

## Ethnoecology of The Slamet Mountain Slope Community (SMSC) in Paguyangan District, Brebes Regency, Central Java

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**Abstract.** *The local communities have local knowledge in utilizing and managing landscape units. The threat of modernization has led to the degradation of local knowledge, including the Javanese community on Mt. Slamet. This study aimed to analyze the plant diversity characteristics of landscape units and determine the important value of landscape units and plant species used by the community. This research was conducted in the Ragatunjung, Cipetung, and Pandansari village, Paguyangan District, Brebes Regency, Central Java. Semi-structured interviews collected Ethnoecological data with eight key informants and 83 respondents selected by purposive sampling and snowball sampling. Data on the level of landscape utilization were analyzed using the Local User's Value Index (LUVI). The community recognizes nine types of landscape units, such as perawisan (yard), wanah (production forest), Majegan (gardens), Sabin (rice fields), Kubang buyut (protected forest plan), tea plantations, Telaga Ranjeng Nature Reserve, Tanah Bengkok and tuk (water sources). Wanah was the most important landscape unit in the community in Ragatunjung (31.27), Cipetung (53.55), and Pandansari (28.17). Oryza sativa had the highest importance value in Sabin (22) and wanah (12) of Ragatunjung. In contrast, Syzygium aromaticum had the highest in Majegan (6.68). Brassica oleracea has the highest importance value in the two landscape units of Cipetung, namely, Majegan (4.20) and settlements (3.5), while in the wanah is Zea mays (11.38). Solanum tuberosum had the highest value in each landscape unit in Pandansari, both in wanah (10.33), Majegan (6.80), and Protection Forest Plan (PFP) (4.13). Categorizing landscapes and their utilization by maintaining certain landscapes, such as the Telaga Ranjeng Nature Reserve and Kubang buyut, directly impact the sustainability and integrity of ecosystems and natural resources in and around the area.*

**Keywords:** *ethnoecology, local knowledge, Slamet Mountain slope community, utilization of landscape units*

### Citation

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### INTRODUCTION

Human interaction and adaptation to

the biophysical environment result in a landscape unit used to meet the community's needs (Riu-bosoms et al., 2015). Landscapes

are formed due to community activity patterns in exploring natural resources in an area. The utilization of landscapes in Indonesia reflects human behavior in responding to and utilizing landscapes (Aqilah, 2017). Efforts to use landscapes have a close relationship with the practice of conserving plant biodiversity, either directly or indirectly (Walujo, 2011), based on their knowledge and experience in interacting with the environment. Local community knowledge of environmental units is a by-product of an effort to maintain survival and develop offspring (Walujo, 1991). Local people already have local knowledge about ecology and natural resource management (Mulyoutami et al., 2004).

The Slamet Mountain Slope Community (SMSC) is a Javanese community was found in the settlement of the slopes of Mt. Slamet (MS), Paguyangan District, Brebes Regency, Central Java. Throughout history, volcanoes have been the source of life for Javanese people through the soil and water fertility, so they have a dependency on their environment. This dependence causes the community have local knowledge in the form of farming and gardening experience. Land use by SMSC is grouped based on the function, characteristics, ownership, and the sacred level of an area which is managed based on local beliefs.

The ecological pressure of the MS ecosystem is increasing every year and threatens the extinction of biodiversity (Sulistiyadi, 2012). The slopes of MS are the area with the highest anthropogenic pressure than other areas (Soemarno & Girmansyah, 2012). Previous studies also stated that there is forests existence pressure on MS. The southern slope has better forest conditions than the others on MS (Helmanto et al., 2020). The conversion of forest land to agricultural land is one of the most severe threats the MS ecosystem faces

related to limited land and economic needs. According to Sardjono et al. (2003), forest land conversion causes many problems such as decreased soil fertility, erosion, extinction of flora and fauna, floods, drought, and even changes in the global environment.

These problems have led to changes in the social system in the society, for example, the younger generation chooses to leave or open new businesses due to limited land. According to Jumari et al. (2012), changes in the social system will automatically result in changes in the biophysical system. The threat of culturally incompatible modernization has caused a decrease in the transfer of cultural knowledge and a shift in local knowledge (Prettya et al., 2009). This is because the knowledge that SMSC possesses is passed down through generations, especially in the landscape categorization. Verbal transmission has several shortcomings, such as extinction if not well documented (Thamrin, 2013). Therefore, it is necessary to do scientific documentation of SMSC local knowledge that has never been done. Documentation of local knowledge and resource management can be studied through ethnoecology, which appears as a bridge between natural science and social science related to sustainable environmental management (Hilmanto, 2010). The concept of using landscapes owned by the community needs to be preserved because it is one of the traditional conservation efforts (Suhartini, 2009). Besides, various studies on the relationship between local communities and natural resource management show that local knowledge can reduce the impact of damage and maintain environmental sustainability (Helida, 2016). This study aimed to analyze the diversity and characteristics of landscape units and to reveal the importance of landscape units and plant species utilized by the

SMSC in Paguyangan District, Brebes Regency, Central Java.

