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Wild Edible Plants: SDGs Strategy in the Kamajong Crater Forest Support Area

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ABSTRACT

Data collection on natural resources, especially wild edible plants (WEPs) in the forest around Kamojang Crater, needs to be done because it is a life support area for the Garut Regency and Bandung Regency. It has abundant biological wealth, community dependence on forest resources is high, and there is still a lack of data collection on the use of WEPs by the community to support sustainable development (SDGs). Environmental management and sustainable use of natural resources are problems that still need to be solved. The aims of this study were to (1) conduct a systematic study of WEPs used by communities in the forest buffer zone of Kamojang Crater, (2) record traditional knowledge related to WEPs, (3) analyze various uses of WEPs, and (4) evaluate species of significant cultural significance to communities in the Kamojang Crater forest buffer zone. The study carried out semi-structured interviews, key informant interviews, and participatory observations in the forest buffer area of Kamojang Crater, Samarang Subdistrict, Garut Regency, West Java, focusing on the nearest village to the Kamojang Crater. A total of 50 informants were involved in the snowball method to obtain information about WEPs, including local names, food categories, parts used, consumption methods, and other local uses. Several quantitative and qualitative methods have been conducted, consisting of RFC and CFSI calculations to identify the most culturally significant WEPs, and ANOVA to evaluate the variables of sex, age, occupation, and education. The study obtained data on 80 species from 37 families of WEPs consumed by the community in the forest buffer area of Kamojang Crater. The families are Asteraceae (19.23%), Euphorbiaceae (6.41%), Solanaceae (6.41%), Malvaceae (5.13%), and Apiaceae (5.13%). WEPs as side dishes with high CFSI values were *Limnocharis flava* (L) Buchenau, and *Pilea melastomoides* (Poir.) Bl., *Nasturtium officinale* W.T. Aiton, *Oenanthe javanica* (Blume) DC., *Monochorea vaginalis* (Burm. f.). Analysis of community age affects knowledge about WEPs, while gender, education, and occupation of the informants have not influenced it.

Keywords: Forest buffer, food security, Kamojang crater, SDGs strategy, wild edible plant

INTRODUCTION

The needs of the world's population for food and nutritional resources are still not resolved. One of the efforts to meet food needs with good nutrition and affordable prices is to utilize edible wild plants (WEPs). WEPs are not commercially managed and cultivated. On the other hand, many cultural, traditional, and heritage practices use it as a source of carbohydrates, proteins, fats, and minerals (Araujo *et al*., 2012).

The necessity of affordable yet nutritious foods, especially for low-income people in rural areas, sometimes becomes a challenge. According to Jyotsna and Katewa (2016), WEPs aids in the fight against malnutrition-related problems and improves the health of the rural population, dietary supplement, and product development.

Indonesia is a mega biodiversity country because it has high biodiversity (Sukardiyono and Rosana, 2019). According to Person *et al*. (2006), natural resource management in Indonesia and the Philippines began to focus on forest resources. However, the utilization of WEPs as genetic resources is not optimal. Information related to WEPs type, nutritional content, efficacy, and usability in the vicinity of settlements and forests, is still insufficient. WEPs type data will provide accurate information to prevent habitat destruction and reduce the genetic diversity of WEPs. Accessible information and technology, social values, location details, and developments in certain areas will affect the ability to use and manage a wide range of biodiversity (Keong, 2015).

As the human population increase, the usage of new plant resources for food potential, animal feed, energy, and industrial purposes cause the urgency of sustainable plant resource exploration. Many species of WEPs that have the efficacy for nutritional sources and food alternatives were being neglected and underutilized (Iskandar, 2017).

Data collection on natural resources, especially WEPs in the forest around Kamojang Crater, needs to be done because of its role as life support for Garut and Bandung Regency. Kamojang Crater Forest has abundant biological diversity, which is the community's high dependence on forest resources. However, lack of data collection on the efficacy of WEPs by the community to support sustainable development goals (SDGs). Environmental and sustainable management for natural resource usage is still subject to be resolved.

The Kamojang Forest, located in Samarang Subdistrict, has the availability of food crops, especially vegetable, that has the potential to increase the acceleration of the regeneration of young farmers. However, the decline in agriculture interest has an impact on the reduction of the farmer's workforce, and the decline in the agricultural sector ultimately has implications for food security in Indonesia. In the millennial era, the younger generation's interest in agriculture has become lesser, which causes interest in agriculture that can support sustainable development to decrease (Santoso *et al*., 2020).

WEPs are essential with micronutrients and bioactive compounds. Its genetic and cultural heritage needs to be reserved including strategies for WEPs usage and retrieval as a part of WEPs sustainability development (Primitivo *et al*., 2022). Currently, WEPs species are declining, affecting global food security and economic growth. There is still a lot of plant diversity that has not been exploited. Traditional ethnobotanical knowledge has not been cultivated and accumulated by the local people, particularly with WEPs species. The diversity of WEP species may be threatened by biodiversity loss and contamination from chemical pesticides and fertilizers (Luo *et al*., 2019).

