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## Research article

Impacts of environmental factors: Impact of changing environments

## The Power of Life Following Natural Rhythm: How Gender Solidarity Transforms Homegardens and Farming Lands into Small Forests

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**Abstract:** The conditions of farmers living around forests and adhering to simple and traditional lifestyles cannot be underestimated. They possess the resilience to adapt to the continuous natural rhythm. Farmers have succeeded in building forested yards (*pekarangna rumah* or homegarden) and gardens (*kebun* or cultivated/farming land) through solidarity and adherence to the natural rhythm, which becomes their property. The proliferation of small forests by forest-dwelling farmers results in a greener and more diverse earth, thereby supporting the sustainability of human life. The novelty of this research is finding simple ways of farming and collecting forest products to meet daily needs and gain income without exploiting the forest. Therefore, the forest can be sustainable. The qualitative research was conducted in Barangkalang Village, Manganitu Sub-district, Sangihe Islands District, North Sulawesi Province, Indonesia. Forest farmers have the right to cultivate yard and garden forests on the basis of their subconscious. This can result in small forests due to the irregular growth of plants and animals in small forests. However, such an occurrence should not be considered a farming failure because farmers have a hereditary copyright that must be respected. In addition, it is crucial to preserve this balance by avoiding the introduction of external technology and ideas.

**Keywords:** diversity; culture; forest; sustainability; earth; human life

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## 遵循自然节奏的生命力量：性别团结如何将家庭花园和农田变成小森林

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**摘要:** 生活在森林周围、恪守简单传统生活方式的农民的条件不容低估。他们具有适应连续自然节奏的弹性。农民通过团结和遵守自然节奏, 成功地建造了森林庭院(北加兰甘鲁玛或家庭花园)和花园(克文或耕地/农田), 这成为他们的财产。居住在森林中的农民扩大小森林, 使地球变得更加绿色和多样化, 从而支持人类生活的可持续性。这项研究的新颖之处在于寻找简单的耕种和收集林产品的方法, 以满足日常需求并在不开采森林的情况下获得收入。因此, 森林是可持续的。定性研究在印度尼西亚北苏拉威西省桑吉赫群岛区曼加尼图分区巴朗卡朗村进行。林农有权根据自己的潜意识开垦庭院林和园林林。由于小森林中植物和动物的不规则生长, 这可能会导致小森林的形成。然而, 这种情况不应被视为农业失败, 因为农民拥有必须得到尊重的世袭版权。此外, 避免引入外部技术和想法来保持这种平衡也至关重要。

**关键词:** 多样性; 文化; 森林; 可持续性; 地球; 人类生活

### 1 Introduction

There is a need to intensify efforts of natural disaster mitigation, but it is more crucial to conserve the existing forests and establish new ones. Although the mitigation process involves adhering to the counting series law, disasters caused by forest destruction follow the law of measuring series. Previous investigations have shown that when the focus remains solely on mitigating natural disasters, there is a risk of succumbing to their increasing severity in the future. This is because the magnitude of natural disasters, following the measuring series, has the potential to surpass the progress of mitigation based on the counting series.

Climate change threatens both humans<sup>[1,2]</sup> and the earth's life<sup>[3-5]</sup>. The only way to protect the Earth and its people, particularly from extreme climate change, is to preserve existing forests and create new ones. Therefore, both forest areas and

farming communities require equal attention<sup>[6,7]</sup>. Although the characteristics of people living around forests vary depending on their respective locations<sup>[8]</sup>, simple and traditional local forest communities have unique features and strengths in interacting with forests.

<sup>[9]</sup> highlighted the significance of Indonesian forests in conserving biodiversity. Despite occupying 1.3% of the Earth's surface<sup>[10]</sup>, Indonesia has a significant share of global biodiversity<sup>[11]</sup>. With 120 million hectares of forest area, Indonesia has the third-largest biodiversity in the world, being recognized as a mega-biodiversity country<sup>[12]</sup>. Only 70% of this area was forested in Indonesia by 2020<sup>[9]</sup>, which is one of the ten countries with the largest annual net loss of forests<sup>[13]</sup>.

