

Ethnobotany Traditional Medicinal Plants by People in Rangkang Village, Kraksaan Sub District, Probolinggo Regency

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Abstract

The purposes of this collaborative research are to reveal the plant species used in traditional medicine, to reveal diseases that can be prevented and treated with medicinal plants, to reveal how to process medicinal plants into traditional medicines, and to analyze the efforts to preserve medicinal plants in Rangkang Village. The methods used are observation, interviews, documentation, and data analysis using Species Use Value (UVs), Family Use Value (FUVs), and SWOT analysis. The results showed 33 species of medicinal plants used by the people of Rangkang Village. Some essential or priority plants for the people of Rangkang Village are betel (*Piper betle*), papaya (*Carica papaya*), lime (*Citrus aurantifolia*), pomegranate (*Punica granatum*), temu ireng (*Curcuma aeruginosa*), turmeric (*Curcuma longa*), noni (*Morinda citrifolia*), galangal (*Alpinia galangal*), guava (*Psidium guajava*), soursop (*Annona muricata*) and white turmeric (*Curcuma mango*). There are 27 medicinal plant families with different FUVs values. The strategy for conserving the diversity of medicinal plants in Rangkang village is by maintaining and preserving the wealth of natural resources owned, forming a farmer community to preserve medicinal plants, and collaborating with the government or Non-Government Organisations counseling the local community.

Keywords: conservation strategy, ethnobotany, medicinal plant, rangkang village

INTRODUCTION

Medicinal plants are one of the important components in medicine, which are in the form of traditional herbal ingredients and have been used for hundreds of years [1]. Traditional medicine is used by some people for generations and until now there are still many that are scientifically proven to have medicinal properties. In addition, traditional medicine can also be used as the basis for the development of new drugs. The knowledge possessed by the community about medicinal plants and ingredients in processing them is obtained from the experience and skills obtained from the ancestors [2].

Advances in technology and science are not able to simply eliminate the meaning of traditional medicine. Therefore, one of the alternative treatments is to increase the use of medicinal plants in the community. Local wisdom, traditional medicine, and ethnobotany knowledge need to be studied and developed [1]. Ethnobotany is a scientific discipline that studies the interactions between plants and humans. Interaction based on local wisdom values that apply to a certain community culture. Things that need to be studied

in ethnobotany include the study of the use of plants as food, protection or housing, medicine, clothing and traditional ceremonies [3].

Human dependency on biodiversity and the way of life is closely related to cultural diversity that determines the fate of the environment. Therefore, it is necessary to study the concept and understanding and mastery of knowledge in processing biological resources [4]. The development of human civilization makes dependence on plants increasing, which has implications for needs such as clothing, shelter, food and health. An ethnobotanical research approach is needed to integrate the natural sciences and social sciences (anthropology). There are two approaches used in this research, namely qualitative and quantitative approaches. The two approaches can be conducted together to make this research stronger and complete each other [5]. Nowadays, research on ethnobotany of medicinal plants is very important because this science has a major contribution to the development of modern science, including contributions to the field of Pharmacy [6].

One of the people who have local wisdom in the field of traditional medicine using plants is the Rangkang Village community, Kraksaan District, Probolinggo Regency. Probolinggo Regency is an area that has a variety of topography in the form of lowlands, hills and mountains, most of which are at an altitude between 100-1.500 mdpl. The majority

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of the people of Rangkang Village are Javanese and Madurese. The use of medicinal plants by the people of Rangkang Village is an invaluable indigenous knowledge and is a culture that needs to be more deeply so that knowledge is not lost. Another thing that is also important to be studied is how the community maintains knowledge about medicinal plants and maintains the sustainability of medicinal plants in Rangkang Village. Because the use of natural resources must be balanced with conservation activities so that the resources used are still available and can continue to be utilized.

Nowadays, there are still many people in Rangkang Village who work as shamans or healers, who still use medicinal plants to give to their patients. In addition, the people of Rangkang Village are still classified as ordinary people who still do not understand modern medicine. The community is also still thick with herbs or herbal concoctions that have been inherited by their ancestors.