## MATERIALS AND METHODS

### Study Area

The research was conducted from July 2019 to January 2020. The MS is located in the western part of Central Java, precisely on the border of Pematang, Banyumas, Purbalingga, Tegal, and Brebes Regencies (Figure 1). Paguyangan District is located on the west

slope of MS. The sub-district consists of 12 villages, and five of them are located in the highlands, including Ragatunjung, Cipetung, and Pandansari, with temperatures between 5 °C - 20 °C. The SMSC as a whole includes the Javanese, Banyumasan culture, and muslims. People often refer to themselves as Wong Jawa or Tiang Jawi (Hidayah, 2015). The research was conducted in 3 villages in the SMSC, namely (1) Ragatunjung, (2) Cipetung, and (3) Pandansari, Paguyangan District, Brebes Regency, Central Java (Figure 1).

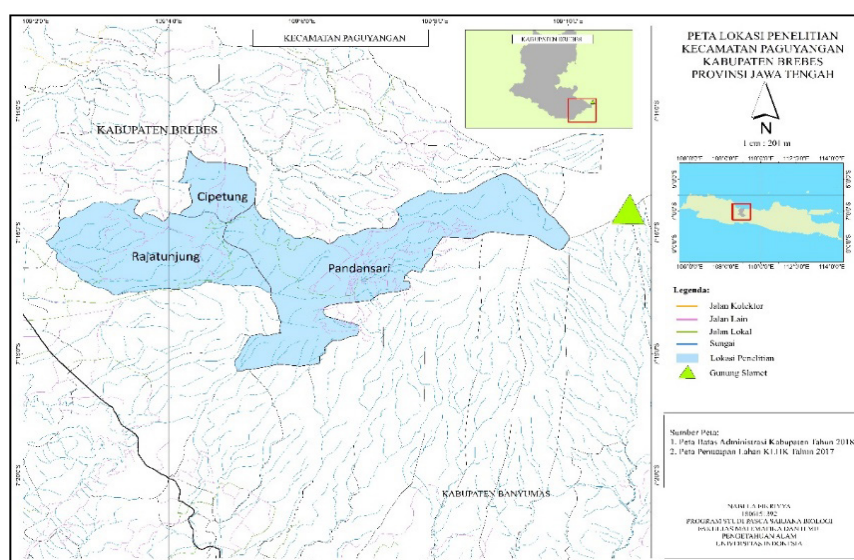


Figure 1. Map of research locations on Paguyangan District, Brebes Regency, Central Java

### Ethnoecological Data Collection

#### *Determination of Key Informant and Respondent*

Key informants were selected by purposive sampling consisting of village apparatus and community leaders totaling eight people. They have more than ten years of experience managing rice fields and gardens with over 18 years of age. Respondents consisted of 83, with details of Ragatunjung Village (24), Cipetung Village (29), and Pandansari Village (30).

#### *Collection Data of Landscape Unit Utilization*

Qualitative data were obtained through observation, semi-structured interviews, Focus Group Discussion (FGD), and literature study. Quantitative data were obtained through the Pebble Distribution Method (PDM). The interview consisted of 2 stages, namely, key informants and responses. Utilization data for landscape units was obtained through FGD and PDM. PDM was carried out twice, namely, to determine each landscape unit's utilization value and the value of the use of plants in

each landscape unit, which was carried out in groups (5-6 people). Assessment of landscape units and plant species was based on intensity, use, and importance (Sheil et al., 2004).

### Data Analysis

An overview of the categorization of landscape units, characteristics, functions, ownership, and forms of activity of each landscape unit was known. Data on the value of the importance of landscape and plant use were analyzed using the Local User's Value Index (LUVI) (Sheil et al., 2004), with the following formula:

$$LUVI = G_{ij}$$

$$G_{ij} = \sum_{Category_j} G_{ij} = RW_j \times RW_{ij}$$

Description:

j = A kind of use

i = Species

$G_{ij}$  = The importance value of the use of species (each species can have more than one utilization)

$RW_j$  = Weights assigned to a broad class of uses

$RW_{ij}$  = Relative weights in category j in the use of species i that qualify as members of j

## RESULTS AND DISCUSSION

### Diversity and Utilization of Landscape Units by SMSC

SMSC has the concept of an environmental unit based on the use and interest of an area, especially for the fulfillment of living needs. The categorization of landscape units is based on the functions, characteristics, and ownership that have been known from generation to generation. Based on this categorization, SMSC recognizes nine types of landscape units, namely, *perawisan* (yard), *wanah* (production forest), *majegan* (garden), *sabin* (rice field), *kubang buyut* (protected forest plan), tea plantations, Telaga Ranjeng Nature Reserve, Tanah Bengkok, and *tuk* (water sources) (Table 1).