Indonesia has approximately 48.8 million people who depend on forest resources, with 10.2 million living below the poverty line<sup>[14]</sup>. The

Indonesian government categorizes forests on the basis of their property rights and function (Indonesian Ministry of Forestry and Plantations Number 41 of 1999). Based on the status of property rights, there are state forests and those owned by individuals or groups. Meanwhile, according to function, forests are classified as protected, conservation, and production forests<sup>[15]</sup>. Protected forests occupy the second largest position after production and have been established by the government to maintain the hydrological cycle (Indonesian Ministry of Forestry and Plantation Number 41 of 1999). State forests have the highest protection status, but there is limited information on the interaction between local communities and between state and protected forests. Protected forests play an important role in maintaining the water cycle and providing clean water while preventing natural disasters such as floods, erosion, and landslides. These forests are located in the upper reaches of watersheds, and damage in the upstream area can lead to disasters downstream, potentially destroying infrastructure and affecting livelihoods.

<sup>[16]</sup> reported variations in the rate of deforestation across several regions. Therefore, local communities tend to sustainably manage areas with forests in good condition that can meet

the needs of their families. These communities also learn about plants that vary in type and size from forests and implement the diverse crop patterns observed in their gardens and yards. This practice is often passed down from one generation to another, emphasizing its importance for communities near protected forests. Therefore, this research discusses how local communities learn and apply diverse crop patterns in areas near protected forests.

This qualitative research was conducted in Barangkalang Village to discuss how men and women in local communities co-exist in harmony with nature. Moreover, this study is part of a 3-year research (multi-years) funded by the Ministry of Research, Technology, and Higher Education through Sam Ratulangi University in 2018–2020.

## 2 Research Methods

The choice of Barangkalang village as the research location is because there are the Saher<sup>[19]</sup>rumang Mountain protected forest and local people who live around the protected forest as its owners or managers. Most of them live in Hamlet (*Lendongan*) 4. Hamlet 4 is located on the road to the forest area and is the closest compared to the other hamlets (Fig. 1).



Fig. 1 Map location (Developed by the authors from the Barangkalang Village Office data, 2019)

This qualitative research is a case study, so it cannot be generalized. However, the findings from this study may be applicable to other areas of Indonesia. Furthermore, if this research was conducted on a large scale, i.e., more than one village, the results could be different.

### 2.1 Limitations

The research object was chosen with the consideration that there are farming communities of Sangihe ethnic group who live and make a living around the protected forest. Therefore, the limitations of the results of this study can only be applied to the Sangihe tribe. To generalize the research results, additional data from other tribes in North Sulawesi are needed. Other tribes, such

as the Minahasa and Bolaang Mongondow tribes, have different behaviors from those of the Sangihe tribe in interacting with their respective protected forests.

This study applies the triangulation method to increase the level of confidence regarding the research results. First, three data sources were selected: farmers as members of forest communities, forest community leaders, and members of forest village community organizations. Their selection was performed purposively (purposive sampling), namely those were chosen who knew the condition of the forest because they had owned or cultivated agricultural land there. The data were collected by conducting observations, interviews, and

focus group discussions (FGDs).

A detailed description of the research method

and sample selection criteria is presented in Tab.

1.

