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Full Length Research Article

Analysis of Stakeholders' Interest and Influence in Non-Timber Forest Products Marketing: A Case Study in the Forest Management Unit Batutegi, Lampung

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ABSTRACT

Stakeholders are involved in the management of the Forest Management Unit (FMU) Batutegi, including the marketing of non-timber forest products (NTFP). The performance of NTFP marketing in the FMU Batutegi currently has not provided optimal benefits, especially for forest farmers. Stakeholders have divergent interests and influence in NTFP marketing. The research aimed to analyze the interests and influence of each stakeholder and the relationship between stakeholders in the marketing of NTFP. Data collection was carried out through observation and interviews. Interviews were conducted with informants and stakeholders. The scoring method was used in this study. Data and information were analyzed qualitatively. The study results showed that the marketing of NTFP in the FMU Batutegi involves 15 stakeholders. There are 11 parties with moderately high interest and 8 parties with moderately high influence. FMU Batutegi is the most responsible party or central actor in NTFP marketing because it has relationships with important stakeholders, has the most relationships, and can control the flow of information in the network. The method's usefulness for understanding stakeholders' position in NTFP marketing. The study result is expected to be utilized by policymakers to facilitate cooperation between stakeholders to achieve optimal NTFP marketing performance.

1. Introduction

A large number of communities depend on non-timber forest products (NTFP) to fulfill their basic needs (Dinda et al. 2020) and are part of the globally recognized household economy (Mahonya et al. 2019). NTFP is essential in providing household food, medicine, nutrition, health, and income and has cultural, religious, and social benefits for communities (Asamoah et al. 2023). NTFP is a source of livelihood, especially for the community, and contributes significantly to the forest economy, in line with the agricultural sector (Chima et al. 2022). NTFP can be directly used or processed into particular products consumers need (Chakravarty et al. 2015).

The NTFP produced by the Forest Management Unit (FMU) Batutegi should be marketed to improve the farmers' livelihood and economic status. Without marketing, NTFP collected or produced by farmers will not move and will never progress other than meeting the daily needs of farmers (Salaka et al. 2012). Farmers must also have sufficient social capital in community forest

management because it will positively impact forest management cooperation (Puspita et al. 2020). Ramadhan et al. (2022) stated that farmer group institutions must effectively collaborate with forestry institutions. The problem with marketing is that farmers have a weak bargaining position relative to marketing agencies. The case of coffee marketing in Air Kubang, Tanggamus shows that the three marketing channels tend to be inefficient; even though the marketing margins and profit margins are moderately high, the profit margin ratio is not spread evenly, and the profits received by farmers are low (Pratiwi et al. 2019). The position of farmers leads to an underestimation of them in the market system (Puspitasari 2015). The farmers' weak bargaining power is due to the fact that in NTFP marketing, farmers face four main obstacles: seasonality, poor transportation, lack of storage facilities, and limited market information. Market information is significantly influenced by education level, gender, income, ethnicity, distance to market, and road access (Amusa et al. 2017). Most farmers depend on the provider's market information, especially the determination of price and quality (Ullah et al. 2020). Limited market information causes marketing carried out by farmers to be not optimal. Therefore, the role of stakeholders is needed to provide power to farmers by increasing the bargaining power of farmers so that farmers can increase production capacity, which is better and able to compete with other products and can improve the welfare of farmers.

Marketing stakeholders refer to activities in the system and process of social institutions that grow and sustain value through exchange with various stakeholders to influence marketing activities (Kull et al. 2016). Integrating NTFPs into forest management can increase economic opportunities but also complexity and require balancing different and possibly conflicting goals among stakeholders (Frey et al. 2023; Musasa et al. 2023)

In Government Regulation of the Republic of Indonesia Number 23 of 2021 concerning forestry administration, there is a change in duties and function of the FMU in forest management. FMUs, before the regulation came into effect, had the goal of being independent FMUs with business objectives through the forestry business. After the enactment of this regulation, the FMU is currently only a facilitator. The impact can be seen from the limited budget policy and the weak role of FMUs in the field so that they have almost the same position as non-governmental organizations. However, in theory, and practice, the FMU is still one of the important stakeholders because, according to Government Regulation of the Republic of Indonesia Number 23 of 2021, the FMU's main duties are to facilitate investment growth, industry development, and markets to support national economic recovery. Therefore, the task of the FMU as a stakeholder supporting increased marketing of forest products has not changed significantly.

FMU Batutegi requires a role and collaboration with other stakeholders (Rahimi-Feyzabad et al. 2022; Richter and Christmann 2023) so that the aim of increasing the marketing of NTFPs and improving the farmer's economy can work. Stakeholders who synergize and engage with each other following their respective roles and functions will support success in carrying out the programs created (Pelyukh et al. 2021; Przybylska et al. 2023; Widodo et al. 2018) and constraints that occur can be minimized through collaboration, communication, coordination, and harmonization between stakeholders (Heryadi et al. 2022; Sukristiyono et al. 2016; Syahputra et al. 2019). The results of this study can be used as material for making policies (Balane et al. 2020).

Based on the problems mentioned above, involving stakeholders by their interest and influence is necessary to improve NTFP marketing in a better direction. Stakeholders' involvement is relatively important in NTFP marketing; therefore, it needs to be identified and mapped so that the role of each stakeholder can be described in NTFP marketing in FMU Batutegi. The scope of

stakeholder analysis in this study is stakeholders involved and can facilitate in increasing the marketing of NTFP from Tanggamus Regency to Lampung Province.