This study aims to reveal the plant species used as traditional medicine by the people of Rangkang village, to reveal diseases that can be prevented and treated with medicinal plants, to reveal the ways in which medicinal plants are processed into traditional medicines by the community, and to analyze the efforts medicinal plants in Rangkang village. Up to now, the researchers hope that people of Rangkang village will keep the existing medicinal plant species from becoming extinct and maintain the conservation of these plants.

MATERIAL AND METHOD

Research location

The research entitled "Ethnobotany of traditional medicinal plants by the community in Rangkang village, Kraksaan District, Probolinggo Regency" was carried out in July 2021 - January 2022. The interviews were conducted in Rangkang Village, Kraksaan District, Probolinggo Regency.

Observation

Observation is a data collection technique that is carried out directly on the object or on the research location regarding the field conditions with the investigated factors. Observation is done by observing closely and taking notes. Observations of medicinal plants were carried out in Rangkang Village, Kraksaan District, Probolinggo Regency. Observations were made in the gardens or yards of local people's houses.

Interview

Interview was conducted directly and semi-structurally to determine public knowledge about

medicinal plants in Rangkang Village. Determination of respondents is done by using purposive sampling method. There were 54 respondents, taken from 2 hamlets (Dusun Krajan 1 and Dusun Krajan 2), with 27 respondents in each hamlet. Respondents are over 30 years old because they are more experienced in making traditional medicines from plants. The results of the interviews were recorded and entered in the respondent's table for data analysis.

Documentation

Documentation is data in the form of photos as evidence of research that researchers are doing. Documentation is used to prove the validity of the observation process.

Data analysis

The qualitative data obtained were then analyzed descriptively. The data were analyzed using the calculation of Species Use Value (UVs), Family Use Value (FUVs) and SWOT analysis.

The results of interviews related to the use of plants were analyzed quantitatively. Quantitative analysis is used to determine the use value of a plant species which is calculated using the UVs (Use Value) method [7].

$$UV_s = \sum \frac{UV_{is}}{i_s}$$

Information:

UV_s : overall use value of type s

UV_{is} : use value of type s determined by informant i

i_s : total number of respondents interviewed for type s

The higher the value of UVs, the more important the usefulness of a species in that area is to the community. The UVs formula can also be developed into FUVs with data conditions that have very many species and can represent certain families [8].

$$FUV = \frac{\sum FU_i}{n}$$

Information:

FUV : use value of a family

FU_i : the number of uses mentioned by each respondent for each family

n : the total number of species in a particular family

The higher the value of FUVs, the more important the use of species in a family in that area to the community.

SWOT analysis

SWOT analysis is a strategic planning method used to evaluate strengths, weaknesses,

opportunities and threats with regard to a project or business activity [9]. This SWOT analysis is a decision-making formulation tool as well as to determine the development strategy to be taken based on logic to maximize strengths and opportunities, but at the same time minimize weaknesses and threats. The formulation was compiled from the results of interviews and observations.

RESULTS AND DISCUSSION

Species of Medicinal Plants in Rangkang Village

Based on observations, there are 33 species of medicinal plants belonging to 27 families. The medicinal plants used by the people of Rangkang Village are aloe vera (*Aloe vera*), banana (*Musa paradisiaca*), basil (*Ocimum sanctum*), beluntas (*Pluchea indica*), betel (*Piper betle*), cambodia (*Adenium windmill*), cassava (*Manihot esculenta*), celery (*Apium graveolens*), chilli (*Capsicum frutescens*), coconut (*Cocos nucifera*), corn (*Zea mays*), cucumber (*Cucumis sativus*), galangal (*Alpinia galanga*), guava (*Psidium guajava*), and iodine (*Jatropha multifida*), jackfruit (*Artocarpus heterophyllus*), kapuk (*Ceiba pentandra*), lime (*Citrus aurantifolia*), moringa (*Moringa oleifera*), neem (*Azadirachta indica*), noni (*Morinda citrifolia*), papaya (*Carica papaya*), pete cina (*Leucaena leucocephala*), pomegranate (*Punica granatum*), sembukan (*Paederia scandens*), shallots (*Allium cepa*), soursop (*Annona muricata*), starfruit (*Averrhoa bilimbi*), taro (*Colocasia esculenta*), temu ireng (*Curcuma aeruginosa*), tomato (*Solanum lycopersicum*), white turmeric (*Curcuma mango*), yellow turmeric (*Curcuma longa*).

