

AGROFORESTRY PATTERNS OF THE BAKUBAKULU VILLAGE COMMUNITY, PALOLO SUB DISTRICT OF SIGI

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Submit: 10 November 2021, Revised: 30 November 2021, Accepted: December 2021

DOI : <https://doi.org/10.22487/agroland.v0i0.1072>

ABSTRACT

The community in Bakubakulu Village, Palolo District, Sigi Regency, was one of the communities that was developing an agroforestry system. The purpose of this study was to determine the agroforestry pattern used on community land in Bakubakulu Village. This research was carried out for 3 months, from October to December 2019. The respondents in this study used a purposive sampling technique, namely the sampling of respondents intentionally (not random) which was adjusted to the criteria. The data were analyzed using descriptive methods. The results of the research on agroforestry patterns applied by respondents according to the time dimension were Intermittent on sloping land and Coincident on flat land. According to the spatial aspect, the pattern used by the respondents was Regular Temporarily on flat land and Permanently Random on sloping land. The most common types of plants planted by the community were candlenut, sugar palm, cocoa, clove and coconut. Regular Temporary Pattern was the most widely applied pattern by respondents.

Keywords: Agroforestry, Agroforestry Patterns, Regular Temporarily, Random Permanent.

INTRODUCTION

Land as a natural resource had a role including as a producer of agricultural commodities. The increasing population and basic needs had led to the need for larger agricultural areas and more intensive cultivation. One way that could be used for optimal land use was through agroforestry activities (Aryal et al., 2019).

Agroforestry was an activity defined as an optimal land use method, which combined short and long rotational

biological production systems in a way based on the principle of sustainability, simultaneously or sequentially both within the forest area and outside the forest area. Agroforestry had advantages compared to other land use systems, including: higher total product, diversity of products and services, free from dependence on outside products, and guarantees farmers' income (Brüning et al., 2018).

Sustainable agriculture was a concept of future thinking. Sustainable agriculture was agriculture that was

sustainable for now, in the future and forever (Scott et al., 2018). This meant that agriculture continued to exist and was beneficial for all and did not cause disaster for all. Meanwhile, agroforestry was a permanent land use system, where seasonal and annual crops were planted together or in rotation to form a layered canopy, so it was very effective in protecting the soil from rainwater. This system would provide benefits both ecologically and economically. So that the concept of complex agroforestry could be used as one of the sustainable agricultural efforts in overcoming environmental problems (Wilson & Lovell, 2016).

The application of the agroforestry pattern system in Bakubakulu Village which was developed was still traditional, resulting in people not understanding the combination patterns that existed in the system. While the proper application of agroforestry patterns could provide financial benefits to the community, optimize the yield of each land managed by the community, as well as an effort to conserve land and forest resources in Bakubakulu Village.

RESEARCH METHOD

Time and place

This research was conducted for 3 months, from October to December 2019 in Bakubakulu Village, Palolo District, Sigi Regency, Central Sulawesi Province. The location selection was based on the consideration that in Bakubakulu Village the community applied an agroforestry pattern in order to increase added value.

Tools and materials

The equipment and materials used for this research include the following:

1. Writing instruments for research purposes such as laptops, calculators, and other personal equipment for data management, typing and thesis preparation.
2. Camera, used for documentation as the legality of researchers in documenting the object of research.

3. Questionnaires, as a meant of collecting data and information needed to support the accuracy of the data taken.
4. Community agroforestry land in Bakubakulu to collect data on agroforestry patterns applied by the community in Bakubakulu.

Data Type

Data types were divided into 2, namely:

1. Primary data, namely data obtained by direct observation on community agroforestry land in Bakubakulu Village. (Pattern of land use in Bakubakulu Village)
2. Secondary data was data that came from literature studies. (Overview of location and other supporting data)

Data collection technique

Data collection techniques used consisted of literature studies and interviews. The literature study was used to obtain information about the agroforestry patterns used by the people of Bakubakulu Village. Interviews were used to obtain clear information from respondents regarding agroforestry patterns used by the people of Bakubakulu Village.

Sampling technique

Respondents in this study were 16 people who managed agroforestry land in Bakubakulu Village. The sampling of respondents in this study used a purposive sampling technique, namely the sampling of respondents intentionally (not random) which was adjusted to the research objectives (Barratt et al., 2015). With the consideration that the sample met the criteria required in the study.

The criteria that must be owned by respondents in this study were as follows:

1. Respondents were indigenous people or people who had lived for more than 10 years in the research area.
2. Respondents were farmers who applied agroforestry patterns on managed land.

- The respondent's agroforestry land had produced or had produced.

Data analysis

To find out the pattern of agroforestry in this study, descriptive methods were used in analyzing the data by looking at the composition or combination of types of perennials and forestry plants.

RESULTS AND DISCUSSION

Respondent's Age

Age respondents were classified into 4 groups, including group I (Age 21-30 years), Group II (Age 31-40 years), Group III (Age 41-51 years) and Group IV (Age over 50 years). The distribution of the number of respondents by age class was presented in Figure 1.

