

Sustainable Harvesting System for Wild Plants with Medicinal Properties for the People of Muna Regency, Indonesia

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ABSTRACT

This study aims to determine the sustainable harvesting system for wild plants with medicinal properties for the people of Lohia District, Muna Regency using observation methods with interview techniques, namely conducting in-depth interviews using questionnaires. The sustainable harvesting system for wild plants as raw materials for traditional medicine is to collect and utilize wild plants in their natural habitat and select the necessary plant organs to be used as ingredients for traditional medicines. Community knowledge about harvesting wild plants as raw materials for traditional medicines is passed down from generation to generation. The harvest time carried out by the community has met the sustainable harvest standard, namely harvesting plant organs according to the harvest age of the wild plants. Harvesting techniques are carried out manually by the community and do not damage the organs of the plants being harvested.

Keywords: Harvest System, Wild Plants, Drug, Muna

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I. INTRODUCTION

The people of Lohia District, Muna Regency use several types of wild plants as traditional medicines for the therapy of certain diseases, which are packaged in several dosage forms, one of which is the herb lansau. People use plants as medicine in healing diseases that have been passed down from generation to generation, even though there are synthetic chemical drugs, they consider wild plants with medicinal properties to have no negative impact on health.

The raw materials, the people of Lohia Sub-district, Muna Regency get them directly from forest areas, fields, plantations, yards and roadsides. However, until now there has been no information about how the

sustainable harvesting system is carried out by the community so that the plant remains sustainable. Excessive use of plant resources as raw materials for traditional medicines will cause the extinction of the diversity of medicinal plants from the species level to the population level [5,17,18]. Harvesting in a sustainable manner provides several advantages because it maintains the diversity of its species, the balance of the ecosystem, the environment and local wisdom of the local community because the harvest method takes into account the quality of the harvest in the form of organ maturity in the plant [4,12,13,21]. Wild plants as traditional medicinal ingredients with limited abundance and slow growth, destructive harvests generally result in resource exhaustion and

even species extinction [10,1], sustainable use must be adequately accounted for for the sustainable use of medicinal plant resources [3]. Wild plants as medicine if harvested continuously without paying attention to sustainable harvesting systems will experience extinction [20]. Good and sustainable harvests of wild plants that have the potential as medicinal raw materials must still be considered [21], identification in their natural habitat must be clear [15,2,20]. Identification of the genus and species of these wild plants must be carried out in order to ensure their existence in nature. Harvesting medicinal plant species in their natural habitat must pay attention to harvesting methods in their environment so that the sustainability of the population of these plants is maintained because wild plant populations used as traditional medicines also provide food for other wild animals. Plant species that live in the wild are used as the main source of raw medicines, and if the management is not appropriate then these plants will experience extinction in the ecosystem [2], [18,22]. The harvest are fruits picked either prematurely or too late, are more susceptible to post harvest physiological disorders than are fruits picked at proper stage of maturity. Harvest is the time when grain, fruit, or vegetable already to cut or pick [27]. Sustainable harvesting is a harvesting system that only takes certain parts of plants/plants and leaves a little or 25% leaving some plants/plants in order to maintain their growth, because the purpose of harvesting is to take and/or separate parts of the produce or plants/plants as a whole and collect them from the land. other parent plants/plants in a good and correct way [11] and paying attention to harvest time, harvested organs, harvesting techniques and harvesting equipment [35].

Sustainable harvesting of wild plants as medicine is the ability to maintain, utilize and preserve wild plants as medicine for the welfare of the wider community. Cultural diversity and local wisdom possessed by our community is the potential to maintain the sustainability of wild plant biological resources as raw materials for traditional medicines in order to remain

sustainable [6,26] Local wisdom is built from social values that are upheld in the social structure of society and has a function as guidelines, controllers, and signs to behave in various dimensions of life both when dealing with others and with nature.

Plant products as medicinal raw materials are sourced from nature, secondary vegetation from cultivation and most of them still come from non-cultivated (wild) plants [29,30,31]. Medicinal plants derived from nature (non-cultivated) and secondary vegetation, can be harvested in a sustainable manner which is the management principle of optimal use of natural resources by considering current and future needs [32,33]. Medicinal plants that are harvested sustainably in certain parts have time, the method of harvesting and handling wild plants as medicinal raw materials is a critical period that greatly determines the quality and quantity of medicinal plant yields [34].

WHO GACP Guidelines 2003 harvest time depends on the part of the plant to be used, therefore time, sustainable harvesting methods and proper and correct handling of wild plants are factors that determine the quality and quantity of raw materials for traditional medicines because each type of medicinal plant has its own time and method. different harvest. Medicinal plants experiencing environmental stress will have different harvest times even though the types of medicinal plants are the same. Sustainable harvests become unsustainable if the method of harvesting medicinal plants is cut, uprooting and pruning the entire medicinal plant [28].