The level of ethnobotanical knowledge possessed by older people is higher than that of younger people. People with old age use medicinal plants because they already believe and are accustomed to using them [10]. According to the community, the use of medicinal plants is better because they have the function of natural ingredients to treat diseases that often arise. Society also does not need to spend a lot of money when compared to modern medicines. The use of medicinal plants also has no side effects when compared to modern medicines [11].

Types of diseases treated using medicinal plants

Types of diseases in Rangkang Village that can be treated using medicinal plants are classified as infectious and non-communicable diseases (aches, internal heat, high blood pressure, intestinal worms, wasp stings, hair loss, colds, pain in the

heels, tonsils, cracked heels leucorrhoea, diabetes, nosebleeds, abdominal pain, sores on the skin, canker sores, diarrhea, irregular bowel movements and fever). People also use medicinal plants to maintain health to prevent disease.

Types of infectious diseases according to the community include smallpox, acne, cough, eye pain, ulcers, itching and diarrhea. The lowest disease percentage value was itching (18%), while the highest disease percentage value was eye pain (72%) (Figure 1).

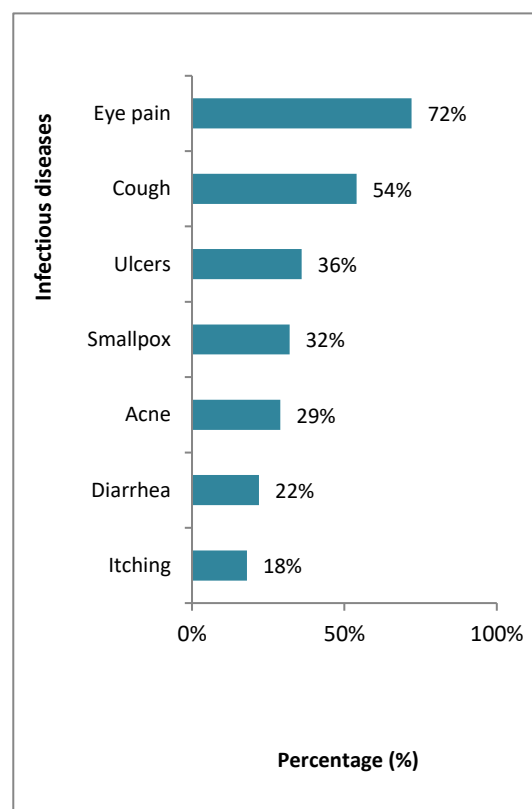
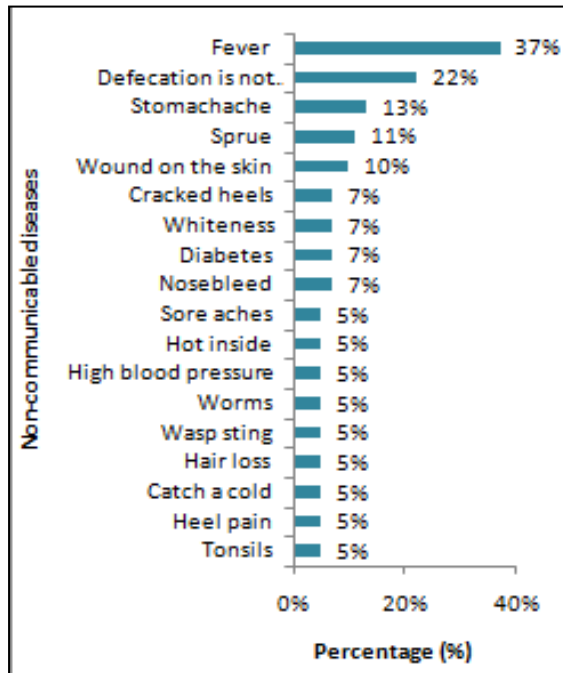


