

Economic Value of Agroforestry in Telagah Village, Sei Bingei District, Langkat - North Sumatra

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Abstract: Telagah Village is one of the area of langkat. That village have agroforestry land which influence their income. Types of agroforestry planted from generation to generation. The objective of the research were to identify type of products of agroforestry which used by community, to determine the economical value of the product and to find the contribution of utilization of agroforestry product in Telagah Village. This research was conducted using purposive sampling. In this study, primary data and secondary data were used. Primary data collected included types of results on agroforestry practices, socio-economic data, retrieval frequency, time and time of collection, collection costs and forms of processing and marketing of forest products. The result of the research shows that types of agroforestry in Telagah Village are *Durio zibethinus*, *Gracinia mangostana*, *Parkia speciosa*, *Archidendron pauciflorum*, *Theobroma cacao*, *Coffea arabica*, *Aleurites moluccana*, *Salacczalacca*, *Arengapinnata*, *Capsicum annum*, *Areca cathecu*, *Gracinia atroviridis*, *Mussa acuminata*, *Etlinge raellatior*, *Zingibe rofficinale*, *Zea mays*, *Elaeis guinensis*, *Saccharon officinarum*, *Bambusa vulgaris*, *Cyclea barbata*, *Cinnamomum burmannii*, *Cocos nucifera* and *Hevea braziliensis*. The highest economical value of agroforestry in Telagah is *Durio zibethinus* that is IDR 366.500.000,-/year and the lowest is *Arenga pinnata* as IDR502.500,-/year. The contribution of agroforestry product in Telagah is IDR788.638.500,-/ year (77%) and non agroforestry is IDR 231.000.000,-/year (23%).

1 INTRODUCTION

Telagah Village is a village located in Sei Bingei District, Langkat District, North Sumatra, Indonesia. The pattern of land management in the agroforestry system in Telagah Village takes place from generation to generation. The agroforestry pattern develops based on the knowledge of local farmers. Community income depends heavily on the results of agroforestry. According to Wijayanto (2015) Agroforestry has been practiced for many years by Indonesian farmers. One form of agroforestry is known as "agroforest". Agroforest is a term used to emphasize the close interaction between agricultural components and forestry in the context of natural resource management.

Many agroforestry systems developed in the Sumatra region are agroforestry complexes. Complex agroforestry according to Deforesta et al (2000), is a sedentary farming system that involves many types of tree plants (tree-based) both intentionally planted and that grow naturally on a plot of land and managed by farmers to follow

cropping patterns and ecosystems resembling forests. In this system, besides there are various types of trees, also shrubs, climbing plants (lianas), seasonal plants and grasses in large quantities

The objectives of this study are (1) to identify the types of agroforestry products utilized by the people in Telagah Village, Sei Bingei District, Langkat Regency, North Sumatra, (2) to calculate the economic value of agroforestry practices by communities in Telagah Village, Sei District Bingei, Langkat Regency, North Sumatra, (3) Knowing the contribution of income from agroforestry practices obtained by communities in Telagah Village, Sei Bingei District, Langkat Regency, North Sumatra.

2 METHODOLOGY

The material used in the research activities was a questionnaire to collect secondary and primary data, maps of Sei Bingei sub-district and other

documents related to the study location. Method of collecting data. In this study, primary data and secondary data were used. Primary data collected included types of output on agroforestry practices, socio-economic data, retrieval frequency, time and time of collection, collection costs and forms of processing and marketing of forest products. Secondary data collected include: general conditions of the research location or general data available at village and sub-district government agencies.

Determination of respondents is conducted by purposive sampling method. The sample taken is intentionally towards the community that uses the results of agroforestry practices in the vicinity of Telagah Village, Sei Bingei District, Langkat District, North Sumatra. Determination of the number of respondents refers to Arikunto (2006) if the subjects are less than 100 people, all are better taken so that the research is population research. However, if the number is greater than 100 people it is taken between 10-15% or 20-25% or more. Based on the figures obtained, it is known that the population in Telagah Village is 917 households. Based on the sampling procedure above, the researchers took only 10% of the village. So that the overall sample is 92 households as the number for distributing questionnaires.