Table 1. The system of landscape categorization by the Javanese community on the slopes of Mt. Slamet

Landscape categorization	Ownership	Function
Residential Area:		
a. Settlement	Community	Community housing
b. Umah or griyo (house)	Personal and family	Residence
c. <i>Perawisan</i> or <i>karangan</i> (yard)	Personal and family	Cultivation of land for daily necessities, a nursery, and cattle sheds
<i>Wanah</i> or <i>kontrakan</i> or <i>alas</i> (production forest area)	Perum Perhutani	Vegetable farming area
<i>Majegan</i> or <i>tegalan</i> or <i>kebon</i> (garden)	Personal	Dryland agriculture cultivating vegetables and perennial crops
<i>Sabin</i> (rice fields)	Personal	Wet agricultural land for rice cultivation
Protected Forest Plan Area:		
a. <i>Kubang buyut</i>	Perum Perhutani	Land that is cleared and functions as a spring protection
b. <i>Rencana hutan lindung</i> (RHL)		Vegetable cultivation land
Tea plantation	state-owned corporation	Tea cultivation and agro-tourism
Telaga Ranjeng Natural Reserve	Nature Conservation Agency, Ministry of Environment and Forestry	Protection and preservation of biodiversity
Tanah Bengkok	Village government	Rice farming land, community activities
<i>Tuk</i> (water source)	Community	Water sources and irrigation of agricultural

## The Importance Value of Landscape Units Used by SMSC in Paguyangan District, Brebes Regency, Central Java

### The Residential area

#### Settlement

The settlement pattern of SMSC is formed in groups. It is centrally built following the slopes and surrounded by agricultural areas that are centers of activity covering housing, social, and farming and are divided into several sections according to social, administrative, economic, educational, health, and religious aspects. The village hall is the administrative center at the village level led by the *Lurah* (village head), and the religious center is located in the mosque. The education facilities available in each village vary.

#### Umah or Griyo (House)

*Umah* or *griyo* is a term used by SMSC to refer to a building that functions as a private or family property residence. The majority of the houses are permanent houses with increasingly diverse forms consisting of walls, tiled floors, two pillars (poles) on the house's terrace, and roof tiles equipped with electricity that have long since left the traditional Javanese house. The SMSC house is divided into three parts: the front, middle, and back. In front of part consists of a terrace and a general living room. The middle and back parts are private, which consists of the living room and bedroom, while the back part consists of a *pawon* (kitchen) and a bathroom equipped with a lavatory. The *pawon* (kitchen) is equipped with a fire stove used for *garang* (to warm up when the weather is cold).

#### Perawisan (Yard)

SMSC defines yards as the land around the house planted with seasonal crops, annual crops, seed nurseries, and cattle sheds that

located at the front, side, or behind the house. The majority of livestock that are kept include goats and cows. The boundaries between yards are visible using hedgerows (*Cordiaeaum varieg*) or perennials (*Toona sinensis*). The inventory of plant species diversity in the yard recorded 24 tree species and 23 understory species. The majority of cultivated annual plants are *Toona sinensis*, *Litsea glutin*, and *Hibiscus tiliaceus* used as building materials, and *Psidium guajava* as fruit producers. Meanwhile, the species of seasonal plants found in SMSC include *Brassica oleracea*, *Capsicum annum*, *Zea mays*, and *Colocasia esculenta*.

#### Wanah

*Wanah* is used as dryland agriculture to cultivate vegetable crops. Perhutani's land tenants are called *pesanggem*. In general, wanah have the same characteristics as *majegan* (gardens), what distinguishes them is the existence of Perhutani's pine that must be cared for and guarded by the *pesanggem*. Wanah is located outside residential areas directly adjacent to *majegan*. Based on the analysis of vegetation structures, 40 tree species and 44 understory species were recorded. The majority of annual plants are *Pinus merkusii*, Perhutani's staple crop. Other plants include *Calliandra calothyrsus*, *Crassula tetragona*, and *Toona sinensis*, used as building materials. Less vegetable cultivation is found in Ragatunjung because it requires higher capital and the majority of cultivated is *pantun* (rice) on rainfed managed lands. The wanah area is also used for *Pennisetum purpureum* as animal feed.

#### Majegan (Garden)

The term Majegan comes from the Javanese language, *pajeg*, which means tax that refers to private land required to pay taxes annually. Cultivating crops in Majegan is us-

ing a multi-species system, thus forming an agroforestry system that is proven to provide economic and ecological benefits. Economically, agroforestry provides community needs in a sustainable manner, namely short-term needs obtained from vegetable cultivation and long-term needs obtained from annual crops and livestock. Based on the analysis of the vegetation structure, 35 tree species and 38 understory species were recorded, consisting of 31 species in Ragatunjung, 48 species in Cipetung, and 23 species in Pandansari. Ragatunjung prioritized tree species because of its undulating topography and dense soil and one of the primary commodities is *Syzygium aromaticum*, a spice with many benefits, including its use as the essential ingredients of medicines. Ecologically, *S. aromaticum* can be used as landslide control because it has deep roots, can penetrate the impermeable layer, and can release water into deeper layers (Idjudin, 2011). In contrast, Cipetung and Pandansari prioritized seasonal crops due to their gentler topography and commonly found in Cipetung is *Zea mays*, *Camellia sinensis*, *Capsicum annum*, and *Brassica oleracea*. In comparison, the plant commonly found in Pandansari is *Solanum tuberosum*, *Daucus carota*, *Allium fistulosum*, and *B. oleracea*.