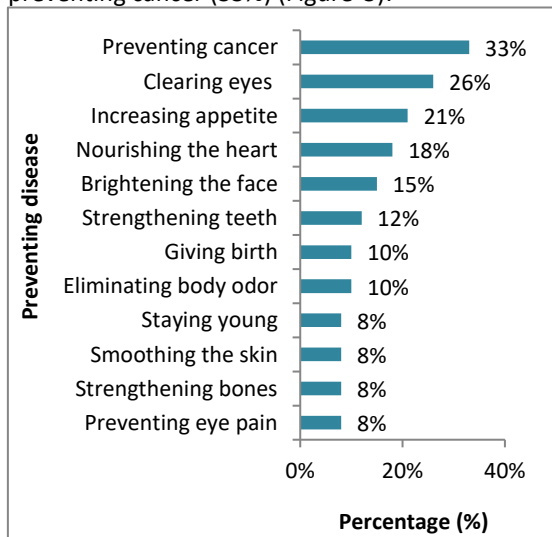
Figure 1. Percentage of infectious diseases

Types of non infectious diseases according to the community include aches, internal that, high blood pressure, intestinal worms, wasp stings, hair loss, colds, pain in heels, tonsils, cracked heels, vaginal discharge, diabetes, nosebleeds, stomachache, sores on the skin, cancer sores, bowel movements are not smooth and fever. The lowest percentage value of disease is aches, internal heat, high blood pressure, intestinal worms, wasp stings, hair loss, colds, pain in the heels and tonsils (5%), while the highest percentage value of disease is fever (37%) (Figure 2).



Picture 2. Percentage of non-communicable diseases

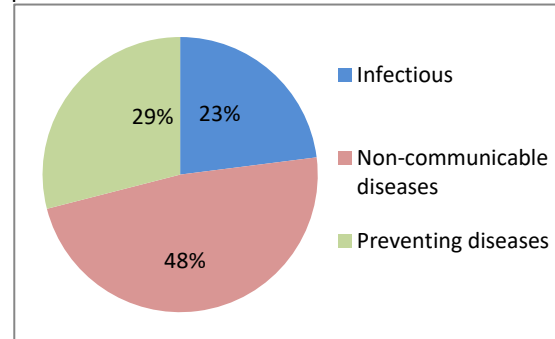
Preventing disease according to the community includes staying young, smoothing the skin, strengthening bones, preventing eye pain, giving birth, eliminating body odor, strengthening teeth, brightening the face, nourishing the heart, increasing appetite, clearing eyes and preventing cancer. The lowest percentage value is youthful, smoothes skin, strengthens bones and prevents eye pain (8%), while the highest percentage value is preventing cancer (33%) (Figure 3).



Picture 3. Percentage of maintaining health

The group of diseases with the highest percentage value in Rangkang Village is non-communicable diseases (48%), while the lowest is

the infectious disease group (23%). Prevention of disease attack (29%) (Figure 4). The high cultivation and use of traditional medicinal plants in Rangkang Village can increase efforts to conserve medicinal plants.

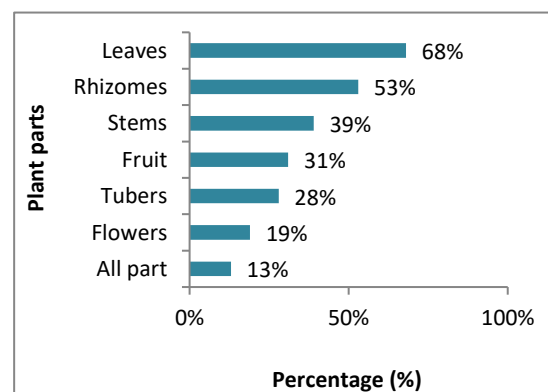


Picture 4. Percentage of types of diseases treated with medicinal plants

Parts of plant used as medicine

The plant parts used as medicine by the people of Rangkang Village include stems (39%), fruit (31%), flowers (19%), leaves (68%), rhizomes (53%), all parts (13%) and tubers (28%) (Figure 5). The part of the plant that is used the least in traditional medicine is the whole part (13%), this is because all parts of the plant have different effects. The part of the plant that is often used for traditional medicine is the leaves (68%) this is because the leaves are easy to consume in traditional medicine using easy processing.

Generally, leaves have a soft texture, high water content (70-80%) and many organic substances can cure diseases. The results of photosynthesis in leaves produce complex compounds called secondary metabolites. These compounds are generally found in all parts of the plant, especially the leaves [12].



