

Identification Types Of Mpts To Life On Of Critical Catchment Areas Of Lake Toba, Indonesia

Afifuddin Dalimunthe, Budi Utomo, Ameilia Zuliyanti Siregar Angga Wijaya, Bambang Irawan

Abstract: Utilizing forest while maintaining sustainability is absolutely necessary. Plant Multy Purpose Tree Species (PMPTS) Adaptive is a solution to increase the income of local forest communities. This study aims to identify the type of PMPTS in the catchmnet areas of Lake Toba are recorded from Dairi regency, Samosir, Humbang Hasundutan, Toba Samosir and Simaungun. The research was conducted from May to July 2016. The method used in this research is the belt transect method. The results were obtained districts Silahisabungan, Regency of Dairi is the most commonly found types of MPTS. Mango and hazelnut plants are plants that are most often found in five counties. Removal of saplings is silviculture techniques most widely used by the public, reached 87.76 % and the biggest obstacle growth MPTS according to respondents is the climate, especially the strong winds that 54.60 %.

Index Terms: MPTS, catchment area, Lake Toba, forest, adaptive.

1 INTRODUCTION

Distribution of critical land in North Sumatra in general quite extensive including catchmnet areas of Lake Toba which includes the seven Districts (Samosir, Toba Samosir, Humbang Hasundutan, Dairi, Karo Simalungun and North Tapanuli). Greening efforts by government and the private sector often deadlocked due to various factors, such as: extreme climate, soil fertility and lack of attention to people living in the region. In addition to the people who live within the forested area in the region are also classified as poor or very poor because her other economic value that can be obtained from forest areas. Until now catchment area of Lake Toba steadily declining quality of land. Greening efforts up to now proved still less successful. Many things that make it difficult to achieve the success of growing crops, such as dry climate, the frequent occurrence, of forest fires and land, private land ownership are customary, caring society and a lack of public knowledge to make the choice of plants greening useful improve the local economy around the area. Cool climate condition around catchmnet area of Lake Toba cause this area is not allowed to be turned into gardens such as palm oil and rubber. As a result up to now plantation companies and the public are not interested in planting in the region. These conditions resulted in the public interest to care for the environment increasingly degraded. Greening efforts made by the government is less positive response by the public because of the type of crops grown not give the economic impact for the community. Need an integrated research in order to improve the condition of the damaged forest areas certainly with screened plant species beneficial to the local community economy that arises the desire to have and maintain the proposed greening plants. In addition to the extreme field conditions in dispensable application of technology to improve growing success plant. This research is intended to obtain useful greening plant species (Plant Multi Purpose Tree Species = PMPTS) are adaptive but high economic value in the critical catchmnet areas of Lake Toba.

RESEARCH METHODS

Location and Time

The intensive search was conducted in five districts, located in the District of Dairi Silahisabungan, Samosir regency located in District Pangururan, located in the District Simalungun Pematang Sidamanik, Toba Samosir regency located in District Balige and Humbang Hasundutan located in District Baktiraja. This study was conducted over three months.

Materials and Tools

The materials used in the study is a plant PMPTS (Plant Multy Purpose Tree Species) were found at the sites. The tools used in this research is the survey equipment such as GPS. Other equipment used are digital cameras and stationery.

Research Methods

The method used in this research is the belt transect method, a method that is carried out only observe objects and retrieved data. Belt transect method commonly used to study a group of vast forests and unknown previous state. This technique is also most effective for studying changes in the state of vegetation according to the state of the soil, topographic, and elevation. Transect made the cut lines topography, from the waterfront to inland, cutting the river or up and down the mountain slopes. This study will inventory the types of plants MPTS.

Data Collection

Data collected in this are consist of:

1.Secondary Data

Data obtained by identifying Plant PMPTS in the field and also based on literature.