### Sabin (Rice Fields)

Sabin is defined as wet agricultural land for rice cultivation as a staple crop and only found in Ragatunjung which is the characteristic feature is the presence of terraced rice fields or bunds forming terraces. Most Sabin holdings in Ragatunjung are privately owned or family-owned. The cropping pattern used rotation between rice-paddy-secondary crops and vegetables, to reduce the attack of rat pests. Cultivated species include *Amaranthus hybridus*, *Brassica juncea*, *Vigna sinensis*, and *Zea mays*, generally used as food ingredients.

Annual plants are also found in Sabin, such as *Toona sinensis*, *Ceiba pentandra*, and *Falcataria falcata*. According to Chen et al. (2012), crop rotation is a wise alternative as one of the sustainable agricultural system practices that can maintain productivity, increase rice field fertility and the farmer's economy. Suprihatin & Amirullah (2018) add that crop rotation can control weeds, pest attacks, and diseases to reduce the use of chemical pesticides. There are three ways to irrigate rice fields in Ragatunjung: rainfed, technical, and semi-technical.

### Kubang Buyut (Protected Forest Plan Area)

Kubang buyut is the land that has long been abandoned and has not been used for about 30 years. *Kubang* means pool and *buyut* is the name for great-grandchildren. The area has a water storage pond for rice field irrigation originating from the nearest spring, namely *Tuk pitu*. Currently, this area is a Protected Forest Plan Area located in Ragatunjung and one of the sacred places by SMSC. Kubang buyut is characterized by pine trees with a large diameter of about 50 cm and tight so that the land under the stands cannot be reused. There is also a Protected Forest Plan Area in Pandansari which is still used as agricultural land like *wanah*.

### Tea Plantation

Kaligua tea plantation is a tea cultivation area (*Camellia sinensis*) in Pandansari, which SMSC uses as a livelihood, namely, picking tea leaves, maintaining tea, and garden supervisors and managed by PT. Perkebunan Nusantara IX. Kaligua Tea Plantation is also an agro-tourism area, so it can directly increase the welfare of society. The plants commonly found in the area are *Cinchona pubescens*, *Paraserianthes falcataria*, *Toona sinensis*, and *Crotalaria juncea* which are used as a tea

rotation crop and serve as a soil fertilizer.

### **Tanah Bengkok**

Tanah Bengkok for SMSC is land owned by the Village Government which is given to the Village Head and his apparatus during the term of office as wages. The village head and village apparatus only get the harvest, not ownership of the land. The majority of *tanah bengkok* types owned by SMSC are rice fields. Currently, only Ragatunjung has *tanah bengkok* with an area of 11.5 ha, while Cipetung and Pandansari have not owned it for a long time because it has been converted into public facilities, such as the field in Cipetung, and have been traded for the benefit of the village. This is in line with Edi (2010) statement that the crooked land is currently developing more diverse due to the needs of the village, for example, in the form of fields and other village facilities. The transfer of function of *tanah bengkok* is also related to Government Regulation 43/2014, which states that the village apparatus' income does not come from *tanah bengkok* but from fixed income, allowances, and other legal revenues from the government (Hartanto, 2016).

### **Telaga Ranjeng Nature Preserve**

Telaga Ranjeng Nature Preserve is a protected and sacred area by SMSC which believes that it is forbidden to take and consume catfish located in Telaga Ranjeng. The lake has a very large number of local catfish (*Pangasius hypophthalmus*). If violate this prohibition, will get harm, for example, an illness that does not heal. Prameswari & Sudarmono (2011) stated that local beliefs and knowledge about the protection of the Ranjeng Lake Nature Reserve area have been proven to be able to preserve the diversity of the lake's aquatic biota and make it one of the attractions of natural tourism. Another bene-

fit of it is that it never dry. According to Herawati et al. (2012), the existence of the forest around the lake makes the stability of the lake water guaranteed so that even though the dry season is long, the lake water never dries up. Prameswari & Sudarmono (2011) added that these forests also help retain water in the event of heavy rains and prevent landslides from the tea plantations."

### **Tuk (Water Source)**

SMSC referred springs with the term *tuk*. One of the largest is the *tuk capit-urang* which is located in the MS Protected Forest area. These springs are not only used for the fulfillment of daily needs, but also for agricultural irrigation. Other sources of water are, *tuk bening* located in the Kaligua tea plantation area, *Tuk pitu* in Ragatunjung, and several other small springs. The *Tuk pitu* spring is located around the Kubang buyut area which is one of the areas prohibited from being used because of its sacredness. SMSC believes that snakes guarding the springs and should not use the surrounding land with a radius of 1 ha. Respect in the form of sacredness springs and awareness to maintain springs is conservation practices that have been carried out from generation to generation. The spring is managed by an *ulu-ulu* (irrigation supervisor) who is in charge of managing water sources so that they are distributed evenly and repaired if there is damage. It is also useful to avoid conflicts of social jealousy due to the unequal distribution of water and plays a role in conservation practices, namely, minimizing community entry into forest areas, thereby minimizing forest damage.