The objectives of this study are to gather information on the WEPs diversity around the Kamojang forest in Samarang Subdistrict, including traditional knowledge related to WEPs, to analyze various benefits of WEPs, and to evaluate species that have a significant impact on the people. WEPs cultivation alternatives also can be generated in terms of sustainable development.

METHODS

Study Area

A literature review was first carried out to obtain information about the area in the villages of Samarang Subdistrict, the forest buffer area of Kamojang Crater, including climate, topography, vegetation types, and culture. This study was carried out in an exploratory manner and WEPs data collection was conducted in two villages in Samarang Subdistrict, as a buffer zone for the Kamojang Crater forest. The selected villages were based on the closest distance to the area: Sukakarya Village (-7.180357, 107.801016) and Cisarua Village (-7.180921, 107.793333). The Kamojang Crater Forest area is geographically located between 107°42'44.02" - 107°48'35.92". The initial status of Kamojang Crater was as a Nature Reserve and turned into a Nature Tourism Park (KLHK, 2018).

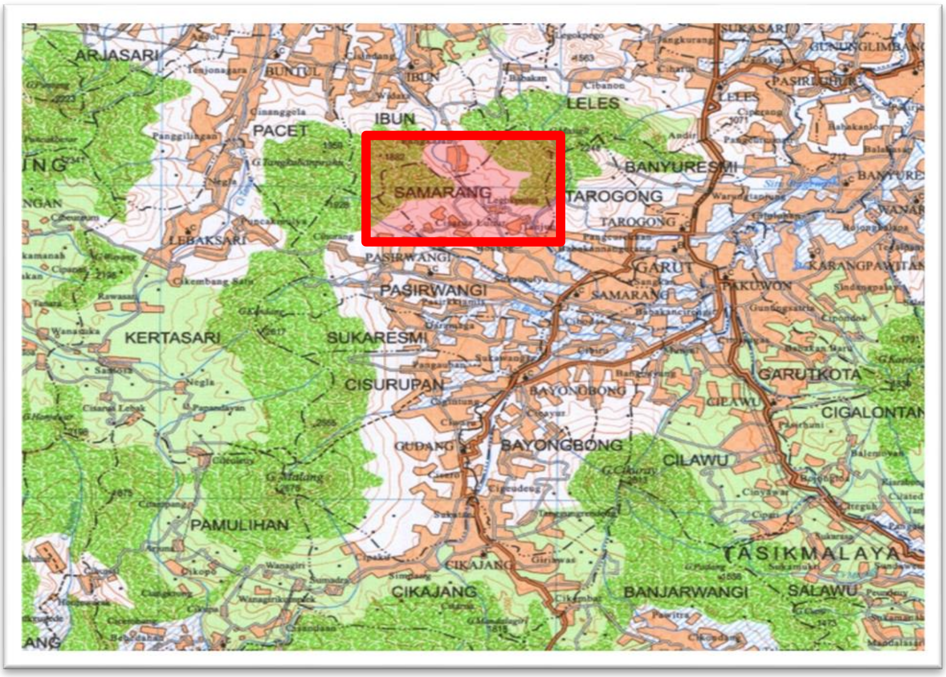

Figure 1. Map of the administrative boundaries of Garut Regency
(Source: bapenda.jabarprov.go.id)

Field Survey and Data Collection

The data collection method used is based on the ethnographic approach. Data on WEPs knowledge is taken based on information from community leaders, traditional leaders, village heads, and other reliable sources. Information was obtained through semi-structured interviews with open-ended questions to obtain types and variations of WEPs. Some informants, with significant knowledge about a specific subject (Araújo *et al*., 2012), were selected to interview 50 participants in Sukakarya and Cisarua Villages. Purposeful sampling is commonly used to identify and select relevant data cases related to the phenomenon of interest (Palinkas *et al*., 2013). The interview consisted of two parts, the first part was about the basic situation of the informants (gender, age, education, occupation), and the second part was about WEPs information, including local name, utilization, partly used, availability, and frequency of use of WEPs. The third part is a special interview regarding the WEPs used as side dishes. Plant identification compares native forms of WEPs in the field and manuals, and on the Plantlist and Plantamor sites (Cheng *et al*., 2022). Data collected from the two villages were pooled into an inventory containing all WEPs species and related information. The WEPs data from the informants were then calculated using the Relative Frequency of Attendance (RFC) and the Food Cultural Significance Index (CFSI) to determine the most culturally significant WEPs types (Pieroni, 2001; Araujo *et al*., 2012).