**Tab. 1 Description of the research methods and data findings**

Research Subject	Description
1 Research Village	Barangkalang
2 District	Manganitu
3 Regency	Sangihe
4 Distance from North Sulawesi Provincial Capital	7 h by sea or 50 min by airplane (Manado-Tahuna = 128 km or 54 miles) 1 h by road (Tahuna-Barangkalang Village = 28 km <sup>2</sup> )
5 Implementation of the data collection	August 2019, November 2020; throughout the year, communication with the village head and key informants was conducted.
6 Sample farmers: 25 men, 25 women, unmarried couple	The sample was purposively selected by researchers after asking the village head to provide men and women farmers who know forests because they have been and are currently farming in the vicinity of the Sahendarumang protected forest.
7 Education	Data Findings Length of time in school: 6-12 years (elementary to senior high school); Most have an elementary school education and below; <i>Notes:</i> 18 Elementary school = 6 years Junior high school = 6 years+3 years = 9 years Senior high school = 9 years+3 years = 12 years
8 The agricultural land area of each farmer	The area of the yard ranges from 35 to 400 m <sup>2</sup> . The yard plant type: very diverse, including trees, food crops, medicines, herbs, and vegetables (Tab. 2 Plant configurations that adopt forest growth patterns) <ul style="list-style-type: none"> <li>• 1 tree type</li> <li>• Not trees</li> <li>• Most food plants are of 4 types</li> <li>• Most vegetable plants are of 9 types</li> <li>• Most spice plants are of 11 types</li> <li>• Most fruit plants are of 3 types: pineapple, papaya, and banana</li> <li>• Most medicinal plants are of 10 types</li> </ul> Harvest results <ul style="list-style-type: none"> <li>• Family consumption</li> <li>• Shared with neighbors</li> <li>• To be sold</li> </ul> Garden size: 400-15,000 m <sup>2</sup> Number of plots: 1-4 - 100% of the respondents have 1 plot - 80% of the respondents have 2 plots - 45 % of the respondents have 3 plots - 10% of the respondents have 4 plots 800–10.000 m Clove, nutmeg, coconut, yam, and vegetables Trees: 5 types Non-tree Food crops Harvest results <ul style="list-style-type: none"> <li>• Sold to the market (cloves, nutmeg)</li> <li>• Family consumption (yams and vegetables)</li> </ul>
Garden	
Distance from home	
Plant type	
9 • Examples of community leaders • Number of examples: 3 men, 3 women	The method of selecting community leaders by the researchers was purposive after asking the village head to provide community leaders who know forests because they have been or are currently farming. They are formal or informal leaders with religious, educational, and government backgrounds.
	Data Findings <ul style="list-style-type: none"> <li>• Farmers' parents passed on the homegarden/yard and cultivation land/farming land/garden land and how to plant trees and non-trees.                             <ul style="list-style-type: none"> <li>• Some farmers open their agricultural land.</li> </ul> </li> <li>• There are no known taboos in the forest, and the important is not to make much noise and shouts.</li> <li>• Both men and women together are allowed to enter forests (No restrictions)</li> </ul>
10 • Focus group discussion • Number of the participants: 5, consisting of 1 man and 4 women	The focus group participants were those who represented community organizations and had agricultural land around the Sahendarumang protected forest.
	Data findings <ul style="list-style-type: none"> <li>• Routine of men and women farmers going to the agricultural land in the</li> </ul>

- morning and returning in the afternoon
- There is no compulsion for women to perform certain types of labor.
- Men and women work together on farming, and the decision-making is carried out together.
- When men take a smoke break, women continue to work. Meanwhile, when women cook, men continue to work.

### 3 Results and Discussion

#### 3.1 Research Area Conditions and Community Situations

##### 3.1.1 Geographical Location

Barangkalang Village, Manganitu District, Sangihe Islands Regency (Fig. 1) is one of the 17 villages in Manganitu District (Barangkalang Village Office, 2019). Administratively, the boundaries of Barangkalang Village are as follows:

- To the north, it is bordered by Belengang Village;
- To the south, it is bordered by Kampung Nagha II;
- To the east, it is bordered by Kampung Ulung Peliang;
- West side is bordered by the Sulawesi Sea.

##### 3.1.2 Land Use in Barangkalang Village

The area of Barangkalang Village is 334 km<sup>2</sup>, which stretches from the top of the mountain to the coastal area, namely from the protected forest of Mount Sahendarumang to the coastal area, which is part of the Sulawesi Sea (Fig. 1C). Broadly speaking, the population differentiates the village area into 65 main areas: (1) protected forest area, (2) distant farming land located in forest areas, (3) areas overgrown with ferns, (4) nearby farming land, and (5) residential and coastal areas (Fig. 2).