2. Material and Methods

2.1. Research Location

The research was conducted from April 2022 to June 2022. The research location is in the FMU Batutegi area in Tanggamus Regency to Lampung Province. The map of the research location is shown in **Fig 1.**

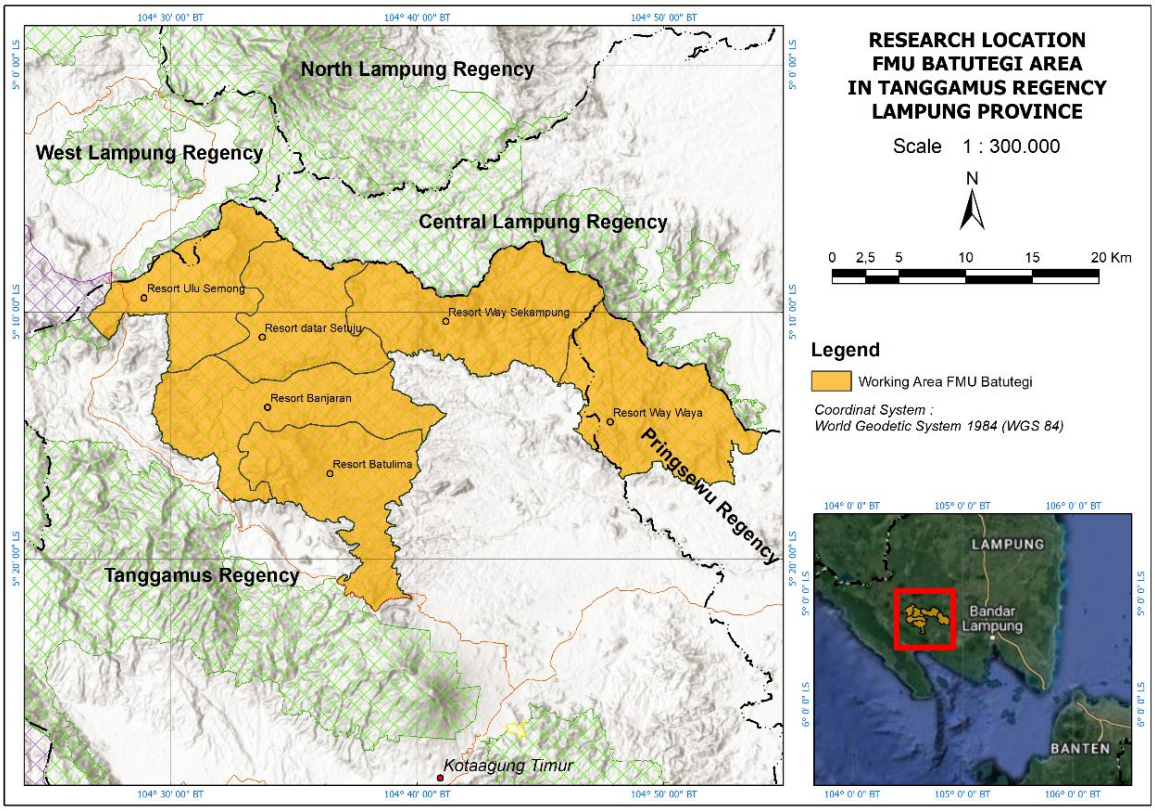


Fig. 1. Map of the research location.

2.2. Data Collection

Data collection was carried out through interviews using a questionnaire. The interviews were intended to obtain an explanation regarding the interests and influence of each stakeholder in the NTFP's marketing. Determination of informants was carried out using key informants, namely FMU Batutegi as forest area managers appointed by purposive sampling with the consideration of having knowledge and understanding of NTFP marketing activities. Then, the key informants appointed other stakeholders (snowball sampling) that consisted of academician (1 person), businessman (1 person), community members (7 person), government officials (4 person), and media (2 person). Overall, based on the results of interviews, it was found that 15 stakeholders were involved in the marketing of NTFP.

2.3. Data Analysis

The collected interview data were analyzed qualitatively using the theoretical concept (Ackermann and Eden 2011; Reed et al. 2009) and stakeholder analysis that was carried out in 3 steps: (1) identifying stakeholders, (2) categorizing stakeholders, (3) investigating the relationship between stakeholders. This stakeholder analysis was conducted to see the transformation of relationships, trust, and understanding among stakeholders. This tendency also allows potentially conflicting stakeholders to respect each other's views and work together. Karalliyadda et al. (2023) used the Reed et al. (2009) method in their research to distinguish stakeholders based on subjective perspectives and empower stakeholders to participate in the decision-making process.

2.3.1. Stakeholders identification

Identification of stakeholders was carried out by determining key informants, namely FMU Batutegi as the forest manager who was appointed by purposive sampling with the consideration of having knowledge and understanding of NTFP marketing activities in FMU Batutegi then other stakeholders were appointed from these key informants using the snowball sampling method. Stakeholders who have been identified will be analyzed descriptively to categorize their interests and influence.

