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Medicinal Plant inventory at the Agroforestry Land in Buffer Area of Gunung Leuser National Park

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Medicinal Plant inventory at the Agroforestry Land in Buffer Area of Gunung Leuser National Park

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Abstract. The inventory of medicinal plants in North Sumatra Province are important, especially those that are often utilized by the community. This study aimed to map the distribution of medicinal plants (herbs) under the agroforestry land in buffer area Gunung Leuser National Park. This research was conducted in Simpang Kuta Buluh Village, Sei Bingai Sub District, Langkat District, North Sumatra Province. This research was conducted on March to June 2018. The survey method was used by making plots in the field. A Geographic Information System (GIS) was used to analyze the distribution of the medicinal plants and a Global Positioning System (GPS) was used to record the coordinate points of medicinal plants in the area. The results showed that there were found thirty four (34) species of herbs plant in the area with the total of 307 individuals herb,. Sampelulut (Urena lobata L.) was dominant spesies which is found (56 individuals) in this area, followed by Asar-asar (Selaginella deoderleinii) (42 individuals) and Senduduk Bulu (Clidemia hirta) (30 individuals). Constituent plants in Agroforestry land, namely: Mahoni (Swietenia mahagoni), Durian (Durio zibethinus), Karet (Hevea brasiliensis), Pisang (Musa paradisiaca), Angsana (Pterocarpus indicus), Coklat (Theobroma cacao L.), Petai (Parkia speciosa), Cengkeh (Syzygium aromaticum), Asam Glugur (Garcinia atroviridus, and Kelapa (Cocos nucifera). The data of medicinal plants distribution is vital to provide information for community, researchers, and government.

1. Introduction

One of the most important biodiversity is medicinal plants. Medicinal plants are currently still widely used by people in traditional medicine and have a very important role for the world of health. Furthermore, medical experts known as physicians make medicinal herbs with raw materials from the forest [3]. The medicinal plants are classified into three, namely: traditional medicinal plants, modern medicinal plants, and potential medicinal plants [13, 14].

One place that has the potential to be found in Simpang Kuta Buluh Village, Sei Bingai Sub District, Langkat District, North Sumatra Province. Simpang Kuta Buluh village is one of the villages in the TNGL area buffer and has good natural medicinal plant potential [2]. Community life still uses plants for traditional treatment. Most of the Simpang Kuta Buluh people have used medicinal plants for generations. There are several medicinal herbs that have long been known by the people of Simpang Kuta Buluh Village. In this research, the community used plants for Traditional medicinal plants, which are plant species that are known or believed to have medicinal properties and have been used as raw materials for traditional medicine, but until now information about the potential of medicinal plants in Simpang Kuta Buluh village is limited, so it is necessary to identify the medicinal plants in the village.

Through this research, it is expected to provide information about medicinal plants that have the potential to be developed commercially, for example as raw materials for certain drugs. Research on medicinal plants in this location has never been done. Based on the description above, this research needs to be done to determine the types of medicinal plants found under the stands in Simpang Kuta Buluh Village, Sei Bingai Sub District, Langkat District, North Sumatra Province and map the distribution of medicinal plants. This study aimed to map the distribution of medicinal plants (*herbs*) under the agroforestry land at Buffer aera Gunung Leuser National Park in Simpang Kuta Buluh Village, Sei Bingai Sub District, Langkat District, North Sumatra Province.