The importance value of landscape units is directly proportional to the livelihoods owned by the community. Farmworkers and farmers make up the majority of the livelihoods, accounting for 40% in the three study

locations (Figure 2). The number of farmworkers in the study area is higher than that of farmers due to limited private land and the condition of the location being surrounded by state forests. This can be seen in the highest

proportion of people as farmers only reaching 21.11%, while farmworkers reached 41.59%. This is in line with the area of state forest in the three villages which reaches 40% of the village area.

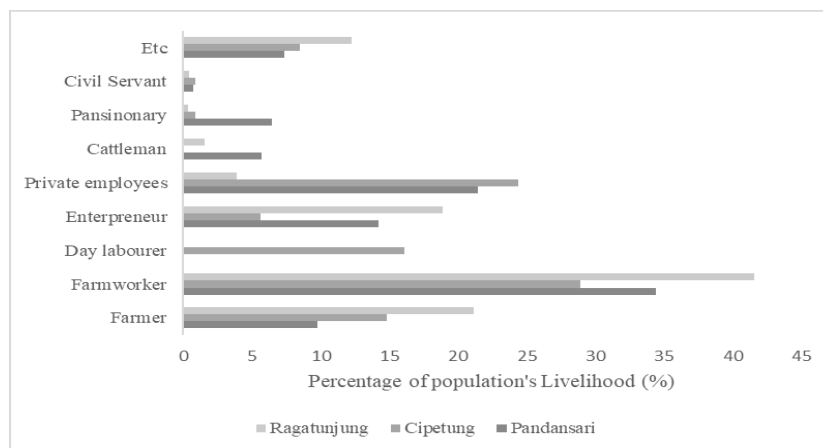


Figure 2. Percentage of population's livelihood in MLGS.

Wanah for the Cipetung and Pandansari people has the highest importance value than other landscape units and is the second-highest for the Ragatunjung community. This value in each village, namely, Ragatunjung was 31.27 (Figure 3a); Cipetung was 53.55 (Figure 3b), and Pandansari was 28.17 (Figure 3c). The high importance of *wanah* is because the three villages are surrounded by state forest areas.

The highest value of importance for the landscape unit for the Ragatunjung community is Sabin with a value of 35.27 (Figure 3a). The assessment revealed that Sabin is used as rice cultivation land, the staple food ingredient. Besides, Sabin is also used for vegetable cultivation because *Majegan* is more intended to cultivate annual crops. The *Majegan* landscape unit has the same function as the *wanah* as a vegetable cultivation area by the Cipetung and Pandansari communities. In contrast, the Ragatunjung community is more used for tree cultivation, such as *Syzygium aromaticum*, *Swietenia macrophylla*, Fikriyya et al.

and *Falcataria falcata*. The value of the interest of *Majegan* for SMSC is the third highest after *wanah* and *Sabin*. The score in each village, namely, Ragatunjung is 23.59 (Figure 3a); Cipetung is 24.73 (Figure 3b), and Pandansari is 24 (Figure 3c). *Majegan* is private or family-owned land that is increasingly limited because it has been converted into a house building. Therefore, even though owning *Majegan* land, the community continues to work on *Wanah*.

The use of settlements by the community is more intended for housing, gathering with family, and socializing. Residential areas in which there are yards also provide beneficial value for both vegetable cultivation and livestock cultivation. The value of the importance of residential landscape units in each village is as follows Ragatunjung of 8.136 (Figure 3a), Cipetung of 13.43 (Figure 3b), and Pandansari of 26.17 (Figure 3c). The value of the interests of settlements in Pandansari Village has a higher value than *Majegan* (24). This is influenced by the majority of people



use residential areas, especially yards as a place for sowing seeds and cultivating livestock. The low residential use value in Ragatunjung is influenced by narrow and limited yards so that the community prioritizes culti-

vation in the Majegan and Sabin areas (Figure 3a). Therefore, the function of the Ragatunjung community settlements is more used for housing than for fulfilling daily needs.