2.Primary Data

Data was obtained through a questionnaire, which is a list of questions addressed to the owners of crop farmers, either directly or indirectly. Interview intended to complement other data related to the research and observations in a survey immediately by looking at the types of PMPTS contained in research sites.

Data Analysis

1.Data analysis of the number an types of plants in the PMPTS is presented in tabular form.

- Afifuddin Dalimunthe Lecturer Faculty of Forestry USU, Ph. +6281265204029, E-mail: afifuddindalimunthe@yahoo.co.id.
- Ameilia Zuliyanti Siregar, lecturer of Agriculture USU, Ph.+6282273017027, E-mail:azsyanti@gmail.com.

2. Sampling methods do purposive sampling the sample deliberately selected. To determine the sample size used quantitative methods, Krecjek and Morgan in Dantes (2012) mentions that for population of 30.000 then take a sample of 378. Taken a sample of 378. Based on data from the Central Bureau of Statistics (2015) the number of households districts tested were the District Silahisabungan Totaling 1.178 households, District Pangururan household amounted to 6.926, District Causeway Sidamanik household amounted to 8.155, District Baktiraja Totaling 1.271 households and Balige amounted to 8.823 households. When totaled, the total population to be tested is 26.373 households. The number of samples that will serve as the respondent was 379 household.

RESULTS AND DISCUSSION

Distribution Plant MPTS

The result of field surveys show the catchment areas of Lake Toba found various types of stands of plants PMPTS with different ages (Table 1). This is due to become the custom since time immemorial people around catchment areas of Lake Toba in planting types of PMPTS. Silahisabungan Subdistrict Dairi district is the location of the most common types of plants PMPTS. In general, people living in the catchment areas of Lake Toba very lake plants PMPTS and most profession as farmers. They make the kind of PMPTS be a second choice after the plant type season. This can be seen in every field of society there are plants that PMPTS into additional plants. People are realizing the importance of plants PMPTS. Aside from being a shade plant, people also used the results of the fruit, which is usually harvested every season thus add value to the local economy. In addition, people usually also take advantage of the wood or branches that can be used as fuel. Based on the results of the field survey, the following is a table of PMPTS plant species contained in the catchment areas of Lake Toba which most plant species PMPTS are Manggo (*Mangifera indica*) and Kemiri (*Aleurites molucana*). Because type of plant does not require a special place for it grows, in accordance with the opinion of Hanum (2008), which states that the mango crop can grow and develop well in areas with altitudes between 0 – 300 meter above sea level (masl), however, These plants can still grow to a height of 1.300 masl. Pracaya (2004), states that mangoes can grow well in lowland or highland, hot or cold areas, areas little rain or a lot of rain. Directorate General of Plantations Annual Plant Cultivation of Department of Agriculture (2006), states pecan crop can grow well on limestone soils, sandy soils shore. But it can also grow on soils podsolic less fertile to fertile soils and the latosol. Pecan crop can grow and produce well at an altitude of 0-800 masl, although some places may also grow at an altitude of 1.200 meters above sea level. Pecan crop can be grown on flat land, its rugged bumpy and steep. Pecan crop can grown dry and wet areas. Among the sites that most crops MPTS 20-60 years old. In a live interview with MPTS plant society inherited from their parents, but there is also planted by the people who currently live location research. It makes the life of plants varies.

Silviculture Mechanical Plant MPTS (Multy Purpose Tree Species)

Based on the results of the field survey and data analysis questionnaire that was distributed to the public regarding silviculture techniques performed on MPTS plant communities listed in Table 2. From the data Table 2 showed the silviculture techniques used by the people there are two ways, namely the transfer of saplings and grafts. Displacement tiller is silviculture techniques most widely used by the public, reached 87,60 %, while the graft reaches 12,40 % of 379 respondents. Through direct discussions with the people in the study site, that people prefer puppies transfer technique because, had no difficulty in using this technique. While the technique was also chosen by the public in addition to the removal of saplings, people also choose silviculture techniques by means of grafting. Actually this technique relative has long been known by the public. In this technique, the success rate is higher, because of the way growing root grafting while still in the mother plants. Prastowo and James (2006), said profit nursery with a system of grafting, namely the production and fruit same as the parent plant and plant origin grafts could be grown on land that lies groundwater is high or dike fishpond, while the disadvantages are the long dry season crops not tolerant of drought, the plants easily collapse when there are strong winds because it is not rooted riding, the parent tree canopy becomes damaged because of a lot of branches are cut off, and one mother plant we can only grafting a few sticks of course, so the propagation of plants in large quantities can not be done with this way.