Data Analysis

Data analysis used mixed methods with the ethnobotany approach (Albuquerque, 2019). Relative citation frequency (RFC) is used to measure the frequency of use of a particular type, using the formula:

$$RFC = \frac{FC}{N}$$

FC shows the number of respondents who mention the type of WEPs and N is the number of all respondents/participants in the survey. The RFC value varies from 0 to 1 and the higher the RFC values, the more important WEPs are in the region. Cultural food significance index (CFSI) to determine the cultural significance of WEPs (Pieroni, 2001).

$$CFSI = QI \times AI \times FUI \times PUI \times MFFI \times TSAI \times FMRI \times 10\text{-}2$$

The CFSI calculation consists of several factors, namely citation frequency index (QI) Availability index (AI), plant part index used (PUI) Frequency of use index (FUI), Food multifunctional index (MFFI), Tasting / organoleptic appreciation index (TSAI,) and the role of food as medicine index (FMRI). This important value index is used to determine the potential of WEPs in the Kamojang Crater forest area (Cheng, 2022).

Analysis to examine four factors (gender, age, education, and occupation of participant) was used as a reference variable. ANOVA test to evaluate whether the four factors (gender, age, occupation, and education) have a significant effect on knowledge about the types of WEPs mentioned by participants. Analysis was performed with SPSS (Cheng, 2022).

RESULTS AND DISCUSSION

Foods with high diversity are effective in overcoming the problem of food security and changes in diet. Food diversification is needed to meet its energy and micronutrient content. Communities in rural areas and forest buffer areas have the advantage of being in an ecosystem with high biodiversity as a source of food (Penafiel *et al*., 2011).

Diversity (WEPs)

Data from WEP interviews with 50 people yielded 80 species of WEPs divided into 37 families. WEPs family data contains information on local and latin names, families, body parts, and usage (Table 1). Plant parts that are edible include the leaves, stems, fruits, roots, and shoots. WEPs identified include 48% of plants used as medicinal plants, 35% of species used as side dishes, and 17% of species used as both medicinal plants and side dishes.

The results of the analysis obtained that most of the five families mentioned by the respondents were used as medicinal plants or additional side dishes. The families are

Asteraceae (19.23%), Euphorbiaceae (6.41%), Solanaceae (6.41%), Malvaceae (5.13%), and Apiaceae (5.13%).

Table 1. Family, latin, and local names, plant parts, habitat, and benefits of WEPs

Family names	**Latin names**	**Local names**	**Plant part**	**Habitus**	**Usage**
Acanthaceae	*Strobilanthes crispa* Blume	Keci beling	leaf	herbaceous	TO
	Staurogyne elongata Nees	Rendeu	leaf	herbaceous	TL
Alismataceae	*Limnocharis flava* L.	Genjer	leaf, stem	herbaceous	TL
Amaranthaceae	*Alternanthera philoxeroides* (Mart.) Griseb	Bayem dempo	leaf	herbaceous	TL
	Cyathula prostrata (L.) Blume	Bayem pasir	leaf	herbaceous	TO
	Dysphania ambrosioides (L.) Mosyakin & Clemant	Cia cia	all body parts	herbaceous	TO
Apiaceae	*Centella asiatica* (L.) Urban	Antanan bodas	leaf	herbaceous	TO, TL
	Centella asiatica (L.) Urban	Antanan beureum	leaf	herbaceous	TO
	Hydrocotyle sibthorpioides Lam.	Antanan beurit	leaf	herbaceous	TO
	Oenanthe javanica (Blume) DC	Tespong	leaf	herbaceous	TL
Arecaceae	*Arenga pinnata* (Wurmb) Merr.	Cangkaleng	fruit	shrub	TL
Asteraceae	*Bidens Pilosa* L.	Hareuga	leaf	herbaceous	TL
	Emilia sonchifolia L., *Rorippa indica*	Jonghe	leaf	herbaceous	TO, TL
	Erigeron sumatrensis Retz.	Jalantir	leaf	herbaceous	TO
	Ageratum conyzoides Linn.	Babadotan	all body parts	herbaceous	TO
	Spilanthes paniculata Wall.	Jotang	leaf	herbaceous	TL
	Taraxacum officinale Web.	Jombang	leaf, stem, root	herbaceous	TO, TL
	Artemisia vulgaris L	Lokat mala	leaf	shrub	TO, TL
	Crassocephalum crepidioides Benth.	Sintrong	leaf	herbaceous	TL
	Vernonia amygdalina Delile	Dayang	leaf	herbaceous	TO
	Pluchea indica (L.) Less	Baruntas	leaf, root	shrub	TO, TL
	Conyza sumatrensis Retz.	Jalantir	leaf	herbaceous	TO
	Eupatorium riparium Regel	Teklan	leaf	herbaceous	TO
	Sochcus arvensis L.	Lobak cai	all body parts	herbaceous	TO
	Elephantopus scaber L.	Tapak liman	leaf	herbaceous	TO
	Chromolaena odorata L.	Kirinyuh	leaf, root	tree	TO