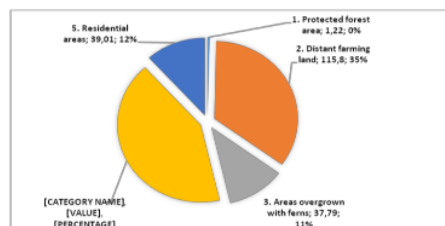


Fig. 2 Land use in Barangkalang Village (Developed by the authors from Barangkalang Village data, 2019)

##### 3.1.3 Population of Barangkalang Village

###### Number

The population of Barangkalang Village according to data from the Barangkalang village office in 2019 is 880 people, where the number of men is 449 (51.02%), more than women (431; 48.98%).

The number of family heads is 278 people spread over 4 hamlets. However, several village heads and their wives live temporarily in their temporary shelters, mostly in their farming land near the protection forest known as distant farming land or *kebun jauh* (Fig. 3).



Fig. 3 Situation of the Barangkalang Village Community (The authors' documentation, 2020)

Tab. 2 Configurations of plants that adopt a pattern of forest growth (Collected and developed by the authors)

Land Types	Plant Types	
	Trees	Non-Trees
A. Homegarden land	1. Cengkeh ( <i>Eugenia aromatica</i> )	<b>Staple food plants</b> 1. Ubi kayu ( <i>Manihot sp</i> ) 2. Talas ( <i>Colocasia esculenta</i> ) 3. Jagung ( <i>Zea mays</i> ) 4. Ubi Jalar ( <i>Ipomoea batatas</i> ) 5. Sagu ( <i>Metroxylon sp.</i> ) 6. Pisang ( <i>Musa sp.</i> ) <b>Vegetable plants</b> 1. Papaya ( <i>Carica papaya</i> ) 2. Pare ( <i>Momordica charantia</i> L.) 3. Gedi ( <i>Abelmoschus manihot</i> ) 4. Wori ( <i>Ormocarpucochin Chinense</i> Lour) 5. Leilem ( <i>Clerodendrum minahassae</i> L.) 6. Katu ( <i>Sauropus androgynus</i> ) 7. Kangkung ( <i>Ipomoea aquatica</i> ) 8. Labu Siam ( <i>Secchium edule</i> ) 9. Kelor ( <i>Moringa oleifera</i> ) <b>Herbs and medicinal plants</b>
	2. Pala ( <i>Miristica fragrans</i> L)	
	3. Kelapa ( <i>Cocos sp</i> )	
	4. Sukun ( <i>Artocarpus altilis</i> )	
	5. Jambu air ( <i>Syzygium aqueum</i> )	
	6. Rambutan ( <i>Nephelium Lappaceum</i> L)	
	7. Mangga ( <i>Mangifera sp.</i> )	
	8. Langsat ( <i>Lansium domesticum</i> )	
	9. Jeruk ikan ( <i>Citrus macrocarpa</i> )	
	10. Durian ( <i>Durio zibethinus</i> Murr)	
	11. Manggis ( <i>Garcinia mangostana</i> L.)	
	12. Belimbing ( <i>Averrhoa carambola</i> )	