2. Materials and Methods

This research was conducted in Simpang Kuta Buluh Village, Sei Bingai Sub District, Langkat, North Sumatra, Indonesia (Figure 1). This research was conducted on March to June 2018. The survey method was conducted to collect medicinal plants samples in the field. The Geographic Information System (SIG) was used to show the spatial distribution of medicinal plants and a Global Positioning System (GPS) was used to record the coordinate points of medicinal plants. The map represents the distribution of medicinal plants in Simpang Kuta Buluh village. To retrieve plant coordinate points by taking one coordinate point that represents all the same medicinal plants that were in the observation plot.
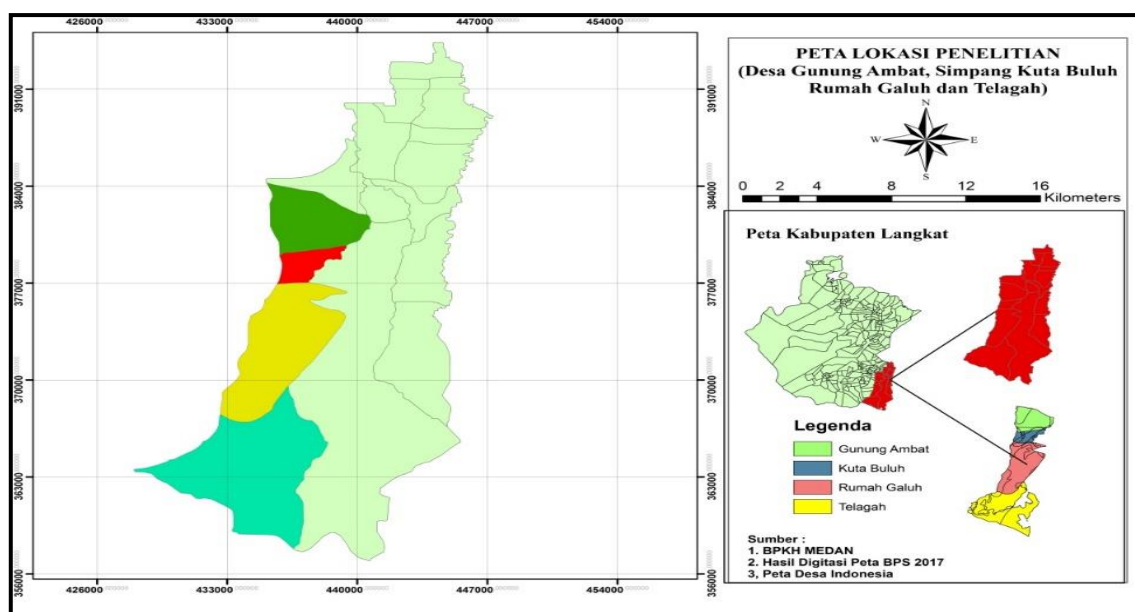
Figure 1. Map of Simpang Kuta Buluh Village, Sei Bingai Sub District, Langkat, North Sumatra, Indonesia.

The inventory method of medicinal plants is carried out using a plot sampling method. Determination of the starting point of the inventory in the pathway is done by purposive sampling method, then carried out by systematic sampling, to find out how the state of distribution of medicinal plants in the research area. Collection of medicinal plants using the plot sampling method, namely by making plots in the pathway with sampling intensity of 10% of the land area. Each path is made with a plot of 20 x 20 meters [6]. The total number of plot samples made was 14 plot.

The composition of tree species was determined by the important value index (IVI). The IVI was the sum of the relative frequency (RF), relative density (Rde) and the relative dominance (Rdo). Mastery level of the species in the community indicated by the IVI [6]. The diversity of a forest area can be described by the Shannon Index [6].

3. Results and discussion

Species numbers of medicinal plants, important value index (IVI), and the Shannon Index (H') were presented in Table 1.

Table 1. Species numbers of Medicinal Plants, important value index (IVI) and H'.

No	Local Name and Scientific	Total	IVI	H'
1	Asar-asar (*Selaginella deoderleinii*)	42	21.7	0.27
2	Bancir (*Bidens pilosa*)	5	5.63	0.07
3	Balik Angin (*Mallotus paniculatus*)	1	1.66	0.02
4	Bas-bas (*Coleus aemboinicus*)	4	2.64	0.06
5	Belasih (*Lantana camara*).	7	4.94	0.09
6	Betak (*Paederia scandes* L. Merr)	21	10.8	0.18
7	Burley (*Zingiber pupureum* R.)	7	3.61	0.09
8	Bibi kacimukmuk (*Leucas lavandulifolia*)	1	1.66	0.02
9	Dulpak (*Blumea balsamifera*)	1	1.66	0.02
10	Empu-empu (*Lilium* sp.)	1	1.66	0.02
11	Kacibini (*Elephantopus scaber*)	10	7.25	0.11
12	Karpe Balu (*Trema orientalis*)	5	4.29	0.07
13	Kemusing (*Portulaca oleracea* L.)	5	2.96	0.07
14	Kuning gajah (*Maranta arundinacea*)	6	4.62	0.08
15	Kurmak-kurmak (*Sterculia javanica*)	3	3.64	0.05
16	Merah mata (*Hedyotis corimbosa* L.)	2	3.32	0.03
17	Nungke (*Eurycoma longifolia*)	2	1.98	0.03
18	Panggil-Panggil (*Peperomia pellucid* L.)	2	1.98	0.03
19	Pakis (*Polystichum setiferum*)	5	4.29	0.07
20	Pesul (*Piper betle* L.)	2	3.32	0.03
21	Pupuk Mulajadi (*Cylea barbata*)	2	1.98	0.03
22	Ratah Flower (*Eleusine indica*)	2	3.32	0.03
23	Rimbatasik (*Rauwolfia verticillata*)	13	10.9	0.13
24	Salantam (*Graptophyllum pictum*)	14	5.89	0.14
25	Sambung nyawa (*Gynura procumbens*)	2	1.98	0.03
26	Sampelulut (*Urena 3obate* L.)	56	30.2	0.31
27	Senduduk Bulu (*Clidemia hirta*)	30	19.1	0.23
28	Serai (*Cymbopogon citratus*)	22	9.83	0.19
29	Sikerbeng (*Centella asiatica* L. Urban)	13	8.23	0.13
30	Suntil-suntil (*Achyranthes aspera*)	5	2.96	0.07