2.1 Data analysis Economic Value of Agroforestry

Data obtained from observations in the field both through interviews and questionnaires were then analyzed quantitatively. The value of agroforestry products for each type per year obtained by the community is calculated by:

- a. The price of agroforestry goods obtained is analyzed by the market price approach, relative prices and the approach to procurement costs. For forest goods and services that are already known to the market, the assessment is carried out with market value (the prevailing value in the market). For the results of agroforestry that have not been known for their market prices but can be exchanged or compared with the value of goods and services that already have a market, the valuation is integrated with the relative method. Whereas for forest products and services that have not been known to the market and are not included in the exchange system, the valuation is carried out by the method of procurement costs, namely the amount of costs incurred to obtain these forest goods and service
- b. Calculate the average value of items taken per response per type,

$$\text{Average number of items taken} = \frac{X_i + X_{ii} + \dots + X_n}{N}$$

Information:

- Xi: The number of items taken by the respondent
- n: Number of Lots of Takers per Type of Goods

- c. Calculate the total collection per unit of goods per year,

$$TP = RJ \times FP \times JP$$

Information:

- TP: Total Retrieval per Year
- RJ: Average Amount taken
- FP: Frequency of Retrieval
- JP: Amount of collection

- d. Calculate the economic value of agroforestry goods per item per year,

$$NH = TP \times HH$$

Information:

- NH: Value of Agroforestry Results per Type
- TP: Total Retrieval (unit / year)
- HH: Price of Agroforestry Results at Harvest

- e. Calculate the percentage of economic value by:

$$\%NE = \frac{NE_i}{\sum NE} \times 100\%$$

Information:

- % NE: Percentage of Economic Value
- NEi: Economic Value of Results of Agroforestry / Types
- ∑NE: Total Economic Value of All Agroforestry Results

2.2 Income Contribution from Agroforestry Practices

The results of the calculation of agroforestry results show the total income of agroforestry products of all types per year, so that the value of the contribution of the value of the results of agroforestry to community income can be calculated. Calculating the level of contribution to the use of agroforestry products (Affandi and Patana, 2002).

$$\text{Contribution} = \frac{\text{Agroforestry Revenue Results}}{\text{Total Income}} \times 100\%$$

3 RESULT AND DISCUSSION

Based on the results of research conducted in Telagah Village in Table 1. it shows that the economic value of the use of agroforestry products by the people of Telagah Village is IDR 788,638,500 per year for all actors in agroforestry practices. This total value is obtained from the total sum of agroforestry products utilized by

communities such as durian, mangosteen, petai, jengkol, chocolate, coffee, candlenut, salak, aren, chili, areca nut, asamglugur, banana, tamarind, ginger, corn, palm oil, sugar cane, bamboo, sticky rice, cassava, cinnamon, coconut and rubber. According to Puspasari (2017) agroforestry activities in Community Forest Lampung Barat Indonesia it is known that 93 % of farmers are in the prosperous category.

Tabel 1: Percentage of Product Economic Value in Telagah Village

No	Product of Agroforestry		Unit	Total Retrieval	Price (Rp)	Amount (Rp)	Economic Value (%)
	Local name	Latin name					
1	Durian	<i>Durio zibethinus</i>	Fruit	36.650	10.000	366.500.000	46.47
2	Manggis	<i>Gracinia mangostana</i>	Kg	4.400	15.000	66.000.000	8.4
3	Kopi	<i>Coffea Arabica</i>	Kg	1.550	30.000	46.500.000	5.94
4	Jengkol	<i>Archidendron pauciflorum</i>	Kg	5.150	8.000	41.200.000	5.27
5	Asam glugur	<i>Gracinia atroviridis</i>	Kg	11.000	3.500	38.500.000	4.88
6	Sawit	<i>Elaeis guinensis</i>	Kg	9.600	3.500	33.600.000	4.26
7	Petai	<i>Parkia speciosa</i>	Tie	2.650	10.000	26.500.000	3.39
8	Pisang	<i>Mussa acuminata</i>	Bunches	750	35.000	26.250.000	3.32
9	Cabai	<i>Capsicum annum</i>	Kg	925	25.000	23.125.000	2.93
10	Tebu	<i>Saccharon officinarum</i>	Stem	4.950	3.500	17.325.000	2.19
11	Salak	<i>Salacca zalacca</i>	Kg	2.100	8.000	16.800.000	2.13
12	Kemiri	<i>Aleurites mouccana</i>	Kg	3.450	4.700	16.215.000	2.05
13	Bambu	<i>Bambusa vulgaris</i>	Stem	2.900	5.000	14.500.000	1.83
14	Lengkong	<i>Cyclea barbata</i>	Kg	1.600	7.000	11.200.000	1.42
15	Jagung	<i>Zea mays</i>	Kg	3.550	2.500	8.875.000	1.12
16	Pinang	<i>Areca cathecu</i>	Kg	1.025	10.000	10.250.000	1.3
17	Asam cekala	<i>Etilingera elatior</i>	Kg	1.025	10.000	10.250.000	1.3
18	Kincong	<i>Etilingera elatior</i>	Kg	734	10.000	7.340.000	0.93
19	Coklat	<i>Theobroma cacao</i>	Kg	355	8.000	2.680.000	0.34
20	Kayumanis	<i>Cinnamomum burmannii</i>	Kg	74	27.000	1.998.000	0.25
21	Kelapa	<i>Cocos nucifera</i>	Fruit	307	4.000	1.228.000	0.15
22	Jahe	<i>Zingiber officinale</i>	Kg	160	4.000	640.000	0.08
23	Karet	<i>Hevea brasiliensis</i>	Kg	22	30.000	660.000	0.08
24	Aren	<i>Arenga pinnata</i>	Liter	335	1.500	502.500	0.06
Total						788.638.500	100