Auricuraliaceae	*Auricularia auricula-judae* (Bull.) Quél.	Lember	all body parts	saprofit	TL
Basellaceae	*Anredera cordifolia (*Ten.) Steenis	Binahong	leaf, stem, tubers	herbaceous	TO
Brassicaeae	*Nasturtium montanum* Wall	Sawi taneuh	leaf	herbaceous	TO
	Nasturtium officinale W.T. Aiton	Seladah cai	leaf, stem	herbaceous	TL
Campanulaceae	*Hippobroma longiflora* (L).G. Don	Ki tolod	flower	herbaceous	TO
Caricaceae	*Carica papaya* L.	Gedang rante	flower	shrub	TL
Caryophyllaceae	*Drymaria cordata* (L).Willd. Ex Schult	Jukut ibun	all body parts	herbaceous	TO
Cleomaceae	*Cleome rutidospermae* D.C	Maman lanang	leaf	epiphytic	TO
Commelinaceae	*Cyanotis axillaris* L.	Tali said	leaf, stem	herbaceous	TO
Crassulaceae	*Paederia foetida* L.	Kahitutan	leaf	herbaceous	TO, TL
	Kalanchoe pinnata Lam.	Buntiris	leaf	herbaceous	TO, TL
Cryteroniaceae	*Scurrula atropurpurea* (Bl.) Dans.	Mangandeuh	leaf, stem	herbaceous	TO
Cyperaceae	*Cyperus rotundus* L.	Jukut papayungan	root	herbaceous	TO
Euphorbiaceae	*Glochidion borneense* Boerl	Mareme	leaf	tree	TO, TL
	Phyllanthus urinaria L.	Memeniran	all body parts	herbaceous	TO
	Claoxylon indicum (Reinw. ex Blume) Hassk	Sinimnim	leaf	shrub	TO, TL
	Ricinus communis L.	Kaliki	fruit, leaf, seed	shrub	TO
	Euphorbia hirta L.	Nanangkaan	leaf, stem	herbaceous	TO
	Antidesma bunius L.	Huni	fruit, leaf	tree	TL
Fabaceae	*Mimosa pudica* L.	Jukut riyut	leaf, root	herbaceous	TO
Lamiaceae	*Hyptis capitata* Jacq.	Kenopan	leaf	herbaceou	TO
	Mentha piperita L.	Min	leaf	herbaceous	TL
Loranthaceae	*Scurrula atropurpurea* (Bl.) Dans.	Mangandeuh	leaf, stem	herbaceous	TO
Malvaceae	*Sida rhombifolia* L.	Sidaguri	root	shrub	TO
	Pterospermum javanicum Jungh.	Wadang/walang	leaf	shrub	TL
	Hibiscus rosa-sinensis L.	Kembang sapatu	leaf	shrub	TO
	Urena lobata L.	Pungpurutan	all body parts	herbaceous	TO

Moraceae	*Ficus glomerata* Roxb.	Pucuk loa	leaf	shrub	TL
	Ficus superba Miq.	Pucuk karasak	leaf	tree	TL
	Ficus septica Burm. F	Kuciat	leaf, fruit	tree	TO
Musaceae	*Musa troglodytarum* L.	Boros cau kole	stem, shoot	shrub	TO
Myrtaceae	*Psidium guajava* L.	Jambu kulutuk	leaf, fruit	tree	TO, TL
Nyctaginaceae	*Mirabilis jalapa* L.	Kembang isuk sore	flower	herbaceous	TO
Oxalidaceae	*Oxalis corniculata* L.	Calincing koneng	all body parts	herbaceous	TO
	Oxalis latifolia Kunth.	Calincing kayas	all body parts	herbaceous	TO
Piperaceae	*Peperomia pellucida* (L.) Kunth	Suruhan	leaf	herbaceous	TO, TL
Plantaginaceae	*Plantago major* L.	Ki urat	leaf	herbaceous	TO, TL
Pleurotaceae	*Pleurotus ostreatus* (Jacq.) P.Kumm	Supa liat	all body parts	saprofit	TL
Poaceae	*Dendrocalamus asper* (Schult.) Backer	Iwung	shoots	shrub	TL
	Eleusine indica Gaertn	Carulang	leaf	herbaceous	TO
	Imperata cylindrica L.	Eurih	root	herbaceous	TO
Pontederiaceae	*Monochoria vaginalis* Burm.	Eceng leutik	leaf, stem	herbaceous	TL
Rubiaceae	*Paederia foetida* L.	Kahitutan	leaf	herbaceous	TO
Sclerodermataceae	*Scleroderma citrinum* Pers.	Supa bangkong	all body parts	saprofit	TL
Solanaceae	*Solanum torvum* Sw.	Takokak	fruit	herbaceous	TL
	Solanum nigrum L.	Leunca manuk	fruit	herbaceous	TL
	Brugmansia suaviolens Bercht. & J.Presl	Kucubung	flower	shrub	TO
	Physalis angulata L	Cecenet	leaf	herbaceous	TO, TL
	Solanum nigrescens M. Martens & Galeotti	Leunca hayam	leaf	herbaceous	TL
Urticaceae	*Laportea aestuans* (L) Chew	Pulus hayam	leaf	herbaceous	TO
	Pilea melastomoides (Poir.) BI.	Poh pohan	leaf	herbaceous	TL
Verbenaceae	*Stachytarpheta jamaicensis* (L.) Vahl	Pecut kuda	leaf	herbaceous	TO
	Lantana camara L.	Saliara	flower, leaf	herbaceous	TO