31	Solur tangga (*Acalypha australis* Linn)	3	2.31	0.05
32	Tanduk reFruit (*Phyllanthus niruri* L.)	2	1.98	0.03
33	Tegi-tegi (*Euphorbia hirta* L.)	5	4.29	0.07
34	Temu-temu (*Boesenbergia rotunda*)	6	3.29	0.08
	Total	307	200	2.91

Various types of tree were presented in Table 2 and Figure 2.

Table 2. Species numbers of Trees.

No	Lokal Name	Scientific Name	Total
1	Angsana	*Pterocarpus indicus*	2
2	Asam Glugur	*Garcinia atroviridus*	1
3	Coklat	*Theobroma cacao* L.	6
4	Cengkeh	*Syzygium aromaticum*	1
5	Durian	*Durio zibethinus*	10
6	Karet	*Hevea brasiliensis*	103
7	Kelapa	*Cocos nucifera*	1
8	Mahoni	*Swietenia mahagoni*	12
9	Pete	*Parkia speciosa*	1
10	Pisang	*Musa paradisiaca*	17
	Total		76

Species numbers and important value index (IVI) of medicinal plants at the Simpang Kuta Buluh Village, Sei Bingai Sub District, Langkat District, North Sumatra Province was Presented in Table 1. Based on Table 1, Sampelulut (*Urena lobata L.)* has the highest IVI (30.23 %), followed by Asar-asar *(Selaginella deoderleinii)* (21.7 %) and Senduduk Bulu (*Clidemia hirta) (19.1%)*. The value of the diversity index for the study sites was 2.91 (classified as moderate). This means that environmental conditions were still relatively stable. Sampelulut (*Urena lobata L.) was effective for the treatment of itching, fever, dysentery, diarrhea and rheumatism,* Asar-asar *(Selaginella deoderleinii)* was efficacious to reduce heat, improve blood flow, antitoxic, antineoplasm, stop bleeding and eliminate swelling, and Senduduk Bulu (*Clidemia hirta) was* efficacious for treating sugar, vaginal discharge, diarrhea, mouth sores and burns [4].

The advantages of medicinal plants are raw materials found in nature and do not require large costs in their use. The treatment using herbs with traditional medicinal herbs has advantages in general is considered safer than the use of modern medicine [1]. This is because traditional medicine has relatively fewer side effects than modern medicine. Based on WHO, IUCN and WWF records, more than 20,000 species of medicinal plants are used by 80% of the population worldwide. Research reports and literature no less than 2039 species of medicinal plants originating from Indonesian forests [14].

The constituent stands of agroforestry land consist of: Mahoni (*Swietenia mahagoni*), Durian *(Durio zibethinus)*, Karet *(Hevea brasiliensis)*, Pisang *(Musa paradisiaca)*, Angsana *(Pterocarpus indicus)*, Coklat *(Theobroma cacao* L.*)*, Petai *(Parkia speciosa)*, Cengkeh *(Syzygium aromaticum)* dan Asam Glugur *(Garcinia atroviridus)*and Kelapa *(Cocos nucifera)*.
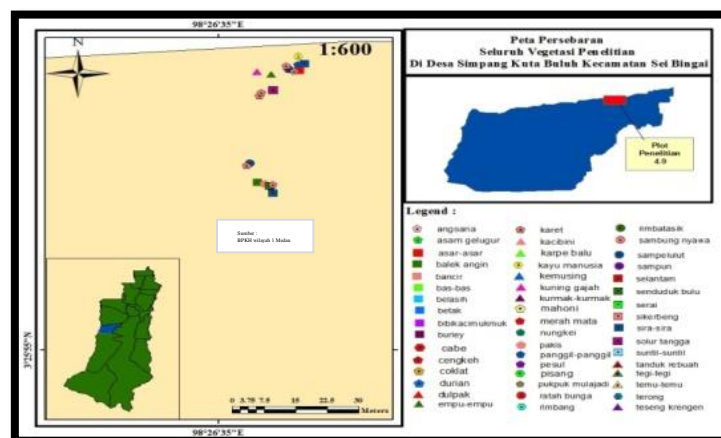
3.1 Mapping of Medicinal plants Distribution