II. METHODS AND MATERIAL

The method used in this research is the observation of wild plants that are used as raw materials for traditional medicines and interview techniques, namely conducting in-depth interviews using interview guidelines to examine sustainable harvesting systems for wild plants that are used as raw materials for traditional medicines for the people of Lohia District, Muna Regency.

III. RESULTS AND DISCUSSION

The most widely used plant organs were leaves 70%, stems 21%, the least used were roots, rhizomes, sap and all organs only 2% each. The percentage of organ utilization which includes roots, stems, leaves, rhizomes, sap and all organs is presented in Figure 1.

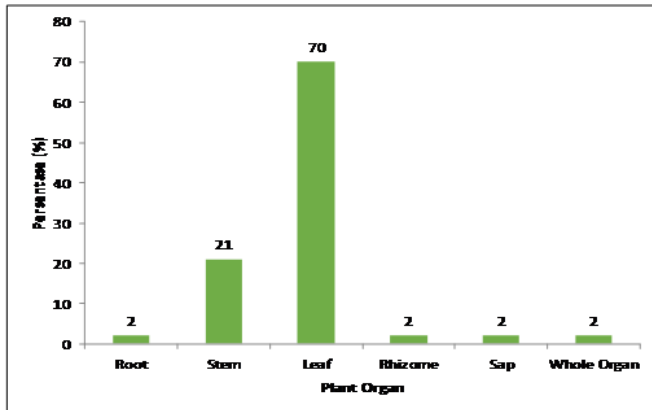


Figure 1. Percentage of Utilization of Plant Organs as Medicine in Lohia Kecamatan District

Figure 1. The organs used are 70% leaves, 20% stems, root organs, tubers, 10% rhizomes. The leaf organ is most widely used as raw material for traditional medicine because the leaf is the softest part and is a photosynthetic organ that contains chlorophyll which captures energy from sunlight. Leaves are the easiest part to get without damaging the plant [36]. In addition, the use of leaves for medicinal ingredients does not have a negative effect on plant growth, because the leaves can grow again on the shoots of plants. Meanwhile, the use of other parts, such as roots, rhizomes, tubers, bark, stems or all parts of the plant has an impact on the ecological role and survival of plants. Ingredients that use leaves are very high, because leaves are organs to produce secondary metabolites which generally contain active ingredients that are used as medicinal ingredients. Leaves are plant parts that come from metamorphosis of roots or stems or leaves that function to store food reserves including secondary metabolic products. The leaves are widely used by battra because this part according to them is part of a nutritious plant and they use it because of a

habit that has been passed down from generation to generation. The most widely used plant parts in traditional Saudi medicine are whole plants, leaves, seeds, and aerial parts with percentages of 29%, 28%, 7%, and 5%, respectively, [23].

Harvesting techniques and tools used for wild plants as raw materials for traditional medicine are presented in Figure 2.

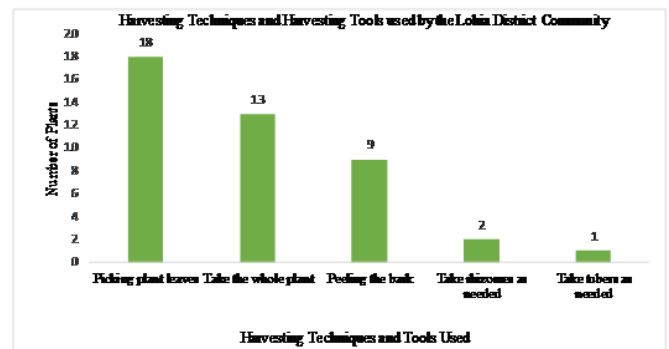


Figure 2. Harvesting Techniques and Harvesting Tools used by the Lohia District Community on Wild Plants as Raw Materials for Traditional Medicine.

Figure 2 related to harvesting techniques for medicinal plants in Lohia District shows that harvesting by picking leaves is the most common method, taking all parts of the plant, followed by peeling the bark, taking the rhizomes as needed and harvesting tubers as needed. Leaves have high regeneration to re-sprout and do not affect the growth of a plant even though the leaves are the site of photosynthesis [8]. The use of leaves as a part of medicine, apart from not harming medicinal plant species, the leaves are also easy in terms of taking and compounding medicinal herbs. Leaves are parts of plants that are widely used as traditional medicine [9]. Leaves are generally soft textured because they have a high-water content (70-80%). Leaves are a place for photosynthate accumulation which is thought to contain elements (organic substances) that have disease-healing properties. Substances found in many leaves are essential oils, phenols, potassium compounds, and chlorophyll. Chlorophyll is a substance that is abundant in green plants. The use of leaves as

ingredients for medicinal herbs is considered a method of processing that is easier than the bark, stems and roots [38]. The leaves are easy to take and have good properties compared to other parts and do not depend on the season, the use of leaves also does not damage other parts because the leaves are easy to grow back and can be used continuously.