Abbreviations: TO = medicinal plants, TL: additional side dish.
Source: plantamor.com and gbif.org

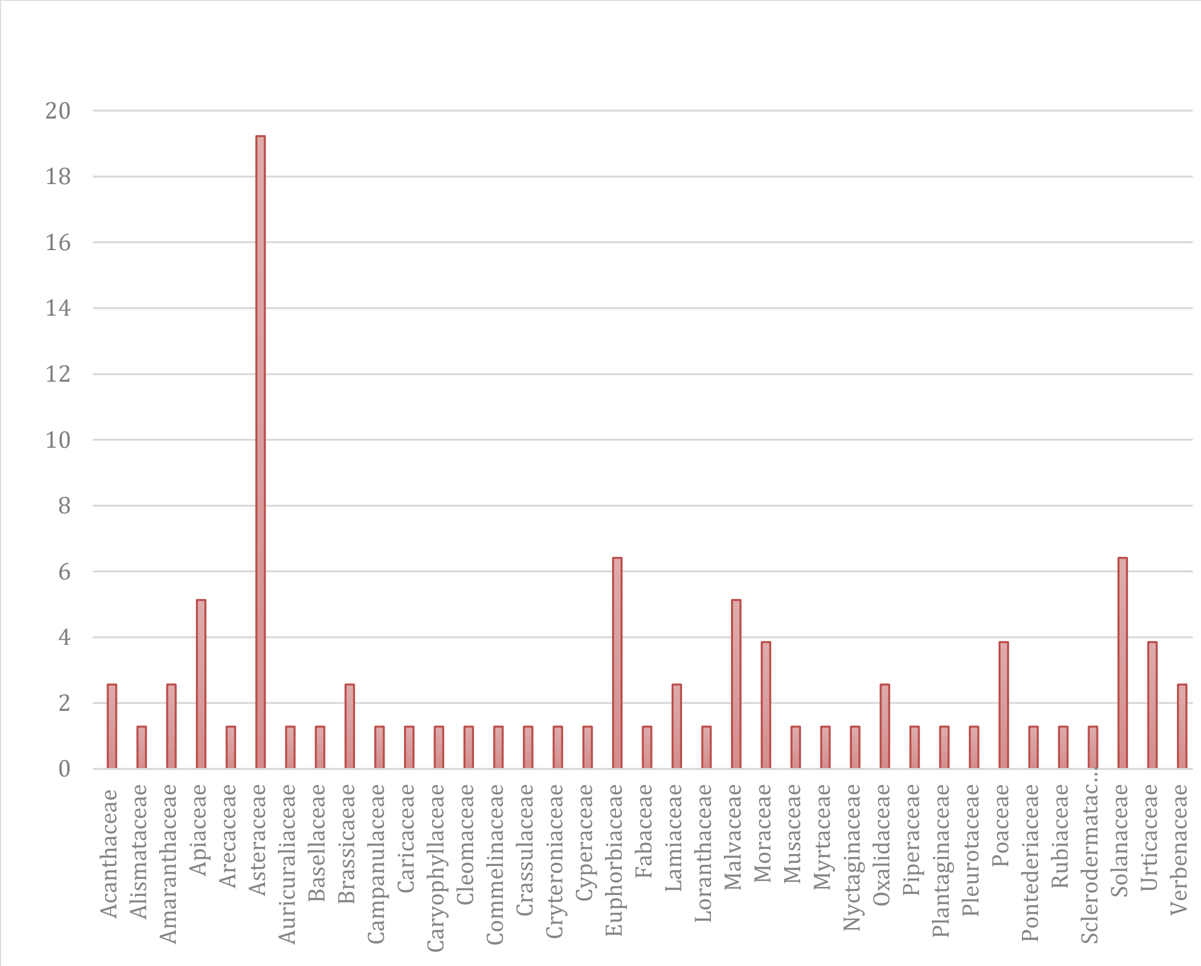

Figure 2. Comparison of WEPs family

The data in Figure 2 show the WEPs family that has been sampled the most by respondents, as follows:

Asteraceae

The Asteraceae family lives as succulent plants, epiphytes, trees, shrubs, and vines. The morphological characteristics of this Asteraceae family member have beautiful flowers, so they are preferred as ornamental plants, and herbal plants with high economic value and are cultivated. The habits of this family are shrubs, herbs, climbing, and perennials. Tubular flowers, roots, leaves, and flowers contain quite good Na, K, Ca, and Mg, and vitamins A, B, C, and D, the leaves are glandular, parenchymal in bundle vessels, papillary epidermis and hydathodes (Milan *et al*., 2006). This family commonly contains components of bioactive compounds, such as sesquiterpenes, lactones, pentacyclic triterpenes, alcohols, alkaloids, tannins, polyphenols, saponins, and sterols (Wegiera *et al*., 2012). The content of this compound is useful as an antioxidant, anti-inflammatory, anti-microbial, prebiotic activity, antiplatelet, diuretic, and hepatoprotector. It contains protein from 0.4 to 6.13 g per 100 g and fiber from 2.55 to 13.44 g (Rolnik *et al*., 2021). The results of data analysis on the group of WEPs members of the Asteraceae family with the highest citation were *Crassocephalum crepidioides* (Benth.) S. Moore (Sintrong), followed by *Emilia sonchifolia* L. (Jonghe).

