Indonesian Journal of Applied Research (IJAR)
Vol 2 No 1 (2021)
e-ISSN 2722-6395
DOI: 10.30997/ijar.v2i1.95

CONTRIBUTION OF RIPARIAN VEGETATION TO WATER QUALITY IN SPRING WATER ORAS

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Abstract: Soba Village, West Amarasi Subdistrict, Kupang Regency is located in East Nusa Tenggara Province with abundant natural resources. One of the natural resources is a natural spring with abundant diversity of riparian vegetation. The diversity of riparian vegetation around water sources plays an important role in water quality. This study aimed to identify the diversity of riparian vegetation around springs and to determine water quality. The method used was plot installation, identification of riparian vegetation types, measurement of environmental factors and water quality testing. The results showed that there were 12 species of tree vegetation with a total of 74 individuals, the most common tree species found was *Canangan odorata* with a relative abundance of 24.32%, followed by *Cocos nucifera* 18.92%, and *Areca sp.* 16.22%. Meanwhile, the least species found were *Tectona grandis*, *Mangifera indica*, *Artocarpus altilis*, and *Syzygium aqueum* with relative species abundance of 1.35%. The results of quantitative analysis of the relative frequency found tree species *Areca sp.* and *Cocos nucifera* had the highest value, namely 19.05%. Meanwhile, the highest relative dominance value was found in thespecies *Artocarpus altilis*. The results of water quality testing with 3 parameters namely physical, chemical and bacteriological showed a COD value of 85.03 mg / L, a total *colifrorm* of 45 and a total *fecal colliform* of 230.

Keywords: riparian vegetation; water quality; spring water

Mamulak, Y. I., & Semiun, C. G. (2021). CONTRIBUTION Of RIPARIAN VEGETATION TO WATER QUALITY IN SPRING WATER ORAS. *Indonesian Journal of Applied Research (IJAR)*, *2*(1), 28-32. https://doi.org/10.30997/ijar.v2i1.95

1. INTRODUCTION

Soba Village, West Amarasi Subdistrict, Kupang Regency is located in East Nusa Tenggara Province with abundant natural resources. The existence of these natural resources gives a distinctiveness to the area and is a source of livelihood for the surrounding community. The natural resources owned are springs surrounded by riparian vegetation which are used by the community for their daily needs. Some villagers use springs, wells, and water reservoirs as their source of clean water (Environmental Agency, 2013). Springs are groundwater that comes out by itself to the ground. Based on the discharge of the springs, they are divided into two, namely seepage springs, namely springs that come out of the slopes and umbul springs, namely springs that come out of the mainland (Agustiningsih et al, 2012). Springs are generally small and unique, prone to anthropogenic transformations that have an impact on groundwater

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pollution and decreased quantity (Pakulnicika *et al.*, 2016). In general, the community uses spring water for cooking, washing, bathing, which has the potential to cause pollution and decrease water quality. The resulting washing waste can be degraded by microorganisms, especially bacteria, and riparian vegetation around water sources.

Natural riparian vegetation is a biotic component of riparian ecosystems that play an important role in protecting water quality, controlling temperature, preventing erosion, as habitat, as a corridor (Solano, 2003). In addition, it also acts as a nutrient and sediment filter, as well as a storehouse for biodiversity (Ghermandi et al., 2009). The existence of natural riparian vegetation is a factor that determines the high or low quality of water in a water body, especially in springs.

Conservation efforts of spring ecosystems are needed to maintain their sustainability and overcome the negative impacts caused by human activities. One example of conservation is the use of water wisely and preserving organisms around springs so that water quality is guaranteed for present and future generations. This research focuses more on the diversity of riparian tree vegetation which can be used as a biological reference in determining the quality of the Oras spring in Soba Village, West Amarasi District, Kupang Regency.

2. METHODS

The research was conducted at Mata-air Oras, in the village of Soba, West Amarasi District, Kupang Regency, in August-October 2020. This research was descriptive in nature and was conducted using themethod *point quarter* (Figure 1).

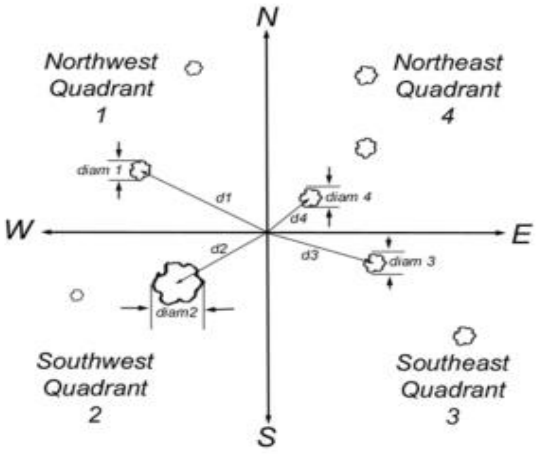

Figure 1 Illustration of themethod *Point Qurter*

Observation of the quality of tree vegetation is carried out directly by measuring the number of individuals, height, and stratification (Indriyanto, 2005). Identification is done by *browsing the* internet, flora identification books, and with the help of a technician who is familiar with the types of leaves, flowers, or fruits that have been used. made dry herbarium. The data obtained were then analyzed quantitatively. This is to determine the Importance Value Index, Species Richness Index, and Shannon-Wiener Diversity Index. The water quality test refers to the Quality Standards PP Number 82 Year 2001 regarding Water quality Management and Control (Class 1 water).