2.3.2. Stakeholders' categories based on interest and influence

The preparation of the interest and influence matrix was based on the interview results using questions with informants, which were expressed in scores and then grouped according to criteria of interest and influence. A total of five questions based on criteria of interest and influence of stakeholders were used to measure the level of interest and influence of stakeholders in this research. The answer to each question describes the level of interest and influence of stakeholders by giving a score of 1-5 (**Table 1**). Then, the score of five questions is added up and mapped in the form of an interest and influence matrix. The determination of scores on questions to measure the level of interest and influence of stakeholders refers to five-level data measurement (Abbas 2005; Hasan et al. 2022), as shown in **Table 1.**

Table 1. Matrix of criteria for assessing the level of interests and influence

Score	Total	Criteria	Description
Stakeholders interest			
5	20 – 25	Very high	Very interested in the NTFP marketing
4	16 – 20	High	Interested in the NTFP marketing
3	11 – 15	Moderately high	Moderately interested in the NTFP marketing
2	6 – 10	Less high	Less interested in the NTFP marketing
1	0 – 5	Low	Not interested in the NTFP marketing
Stakeholders influence			
5	20 – 25	Very high	Very influences in the NTFP marketing
4	16 – 20	High	Influences in the NTFP marketing
3	11 – 15	Moderately high	Moderately influence in the NTFP marketing
2	6 – 10	Less high	Less influences in the NTFP marketing
1	0 – 5	Low	Not influence in the NTFP marketing

The results of the stakeholders categories based on their interests and influences are grouped into four quadrants, as presented in **Fig. 2** (Reed et al. 2009).

1. **Subject**: stakeholders who support an activity but lack the capacity or ability to make an impact, but they can become influential if they form alliances with other stakeholders (stakeholders who have high interest but low influence),
2. **Key Players**: key stakeholders who drive activities that have high interest and influence (Stakeholders who have high interest and influence),
3. **Context Setters**: Stakeholders who are significant risks that should be monitored and managed (stakeholders who have low interest but high influence),
4. **Crowd**: Stakeholders with little need to be considered involved in the activity because their interest and influence change from time to time, and the impact of these changes can be considered (stakeholders who have low interest and influence).

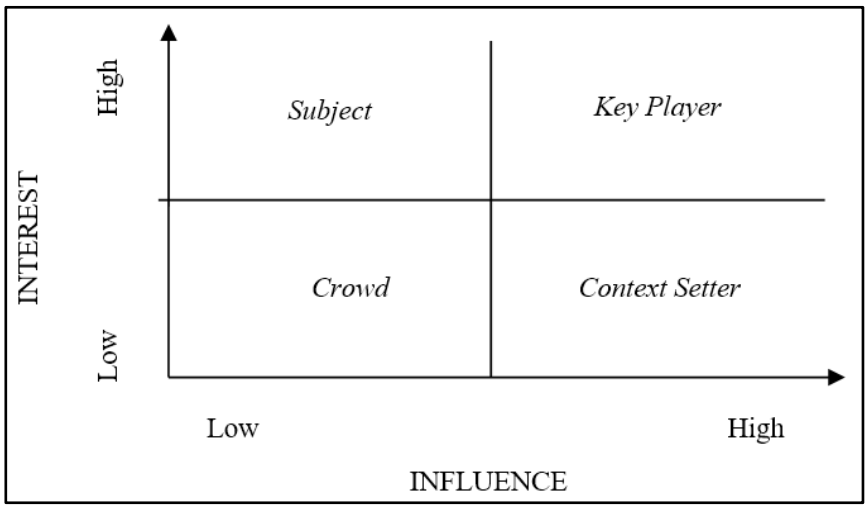


Fig. 2. Stakeholders interest and influence matrix (Reed et al. 2009).

2.3.3. Relationship between stakeholders

Relations between stakeholders show the flow of relationships between stakeholders, both written in documents (task, functions, authorities, cooperation) and implemented in the field. This tendency is intended to form an agreement and understanding of the concept of developing NTFP marketing in the FMU Batutegi area. Identified stakeholder relationships are then written in rows and columns of the table and descriptively described into actor linkages using UCINET 6 for Windows Version 6.752 and Net Draw 2.179 - Network Visualization Software.

3. Results and Discussion

3.1. General Condition of FMU Batutegi

The FMU Batutegi was established based on the Decree of the Minister of Forestry Number: SK. 650/Menhut-II/2010 dated January 2010, 28 covering an area of 58,162 Ha, the entire area of which is a protected forest and is divided into three registers, namely partly Register 39 Kota Agung Utara, Register 32 Bukit Rindingan and partly Register 22 Way Waya which are administratively located in 4 regions districts namely Tanggamus Regency, Pringsewu Regency, Central Lampung Regency and West Lampung Regency. Geographically, the FMU Batutegi is located at 104º27'-104º54' East Longitude and 5º5'-5º22' South Latitude.

The condition of the vegetation cover in the FMU Batutegi managed area is dominated by non-forest vegetation at 76.49%, namely for dry land agriculture mixed with shrubs 53.73%,

shrubs 19.76%, open land at 2.26%, clouds at 0.72% and settlements at 0.02%. In it, some cultivators are members of Hkm or those who are not. Many sharecroppers grow coffee and cocoa in the area. FMU Batutegi, between 2006 and 2010, lost 0.02% of primary forest, and 1,800 ha of open land appeared. FMU Batutegi is divided into two blocks, namely: a core block covering an area of 10,827 ha, functioning as protection and water management, and a utilization block covering an area of 47,334.46 ha, functioning as an area planned for limited utilization. In this utilization block, there is a forest area utilization permit in the form of the legality of forest management business carried out by the community (IUPHKm) covering an area of 11,103.65 ha consisting of 24 Gapoktan.