Euphorbiaceae

This family is a succulent plant that lives in colonies and can survive in all types of habitats. Some species can withstand temperature, salinity, drought, and genetic factors such as gene expression and mutation. This ability is one of the reasons for its use as a medicinal plant, based on hereditary information (Mwine *et al*., 2011). The use of this family as an antimicrobial treats infections caused by microorganisms (Essiett *et al*., 2010). The habitats of the genus Euphorbia are succulents, herbs, shrubs, trees, and cactus-like plants. These plant extracts contain tannins, alkaloids, and flavonoids which can treat wounds, ulcers, wounds, dysentery, and diarrhea (Ogbulie *et al*., 2007). This is supported by the results of research by Al Snafi (2017) on the compound content in *Euphobia hirta*, and finding the pharmacological and therapeutic potential of the plant.

Solanaceae

Solanaceae is one of the important plant families as a main or additional food source. Solanaceae family species used as food, 15 genera, 4 genera, and 17 species are cultural plants that have economic value, either living in the wild or as weeds (Samuels, 2015). Other uses as medicine, culture, pharmacology, and ornamental plants (Catarina, 2002; Ogbulie, 2007). According to Shah and Patrekar (2013), the Solanaceae family is used as medicine because it contains alkaloids, scopolamine, atropine, and hyoscyamine.

Malvaceae

Plants from the Malvaceae family are used in the form of extracts/powder/paste by tribes in India to treat common ailments such as coughs and colds, fever, stomach, kidney, and liver disorders, pain, inflammation, and wounds. The use of the family has traditionally been observed from a phytochemical and ethnopharmacological perspective (Abat *et al*., 2017). This family is used as an herbal medicine to help overcome internal medicine such as bronchitis, cancer, asthma, earache, cough, diarrhea, headache, inflammation, liver disease, kidney, paralysis, ulcer, toothache, and worm medicine (antihelmintic). This family is also used for leprosy, skin diseases, ringworm, and dermatitis (Islam, 2019).

Apiaceae

The use of the Apiaceae family by the community for food, flavoring, aroma, and medical purposes, since time immemorial. The chemical composition and biological activity of essential oils of this family have the potential for pharmaceutical development, such as antimicrobial, anticancer, antifungal, and anti-inflammatory, cosmetic products, and other industrial uses. The results of ethnomedicine research also show that methanol extract can be used as a natural sunscreen, cosmetic, and as a source of natural antioxidants that have high economic value (Ikram *et al*., 2015). This is supported by the research of Christensen and Brandt (2006), polyacetylenes components are widely contained in the Apiaceae family and are often consumed such as carrots and celery. The essential oil produced has a biological activity for industrial (Ahmad *et al*., 2017).

Citation frequency (RFC) and Cultural value (CFSI)

The RFC and CFSI values are analyzed to obtain types that can be used as SDGs strategies in food security.

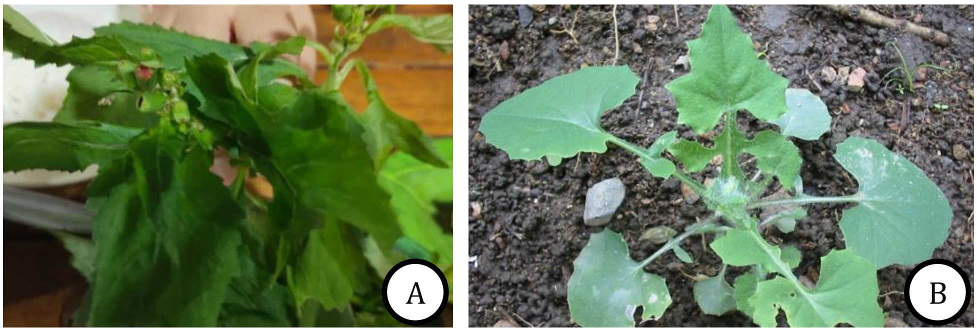

Figure 3. Species of the Asteraceae family. A. *Crassocephalum crepidioides* Benth., B. *Emilia sonchifolia* L.
(Source: personal collection and plantamor.com)