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3. RESULT AND DISCUSSION

3.1. Observations of riparian vegetation

There are 12 species of tree vegetation with a total of 74 individuals (Semiun et.al., 2018) found in the Oras spring in Soba village (table 1). Based on table 1, the most common tree species found were *Canangan odorata* with a relative species abundance of 24.32%, followed by *Cocos nucifera* 18.92%, and *Areca sp.* 16.22%. Meanwhile, the least species found were *Tectona grandis*, *Mangifera indica*, *Artocarpus altilis*, and *Syzygium aqueum* with relative species abundance of 1.35%. The results of the quantitative analysis of relative frequencies (Figure 2) found tree species *Areca sp.*and *Cocos nucifera* had the highest value, namely 19.05%. Meanwhile, the highest value for relative dominance (Figure 3) was found inspecies *Artocarpus altilis*.

Table 1 Types of Riparian Trees at the Oras Spring

Local Name	Scientific Name	∑ Individual
Betel Nut	*Areca sp.*	12
Coconut	*Cocos nucifera*L.	14
Saga	*Adenanthera pavonina*L.	4
Teak	*Tectona grandis*	1
Manggo	*Mangifera indica*L.	1
Haumoro		9
Breadfruit	*Artocarpus altilis*(Parkinson) Fosberg	1
Cananga	*Canangan odorata*L.	18
Water Apple	*Syzygium aqueum*	1
Mahoney	*Swietenia mahagoni*(L.) Jacq	6
Venus	*Senna siamea*Lam.	5
Kapok Hutan	*Ceiba pentandra*(L.) Gaertn	2
	TOTAL	**74**

Importance value index shows the most dominant tree species in a habitat (Fischer. et.al., 2000). The INP value is determined from the sum of the relative density, relative frequency and relative dominance. Based on the results of the calculation of the index of importance value (Figure 4), the tree species with the highest index value of significance were *Canangan odorata* 42% and the lowest was *Mangifera indica*, which was 6.97%.

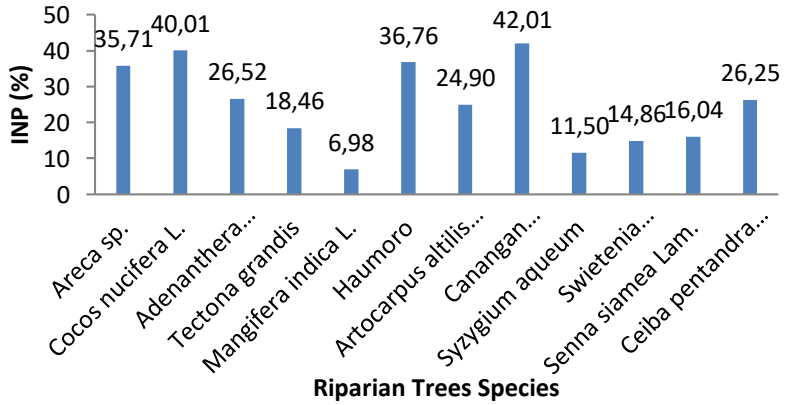

Figure 4 Significance Value Index of riparian trees in Oras springs

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Species diversity is the number of species of a species found in a community (Solano, 2003). Based on the results of the calculation of the species diversity index, the value is 2.08384. This indicates that the diversity of riparian tree species at the Oras spring is classified as moderate. The data table for the index value of riparian tree species diversity can be seen in Table 2 below.

Table 2 Shannon-Wiener Diversity Index of Riparian Trees

No	Scientific Name	H'
1	*Areca sp.*	0.294999
2	*Cocosnucifera*L.	0.315001
3	*Adenantherapavonina*L.	0.157717
4	*Tectonagrandis*	0.058163
5	*Mangiferaindica*L.	0.058163
6	Haumoro	0.256237
7	*Artocarpusaltilis*(Parkinson) Fosberg	0.058163
8	*Cananganodorata*L.	0.343871
9	*Syzygiumaqueum*	0.058163
10	*Swieteniamahagoni*(L.) Jacq	0.2037
11	*Sennasiamea*Lam.	0.182069
12	*Ceibapentandra*(L.) Gaertn	0.097592
	TOTAL	**2.08384**

3.2. Water quality test

The measurement results of temperature, TDS, pH, COD, Total coliform and fecal coliform for each parameter, namely: Water temperature 27^0C, pH: 6, 91, TDS: 285, COD: 85.03, Total coliform and fecal coliform: 230 and 45, from these results, it can be seen that the quality of oras springs is low, this is closely related to community activities around the spring, and is related to the diversity of riparian tree vegetation around the spring. The higher the presence of trees with vegetation cover, the better the water quality, because riparian tree vegetation is able to absorb pollutants around the spring (Hikayat, 2003; Sutrisno, 2000).

The vegetation around the springs plays a role in preserving the flow of the springs and the availability of water in the area (Trimanto, 2013). Riparian vegetation absorbs pollutants and converts them into harmless materials so that it helps in efforts to improve water quality, in this case riparian vegetation functions in natural *purification (self-purification*water). The source of the Oras spring has moderate tree vegetation, this is due to community activities that cut down and use part of the land as a place for raising cows. This community activity causes the water discharge to decrease. In order to conserve water, sanctions are given in the form of replanting trees around the spring.

The top of the spring has lush vegetation. This condition supports the existence and sustainability of the spring. The soil at the site has more pores because tree roots loosen the soil and collect more organic matter with high infiltration. It thus affects the water storage capacity of vegetation cover locations, and in turn increases the overall water storage capacity (Lüscher & Zürcher 2003).

4. CONCLUSION

From the results of the analysis and discussion of this study, it can be concluded that vegetation of riparian trees in oras springs there are 12 species with a total of 74 individuals. The most common tree species found is *Canangan odorata*. COD value is 85.03, Total coliform and fecal coliform: 230 and 45. The higher the riparian tree vegetation in the spring, the better the quality and sustainability.

ACKNOWLEDGEMENT

This research was funded through a National Dikti grant. Special thanks go to the Mata Air research team for their assistance.

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