3.2. Stakeholders Involved in the NTFP Marketing at FMU Batutegi

Identified stakeholders must be involved on paper and in the implementation and are very dependent on their role (Przybylska et al. 2023)**.** The results of interviews show the stakeholders involved in the NTFP marketing at FMU Batutegi consisting of 1 from academic, 1 from business, 7 from the community, 4 from the government, and 2 from the media (**Table 2**). The number of stakeholders involved in the marketing of NTFP in the FMU Batutegi is not much different from other related studies. Balane et al. (2020) identified 18 stakeholders, and Guðlaugsson et al. (2020) identified 20 stakeholders. This tendency is influenced by longer research time so that it can further explore the stakeholders involved. Collaboration of stakeholders is urgently needed to improve local institutions, introducing potential, promoting, and strengthening the concept of necessary activities (Sulistyorini et al. 2022). Stakeholders need to understand each other so that they can be involved, act, and have initiatives in accordance with the goals of creating, building, and strengthening organizational ties (Mainardes et al. 2012).

3.3. Categories of Stakeholders Based on Interest and Influence in NTFP Marketing at FMU Batutegi

These categories aim to identify the level of involvement in the decision-making process of each stakeholder based on the ability of stakeholders to represent group interests (Pelyukh et al. 2021). **Table 3** shows that FMU Batutegi has high criteria of interest in NTFP marketing because FMU Batutegi, as the manager of the forest area, has the authority to develop forest management programs that are beneficial and improve the welfare of forest communities. FMU Batutegi must protect and preserve forest areas even though most of the area is used for community activities, including utilization, production, and marketing of NTFP. Bowditch et al. (2022) stated that forest managers play a key role in achieving forestry and the forestry-related goals of managers, such as planting goals, emission reductions, timber production, or conservation of ecosystem services.

Stakeholders with moderately high-interest criteria in the NTFP marketing at the FMU Batutegi are Gapoktan Mandiri Lestari, Gapoktan Margorukun, Rumah Kolaborasi, Rainforest Alliance, the community of youth and millennials who care about the environment (KOMUNAL), international animal rescue foundation (YIARI), regional beekeeping association (APIDA), Lampung Provincial Forestry Service, the regional watershed management office (BPDAS) Way Seputih Way Sekampung, the regional sustainable forest management office (BPHL) Region VI Bandar Lampung and Exporters. These stakeholders support the activities carried out by FMU Batutegi as the key stakeholder because they have the same interest in marketing development, namely increasing people's income from marketing NTFP.

Table 2. Stakeholders involved in the NTFP marketing at FMU Batutegi

No.	Stakeholders	Description
1	University of Lampung	Academics who have a vision and mission in the fields of education and research, including NTFP research.
2	Exporter	The largest coffee exporters from Lampung Province participate in the development of Lampung coffee through farmer mentoring and empowerment community activities.
3	Rumah Kolaborasi	Non-governmental organizations carry out community empowerment activities at FMU Batutegi and Lampung Province, assisting in the form of a solar dryer dome for coffee processing.
4	Rainforest Alliance	International non-profit organization oriented to the fields of business, agriculture, and forestry, with one of the activities related to community empowerment at FMU Batutegi and Lampung Province, especially in coffee certification activities.
5	KOMUNAL	Non-governmental organizations who carry out the activity empowerment community activities at FMU Batutegi and Lampung Province, including coffee certification activities for Gapoktan with Rainforest Alliance.
6	YIARI	An organization engaged in the conservation of Indonesian primates and their habitat that collaborates with multi-stakeholders to create harmonious ecosystems between the environment, animals, and humans through sustainable agroforestry agricultural activities that focus on arable land management and institutional strengthening in 3 Gapoktan in FMU Batutegi through the provision of NTFP seeds and training on NTFP cultivation.
7	APIDA	The association conducts training activities, honey bee cultivation, and honey marketing at FMU Batutegi.
8	Gapoktan Mandiri Lestari	A combination of HKm farmer groups in the FMU Batutegi area, farmers who produce and sell NTFP
9	Gapoktan Margorukun	A combination of HKm farmer groups in the FMU Batutegi area, farmers who produce and sell NTFP
10	FMU Batutegi	Batutegi forest area manager who facilitates NTFP development programs and promotes NTFP
11	Lampung Provincial Forestry Service	Administering some of the provincial government affairs in the forestry sector, including planning and implementing activities at the FMU Batutegi, promoting NTFP
12	BPDAS Way Seputih Sekampung	BPDAS Way Seputih Way Sekampung carried out many activities related to the procurement of forestry seedlings and MPTS (including NTFP seeds), as well as cultivation and conservation training in protected forest areas in Lampung Province
13	BPHL Region VI	Facilitating NTFP cultivation training and NTFP marketing
14	Kompas	Media of information and education for farmers and the public, especially environmental and forestry issues
15	AJI Bandar Lampung	Media of information and education for farmers and the public, especially environmental and forestry issues

Stakeholders who have less high-interest criteria in NTFP marketing are the University of Lampung, Kompas, and AJI Bandar Lampung. Academics (University of Lampung) focus on overall forestry research, particularly the Social Forestry program, including NTFP research. The media (Kompas and AJI Bandar Lampung) is a stakeholder whose importance is not high because its function is to convey news in general regarding forestry activities carried out by both the government and non-governmental organizations and does not convey much related to the promotion of NTFP.

