BIODIVERSITY OF YARD PLANTS IN WIYANTRI VILLAGE, SKANTO SUB DISTRICT, KEEROM DISTRICT, PAPUA PROVINCE, INDONESIA

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ABSTRACT

The yard is land located in front, side, and back of the house. At first the yards in the countryside were quite large in size. Generally planted with various types of plants to meet the food needs of homeowners and their family members. Characteristics of the yards, the analyzed include the size, zoning of the diversity of functions and plant strata in the yard using vegetation analysis. Vegetation analysis based on the zoning of the front, right side, left side and rear obtained three dominant strata, namely strata I, II and IV and the four most dominant functions, including function as a vegetable plant, as a fruit plant, as an ornamental plant and other functions. Data collection methods that will be implemented in this research are survey, interview and literature study methods. The survey method with a random purposive technique was performed by direct observation to the community yard. For the biodiversity of the yard as a whole, it is worth 1.07, which means it is of moderate value. With a yard area of 2,500 m2, it means that the yard has the potential to be able to increase its productivity both in the number of types and functions to make it more optimum.

Keywords: Sustainable of yard, Biodiversity Studies, Vegetation analysis, Wiyantri village

Introduction

The diversity of plants in the yards owned by Indonesia and has a major role in people's lives. Based on the type of plant utilization, the types are classified as ornamental plants, fruit plants, vegetable plants, medicinal plants, spice plants, starch-producing plants, industrial plants, shade plants, and plants producing feed, firewood, handicraft materials and benefits.

Utilization of plants can be obtained from the tropics, but also managed through land cultivation techniques. The land used for these plants can be done in dry land or wet land. Other research shows that the use of wetlands by farmers in South

Sumatra is more successful by transmigrants (Wildayana and Armanto, 2018). The pattern of extensive use shows that currently there has been a high increase in land use. With the current high land use, the use of the yard is the right alternative. If the yard is managed intensively in accordance with the potential of suitable plants and can be developed in the yard, it can meet the consumption needs of the farmer's household, and also the yard can contribute to income for the family. From the research results of the Agency for Food Security and Agricultural Extension, it is explained that in general the yard can contribute to family income between 7% to 45% (Arifin et al, 2009). The use of yards can also significantly increase household income (Linger, 2014). The interaction between farming households in the use of yards to increase knowledge in using land occurs informally through courses and trainings (Dirimanova, 2018).

The function of the yard includes producing food ingredients, producing spices or drugs, producing firewood, producing building materials, and crafting raw materials. Various studies also explain other functions of the yard, namely improving family nutrition, adding aesthetics, maintaining ecological stability, and strengthening the national food security system (Antoh, 2016; Arifin, et al, 2012).

Food plants in the yard come from local strains and varieties or newly introduced high yielding varieties. The type of plants planted is closely related to the preferences of the residents of the house or the owner of the yard. Garden plants are a source of carbohydrates, proteins, fats, vitamins, minerals that the body needs, and medicines for health. Garden plants function to increase family income, increase food security, and overcome malnutrition (Sutoro, 2017; Galhena et al, 2013).

Differences in the physical and social environment of the 4 areas that have different characteristics, namely near the forest, near the cultural center or historical heritage, near rice fields or agriculture and crafts and near urban areas, will affect the mindset of the community in determining the types of plants cultivated. Owners of yards usually plant according to their needs both from an economic, social, cultural and aesthetic perspective that can provide benefits to their families. Besides contributing to income, the yard can also contribute to income, the yard can also be a fortress to face the uncertainty of climate change because in the yard there are many plants that can be utilized even though the plants cultivated in the fields fail (Mulyanto, 2011).

The use of land for gardens and agricultural business activities is developed by various ethnic groups in Indonesia in various ways. In Indonesia there are 5,132,000 ha of yards of which 1,736,000 ha are on the island of Java (Antoh et al, 2019). Flora biodiversity is a strategic resource, plays a role as one of the determinants of the quality of human life. Utilization that is not environmentally friendly has caused a fairly high rate of degradation, thus threatening biodiversity globally (Njurmana et al, 2016; Houdet et al, 2012; Butchart, 2010). One of the consequences is a flora biodiversity crisis which has implications for the environmental crisis, food crisis, water crisis and energy crisis, so that it becomes a

political, social, and economic problem for the international community (Njurmana et al, 2016; Lele, et al., 2010; Dasgupta and Beard, 2008).