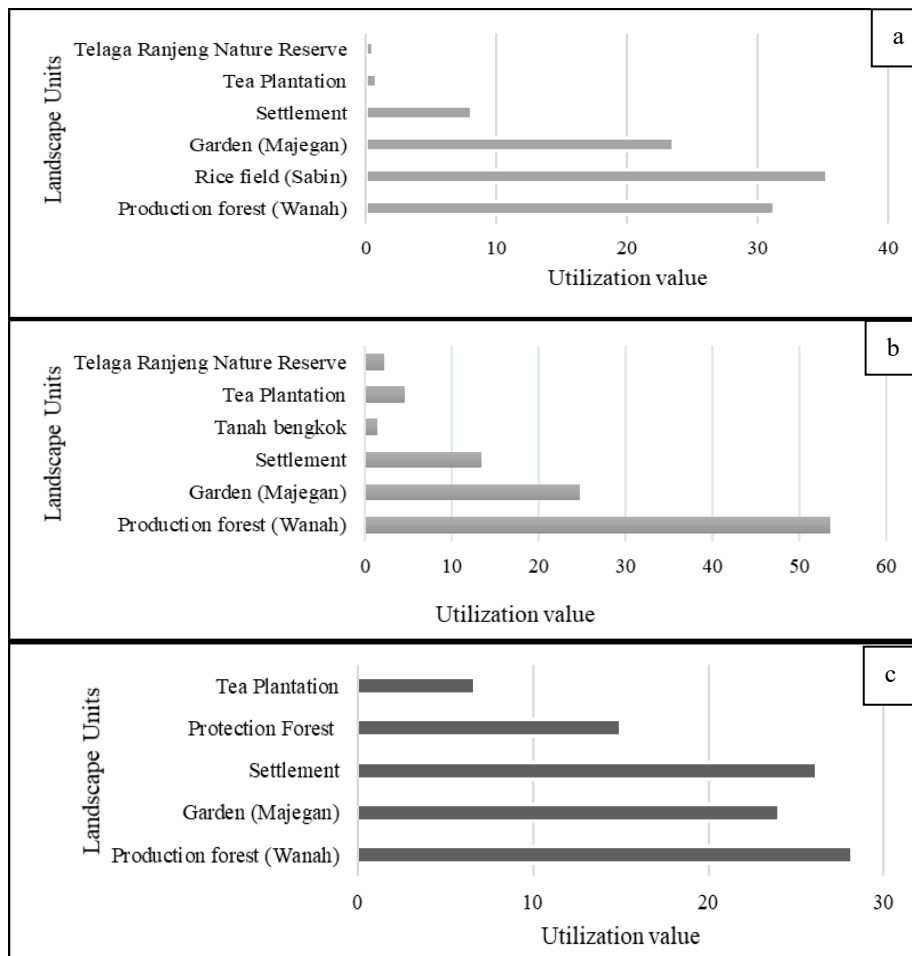


Figure 3. Diagram of the value of landscape utilization by the Javanese Slopes of Mt. Slamet in (a) Ragatunjung (b) Cipetung (c) Pandansari

Tea plantations for the people of Ragatunjung, Cipetung, and Pandansari have different utilization values. For the Pandansari community, tea plantations are intended as a livelihood, while for the people of Ragatunjung and Cipetung, it is used as recreational facility. Therefore, the importance value of tea plantations for the Pandansari community is higher than the Cipetung and Pandansari com-

munities. The value of the interests of each village, namely Ragatunjung of 0.8 (Figure 3a); Cipetung by 4,568 (Figure 3b); and Pandansari at 6.67 (Figure 3c). Likewise, Telaga Ranjeng Nature Reserve is used as a means of recreation for people outside Pandansari, which are visited because of its uniqueness, namely the local catfish (*Pangasius hypophthalmus*) that belief not to use it, both resi-

dents and visitors. The utilization value of the area for Ragatunjung and Cipetung is 0.6 and 2.273.

### Local User's Index (LUVI) of Plant Species

SMSC utilized plants in each landscape unit identified by 136 species from 111 genera and 55 families (Figure 4). The majority of the species used belong to the Fabaceae family, namely 15 species from 12 genera, the majority of which are used as food ingredients in vegetables such as *Phaseolus vulgaris*, and *Vigna angularis*. Besides, the community also uses it as animal feed taken from the leaves of *Calliandra calothyrsus* and *C. tetragona* and building materials (*Falcataria falcata*). Moreover, Fabaceae has high economic value in crops and food sources and *F. falcata* is one of the species that is the primary commodity in community forest practices (Zulkarnaen & Suryanto, 2013 ; Rahman & Parvin, 2015), added that Fabaceae plays a role in agriculture because it can utilize nitrogen through bacteria to fertilize the soil.

Other species that are widely utilized are Euphorbiaceae (8 species), Malvaceae (7 species), Solanaceae (7 species), and Poaceae (6 species). The members of the Euphorbiaceae family that are commonly found in the area are *Manihot esculenta* that cultivated during the dry season, and wood species such as *Glochidion arborescens* and *Macaranga tanarius*. Members of this family are also used as material for livestock feed (*Ricinus communis*) and ornamental plants (*Euphorbia pulcherrima*). There are eight species of Solanaceae family. The majority of which are foodstuffs in the form of vegetables and become the main commodity of SMSC, such as *Solanum tuberosum* and *Capsicum annum*. This family is one of the most influential families in human needs (Setshogo, 2015). In the Malvaceae family, seven species were found

used as fruit producers (*Durio zibethinus Murray*), Building materials (*Hibiscus tiliaceus*), cotton producers (*Ceiba pentandra*), and ornamental plants (*Hibiscus schizopetalus*). Six species of Poaceae family are used as the most important species for the community, such as *Oryza sativa*, which is used as the primary food, *Zea mays* which is the main commodity during the dry season, *Andropogon nardus* as a cooking spice, and *Pennisetum purpureum* as livestock feed.