Mapping of the distribution of medicinal plants is carried out by using the method of inventory and retrieval of medicinal plants in the field. Data on the distribution of medicinal plants are stored in GPS in the form of a waypoint, then overlaid with a map of the location of the research, namely the village

of Simpang Kuta Buluh, Sei Bingai sub-district. Mapping of medicinal plants is done to determine the location of the distribution of medicinal plants in the village of Simpang Kuta Buluh. The aim is to provide information on the potential of medicinal plants in the field and present them in the form of maps to the public. So that when conducting a field survey, people find it easier to find medicinal plants in the Buluh village of Simpang Kuta. Map of the distribution of medicinal plants can be seen in Figure 2-7.
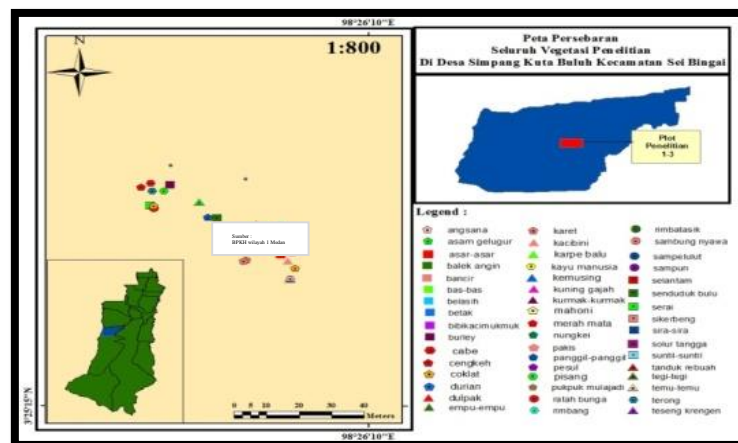
Figure 2. Map of Vegetation Distribution in Plot 1, 2, 3.

Figure 3. Map of Vegetation Distribution in Plot 4 – 9.
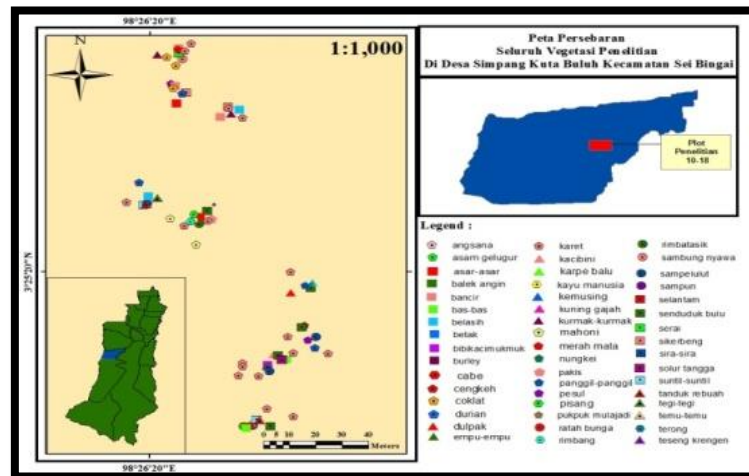
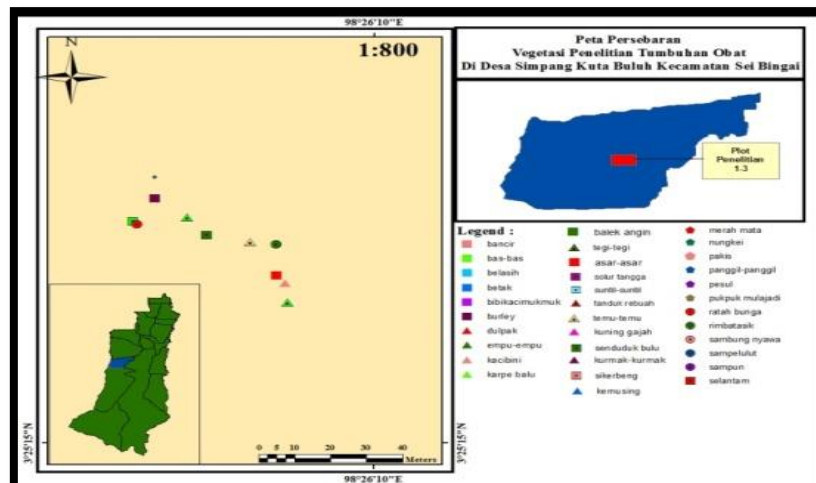**Figure 4**. Map of Vegetation Distribution in Plot 10 – 18.