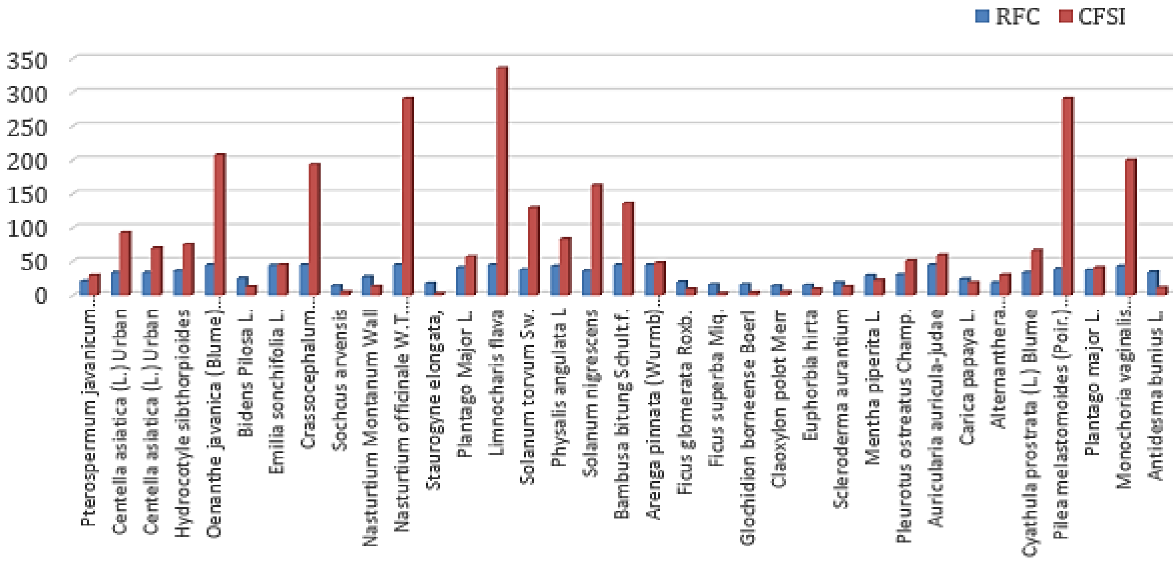

Figure 4. The value of frequency citation and the culture of WEP consumption

Figure 4 depicts the WEPs with high citation frequency values, which include *Dendrocalamus asper* (Schult)., *Limnocharis flava* (L.) Buchenau, *Arenga pinnata* (Wurmb) Merr., *Oenanthe javanica* (Blume) DC, and *Nasturtium officinale* W.T. Aiton, while plants such as *Limnocharis flava* (L.) Buchenau, *Nasturtium officinale* W.T. Aiton, *Oenanthe javanica* (Blume) DC, *Crassocephalum crepidioides* Benth, and *Solanum nigrescens* have a high culture value values.

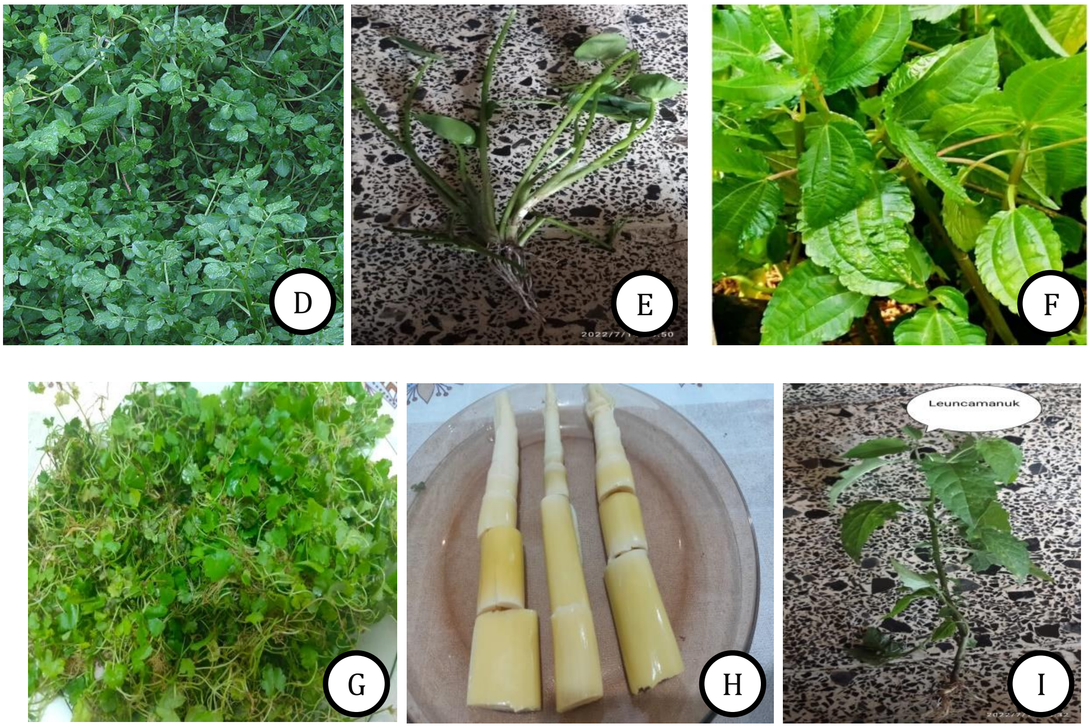

Figure 5. WEPs in the Kamojang Crater forest buffer zone. A. *Oenanthe javanica* (Blume) DC, B. *Crassocephalum crepidioides* (Benth.) S. Moore, C. *Limnocharis flava* (L.) Buchenau, D. *Nasturtium officinale* W.T. Aiton, E. *Monochoria vaginalis* (Burm. f.) C., F. *Pilea melastomoides* (Poir.) Bl., G. *Hydrocotyle sibthorpioides* Lam., H. *Dendrocalamus asper* (Schult. f.), I. *Solanum nigrum* L.
(Source: personal collection and plantamor.com)

Wild edible plants (WEPs) or wild plants that are safe for consumption are all plant resources that are not maintained but taken from shrubs and forests for human use. Part of WEPs is one of the body parts, namely roots, shoots, leaves, fruits, seeds, and shoots. WEPs can be used as an alternative treatment when a disaster occurs (Cheng *et al*., 2022).

