *= 50+<, **=333+<, ***=999+*=score of 1 variable, **=score 1 aspect, ***=score of total 3 aspects. Source: Antoh et al. (2018)

Table 3. Assessment of community sustainability in Wiyantri Village, Skantor District, Skanto District, Keerom Regency.

No	Data Collection	Ecologist Aspect							A	Socio-Culture Aspect							B	Spiritual Aspect							C	T
		1	2	3	4	5	6	7		1	2	3	4	5	6	7		1	2	3	4	5	6	7		
1	Jalan Melati	34	26	30	28	47	29	44	238	55	29	46	47	42	37	28	284	33	21	41	49	33	54	41	272	794
2	Jalan Flamboyan	42	30	32	32	42	27	56	261	55	36	50	58	13	34	21	267	38	33	44	53	33	62	66	329	857

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No	Data Collection	Ecologist Aspect							A	Socio-Culture Aspect							B	Spiritual Aspect							C	T
		1	2	3	4	5	6	7		1	2	3	4	5	6	7		1	2	3	4	5	6	7		
3	Jalan Cendana	33	25	52	35	43	41	43	272	41	45	54	66	45	48	50	**349**	49	29	42	71	65	70	78	404	1025*
4	Jalan Kenanga	18	17	25	14	19	22	16	131	44	16	34	71	26	30	28	249	34	4	45	53	65	70	82	353	733
5	Jalan Nusaindah	28	35	21	10	23	23	36	176	55	36	50	51	31	43	35	301	11	30	28	55	39	50	54	267	744
6	Jalan Kamboja	31	32	38	34	35	47	43	260	59	32	50	67	32	37	48	325	36	31	48	61	71	66	66	379	964
7	Jalan Menur	30	16	32	34	38	39	45	234	51	25	50	52	37	27	34	276	37	25	36	59	50	58	54	319	829
8	Jalan Cempaka	30	35	21	10	24	21	36	177	55	36	50	49	31	43	31	295	6	30	12	55	39	50	54	**246**	718
9	Jalan Teratai	39	20	29	21	17	31	43	200	49	25	58	61	44	42	25	304	62	34	47	53	51	54	56	357	861
10	Jalan Mawar	25	21	14	14	24	10	17	**125**	25	23	22	18	37	26	54	**205**	54	15	25	39	13	58	41	245	**575**
11	Jalan Teratai	43	35	47	44	52	52	52	**325**	61	43	54	51	42	44	30	325	56	49	46	59	62	70	78	**420**	**1070***
12	Jalan Dahlia	28	29	26	15	32	18	30	164	30	25	49	40	36	32	24	236	27	20	45	49	36	66	70	313	727
13	Jalan Cendana	34	23	24	22	20	13	17	146	48	26	60	51	45	39	24	293	47	24	47	55	30	62	60	325	771

The results of interviews with respondents selected deliberately include ecological aspects, socio-cultural aspects and spiritual aspects (Table 3) as follows:

Research Findings and Discussions

Ecological Aspects

Ecological aspects include housing factors, food availability (production and distribution), infrastructure (buildings and transportation), patterns (consumption and processing of solid waste), water (source, quality and development patterns), management (liquid waste and water pollution) and Energy (source and use) is one of the aspects measured (Figure 2).

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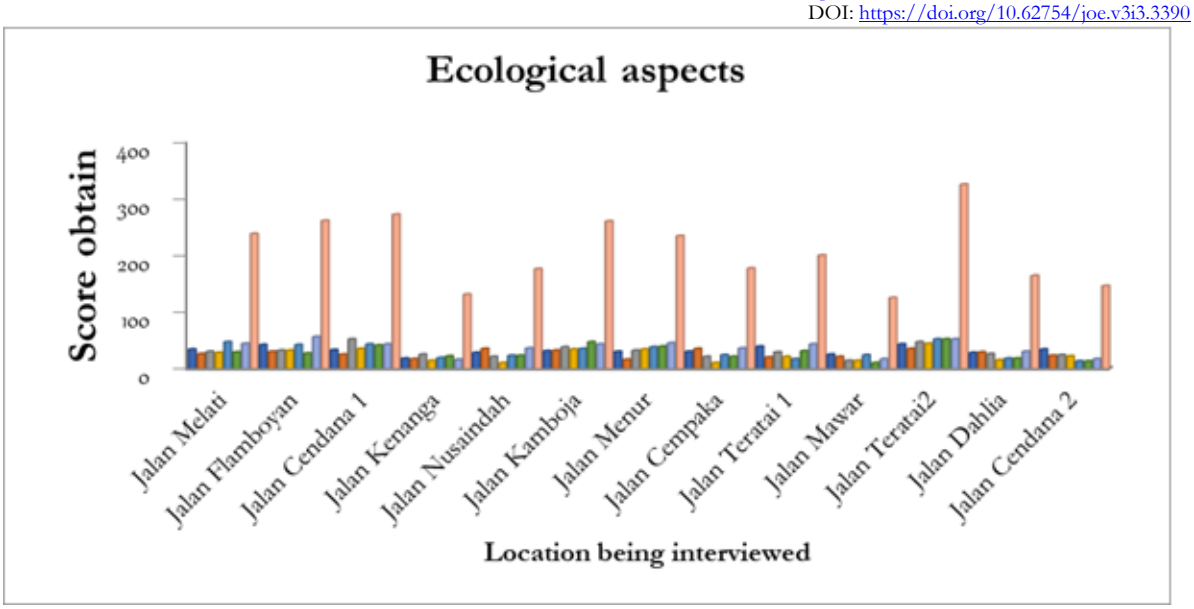