Table 3. Stakeholders interest level

No.	Stakeholders	Interest value					Total	Criteria
		It1	It2	It3	It4	It5		
1	University of Lampung	3	2	1	1	1	8	Less high
2	Exporter	1	1	1	5	5	13	Moderately high
3	Rumah Kolaborasi	2	4	1	3	1	11	Moderately high
4	Rainforest Alliance	4	4	1	1	1	11	Moderately high
5	KOMUNAL	2	3	1	4	1	11	Moderately high
6	YIARI	3	3	2	2	1	11	Moderately high
7	APIDA	2	2	2	5	1	12	Moderately high
8	Gapoktan Mandiri Lestari	2	4	1	4	4	15	Moderately high
9	Gapoktan Margorukun	2	4	1	4	4	15	Moderately high
10	FMU Batutegi	5	5	2	4	1	17	High
11	Lampung Provincial Forestry Services	5	3	1	1	4	14	Moderately high
12	BPDAS Way Seputih Sekampung	5	3	2	2	1	13	Moderately high
13	BPHL Region VI Bandar Lampung	5	3	2	2	1	13	Moderately high
14	Kompas	1	2	1	1	1	6	Less high
15	AJI Bandar Lampung	1	2	1	1	1	6	Less high

Note: It1–It 5 = Interest value based on questions 1-5.

Table 4 shows that stakeholders with high influence in NTFP marketing are the FMU Batutegi because they have the duty and authority to manage forest areas sustainably. FMU Batutegi is in direct contact with the community around the forest to influence the community to utilize, produce, and market NTFP with various programs and activities created.

Table 4. Stakeholders influence level

No	Stakeholders	Influences value					Total	Criteria
		In1	In2	In3	In4	In5		
1	University of Lampung	5	1	1	1	3	11	Moderately high
2	Exporter	3	1	1	5	2	12	Moderately high
3	Rumah Kolaborasi	2	2	2	3	4	13	Moderately high
4	Rainforest Alliance	3	1	1	1	3	9	Less high
5	KOMUNAL	1	1	1	4	2	9	Less high
6	YIARI	1	1	1	2	4	9	Less high
7	APIDA	2	2	1	1	2	8	Less high
8	Gapoktan Mandiri Lestari	3	1	1	3	3	11	Moderately high
9	Gapoktan Margorukun	3	1	1	3	3	11	Moderately high
10	FMU Batutegi	4	3	3	1	5	16	High
11	Lampung Provincial Forestry Service	4	2	3	3	3	15	Moderately high
12	BPDAS Way Seputih Sekampung	5	2	3	2	3	15	Moderately high
13	BPHL Region VI Bandar Lampung	2	1	3	2	5	13	Moderately high
14	Kompas	2	1	1	1	2	7	Less high
15	AJI Bandar Lampung	2	1	1	1	3	8	Less high

Note: In1–In5 = Influence value based on questions 1–5.

Stakeholders who have a moderately high level of influence in the NTFP marketing are the Lampung Provincial Forestry Service, BPDAS Way Seputih Way Sekampung, BPHL Region VI Bandar Lampung, exporters, University of Lampung, Rumah Kolaborasi, Gapoktan Mandiri

Lestari and Gapoktan Margorukun. Stakeholders have less influence than FMU Batutegi but support all activities carried out by FMU Batutegi in marketing NTFP.

Stakeholders with less high influence in the NTFP marketing are Rainforest Alliance, KOMUNAL, YIARI, APIDA, Kompas, and AJI Bandar Lampung. All stakeholders of non-governmental organizations have various kinds of activities related to community empowerment. This non-governmental organization, together with FMU Batutegi, usually assists farmers and listens to farmers' aspirations. White et al. (2022) stated that non-governmental organizations provide input to the community and the government regarding conversation, activity planning, and practice. Kompas and AJI Bandar Lampung have low influence because the media does little to convey news related to the marketing of NTFP. The media should have a high influence on the marketing of NTFP because, according to Thaker et al. (2023), the role of the media in shaping public risk perceptions. A good perception can improve the marketing of NTFP.

The results of the categories of stakeholders based on their interest and influence are grouped into four quadrants (Reed et al. 2009). The quadrant in **Fig. 3** shows the following results:

1. **Subjects** are occupied by four stakeholders. Subjects are moderately active in the FMU Batutegi community by being heavily involved in programs designed for community empowerment activities, having high availability of human resources, and providing facilities but low impact because they have low authority.
2. **Key Players** are occupied by eight stakeholders. These eight stakeholders are the main stakeholders who coordinate, communicate, and work together so that all programs run well. FMU Batutegi has the most critical role in marketing NTFP because it has high authority over the management of the FMU Batutegi area. Key players are groups that get support but also have to face resistance and obstacles (Richter and Christmann 2023).
3. **Context setters** are occupied by one stakeholder. Academics have a strong influence in accelerating NTFP marketing through involvement in increasing human resources knowledge and skills. Key stakeholders can partner with academics through research and the use of effective techniques (Musasa et al. 2023). So it can increase the production and marketing of NTFP.
4. **Crowds** are occupied by two stakeholders. Programs related to NTFP marketing are still low due to a lack of ability to fight for NTFP marketing aspirations. The role of the media in marketing NTFP is still not significant, although the media is expected to become a medium for promoting NTFP so that the public can widely recognize it. Mandang et al. (2018) stated that engaging stakeholders requires some consideration as their interests and influence change over time. The concerned group must be constantly monitored and well-communicated.

3.4. Relationship between Stakeholders

Relations between parties are built based on the responsibilities of each stakeholder. This relationship illustrates the existence of interaction, continuity, synergy, strength, and conflict (Yeny et al. 2018). The lines in **Fig. 4** show the relationship between stakeholders entering and leaving the network. Stakeholder relations are grouped into three groups: cooperation, communication, and coordination. The relationship between stakeholders is shown in **Table 5**.