		Continuation of Tab. 2	
			<ol style="list-style-type: none"> <li>1. Kunyit (<i>Curcuma domestica</i>)</li> <li>2. Jahe (<i>Zingiber officinal</i>)</li> <li>3. Cabai (<i>Capsicum annum</i>)</li> <li>4. Sereh (<i>Cymbopogon citratus</i>)</li> <li>5. Pandan (<i>Pandanus amaryllifolius</i>)</li> <li>6. Kemangi (<i>Ocimum basilicum</i>)</li> <li>7. Seledri (<i>Apium graveolens</i>)</li> <li>8. Daun bawang (<i>Allium fistulosum</i>)</li> <li>9. Lengkuas (<i>Alpinia galanga</i>)</li> <li>10. Temulawak (<i>Curcuma Xanthorrhiza</i>)</li> </ol>
			<p><i>Fruit plants</i></p> <ol style="list-style-type: none"> <li>1. Nenas (<i>Ananas comosus</i>)</li> <li>2. Pepaya (<i>Carica papaya</i>)</li> <li>3. Pisang (<i>Musa sp</i>)</li> </ol>
B.	Farming land	Trees	Non-trees
		<ol style="list-style-type: none"> <li>1. Cengkeh (<i>Eugenia aromatica</i>)</li> <li>2. Pala (<i>Miristica fragrans</i> L.)</li> <li>3. Kelapa (<i>Cocos sp</i>)</li> <li>4. Langsat (<i>Lansium domesticum</i>)</li> <li>5. Nangka (<i>Artocarpus heterophyllus</i>)</li> <li>6. Mangga (<i>Mangifera sp.</i>)</li> </ol>	<p><i>Staple food plants</i></p> <ol style="list-style-type: none"> <li>1. Ubi kayu (<i>Manihot sp</i>)</li> <li>2. Talas (<i>Colocasia esculenta</i>)</li> <li>3. Sagu (<i>Metroxylon sp.</i>)</li> <li>4. Pisang (<i>Musa sp.</i>)</li> <li>5. Ubi jalar (<i>Ipomoea batatas</i>)</li> </ol> <p><i>Vegetable plants</i></p> <ol style="list-style-type: none"> <li>1. Papaya (<i>Carica papaya</i>)</li> <li>2. Pare (<i>Momordica charantia</i> L.)</li> <li>3. Gedi (<i>Abelmoschus manihot</i>)</li> <li>4. Kelor (<i>Moringa oleifera</i>)</li> <li>5. Kacang Panjang (<i>Vigna unguiculata</i>)</li> <li>6. Melinjo (<i>Gnetum gnemon</i>)</li> </ol> <ol style="list-style-type: none"> <li>7. Wori (<i>Ormocarpucochin chinense</i> Lour)</li> <li>8. Rebung bambu sayur (<i>Bambusa sp.</i>)</li> <li>9. Leilem (<i>Clerodendrum minahassae</i> L.)</li> <li>10. Katu (<i>Sauropus androgynus</i>)</li> <li>11. Kangkung (<i>Ipomoea aquatica</i>)</li> <li>12. Labu Siam (<i>Sechium edule</i>)</li> </ol> <p><i>Herbs and medicinal plants</i></p> <ol style="list-style-type: none"> <li>1. Cabai (<i>Capsicum annum</i>)</li> <li>2. Tomat (<i>Solanum sp.</i>)</li> <li>3. Jahe (<i>Zingiber officinal</i>)</li> <li>4. Kunyit (<i>Curcuma domestica</i>)</li> <li>5. Sereh (<i>Cymbopogon citratus</i>)</li> <li>6. Kemangi (<i>Ocimum basilicum</i>)</li> <li>7. Daun bawang (<i>Allium fistulosum</i>)</li> </ol> <p><i>Fruit plants</i></p> <ol style="list-style-type: none"> <li>1. Nenas (<i>Ananas comosus</i>)</li> <li>2. Pisang (<i>Musa paradisiaca</i> L.)</li> </ol>

**Education**

Nearly 50% (47.52 percent) of the population of Barangkalang Village have low education, that is, they have only graduated from elementary school. Only 12 people (2.61 percent) can obtain higher education (Fig. 4).

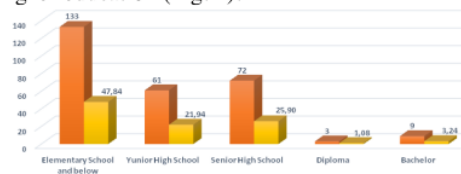


Fig. 4 Education level of the heads of families (HF) in Barangkalang Village (Developed by the authors from the Barangkalang Village Office, 2019)

**Occupation**

The types of work of the head of the family in

the research location are farmers, fishermen, traders, government employees, and private employees (Fig. 5). There are two types of livelihoods dominant in Barangkalang Village: farmers (31.51 percent) and fishermen (25.25 percent).