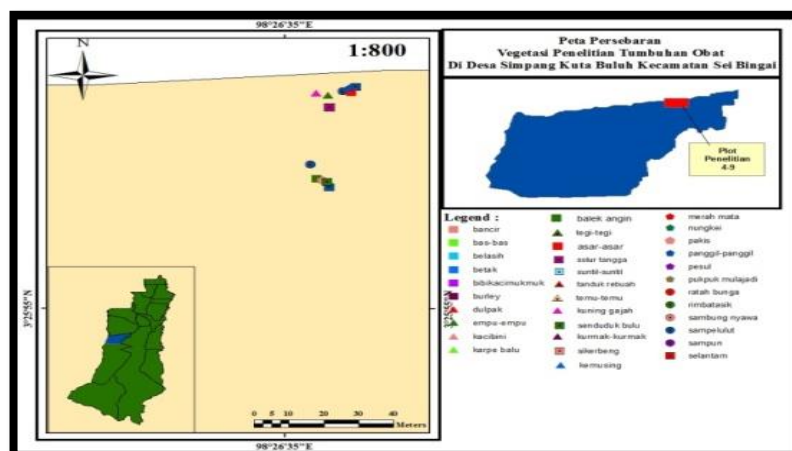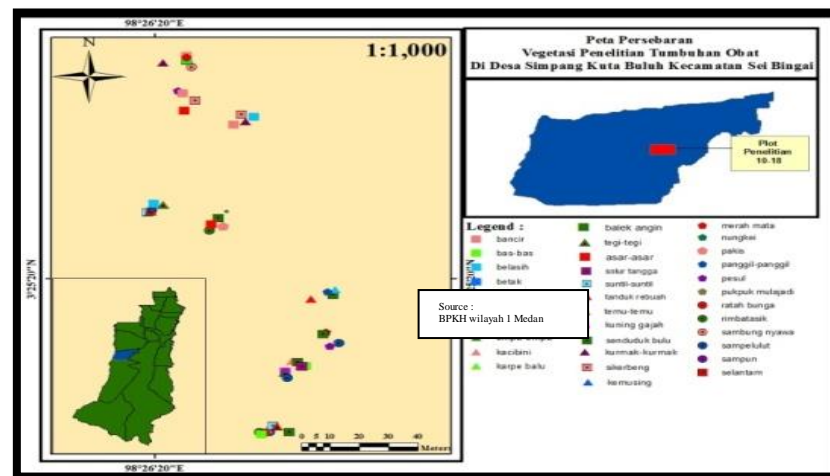**Figure 5**. Map of Medicinal plants Distribution in Plot 1, 2, 3.

Figure 6. Map of Medicinal plants Distribution in Plot 4 – 9.

Figure 7. Map of Medicinal plants Distribution in Plot 10 – 18.

In Simpang Kuta Buluh Village, there were various types of vegetation have been found that have the potential to become medicinal plants. A total of 307 medicinal plant points were recorded the coordinates points using GPS. It was found that medicinal plants in the village of Simpang Kuta Buluh had a species diversity index of 2.91. The diversity of medicinal plants was classified as moderate ($1 \leq H' \leq 3$), meaning that the ecology of understorey vegetation was in a relatively stable condition [5].

4. Conclusion

1. There were found thirty four (34) species of herbs plant in the plot area of Simpang Kuta Buluh Village with the total of 307 individuals herb,. Sampelulut (*Urena lobata* L.) was dominant spesies which is found (56 individuals) in this area, followed by Asar-asar (*Selaginella deoderleinii)* (42 individuals) and Senduduk Bulu (*Clidemia hirta)* (30 individuals).

2. There were found ten (10) species of trees in the plot area of Simpang Kuta Buluh Village with the total of 76 individuals tree, namely: Mahoni (*Swietenia mahagoni)*, Durian *(Durio zibethinus)*, Karet *(Hevea brasiliensis)*, Pisang *(Musa paradisiaca)*, Angsana *(Pterocarpus indicus)*, Coklat *(Theobroma cacao* L.)*, Petai *(Parkia speciosa)*, Cengkeh *(Syzygium aromaticum)* dan Asam Glugur *(Garcinia atroviridus)*.

3. The diversity of medicinal plants in the plot area of Simpang Kuta Buluh Village was classified as moderate.

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