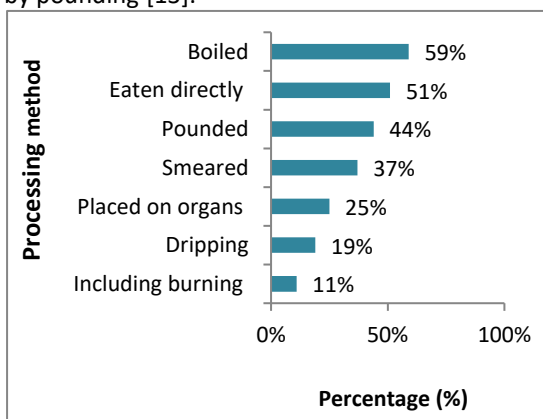
Picture 5. Percentage of plant parts used as medicine

Medicinal plant processing

There are several methods of processing

medicinal plants applied by the people of Rangkang Village, including burning (11%), dripping (19%), placing on organs (25%), smearing (37%), pounding (44%), eaten directly (51%) and boiled (59%). The processing of medicinal plants that are least applied by the community is by burning (11%), while the processing that is most widely applied is by boiling (59%) (Figure 6).

Boiling is believed by the community to kill bacteria on plants. Boiling is also believed by the community to be easier to extract the juice or compounds contained in plants, so that the healing process of disease is faster. The boiling technique will dissolve the active compounds in the leaves such as flavonoids into the water, so the compounds will be more easily digested by the body. Processing of medicinal plants by boiling is not always effective for all types of plants, one of which is rhizome plants which should be processed by pounding [13].



Picture 6. Percentage of medicinal plant processing methods

The processing of medicinal plants can be processed with a mixture of plants or other ingredients such as salt, coconut oil and soy sauce. Medicinal plants are mixed with other plants in processing, namely betel, cayenne pepper and moringa. Medicinal plants mixed with other ingredients are sembukan, celery, banana, papaya and lime. According to the community, plants are mixed with other plants or materials to make the efficacy of these medicinal plants more complete. This is because each part of medicinal plants and ingredients has different chemical compounds or properties and properties. So the application of medicinal plants added to plants or other ingredients is intended for more effective use.

Species use value (UVs) of medicinal plants

Species use value or "Species Use Value" describes the level of species use value of plants in

medicinal use by the community in Rangkang Village. Based on the results of interviews with the community about the use of medicinal plants, 33 types of medicinal plants were obtained with different UVs values, namely species of less importance or not priority ($0 < UVs < 3$) and important or priority species ($3 \leq UVs \leq 6$).

Medicinal plants including important species or priority species are betel, papaya, lime, pomegranate, temu ireng, yellow turmeric, noni, galangal and guava. The plant with the lowest UVs value was kapuk, while the highest UVs value was betel. The high and low value of UVs of medicinal plants in Rangkang Village is related to diseases suffered by the community, so it is possible that there will be changes in the value of UVs in Rangkang Village.

Family use value (FUVs) of medicinal plants

Family use value or "Family Use Value" describes the level of family use value of plants in medicinal use by the people in Rangkang Village. Based on the results of interviews, there were 27 medicinal plant families with different FUVs values. The family most widely used by the people of Rangkang Village is the piperaceae family, while the family that is rarely used is the malvaceae family. This is because the Piperaceae family, one of which is betel, is often used by the community as a medicine for eye pain, vaginal discharge, diabetes, body odor, nosebleeds and strengthens teeth. On the other side, many people also grow the betel plant. The essential oil of betel nut contains bathlephenol oil, sesquiterpenes, starch, attaches, sugar and caviol substances that can kill germs, antioxidants and fungicides, as well as antifungals [14]. The high and low value of FUVs of medicinal plants in Rangkang Village is related to the plant species used and the diseases which are suffered by the community.

SWOT analysis

Ethnobotany management of medicinal plants in Rangkang Village which can be a basis for increasing the conservation of medicinal plants and local wisdom, both among the community or academics and also the government. Therefore, the ethnobotanical management strategy of medicinal plants in Rangkang Village can be seen using a SWOT analysis as described below:

1. Strength

- There are 33 types of medicinal plants found in Rangkang Village.
- Many people still cultivate medicinal plants in their yards.