Table 1 Type and Number of Plants recorded in the MPTS The catchment areas of Lake Toba consist of 5 districts

Subdistrict	Local name	Latin name	Total
Silahisabungan	Avocado	<i>Persea Americana</i>	138
	Manggo	<i>Mangifera indica</i>	463
	Durian	<i>Durio Zibetinus</i>	18
	Guava	<i>Psidium guajava</i>	23
	Jackfruit	<i>Artocarpus heterophyllus</i>	19
	Soursop	<i>Annona muricata</i>	2
	Duku	<i>Lancium domesticum</i>	2
	Rose water	<i>Sizygium aqueum</i>	26
	Mangosteen	<i>Garcinia mangosta</i>	2
	Rambutan	<i>Nephelium lappaceum</i>	15
	Sapodila	<i>Manilkara zapota</i>	8
	Petai	<i>Parkia speciosa</i>	3
	Jegkol	<i>Archidendron pauciflorum</i>	2
	Nutmeg	<i>Aleurites molucana</i>	116
	Cloves	<i>Syzygiun</i>	3

		aromaticum		
Pangururan	Avocado	Persea Americana	482	
	Manggo	Mangifera indica	431	
	Durian	Durio Zibetinus	89	
	Guava	Psidium guajava	14	
	Jackfruit	Artocarpus heterophyllus	12	
	Soursop	Annona muricata	1	
	Rose water	Sizygium aqueum	1	
	Nutmeg	Aleurites molucana	573	
	Cloves	Syzygiun aromaticum	8	
	Cashew	Anacardium occidentale	1	
	Sapodila	Manilkara zapota	3	
	P.Sidamanik	Avocado	Persea Americana	61
		Manggo	Mangifera indica	534
		Durian	Durio Zibetinus	53
Guava		Psidium guajava	13	
Jackfruit		Artocarpus heterophyllus	7	
Soursop		Annona muricata	2	
Cloves		Syzygiun aromaticum	22	
Rose water		Sizygium aqueum	4	
Nutmeg		Aleurites molucana	110	
Petai		Parkia speciosa	2	
Baktiraja	Avocado	Persea Americana	71	
	Manggo	Mangifera indica	556	
	Durian	Durio Zibetinus	71	
	Guava	Psidium guajava	11	
	Jackfruit	Artocarpus heterophyllus	12	
	Soursop	Annona muricata	3	
	Cloves	Syzygiun aromaticum	42	
	Nutmeg	Aleurites molucana	121	
Subdistrict	Local name	Latin name	Total	
Baktiraja	Rose water	Sizygium aqueum	6	
	Petai	Parkia speciosa	4	
Balige	Avocado	Persea Americana	51	
	Manggo	Mangifera indica	375	

Durian	Durio Zibetinus	42
Guava	Psidium guajava	9
Jackfruit	Artocarpus heterophyllus	7
Soursop	Annona muricata	2
Cloves	Syzygiun aromaticum	36
Rose water	Sizygium aqueum	3
Nutmeg	Aleurites molucana	99
Petai	Parkia speciosa	3

Tale 2. Percentage of Silviculture Techniques in PMPTS catchmnet areas of Lake Toba in Silahisabungan District, Pangururan District, Sidamanik District, Baktiraja District and Balige Sub-district.