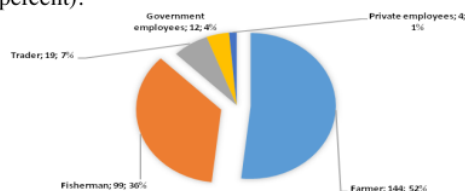


Fig. 5 Types of work of family heads in Barangkalang Village (Developed by the authors from the Barangkalang Village Office, 2019)

**3.2 Life Force Follows the Rhythm of Nature**

The description of how the force of life

follows the rhythm of nature that has occurred in the research village through gender solidarity has turned yards and gardens into small forests in the local community is divided into three themes:

- 1) Following the rhythm of nature;
- 2) Gender solidarity: a form of harmony with nature;

3) How did forest gardens originate?

Detailed explanations of each of the three themes are provided in the following sections.

### 3.2.1 Following Natural Rhythm

Farmers in Barangkalang Village live a simple socio-economic life, following natural rhythm despite their limited knowledge. This simplicity strengthens the farmers' ability to survive compared to migrants from big cities, who considered village life underdeveloped. The villagers' strength lies in their ability to follow natural rhythm without intervention. They experience daily changes in nature, from the passing of morning and night to the occurrence of rain and drought, as well as planting and harvest seasons. However, communities considered advanced are generally eager to subjugate nature to fulfill human desires, leading to damages that nature repays with disasters beyond human understanding.

Because farmers follow natural rhythm without intervention, urban people consider them helpless, traditional, and underdeveloped. Farmers who follow natural rhythms are rewarded with sustainable natural products, revealing the hidden strengths of nature. Although the agricultural yields of farmers were lower than those of modern agriculture, the small intervention in their practice resulted in invaluable biological diversity, making it a sustainable force.

The lifestyles of farmers in Barangkalang Village following the natural rhythm are often considered strange and overlooked by actors of modern agriculture who tend to exploit nature. However, there is a natural strength in the traditional methods used by these economically disadvantaged farmers. This is because they embrace natural rhythm every day and observe the natural growth of flora and fauna over time. Their subconscious records beautiful laws of nature, which are diverse from the smallest to the largest and from the shortest to the highest. As the seasons change, farmers follow the natural cycle of flowering, fruiting, and harvesting, with little intervention such as weeding overgrown grass. Meanwhile, contact with forests inspired farmers to practice the ecosystem in their yards and gardens.

The power of life following natural rhythm results in clean farming free from chemical pollutants, despite its lower productivity than that of intensive farming. This practice produces organic and healthy products sourced from forests rather than from modern monoculture farms. However, it remains unclear whether the market will buy these healthier products than those from chemical-rich monoculture farming. To protect the earth, it is crucial to acknowledge farmers who adhere to traditional forest culture, which may be economically weak by purchasing their agricultural products at a higher price.

### 3.2.2 Gender Solidarity: A Form of Being in Harmony with Nature

Gender equality is a widely recognized concept that is suitable in modern societies but more relevant for traditional farming communities. However, achieving gender equality does not necessarily guarantee gender solidarity due to barriers and rules that limit women's opportunities. There are examples of gender equality and solidarity in societies, such as farmers in Barangkalang Village. In this community, men and women together perform agricultural activities according to their abilities, without gender-based exploitation. For example, men may perform heavier tasks, such as carrying firewood from dry tree trunks, while women lift firewood from dry tree branches. Meanwhile, when women feel stronger and more skillful, they climb coconut trees for harvesting.

Generally, women primarily perform their duties in the yards, while men mostly work in the gardens away from home. This pattern of gender division of labor was found in the Totemboan sub-tribe of Minahasa<sup>[17]</sup> and reported to be more flexible than that in the forest communities of the Dayak tribe in Kalimantan, which is stricter<sup>[18]</sup>. Women in the Sangihe and Minahasa forest communities can work on farms of all types, regardless of their distance from home. However, they mostly take care of plants in their yards and participate in preparing food when gardening near forests. Gender solidarity can be applied in Barangkalang Village, where men and women work together to cultivate flora and fauna in their yards and gardens, imitating the harmonious rhythm of nature. Similarly, gender solidarity in land management around protected forests was observed in several previous studies on forest communities in North Sulawesi, such as Ampreg Village in Minahasa Regency<sup>[17,19]</sup>, Kalatin Hamlet (*Kampung*) in North Lowu Village, Southeast Minahasa Regency; Kayu Uwi Village, Tomohon; Pinilih Village, North



Maluku<sup>[20]</sup>; Otam Village, North Lowu Village, Southeast Minahasa Regency; Kayawu Village, Tomohon; Pinilih Village, North Maluku<sup>[20]</sup>; Otam Village, Bolaang Mongondow Regency<sup>[20]</sup>, and Barangkalang Village, Sangihe Islands Regency<sup>[20,21]</sup>.