- c. People are still thick with herbs or herbal concoctions that have been passed down by their ancestors.
 - d. People are still classified as ordinary people, who still do not understand modern medicine.
 - e. There are many professions of shamans or healers who still use medicinal plants to be given to their patients.
- 2. Weakness**
- a. Lack of understanding of the younger generation, because they are less concerned with medicinal plants and do not understand how to process them.
 - b. The community still has not developed medicinal agricultural land.
 - c. People do not care about the surrounding environment, so medicinal plants are starting to become extinct.
 - d. The community does not yet have the desire to develop medicinal plants.
 - e. Many people choose to buy ingredients for making traditional medicines rather than planting them directly.
 - f. Few people are aware of the importance of conserving medicinal plants.
- 3. Opportunities**
- a. Supporting natural resources.
 - b. There are many distributions of medicinal plants in Rangkang Village.
 - c. Many plants are allowed to regenerate themselves without any interference from humans.
 - d. There is support from the government to organize a medicinal plant farmer group.
- 4. Threats**
- a. The extinction of local wisdom about the function of medicinal plants.
 - b. Scarcity of medicinal plants.
 - c. Damage to the habitat of medicinal plants due to lack of attention to the environment.

From the description above, it is necessary to have a strategy in maintaining the conservation of medicinal plants, namely:

1. SO (Strengths-Opportunities)

Strategy, namely by optimizing the strengths you have and selecting and managing profitable opportunities by:

- a. Maintain and preserve the wealth of natural resources owned, including local species that exist and the fertility of the soil.
- b. Preserve and preserve traditional medicines, including species used as

ingredients for making traditional medicines.

- c. Forming a community of farmers in preserving medicinal plants and also preserving biodiversity.

2. The ST (Strengths-Threats)

Strategy is through the strength you have as much as possible to prevent threats that come by:

- a. Collaborating with the government or NGOs for outreach to local communities about the importance of plant conservation activities involved in the manufacture of traditional medicines.
- b. Pass on ancestral knowledge to the community.
- c. Inviting the community to use land or gardens for cultivating medicinal plants.

3. WO (Weakness-Opportunities)

Strategy, namely minimizing weaknesses by using existing opportunities by:

- a. Providing knowledge to the younger generation about the importance of medicinal plants and how to process them.
- b. Creating a community regarding the study of medicinal plant ethnobotany.
- c. Provide assistance to the community regarding the importance of medicinal plants.
- d. Utilize and process natural resources effectively.

4. WT (Weakness-Threats)

Strategy, namely minimizing weaknesses through prevention of all forms of threats by:

- a. Preserving customs and culture, community beliefs regarding the use of medicinal plants.
- b. The government must support and strive to suppress land conservation, so that the preservation of medicinal plants in Rangkang Village is maintained.
- c. Organize educational activities about biodiversity conservation for the surrounding community.
- d. Optimizing agricultural land and plantations for medicinal plants.

CONCLUSION

There are 33 species of medicinal plants used by the community. People use medicinal plants to treat infectious and non-communicable diseases. The community processes the plant by burning it, dripping it, placing it on the organ, smearing it, pounding it, eating it directly and boiling it. The most widely used plant part as traditional medicine is the leaf. Important or priority plants for the

people of Rangkang Village are betel, papaya, lime, pomegranate, temu ireng, yellow turmeric, noni, galangal, guava, soursop and white turmeric. Based on the results of interviews, there were 27 medicinal plant families with different FUVs values. The most widely used family is the Piperaceae family, while the less used family is the Malvaceae family.

The strategy for conserving the diversity of medicinal plants in Rangkang Village is by maintaining and preserving the wealth of natural resources owned including local species, maintaining and preserving traditional medicines, forming a farmer community in preserving medicinal plants, collaborating with the government or NGOs for counseling the local community, passing on ancestral knowledge to the community, inviting the community to use land or gardens, providing knowledge to the younger generation about the importance of medicinal plants, creating a community regarding the study of ethnobotany of medicinal plants and assisting the community regarding the importance of medicinal plants.

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