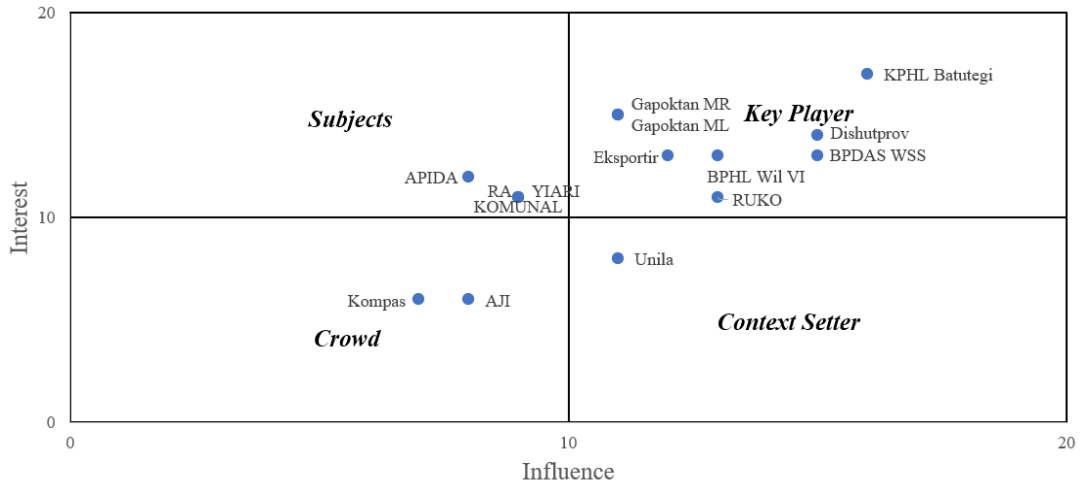
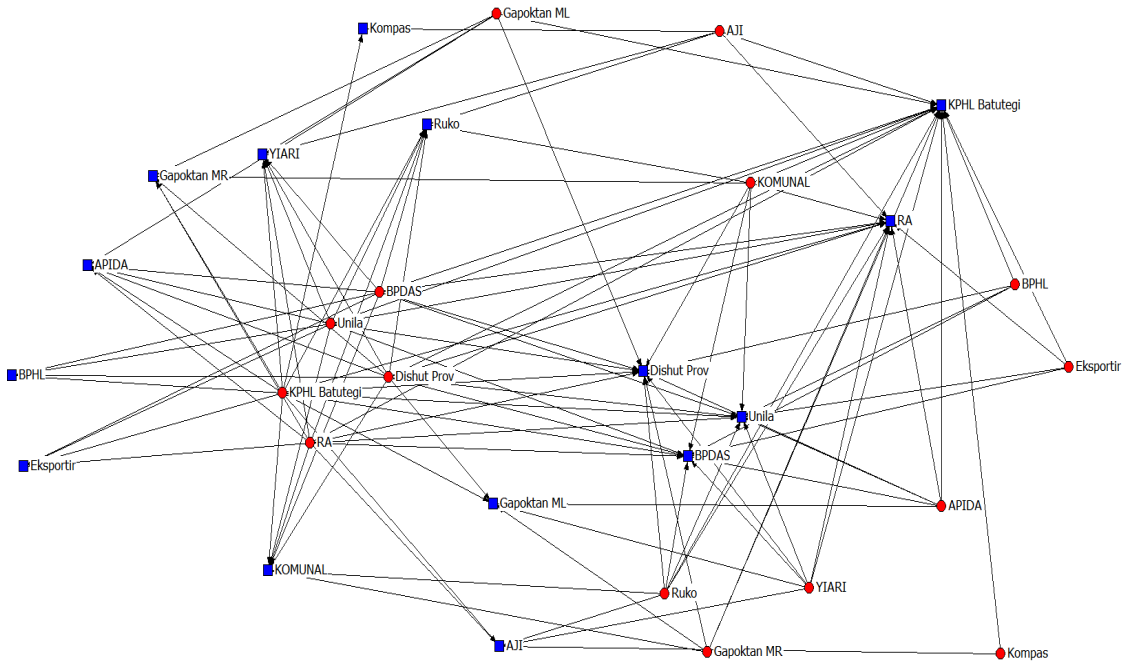


Fig. 3. Matrix of stakeholder interest and influence in NTFP marketing at the FMU Batutegi.



: stakeholders with leaving a relationship

: stakeholders with entering a relationship

Fig. 4. Relationship between stakeholders in NTFP at the FMU Batutegi.

Table 5. Relationship between stakeholders

No.	Relationship	Description
1	Cooperative	- Unila and Exporters collaborate in the fields of education, research and community service, land monitoring, and biodiversity in the watershed land rehabilitation program at FMU Batutegi, including facilitating the production of NTFPs and community empowerment - Unila and Rainforest Alliance are collaborating in research on superior sugar palm seeds and the identification of plus palms - Unila and YIARI collaborate in research and forest area conservation activities and community empowerment - Unila and FMU Batutegi cooperate in NTFP mentoring and training - Unila and the Lampung Province Forestry Service collaborated on research on forestry students, including research on NTFP