The types of agroforestry products that provide the largest contribution are durian with an economic value of Rp. 366,500,000, - and the types of agroforestry products that make the smallest contribution to the income of the people of Telagah Village are sugar palm which is Rp. 502,500. However, we can see the income from the practice of palm agroforestry, namely processing of water into palm sugar products and processing bamboo in the village of Telagah, in Table 2.

According to Winarni (2018) research agroforestry rubber and durian fruit in west Kalimantan Indonesia, the maximum production of rubber latex from three model were achieved at the

age of 17 years, while maximum prediction of durian fruit was achieved at the age of 55 years. The maximum growth increment of champor and durian trees were achieved at the age 40 years. Financially, the combined rubber and durian cultivation was the most profitable.

According to Lisnawati (2017) one of plantation crop commodities that play a pivotal role in the economic growth is coffea. Coffea, despite not being an indigenous plant of Indonesia, plays an important role in the nation-wide plantation industry.

3.1 Contribution of Agroforestry Products to Household Income

The level of education in Telagah Village is a graduate of Elementary, Middle School and High School and rarely educated as a teacher. In Telagah Village the main profession of the community is as farmers. However, there are some rural communities who have other professions as entrepreneurs, entrepreneurs, and cattle breeders can be seen in Table 2.

Table 2: Household income outside agroforestry respondents of telagah village per year

No	Source of income	Total (Rp)	Percentage (%)
1	Traders	15.000.000	7.10%
2	PNS	38.000.000	8.53%
3	Entrepreneurs	163.000.000	77.25%
4	Breeder	15.000.000	7.10%
Total		231.000.000	100%

The results of the research in Table 6 above show that the biggest income outside agroforestry is self-employment, which is Rp. 163,000,000 / year with a percentage of 77.25% and the lowest source of income from outside agroforestry is entrepreneurs and farmers of Rp. percentage equals 7.10%. The value of external income using Agroforestry is Rp. 231,000,000 / year from the total amount of income from entrepreneurs, civil servants, entrepreneurs, and farmers.

The total income of the Telagah Village community is IDR788.638.500/ year. Total income community in Telagah village is IDR 1.019.638.500/year. Comparison between the income of economic value using the results of agroforestry practices and income outside of the results of the Telagah Village agroforestry can be seen in Figure 1.

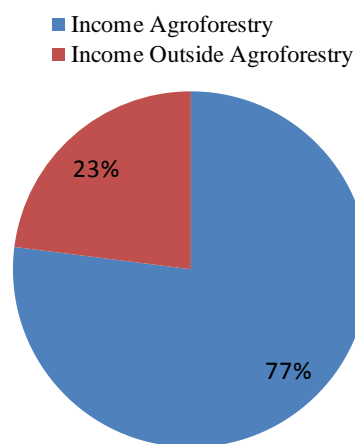


Figure 1: Percentage of Economic Value Results of Agroforestry and Outside of Agroforestry

3.2 Telagah Village

In Figure 1. It can be seen that the income with the largest contribution is in the percentage of agroforestry practices that is equal to 77% while outside of agroforestry is 23%. This is because agroforestry products can be harvested continuously and with diverse harvest cycles. According to Diniyati (2015) Income contributions of NTFPs to total forest community from tree strata is 65,93 % to 75,11 %. The yields of agroforestry practices are abundant and varied from each product, increasing economic value and increasing productivity. This is in accordance with the statement of Mahendra (2009) stating that in the implementation of agroforestry systems seen from the economic aspect, agroforestry systems have a bright future function for the lives of people and farmers. The existence of a system that combines various types of plants in a field, it will increase yields of crop productivity. Each plant has its own selling value. So, when in one type of land a commercial crop is planted it will increase harvest income will be abundant.