The community in the buffer village of the Kamojang crater forest area recognizes plants in the surrounding environment from the various characteristics possessed by plants, such as morphological and sensory characteristics. The knowledge of the community in recognizing wild plants as food comes from inheritance or previous generations or the eating habits of wild animals, such as birds, squirrels, and monkeys. Local people believe that plants that can be eaten by these animals are plants that humans can also eat (Utami *et al*., 2019).

The relationship between knowledge about the benefits of WEPs on factors of age, occupation, gender, and education has been analyzed for validity using ANOVA. The results of the chi-square independence test informed that there was a significant association between age and WEPs knowledge level of the people of the Kamojang Crater forest buffer area, $X2(12)= 22.38$, $p = 0.0330$ ($p < 0.05$). However, the test results did not show a significant association between gender, education, and occupation on WEPs knowledge in the forest buffer area of Kamojang Crater because of the p-value > 0.05.

WEPs Management as a SDGs Strategy

Sundriyal (2001) showed that WEPs are a good source of nutrition for rural populations, and are also comparable in nutritional value to commercial crops. WEPs species need to be cultivated and adopted in traditional agroforestry systems, so as not to disturb the ecosystem in forest stands and generate economic benefits for poor farmers.

There are still many neglected and underutilized WEPs species, although WEPs are rich in nutrients and can adapt to low-scale agriculture. A review of the available literature revealed that most species are rich in nutritional and medicinal properties, a source of vitamins and minerals whose use will assist in combating malnutrition and improving the health of local people, as well as evaluating the beneficial secondary metabolites, phytochemicals, and nutritional features of WEPs (Dansi *et al*., 2012).

The Sustainable Development Goals (SDGs) are to meet the needs of the present without compromising the ability of future generations to meet their own needs. There are three pillars of sustainable development related to social, economic, and environmental aspects. These three aspects are interconnected and when combined and put into practice, can create a solid foundation from which everyone can benefit. It is necessary to maintain that natural resources preserve, the environment protection, and the economy is not harming and the quality of life of the people maintain (Goniadis *et al*., 2015).

Edible wild plants (WEPs) can be an alternative for food security, through government efforts in developing sustainable farming systems and practices, forging partnerships with farmers by promoting entrepreneurial solutions, eradicating poverty by creating jobs, increasing local markets, developing biotechnology, providing appropriate agricultural education and training for youth, increasing the contribution of women in practice agriculture and cultivation of WEPs (Shaheen, 2017). Participatory Plant Breeding is a tool for promoting traditional local varieties or underutilized crops in order to meet community needs. WEPs' potential as genetic resources for fighting poverty, hunger, and malnutrition in order to ensure food security for the world's growing population (Hossain *et al*., 2021). According to Blicharska *et al*. (2019), biodiversity advantages may directly contribute to healthy lives, food provision, and water quality, as malnutrition and poor water quality are important drivers of disease.

Development of WEPs strategy in the forest area of Kamojang Crater through the following methods: (i) inventory and mapping of the distribution of edible plants in the forest area and the surrounding village environment, (ii) socialization and capacity building in the community regarding edible plants, (iii) market analysis of the economic value of WEPs, (iv) establishment of an edible plant nursery in the pilot village, (v) manufacture of ready-to-sell products from WEPs.

CONCLUSIONS

WEPs used by the community in the Kamojang Crater forest buffer area as medicine or as side dishes are still few in comparison to the abundant resources of WEPs. Underutilized WEPs contribute significantly to family food security and disaster survival, as well as herbal medicine. WEPs can also supplement nutritional requirements due to their higher nutritional value. WEPs are regarded as a source of essential nutrients and play an important role in maintaining a healthy body due to their nutritional content, minerals, vitamins, and antioxidants. Communities require WEPs data and socialization about the importance of WEPs as a food source in order to avoid reliance on commercial crops. Natural resources can be conserved, the environment can be protected, and the community's quality of life and economy can be improved. The findings revealed that the majority of the WEPs discovered were herbaceous plants. WEPs with cultural significance can be cultivated on a small scale in or around settlements, collected from the wild seasonally, or cultivated on a larger scale. The tourism industry can help underutilized WEPs by promoting local, cultural, and traditional commodities that increase the economic value of WEPs. Even in industrialized countries, the urban population has begun to adopt a healthy lifestyle, necessitating the use of natural foods and environmentally friendly products.

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