No.	Relationship	Description
		- Unila and BPDAS WSS cooperate in NTFP cultivation training - Exporters and FMU Batutegi cooperate in forest and land rehabilitation activities through planting productive seeds, including MPTS seeds (durian, palm tree, areca nut) - Exporters and BPDAS WSS collaborated in rehabilitation activities for the FMU Batutegi in the form of planting seeds, including MPTS seeds and a comparative study accompanied by Unila - Ruko, RA, collaborated with AJI in a coffee NTFP webinar activity - Ruko with FMU Batutegi and the Lampung Forestry Service in community empowerment activities and providing coffee drying facilities (Solar Dryer - Dome) for Gapoktan Margorukun - RA cooperates with exporters in assisting coffee farmers - RA, in collaboration with Komunal, conducted training for farmer members of Gapoktan Margorukun regarding RA coffee certification for 100 farmers. - RA collaborates with APIDA regarding honey bee cultivation training - RA collaborated with FMU Batutegi in community empowerment, including coffee certification for the Srikandi Maju Bersama Cooperative - RA collaborated with the Lampung Provincial Forestry Office regarding community empowerment and assistance to coffee farmers covering several FMU areas in Lampung, including the FMU Batutegi - YIARI cooperates with FMU Batutegi in managing the protected forest area, including community empowerment, biodiversity, and NTFP cultivation - FMU Batutegi, APIDA, Gapoktan Mandiri Lestari collaborate regarding training activities for honey bee cultivation, honey care, and marketing - BPDAS WSS and APIDA cooperate in beekeeping activities
2	Communication	- Unila and BPHL Region VI Bandar Lampung communicate actively regarding training materials and the need for resource persons to increase human resources knowledge regarding NTFP - Ruko and Komunal communicate with Unila to consult regarding community empowerment activities - Exporters and RA communicate regarding monitoring and evaluation of coffee farmer assistance activities - Ruko, RA, and Komunal communicate with each other regarding community empowerment activities carried out at FMU Batutegi - Komunal communicated with FMU Batutegi regarding coffee certification activities carried out with RA at Gapoktan Margorukun - YIARI and RA communicated with each other regarding community empowerment activities carried out at FMU Batutegi - YIARI communicated with the Lampung Provincial Forestry Service regarding community empowerment at the FMU Batutegi - YIARI communicated with AJI regarding community empowerment activities carried out at the FMU Batutegi - APIDA communicates with Unila in assisting honey bee cultivation - Gapoktan Mandiri Lestari and Gapoktan Margorukun communicated with each other regarding the implementation of NTFP activities that the government and non-governmental organizations had carried out - exchanged information and knowledge on NTFP to mutually enhance farmers' knowledge and skills - FMU Batutegi, YIARI, and Gapoktan Mandiri Lestari communicate with each other regarding the implementation of community empowerment activities and NTFP cultivation training - FMU Batutegi communicates actively with the Lampung Provincial Forestry Service in various activities, provides input to the Central Government regarding regulations and policies for NTFP development, finds the market needed, and promotes NTFP

No.	Relationship	Description
		- FMU Batutegi and BPDAS WSS communicate in seed planting and cultivation training activities - FMU Batutegi and BPHL Region VI Bandar Lampung communicate regarding possible activity plans related to community empowerment and NTFP training - FMU Batutegi communicates with the media for information and promotion of community empowerment activities and NTFP - The Lampung Provincial Forestry Service communicates with Ruko, RA, Communal, YIARI, and APIDA regarding the implementation of community empowerment activities at the FMU Batutegi - The Lampung Provincial Forestry Service communicates with Gapoktan Mandiri Lestari and Gapoktan Margorukun regarding the implementation of community empowerment activities at FMU Batutegi - BPDAS WSS communicates with Ruko, RA, Komunal, and YIARI regarding the facilitation of NTFP seeds - BPDAS WSS and APIDA communicate regarding honey bee cultivation training - BPDAS WSS and the Lampung Province Forestry Service communicate regarding community empowerment activities and facilitation of NTFP seeds in all FMU areas in Lampung Province - BPHL Region VI Bandar Lampung and the Lampung Provincial Forestry Service communicate regarding the implementation of community empowerment activities in the FMU - Kompas and AJI communicate in participating in the NTFP webinar activity
3	Coordination	- Unila and Exporters coordinate the implementation of group assistance activities and community empowerment - Unila coordinates with the FMU Batutegi and the Lampung Provincial Forestry Service regarding group assistance and student research - Ruko, Rainforest Alliance, and Komunal coordinate with each other regarding community empowerment activities at FMU Batutegi - APIDA coordinates with Unila regarding honey bee cultivation activities - FMU Batutegi coordinates with shophouses, Rainforest Alliance, Komunal, YIARI, and APIDA regarding the implementation of group mentoring - FMU Batutegi, as site-level manager, coordinates with the Lampung Provincial Forestry Service in improving NTFP development programs related to group assistance, community empowerment, and infrastructure facilitation - FMU Batutegi and BPDAS WSS are coordinating activities to be carried out related to cultivation and the need for seeds for planting NTFP seeds - FMU Batutegi and BPHL Region VI Bandar Lampung coordinate activities to be carried out related to community empowerment - FMU Batutegi coordinates with Gapoktan Mandiri Lestari and Gapoktan Margorukun regarding the implementation of activities and programs that can increase group knowledge and welfare - BPDAS WSS coordinates with the Lampung Provincial Forestry Service regarding community empowerment activities and facilitation of NTFP seeds in all FMU areas in Lampung Province - BPDAS WSS and BPHL Region VI Bandar Lampung coordinated regarding the facilitation of NTFP seeds and resource persons for NTFP cultivation - BPHL Region VI Bandar Lampung and the Lampung Provincial Forestry Services are coordinating regarding the implementation of community empowerment activities in the FMU

NetDraw can create a network diagram that represents information about the relationships between nodes, can be a very powerful way of describing a social structure, and can help better understand how a node is connected and its role in the diagram (Song et al. 2023). In the view of the stakeholder network using NetDraw 2.179, there are 53 relationships between stakeholders in NTFP marketing at the FMU Batutegi consisting of 18 cooperative relationships, 23 communication relationships, and 12 coordination relationships (**Fig. 4**). The lines in **Fig. 4** show the relationship between stakeholder relations entering and leaving the network.