No	Cultivating Selected	The Number of Respondents	Percentage (%)
1	Root cutting	0	0
2	Shoot Cutting	0	0
3	Removal and sapling	332	87,60
4	Graft	47	12,40
5	Total	379	10.00

That Inhibit Plant Growth Constraints of PMPTS

Through direct observation in the study site in general, the plants grow well PMPTS. But thus there are still obstacles that hinder the growth of plants. The observation and analysis of questionnaire data, spread in the community about the obstacles that hinder the growth of plants MPTS most often experienced by people catchment areas of Lake Toba on the Pangururan District and Silahisabungan District presented as percentages in Table 3. Table 3 showed the percentage of the results shows that the constraint is the most frequent climatic or wind, then followed with a pest. In interviews with farmers who were respondents in this study, said that the climatic conditions or the wind is the case today in the location research often change over time, sometimes strong winds like a constraint MPTS plant. This can be an obstacle when the MPTS plant experienced the flowering process, therefore, can the decline in the production of the fruit of the plant MPTS. Sulawesi Forest Plant Germination hall (2012), stating that bad weather conditions can have a direct influence on fruit and seeds. Drought or low temperatures during fruit. Flowers can also be damaged by rain and strong winds. Strong winds can cause large evaporation. Wind is also one important factor in crop damage and erosion. In the dry season in some regions in Indonesia sea breeze during the day cause problems, because this wind is dry and hot. In Indonesia there is have two winds,such as akind of Fhon winds that can damage the plant because this wind is dry and hot. In Indonesia, the sea breeze during the day cause problems, because the wind is carrying the grains of salt that can cause damage. The wind also plays an important role in the spread of spores and become the cause of a variety of

plant diseases (Setiawan, 2009).

CONCLUSION

The catchment areas of Lake Toba region commonly recorded of PMPTS. The dominant type is the mango and hazelnut. Tillers removal is a technique that is most often done for field planting material. Common obstacles that hinder growth and crop production is the climate, which is a strong wind.

ACKNOWLEDGMENT

The authors wish to thank to farmers and community in catchment areas of Lake Toba, Ministry Research and Technology, Directorate General of Higher Education of Republic Indonesian, for Hibah Grant 2016/2017, University Sumatera Utara and Faculty of Forestry USU.

REFERENCES

- [1] Badan Pusat Statistik (BPS). 2015. Dairi Dalam Angka 2015. Katalog BPS.
- [2] Badan Pusat Statistik (BPS). 2015. Samosir Dalam Angka 2015. Katalog BPS.
- [3] Badan Pusat Statistik (BPS). 2015. Humbang Hasundutan Dalam Angka 2015. Katalog BPS.
- [4] Badan Pusat Statistik (BPS). 2015. Toba Samosir Dalam Angka 2015. Katalog BPS.
- [5] Badan Pusat Statistik (BPS). 2015. Simalungun Dalam Angka 2015. Katalog BPS.
- [6] Dantes. 2012. Research Methods. Andi. Yogyakarta.
- [7] Direktorat Budidaya Tanaman Tahunan, Ditjen Perkebunan, Departemen Pertanian. 2006. Cultivation Guidelines. Jakarta.
- [8] Hanum, C. 2008. Plant Cultivation Techniques, Volume 2. The Directorate General of Primary and Secondary Education Management of the Ministry of National Education. Jakarta.
- [9] Pracaya. 2004. Planting Mango. Revised Edition. Jakarta: Sower Self reliabce.
- [10] Prastowo, N.H. and James, M.R. 2006. Mechanical Vegetative Propagation Nurseries and Fruit Crops. Word Agroforestry Centre (ICRAF) and Winrock International. Bogor.
- [11] Setiawan, E. 2009. Assessment of Climate on Productivity Elements Relationship Chili Herbs (*Piper retrofractum* Vahl) In Sumenep. Agrovigor Journal Volume 2 No.1. Faculty of Agriculture, University Trunojoyo. Telang Kamal Bangkalan Madura.