The percentage contribution to income from agroforestry practices in Telagah Village is very large, around 77 and 23% from outside agroforestry. This proves that agroforestry is the main source of income for farmers. In accordance with the results of Pebrianto's research (2015) the percentage contribution of agroforestry (timber, fruit and secondary crops) to farmer's income was 55.24%. This proves that agroforestry land is the main source of income for farmers. Its role is very important and can be used continuously. In addition, the managed land has a positive impact on both the economic and ecological fields.

4 CONCLUSION

Types of agroforestry in Telagah Village are: *Durio zibethinus*, *Gracinia mangostana*, *Parkia speciosa*, *Archidendron pauciflorum*, *Theobroma cacao*, *Coffea arabica*, *Aleurites moluccana*, *Salacca zalacca*, *Arenga pinnata*, *Capsicum annum*, *Areca cathecu*, *Gracinia atroviridis*, *Mussa acuminata*, *Etilingera ellatior*, *Zingiber officinale*, *Zea mays*, *Elaeis guinensis*, *Saccharon officinarum*, *Bambusa vulgaris*, *Cyclea barbata*, *Cinnamomum burmannii*, *Cocos nucifera* and *Hevea brasiliensis*. The economic value of agroforestry products that provide the largest contribution is durian with an economic value of Rp. 366,500,000 / year and the types of agroforestry products that make the smallest contribution to the income of the people of Telagah

Village are are which is Rp. 502,500 / year. The total income contribution of the Telagah Village community is IDR 1.019.638.500/ year. The results showed that the total income of the people of Telagah Village from the use of agroforestry in the form of the total amount of economic value used by them is amounting to IDR788.638.500/ year. While results from outside use of agroforestry such as entrepreneurs, civil servants, entrepreneurs, and farmers obtain economic value of Rp 216,000,000 / year.

REFERENCES

- Arikunto, S., 2006. *Research Procedures A Practice Approach*. Revised Edition VI. PT Rineka Cipta. Jakarta.
- De Foresta, H., Kusworo, A., Michon, G., Djatmiko, W. A. 2000. When the Garden Formed Forests - Typical Indonesian Agroforests : A Community Donation. *ICRAF*, Bogor. 249 p
- Diniati, D., Achmad, B. 2015. Contribution of non-timber forest product revenues to smallholder agroforestry patterns in the Tasikmalaya regency. *UGM Forestry Science Journal*, 9 (1).
- Lisnawati A., Lahjie A. M., Simarankir BDAS, Yusuf S, Ruslim Y., 2017. Agroforestry system biodiversity of Arabica coffee cultivation in North Toraja District, South Sulawesi, Indonesia. *Biodiversitas Journal of Biological Diversity*, 18(2), 741-751.
- Mahendra, F., 2009. *Agroforestry System and its Application*. Graha Ilmu Publishers. Yogyakarta.
- Pebrianto. R., 2015. The Contribution of Agroforestry to Farmer Household Income. *JomFaperta*, 4(2), 1-13
- Puspasari E., Wulandari, C., Darmawan, A., Banuwa, I. S. 2017. Socio-economic aspects of the agroforestry system in the work area of community forest in West Lampung Regency, Lampung Province. *Sylva Lestrai Journal*. 5(3), 95-103.
- Winarni, B., Lahjie AM, Simarankir BDAS, Yusuf S, Ruslim Y. 2018., Forest gardens management under traditional ecological knowledge in West Kalimantan, Indonesia. *Biodiversitas Journal of Biological Diversity*. 19(1). 77-84.
- Wijayanto, N., & Hartoyo, A. P. P. (2015, April). Biodiversity based on agroforestry. In *Prosiding Seminar Nasional Masyarakat Biodiversitas Indonesia*, 1(2), 242-246.