Harvesting (collection) of plants by the people of Lohia District, is done manually (picking by hand) and using a machete or knife. Plant organs that are harvested manually, must pay attention to the maturity of the organs needed as raw materials for traditional medicines. Harvesters or pickers play an important role in maintaining simplicia correctly and correctly and not damaging the parent plant. For simplicia collected using tools (eg knives) or using machines, the right tool or machine must be selected to pick them. Metal tools are not used if chemically destroys the active compound in the simplicia (eg simplicia containing phenol groups, glycosides).

Leaf harvesting is done when the plant has grown maximally and has entered a physiologically mature period which is done by pruning the plant. Photosynthetic plants take their leaves when the photosynthetic reaction is complete, namely at 09.00-12.00 WITA. Delayed harvesting → the leaves are aging → the quality is low, because the active ingredients have been degraded. Harvesting too quickly causes low yields and low content of active ingredients, such as Dutch teak plants that can be harvested at the age of 1 - 1.5 years, guava at the age of 6 - 7 months, grass jelly 3 - 4 months and aloe vera. at the age of 12-18 months after planting. Leaves are harvested when the plant is flowering and before the fruit is ripe for example: *Athropa belladonna* leaves, (highest alkaloid content in plant shoots).

Taking shoots when experiencing changes in growth from vegetative to generative (when the color of the shoots changes to old leaves) for example: *Orthosiphon stamineus* (cat's whiskers). Selected old leaves that have fully opened and are located on the branches/stems that receive perfect sunlight (perfect

assimilation occurs) for example: *Blumea balsamifera* leaves (sembung).

Rhizomes, roots, tubers, tubers are collected when the growth process stops, namely when the plant parts dry above the soil surface (eg turmeric, temulawak, ginger, and kencur). In general, harvesting of rhizomes is done when the plant is 8-10 months old. Ginger rhizome → For export needs in fresh form, ginger is harvested at the age of 8 - 9 months after planting → For seedlings 10 - 12 months → As a medicinal ingredient, the rhizomes are harvested after they are old, which is 9-12 months after planting. Temulawak rhizome is carried out after the plant is 10-12 months old (producing high levels of essential oils and curcumin). Harvesting of wood is carried out after the wood has maximally formed secondary metabolites.

The harvest age of plants varies depending on the type of plant and the rate of formation of secondary metabolites. Secang plants can only be harvested after 4 to 5 years, because if they are harvested too young, the content of active substances such as tannins and sappan is still relatively small. The fruit is harvested after physiological maturity by picking. If before ripe → low fruit quality and quantity reduced. If harvesting is done late → causes a decrease in quality, because there is a reshuffle of the active ingredients contained in it into other substances. Other conditions and certain types: a) fruit is harvested before it is ripe (example: *Piper nigrum*) b) fruit is harvested after it is fully ripe (example: fennel), c) fruit is harvested when the fruit changes color (example: *Tamarindus indica*), d) fruit is harvested when the fruit changes shape (example: *Cucumis sativus*; and *Momordica charantia*). Local community knowledge of wild plant species that are harvested will determine the sustainability of these plants [6].

Unsustainable harvests are not a problem for wild plants which are abundant in nature [19]. On the other hand, some types of plants that are available in nature are limited and must be harvested sustainably [22]. Tolerance to harvesting wild plants varies and depends on several factors, namely the age of the plant, the

organ of the plant harvested, the abundance of the species, the habitat in which the plant was harvested, or the growth rate of the plant species. Plants that experience slow growth are particularly susceptible to overtaxing, whereas fertile wild plants are less susceptible to heavy harvests [14,26].

IV. CONCLUSION

The results of the research on the Sustainable Harvesting System of Wild Plants with Medicinal Properties for the People of Muna Regency, Indonesia are described as follows:

1. Sustainable harvesting system for wild plants as raw materials for traditional medicine for the people of Lohia District, Muna Regency, is to collect and utilize wild herbs with medicinal properties in their natural habitat, by selecting the plant organs needed to be used as ingredients for traditional medicines.
2. Community knowledge about harvesting wild plants as raw materials for traditional medicine is passed down from generation to generation.
3. The harvest time carried out by the community has met sustainable harvest standards, namely harvesting plant organs according to the harvest age of the wild plants.
4. Harvesting techniques are carried out manually by the community and do not damage the organs of the plants that are harvested.

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