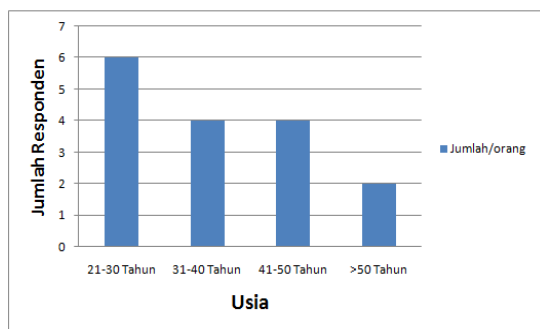


Figure 1. Age Graph of Respondents in Bakubakulu Village.

Figure 1 Age factor was very influential in agricultural activities or farming where in this study showed the age level of the dominant respondents in group I (aged 21-30 years) Total 6 respondents where this age was still very productive to do agricultural or plantation working so that it still dominated in this study, while the lowest number of respondents was in age group IV (age > 50 years). The number of 2 respondents at that age was less productive due to health factors that did not support working anymore.

Respondent Education Level.

The education level of the respondents was classified into 3 groups,

including group I (Elementary School), group II (Junior High School), group III (High School), group IV (Vocational High School). The distribution of the number of respondents based on education level was presented in Figure 2.

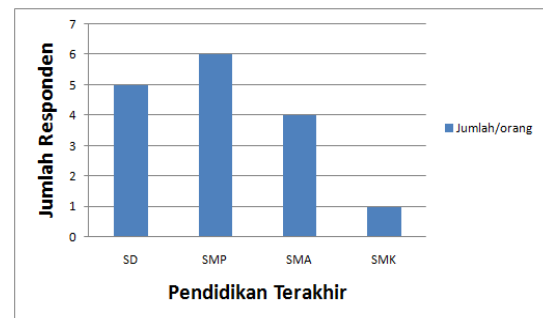


Figure 2. Education Level of Respondents in Bakubakulu Village

Figure 2 showed that the education level of the respondents was dominant in group 2 (Junior High School) with a total of 6 respondents. Meanwhile, the lowest respondent's education level was in group IV (Vocational High School) with 1 respondent.

Respondent's Length of Residence

The length of stay of respondents in Bakubakulu Village was classified into 3 groups, including group I (11-20 years), group II (21-30 and group III (Above 30 years). The distribution of the number of respondents based on the length of residence was presented in Figure 3.

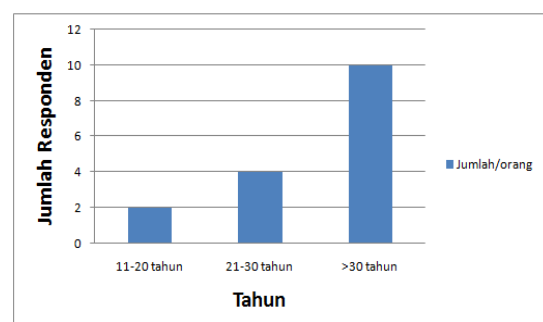


Figure 3. Length of residence of respondents in Bakubakulu Village

Figure 3 showed the length of residence of the dominant respondents in group III (>30 years) of 10 respondents.

Meanwhile, the lowest respondent's length of stay was in group I (11-20 years) with 2 respondents.

Land Ownership

The land area of respondents in Bakubakulu Village was classified into 3 groups including group I (0 - 1.5 Ha), Group II (1.6 - 2.5 Ha) and group III (Above 2.5 Ha). The distribution of the number of respondents based on land area was presented in Figure 4.

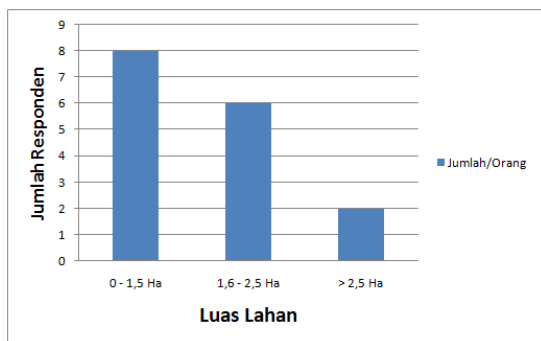


Figure 4. Respondents' Land Area in Bakubakulu Village

Figure 4 showed that the dominant respondent's land area in group I (0 – 1.5 Ha) was 8 respondents. Meanwhile, the lowest respondent's land area was in group III (Above 2.5 Ha). A total of 2 respondents.

Community Agroforestry Patterns

The combination carried out by the community in Bakubakulu Village according to the time dimension there were 2 types of Intermittent/periodic combination patterns used on flat land, which meant that agricultural crops were usually planted only for one harvest, then these plants would be replaced with other agricultural crops. Meanwhile, forestry plants would continue to grow as living fences (Border tree planting). On sloping land, a Coincident combination pattern was used, which was a combination of components continuously as long as the land was used (Dembrow et al., 2015).