Figure 2. Ecological aspects in assessing community sustainability in Wiyantri village, Skanto District, Keerom Regency.

The results of the assessment of the ecological aspect show that the highest score of 325 was obtained on Jalan Teratai because the water, management and energy factors showed very good progress towards sustainability with a score of 50+. The minimum score of 125 on Jalan Mawar due to all ecological factors shows that action must be taken to achieve sustainability with a score of 0-25 and shows a good start towards sustainability with a score of 25-49, and none shows very good progress towards sustainability. However, several indicators in the ecological aspect have shown sustainability, for example: energy parameters and usage patterns on the Flamboyan road have shown good results towards sustainability (56). Another ecological aspect with a good progress score towards sustainability can be seen on Jalan Cendana where building and road infrastructure parameters show a score of (52). This means that this aspect shows good value towards sustainability. The interesting thing in assessing the ecological aspects of Jalan Lotus is that the parameters of water management, its sources and use received a score of (52), as well as the management of waste and pollution in the aquatic environment received a score of (52), and energy for its sources and use received a score of (52). (52), meaning that it shows very good progress towards sustainability.

Sustainability assessments other than other road locations show a value (<50) or a start towards sustainability or with the results that action is needed to move towards sustainability. Furthermore, if the sustainability value is measured as a whole for all roads (research sites), the resulting score is (<333) or with the predicate of a good initial assessment towards sustainability and there needs to be action towards sustainability.

Socio-Cultural Aspects

Socio-cultural aspects include openness factors (beliefs and religion: shared space), communication (flow of ideas and information), networks (achievements and services), social sustainability, education, health services, and economic sustainability (local economic health) (Figure 3).

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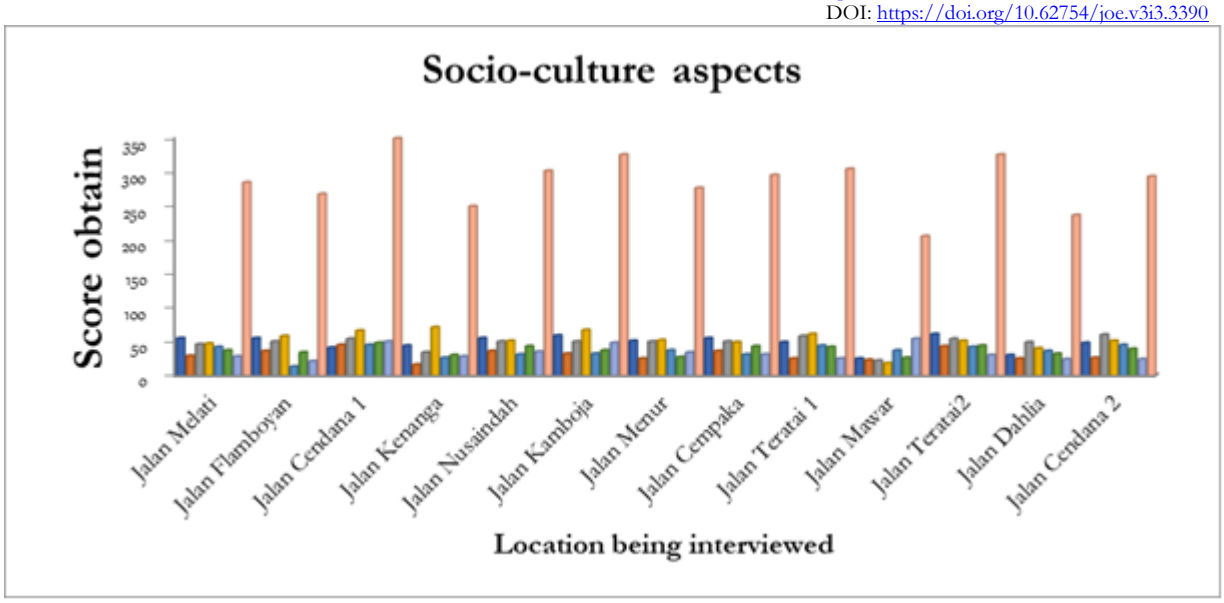

Figure 3. Socio-cultural aspects in assessing the sustainability of the Wiyantri village community, Skanto District, Keerom Regency.