Vegetation is a collection of several types of plants that grow together in one place where between the individual constituents there is a close interaction, both between plants and with animals that live in the vegetation and the environment. In other words, vegetation is not just a collection of individual plants but forms a unit where the individuals depend on each other, which is referred to as a plant community (Cahyanto et al, 2014; Bakri 2009; Soerianegara et al, 1978).

Study area

The Wiyantri Village area, Skanto District, Keerom Regency has a land height above sea level of about 70-71 mean sea level, which means that it belongs to a hot climate zone. In this zone the air temperature ranges from 22ºC-26.3ºC (and even more). live and thrive in the area. Geographically, it is located at coordinates S 02º49'07.1" E 140º37'23.1".The yard data was collected with a sample of 12 yards in Wiyantri village, Skanto Sub District, Keerom District, Papua Province, Indonesia (figure 1).

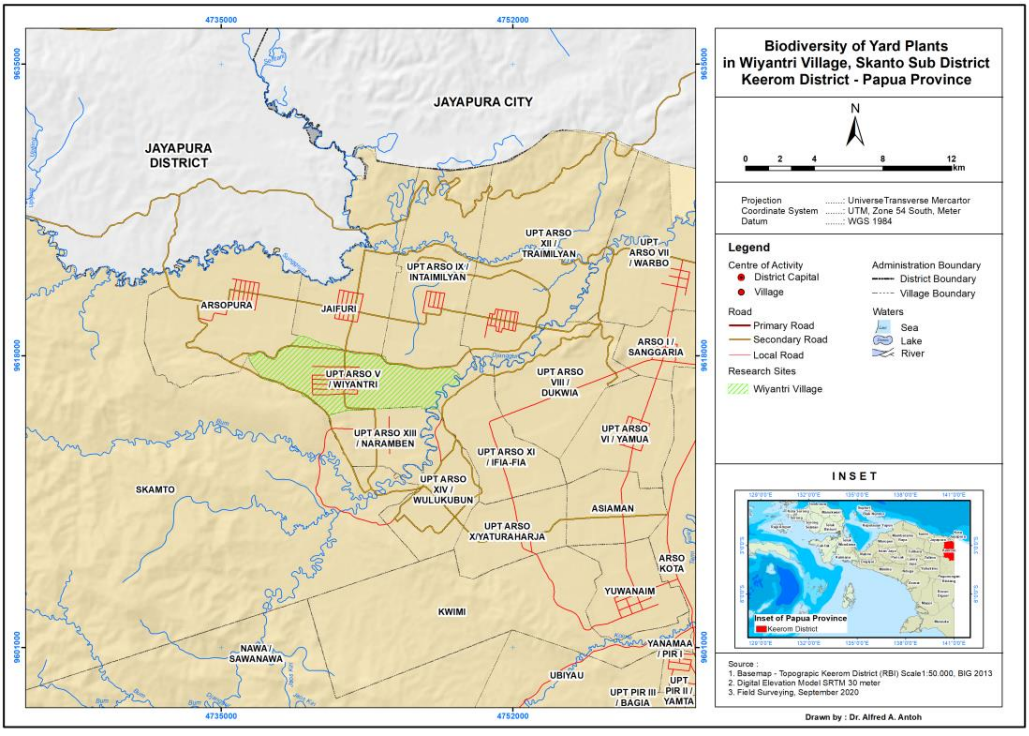

Figure 1. Reseach location for collecting data in Wiyantri village, Skanto Sub District, Keerom District, Papua Province, Indonesia

Data was collected for approximately one month with tools and materials such as: meter roll, questionnaire, global positioning system (GPS), camera and voice recorder. Data on community yards in the village of Wiyantri studied horizontal (structural) and / or horizontal (functional) diversity.