Meanwhile, when viewed from the spatial aspect, the combination pattern used by the Bakubakulu community was a

regular temporary one where the combination pattern could be seen in Figure 5 below.



Figure 5. Examples of agroforestry patterns on community flat land in Bakubakulu Village.

In Figure 5 above where the trees were placed around the plots or placed on the sides of the plots, it was called the trees along the border or the box system. In the picture above, it could be seen that agricultural crops (corn) were planted in one plot and outside the plot there were forestry plants (candlenut) lined up around the plot. Meanwhile, on sloping land, the agroforestry pattern used by the community when viewed in terms of spatial planning was Permanently Random. The combination pattern could be seen in Figure 6 below.



Figure 6. Community combination pattern on sloping land in Bakubakulu Village

In Figure 6 above, it could be seen that the candlenut and sugar palm trees grow irregularly, under the candlenut trees

there were cloves, bananas, grapefruit, and cocoa. From the picture above, it could be seen that the dominant tree was candlenut because candlenut was the main commodity with results that were considered to be more economically profitable.

To see more clearly the details of the cropping pattern used on community flat land, see Figure 7.

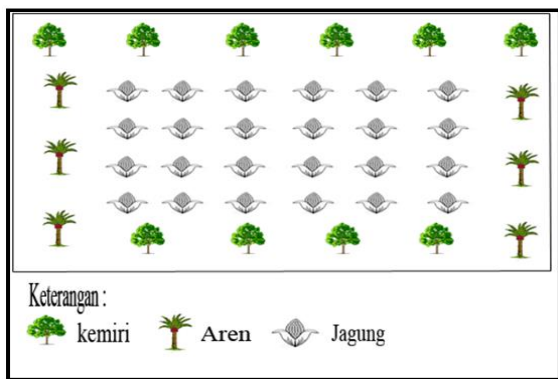


Figure 7. Regular Temporary Agroforestry Pattern

To see the details of the cropping pattern used on community sloping land, see Figure 8.

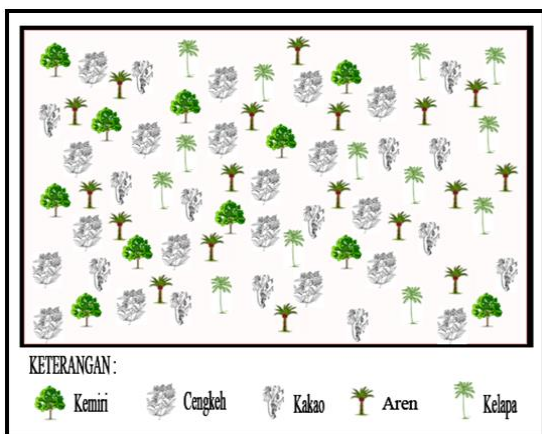


Figure 8. Pattern of Permanent Agroforestry Random

In Figure 8 above, it could be seen that the candlenut, clove, cocoa and coconut plants were planted randomly. Planting distances also vary from 5-15 M, clove plants were always under shade plants such as candlenut or sugar palm because if

cloves were planted without other protective plants, it would most likely cause the clove plant to wilt.

Combination of Community Plant Types

The combination of community plant species in Bakubakulu Village was classified into 4 groups, including group I (Pecan, sugar palm and corn), Group II (Pecan, Cassava and Coconut), Group III (Pecan, sugar palm, cocoa, cloves and coconut), Group IV (Candlenut, cassava, grapefruit, coconut and avocado).

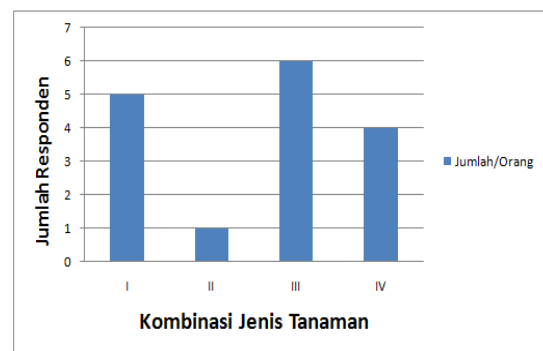


Figure 9. Combination of community plant species in Bakubakulu Village.

Figure 9 showed the combination of plant species being developed in Bakubakulu Village was dominated by group III (Pecan, sugar palm, cocoa, clove and coconut) with 6 respondents while the lowest combination of plant species was group II (Pecan, cassava, and coconut) with 1 respondent.

CONCLUSION

The agroforestry pattern applied by the community in Bakubakulu Village according to the time dimension was the intermittent /periodic combination pattern on flat land and the coincident combination pattern on sloping land. Meanwhile, from the spatial aspect, the combination pattern applied by the Bakubakulu community was regular temporary for flat land and random permanent combination for sloping land. The combination pattern most widely used by the people in Bakubakulu Village was the Regular Temporal combination pattern.

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