The results obtained obtained the highest score of 349 on Jalan Cendana (Figure 3). There are 2 parameters that have a score of (50+<), namely: network (achievements and services) with a score of (54) and social sustainability (66). The lowest score is 205 on Jalan Mawar. Almost all parameters (openness, communication or flow of ideas, network of achievements and services, social sustainability, education and health services). For economic sustainability parameters, Jalan Mawar achieved a score of (54), meaning it shows very good progress towards sustainability. Overall, in the socio-cultural aspect that has a score (>50+) is the parameter of solid waste consumption and processing patterns found in 9 research locations, namely: Jalan Flamboyan (58), Cendana (66), Kenanga (71), Nusaindah (51), Cambodia (67), Menur (52), Teretai 1 (61), Teratai 2 (51) and Jalan Cendana 2 (51). Apart from that, the socio-cultural aspects that have a score (>50+) are the parameters of openness (trust and security of shared spaces), namely: found on Jalan Melati (55), Flamboyan (55), Nusaindah (55), Cambodia (59) , Menur (51), Cempaka (55) and Jalan Teratai (61).

Spiritual Aspects

The spiritual aspect includes factors of cultural sustainability, arts and recreation, spiritual sustainability, community connectedness, community resilience, new holographic (world or global view) and global peace and thinking (Figure 4).

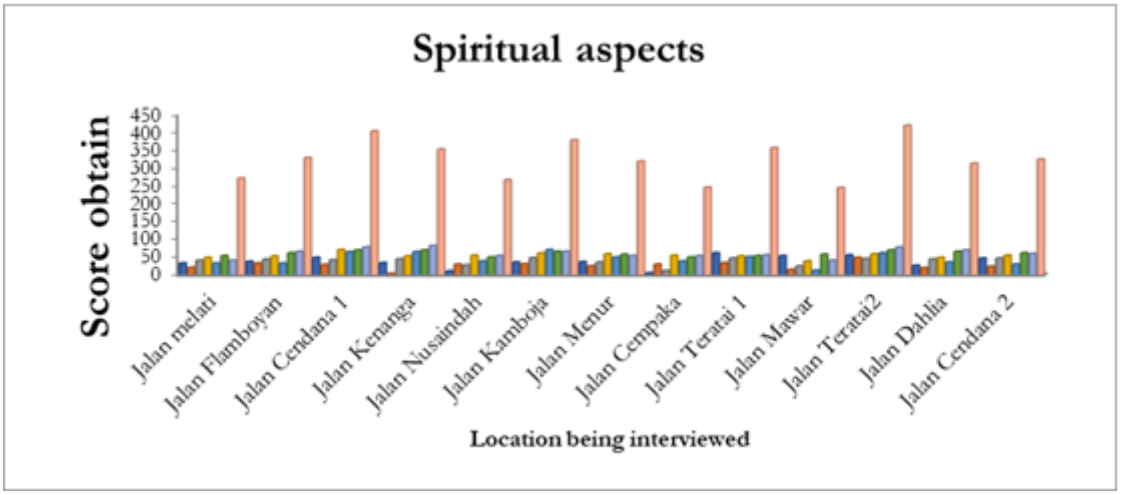

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Figure 4. Spiritual aspects in assessing community sustainability in Wiyantri village, Skanto District, Keerom Regency.

The results of research on the spiritual aspect show that 5 data collection locations obtained scores (>333+) or showed very good progress towards sustainability. These locations are: Jalan Cendana (404), Kenanga (353), Cambodia (379), Teratai 1 (357) and Jalan Teratai 2 (420) (Figure 4). In this spiritual aspect, there are also 4 parameters that dominantly show scores above 50+, namely: community connectedness, community resilience, holographic or global world view and parameters of global peace and thinking. Achievement of a low score or 246 on Jalan Cempaka. There are 5 parameters whose scores are below (50), namely: cultural sustainability (6), arts and recreation (30), spiritual sustainability (12), community resilience (39) and holographic parameters (world or global view) with an assessment score (50). The overall assessment of ecological aspects, socio-cultural aspects and spiritual aspects was only found in 2 research locations which showed very good progress towards sustainability (>999+). The two research locations include Jalan Cendana (1025) and Jalan Teratai 2 (1070) in Wiyantri village, Skanto District, Keerom Regency which show very good progress towards sustainability.

Conclusion

From the data that has been obtained from ecological aspects, socio-cultural aspects and spiritual aspects, it is known that the total of each aspect shows very good progress towards sustainability, Jalan Teratai 2 with a score of 1070 and Jalan Cendana 1 with a score of 1025. These two locations are references in supporting this aspect. Ecological, socio-cultural and spiritual sustainability in managing the natural environment so that it can be sustainable.

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