The forest ecosystem is a harmonious union of diverse flora and fauna, forming a unique community of plant and animal life. In the ecosystem, each element plays a role, contributing to the growth and diversity of plants and animals in terms of type, texture, and structure. The gender solidarity of the farming community in Barangkalang Village emulates the natural and spontaneous harmony of the surrounding forests, which the community experiences daily.

### 3.2.3 How Forest Yards and Gardens Originated

Forest farmers in Barangkalang Village practice the natural rhythm of life by harnessing the power of gender solidarity. By working together, farmers transformed their yards and gardens into small forests that mimicked the natural growth of plants in the forests. The growth of flora and fauna in yards and gardens was carried out with a small energy input, such as weeding and fertilizing. The diversity of plants began to increase, and wild plant seeds transported by birds began to emerge.

Therefore, when farmers planted nutmeg, clove, durian, and coconut trees in their gardens, the plantations were transformed into forest areas. Likewise, in the yard, if it is planted with rambutan, it is more appropriate to call it a small rambutan forest. Because of the variety of other plants that co-exist with rambutan, it forms a forest ecosystem in the yard. Modernists who prioritize monoculture and intensification will underestimate the power of these forest farmers. However, in terms of sustainable efforts to save the earth, the hidden power of this humble forest farmer cannot be ignored. The green mosaic presented by these small forests belonging to traditional farmers makes the earth look more beautiful than just modern plantations and yards where the plants are monocultures and prone to pests and diseases. Even though they produce less, forest farmers can still send their children to school from nutmeg forests, clove forests, coconut forests, and so on. The yard provides results that can be distributed to neighbors when needed. The yard functions more as a social forest. The garden functions more as an economic forest. For their staple food, they use tubers and a type of sago trees, which grows in garden forests and forest yards.

## 4 Discussion

<sup>[22]</sup> in a study of the fuelwood value chain on economic, environmental, and social sustainability issues used value chain analysis. The findings of this research can provide input for policy makers to improve the sustainability of fuel wood production and trade along the value chain, especially in terms of benefit sharing, exploitation of forest resources, and gender equality. The analysis results indicate that firewood business activities are carried out by registered licensed actors, whereas informal actors do not register with government agencies. The conclusion is that women's participation in the breakdown of firewood values is likely to be informal.

Research by <sup>[23]</sup> is devoted to the impact of community forestry income on social value and environmental resilience. The method used is a ranking test based on the Kruskal-Wallis formulation. The results of his research show that the amount of timber income has a significant impact on the community. Forest user groups have an interest in income and expenses related to the biological and socioeconomic resilience of communities around the forest.

Research by <sup>[24]</sup> on the condition of multilevel governance, co-management, and sustainability in forest communities uses qualitative methods of information on historical and recent forest use through the use of regulatory tools in the co-management of forests. The research results show that local decision-making processes can be relative, navigational, and ecologically beneficial to local communities. It is also necessary to move from traditional management models to co-management in community contexts.

<sup>[25]</sup> reported results of their research on collaborative forestry, from laborers to coffee farmers. Collaborative forest management (CFM) assumed to provide benefits for improving forest ecological conditions and the community's economy. The results of his research indicate that government support is needed in the involvement of the poor and teacher farmers to obtain their rights and access to improving the social and ecological conditions of the forest.