The majority of SMSC use cultivated plants in each of their environmental units. Each landscape has different importance values, thus forming a different plant structure. This is in line with Prasetyo (2019), that differences in the management and use of a landscape form differences in plant communities in a landscape. The diversity of plants and the dynamics of interactions between people and their environment can characterize a landscape. The characteristics of each landscape influence the difference in the value of landscape interests in meeting people's living needs. Differences can influence differences in the value of plant interests by a community group in an area's culture, habits, and ecological conditions.

*Oryza sativa* has the highest importance in *Sabin* and *wanah* (Ragatunjung). The value of *O. sativa* in *Sabin* is 22 and in *wanah* 12. The value of the interests of the following species for the Ragatunjung community in *Sabin* is *Vigna sinensis* (3.3), and *Brassica juncea* (3.3) (Figure 5a), while in the region are *Zea mays* (9.6), and *Capsicum annum* (3.31) (Figure 5b). Furthermore, the calculation of the Local User's Value Index (LUVI) in the Majegan landscape unit shows the difference in utilization for the community in the three villages. The Ragatunjung community uses Majegan as land for annual crop cultivation, so the highest value of importance

in the landscape unit is *Syzygium aromaticum* (6.68) (Figure 5c) which is used for fruit, leaves, and wood.

The utilization of the Cipetung community landscape unit has the same function as Pandansari, namely, the cultivation of vegetables and secondary crops. *Brassica oleracea* has the highest plant importance value in the two landscape units of Cipetung, namely, Majegan (4.20) (Figure 5e) and settlement (3.5) (Figure 5f), while in the *wanah* is *Zea mays* (11.38) (Figure 5d). The high Local User's Value Index (LUVI) value in these plants is due to the ease of cultivation and the suitability of upland environmental conditions. *Brassica oleracea* is a common plant in cool areas with an altitude of 800-2000 m asl and a wet climate type (Setiawati et al.,

2007). This condition follows the condition of Cipetung, which has an altitude of 1112 m asl and has a rainfall of 7214 mm/year.

*Solanum tuberosum* has the highest value in each landscape unit of Pandansari because it is the village's main commodity. This species is an important plant for upland farmers because it has a better yield than other vegetables and can be stored longer. The Local User's Value Index (LUVI) values of *S. tuberosum* in each landscape are *wanah* (10.33) (Figure 5g), Majegan (6.80) (Figure 5h), and Protected Forest Plan (4.13) (Figure 5i). Cipetung has an altitude above 1000 m asl. This supports the growth of *S. tuberosum*, but people prefer to use other species of plants because potatoes require a large amount of capital.

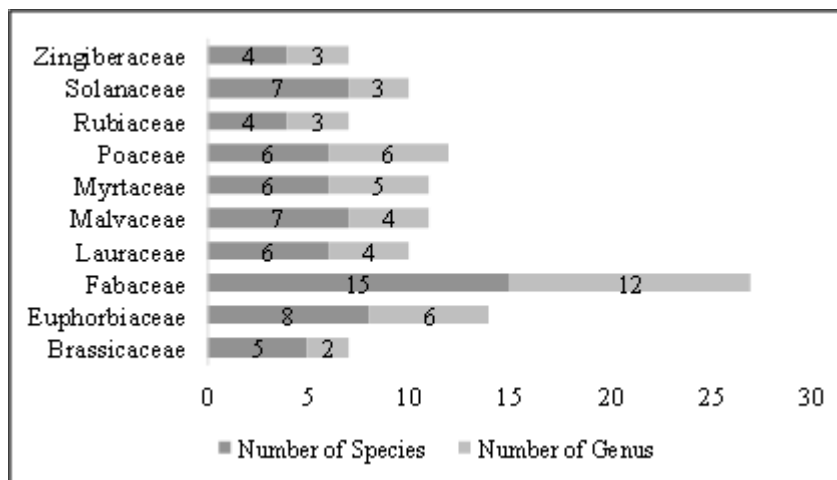
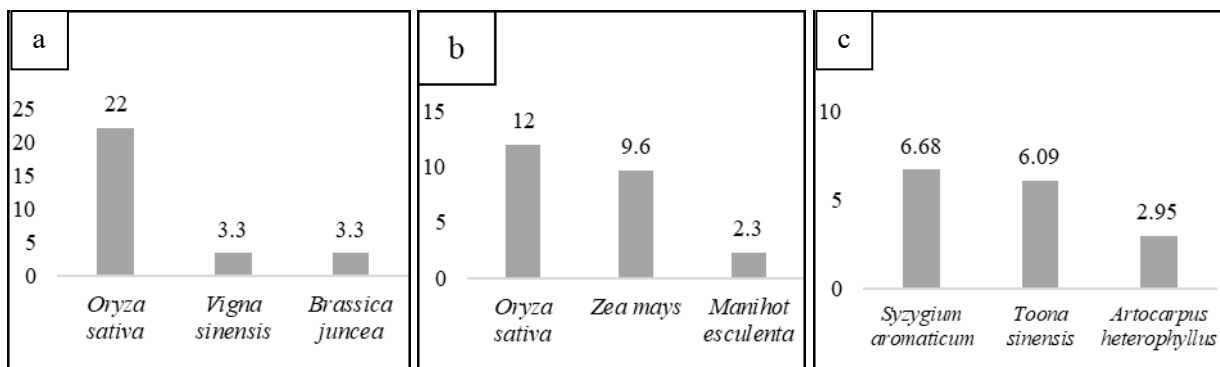