Materials and Methods

Measurement of vertical diversity was carried out around the sample villages (front, side and back yards). In addition to the average yard area data in Wiyantri village, there is also another uniqueness in this study, namely: the vertical diversity of the yard plants. Each sample household also showed different plant diversity for each type of plant in their yard. The diversity of vertical yards is meant by the form of diversity based on the stratification of plants (height) planted by the community around their yard. Then an analysis of vegetation per yard unit was carried out. Grouping plants into 5 strata, namely: strata V is a tree> 10 m tall; strata IV ie small trees or large shrubs 5-10 m, strata III are small shrubs, shrubs 2-5 m strata II are shrubs and strata I are herbs, grass <1 m (Antoh et al, 2019).

Data collection methods that will be implemented in this research are survey, interview and literature study methods. The survey method with a random purposive technique was performed by direct observation to the community yard.

Yard data analysis method is a yard vegetation analysis method by first identifying the species and family of the plant. Next measure the yard area (number of individuals, families, strata, functions or uses and location found) (Antoh et al,2019).

Agricultural biodiversity in the yard (Fachrul, 2007):

a. Density $= \frac{\sum \text{ wholeplants}}{\sum \text{ whole sampling units}}$ .....(1)

b. %Relative density= $\frac{\sum \text{individuals of species}}{\sum \text{individual of all species}} x\ 100\%$.....(2)

c. Frequency $= \frac{\sum \text{sampling unit of species}}{\sum \text{whole sampling unit}}$ .....(3)

d. % Relative frequency = $\frac{\sum \text{frequency of species}}{\sum \text{frequency value for all species}}$ x 100%.....(4)

e. Dominance $= \frac{\sum \text{basal area of species}}{\sum \text{whole basalt}}$ .....(5)

f. % Dominance $= \frac{\sum \text{basal area of species}}{\sum \text{basal cover all types}}$ x 100%.....(6)

INP = KR + FR + DR ..... (7)

FR = relative frequency

KR = Relative density
DR = Relative dominance
INP = important value index

g. $SDR = \frac{INP}{3}$ x 100%.....(8)

SDR: *Summed dominance ratio* (Fachrul, 2007)

h. $H' = \sum_{i:1}^{S} pi \ln(pi)$.....(9)

Information:
H'= *Shannon-Wiener*biodiversity index
Pi = ni/n
ni= number of i-type individuals
n = Number of individuals
ln = Logaritme natural
s = Number of individuals

(Fachrul, 2007):
H'>3 High abundant species diversity
H'1≤H' ≤3 Moderat abundant species diversity
H'<1Biodiversity of species is abundant slightly

Results and Discussion

The results showed that the average yard area was 2,500 m2. The yard biodiversity study conducted in Wiyantri Village, Skanto District, Keerom Regency was carried out by purposive sampling by taking 12 samples from 4 RWs and 3 samples from each RW (Table 1).

Tabel 1. Analysis of dominant biodiversity in Wiyantri Village, Skanto District, Keerom Regency

No	Location	Local name	Species	Family	INP	SDR	H'	Level	Function
1	Jalan anggrek	Spinach	*Amaranthus spp*	*Amaranthaceae*	22.97	7.66	0.08	II	vegetable plants
2	Jalan mawar	lulungan grass	*Eleusine indica*	*Poaceae*	22.97	7.66	0.08	I	other
3	Jalan melati	lulungan grass	*Eleusine indica*	*Poaceae*	27.85	9.28	0.10	I	other
4	Jalan kenanga	meniran grass	*Phyllantus urinaria*	*Phyllanthaceae*	27.85	9.28	0.10	I	other
5	Jalan nusaindah	croton	*Codiaeum variegatum*	*Euphorbiaceae*	22.97	7.66	0.08	II	Decorative plants
6	Jalan dahlia	teki grass	*Cyperus rotundus*	*Cyperaceae*	22.97	7.66	0.08	I	other
7	Jalan teratai	Meniran grass	*Phyllantus urinaria*	*Phyllanthaceae*	22.97	7.66	0.08	I	other
8	Jalan cempaka	Lulangan grass	*Eleusine indica*	*Poaceae*	27.85	9.28	0.10	I	other
9	Jalan flamboyan	patikan kebo grass	*Euphorbia hirta*	*Euphorbiaceae*	27.85	9.28	0.10	I	other
10	Jalan menur	betel nut	*Areca catechu*	*Arecaceae*	22.97	7.66	0.08	IV	fruit plants
11	Jalan kamboja	betel nut	*Areca catechu*	*Arecaceae*	27.85	9.28	0.10	IV	fruit plants
12	Jalan cendana	Pletekan grass	*Ruellia tuberose*	*Acanthaceae*	22.97	7.66	0.08	I	other
JUMLAH					300.00	100.00	1.07		