Research by <sup>[26]</sup> is devoted to strengthening supply chains for maintaining biodiversity and culture by using social and biodiversity bioeconomic indicators. The method used is a bottom-up evaluation approach that considers the individual perspective of the community. The methods used to capture the relevance of the dimensions of the value chain include tradeoffs in the withdrawal of barriers and the role of

institutions in bioeconomic, sociomarketing, and biological capture. The research results indicate that socioeconomic benefits include generating a reasonable income and greater participation by women. Fixed income complements other sources of livelihood for women.

<sup>[21]</sup> comprehensively evaluated the design of protected areas through disclosure of human intervention to protect natural processes and communities. The analysis considered economic, social, and environmental aspects, including impacts on local populations, the economy, bases, business activities, and regional development. The method used is using the quintuple helix model. The study concluded that the need to balance social tensions will protect nature with awareness of the existing measures and conditions of a particular place. Nature protection must integrate itself into every human activity in culturally and historically created landscapes. The study underscores the importance of sustainable landscape development and interactions between universities, government, industry, and civil sector actors and the environment.

Because farmers follow the rhythms of nature without interference, people in urban areas consider them powerless, traditional, and backward. Farmers who follow natural rhythms are rewarded with sustainable natural products, revealing the hidden power of nature. Although the agricultural output of farmers was lower than that of modern agriculture, small interventions in their practices yielded invaluable biological, sustainable energy.

<sup>[27]</sup> reported results of research on mechanisms for realizing the value of ecological products, which are important for implementing the concept of an ecological society in China. The study delved into the connotation of ecological products, the calculation of the value of ecological products, and the progress made nationally and in Shandong province in promoting mechanisms for realizing the value of ecological products. The path of realizing the value of ecological products is through the government, market, and government-market channel as a recommendation to the government.

## 5 Conclusions

For sustainable protection, farming communities around forests need equal attention because of their unique characteristics and resources that can aid conservation. However, a sustainable approach cannot be achieved by solely focusing on forest conservation and neglecting the needs of the communities. This

indicates that modern principles from outside the village may be suitable in certain locations but not necessarily for all diverse locations. Therefore, there is a need to identify and use the local strengths of forest farming communities to build sustainable forests.

Forest farmers have the power to live in harmony with the natural rhythm. This strength should be preserved by refraining farmers from destroying forests for momentary economic needs controlled by investors outside the village. The power to follow natural rhythm has lasted for generations, from parents to children. Therefore, any modern concepts and technologies from outside the village should be introduced with caution to avoid disrupting the existing balance.

Gender coexistence has been successfully achieved in the lives of forest farmers. The harmonious collaboration between men and women in managing forest farms has led to the development of a traditional, simple, and sustainable rural lifestyle. There is no exploitation based on gender, and this experience has instilled in the families the belief that nature and forests should not be exploited.

Forest farmers have the right to cultivate yard and garden forests on the basis of their subconscious. This can result in small forests due to the irregular growth of plants and animals in small forests. However, such an occurrence should not be considered a farming failure because farmers have a hereditary copyright that must be respected. In addition, it is crucial to preserve this balance by avoiding the introduction of external technology and ideas.

This research contributes to the academic field by revealing the behavior of local communities in making a livelihood and living under the forest sustainable development conditions. This is because in principle, forest conservation is different in each community group. There is a need to be aware of the importance of paying attention to local forest communities. They have their own way of building forest yards and gardens. Forest communities have the power to live in simplicity. This should be included in scientific principles so that policies, especially concerning local forest communities, are not only top down.

## 6 Implications

Policies to conserve forests must pay attention to the situation of every local community living around the forest. The successes of local communities in living together with the forest need to be adopted in forest conservation policies.

This means that local situations vary widely and cannot be lumped together in a single policy with technology that is foreign to the people living around the forest who live very simply.

Subsidies to buy forest agricultural products at higher prices should be considered. There is no doubt about the goodness of forest-managed agricultural products because they are organic. Communities around the forest do not live alone because they are protected by the forest in terms

of both garden produce and tuber food. Forests are used for food and money storage because plantation products such as cloves and nutmeg have high economic value. On the other hand, forests require people who live according to natural rhythms without exploiting forests on a large scale. Therefore, national policies on forest conservation require policies that are pro-local communities.

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