Figure 4. The top ten diversity of plant species and genera utilized by MLGS



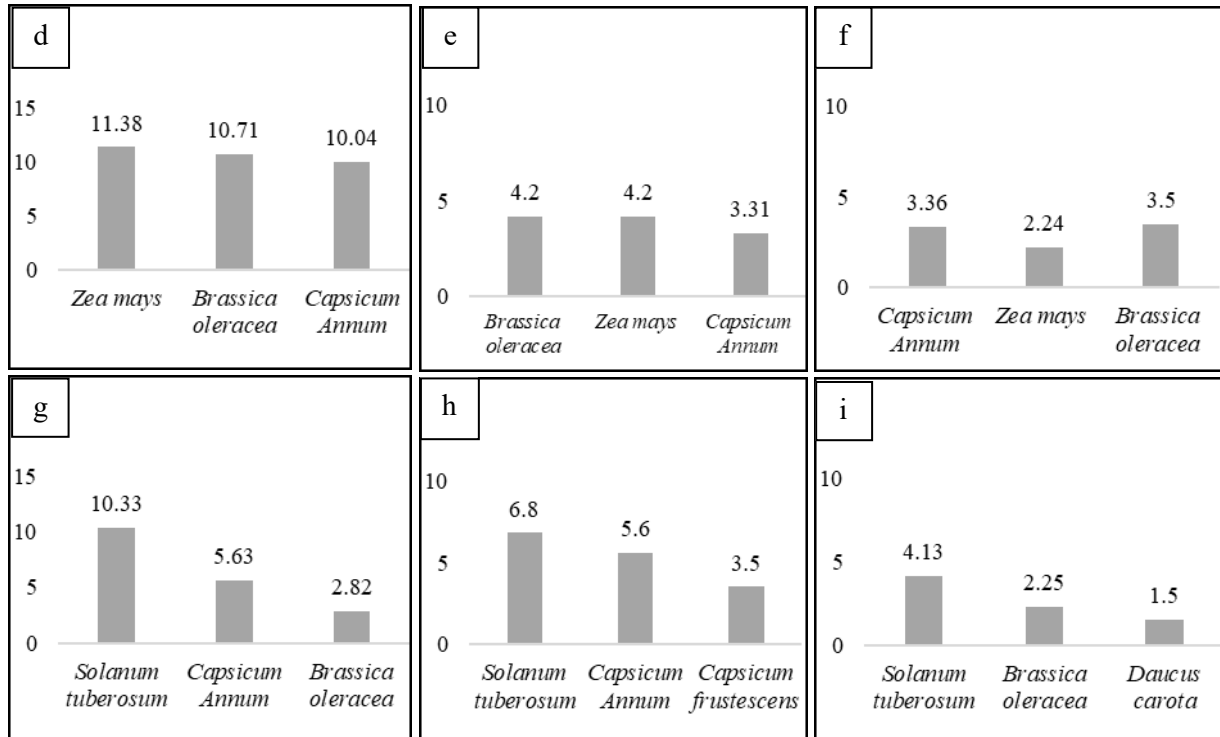


Figure 5. Diagram of the Local User's Index (LUVI) by MLGS (Caption: (a) *Sabin* in Ragatunjung (b) *Wanah* in Ragatunjung (c) *Majegan* in Ragatunjung (d) *Wanah* in Cipetung (e) *Majegan* in Cipetung (f) Settlement in Cipetung (g) *Wanah* in Pandansari (h) *Majegan* in Pandansari (i) Protected forest plan in Pandansari.

## CONCLUSION

SMSC recognizes nine types of landscape units based on characteristics, functions, and ownership, namely, *perawisan* (yard), *wanah* (production forest), *Majegan* (garden), *Sabin* (rice field), *Kubang buyut* (protected forest plan), tea plantations, Telaga Ranjeng Nature Reserve, Tanah Bengerok, and *tuk* (water source). Categorizing landscapes and their utilization by maintaining certain landscapes, such as the Telaga Ranjeng Nature Reserve and *Kubang buyut*, directly impact the sustainability and integrity of ecosystems and natural resources in and around the area.

## AUTHOR CONTRIBUTION

N.F. designed the study, collected the data, analyzed and wrote the manuscript; H.H. and R.N.Z. analyzed and wrote the manuscript, N. and M.S. supervised.

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## CONFLICT OF INTEREST

The authors declare that they have no known competing financial interests or per-

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