Note: Note:Strata (Antoh et al, 2019): V = strata trees> 10 m, IV = small tree/large shrub 5-10 m, III = small shrubs, bushes 2-5 m, II = shrubs, herbaceous 1-2 m, I = grass <1m
INP: impotant value index, SDR: summed dominance ratio; H':diversity value

The data above shows structural and functional biodiversity in the yard, from each of 12 locations or transects with a total of 48 plots or 4 plots in one transect based on yard zoning, namely the front, right side, left and back side. The three most dominant strata were found in the community yard of Wiyantri Village, Skanto District, Keerom Regency (Table 1). The first is spinach (Strata I) with herb or grass types with a height of <1 m on Mawar, Melati, Kenanga, Dahlia, Lotus, Cempaka, Flamboyan and Cendana roads. Both types of grass (strata II) are herbaceous species with a height of 1-2 m on Orchid and Nusaindah roads. The three Pinang (strata IV) types are small trees or large shrubs with a height of 5-10 m on Menur and Cambodia roads. Areca nut as a traditional symbol that is eaten with piper and lime (taken from a type of sea shell) which is ground and eaten together has a high economic value. One large stalk can be sold for IDR 50,000 and at certain times it can reach IDR 500,000 (Antoh and Aisoi, 2021). This is also like Ogwu et al, (2014) explaining in their research that fruit (51.43%) and vegetables (17.14%) are the dominant species

developed in gardens in Edo State, Nigeria. Proper use of yard is beneficial both socio-economically but also ecologically to support climate change (Linger, 2014).

The diversity of yard plants has varied roles. Functionally, yard plants have functions as ornamental plants, fruit plants, vegetable plants, medicinal plants, herbs or spices, starch-producing plants and other functions. Based on the results of the study, it was found that there were three most dominant functions, including the function as a vegetable plant, as a fruit plant and other functions. Utilization of yards to support the family economy through green economic development (Cameron et al, 2012). Jones at al (2018) explained in their research that increasing plant biodiversity was able to reduce 37% nitrogen dioxide (NO2) and 6% ammonia (NH3) in the 2007-2020 period.

From the data obtained functionally, each location or transect has three dominant functions including the function as a vegetable crop on the transect on Jalan Anggrek. Fruit crops on the transects on Menur and Cambodia roads, and other functions on the transects on Mawar, Melati, Kenanga, Dahlia, Teratai, Cempaka, Flamboyan and Cendana roads. Another dominant function on the 12 transects in question is weeds. If this is known, the community is less than optimal and productive in the use of relatively large or extensive expert land. From the interview data that has been conducted on the community, the number of types of weeds in the yard is influenced by the use of various types of grass medicines or pesticides. Mohri et al (2013) explained that the traditional use of yards can increase the diversity of ecosystems and have an impact on the social and economic values of the family.

For the biodiversity of the yard as a whole, it is worth 1.07, which means it is of moderate value. With a yard area of 2,500 m2, it means that the yard has the potential to be able to increase its productivity both in the number of types and functions to make it more optimum. The hortipastoral system is a form of development that combines crops and livestock in the yard and can increase the productivity and sustainability of the yard for farmer households (Ahmad, 2017).

Conclusion

Structural and functional biodiversity in 12 yard transects in Wiyantri Village, Skanto District, Keerom Regency, Papua Province, Indonesia has a certain level of diversity. Based on the zoning of the front, right side, left side and rear, three dominant strata were found, namely strata I, II and IV and the three most dominant functions, including the function as vegetable-producing plants, as fruit plants and plants with other functions.Kesimpulan

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