After knowing the 15 stakeholders involved in NTFP marketing at the FMU Batutegi, the stakeholders were determined as centrality actors in the network. Park et al. (2021) stated that centrality shows how far actors in a network are structurally favored compared to others, and actors with high centrality are in a central position in the network so that they have the advantage of controlling the network. Determination of centrality in a network is carried out through 5 categories: density centrality, eigenvector centrality, degree centrality, closeness centrality, and betweenness centrality.

3.4.1. Density centrality

Density centrality measurement is used to obtain information about how many connections are made or received by each stakeholder in a network. The results in **Fig. 5** show that the matrix average of stakeholders in NTFP marketing at the FMU Batutegi is 0.5143 or 51%. This percentage indicates that the relationship in the network is moderately strong because it is more than 50%. In contrast, Rahimi-Feyzabad et al. (2022) reported a network density of 30.41 %. These numbers mean that only a few actors are connected and that the linkages of the actors in the network are at a very low level. Strong networks can help actors cope with change and ensure that change is successful (Ten Kate et al. 2010). A network can have high density if the matrix average number is close to 1. The standard deviation shows a result of 0.4998, indicating valid data.

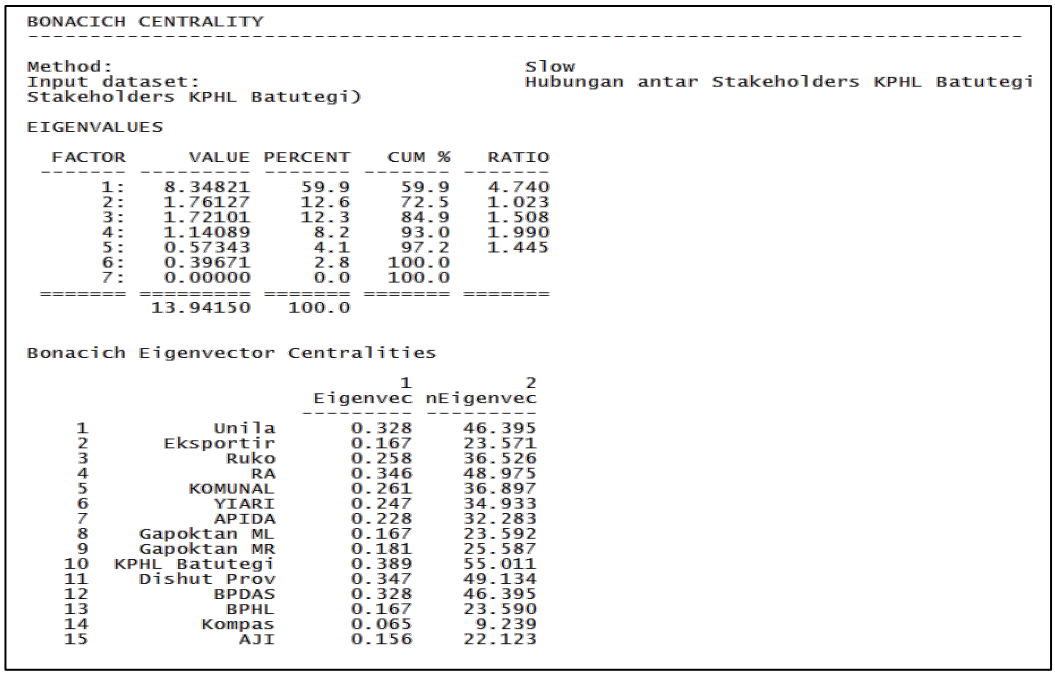
```
BLOCK DENSITIES OR AVERAGES
-------------------------------------------------------------------------------

Input dataset:                          Hubungan antar Stakeholders KPHL Batutegi
KPHL Batutegi)


Relation: Sheet 1

Density (matrix average) = 0.5143
Standard deviation = 0.4998

Use MATRIX>TRANSFORM>DICHOTOMIZE procedure to get binary image matrix.
Density table(s) saved as dataset Density
Standard deviations saved as dataset DensitySD
Actor-by-actor pre-image matrix saved as dataset DensityModel
```

Fig. 5. Density centrality in NTFP marketing at the FMU Batutegi.

3.4.2. Eigenvector centrality

Eigenvector centrality is used to identify parts that are strongly and weakly connected in a network (Ando et al. 2021). An eigenvector is an approach used to find central stakeholders with a higher weight value than other stakeholders in a network. Eigenvector centrality is based on the idea that the centrality of a node depends on both the number and the quality of the neighbor's node (Xu et al. 2021). The eigenvector centrality in **Fig. 6** shows that the stakeholder with the highest score is the FMU Batutegi, with an eigenvector value of 0.389 and an eigenvector

normality value of 55.011. FMU Batutegi is the central actor with the highest value in the NTFP marketing network at FMU Batutegi.



BONACICH CENTRALITY

Method: Slow
Input dataset: Hubungan antar Stakeholders KPHL Batutegi
Stakeholders KPHL Batutegi)

EIGENVALUES

FACTOR	VALUE	PERCENT	CUM %	RATIO
1:	8.34821	59.9	59.9	4.740
2:	1.76127	12.6	72.5	1.023
3:	1.72101	12.3	84.9	1.508
4:	1.14089	8.2	93.0	1.990
5:	0.57343	4.1	97.2	1.445
6:	0.39671	2.8	100.0	
7:	0.00000	0.0	100.0	
	13.94150	100.0		

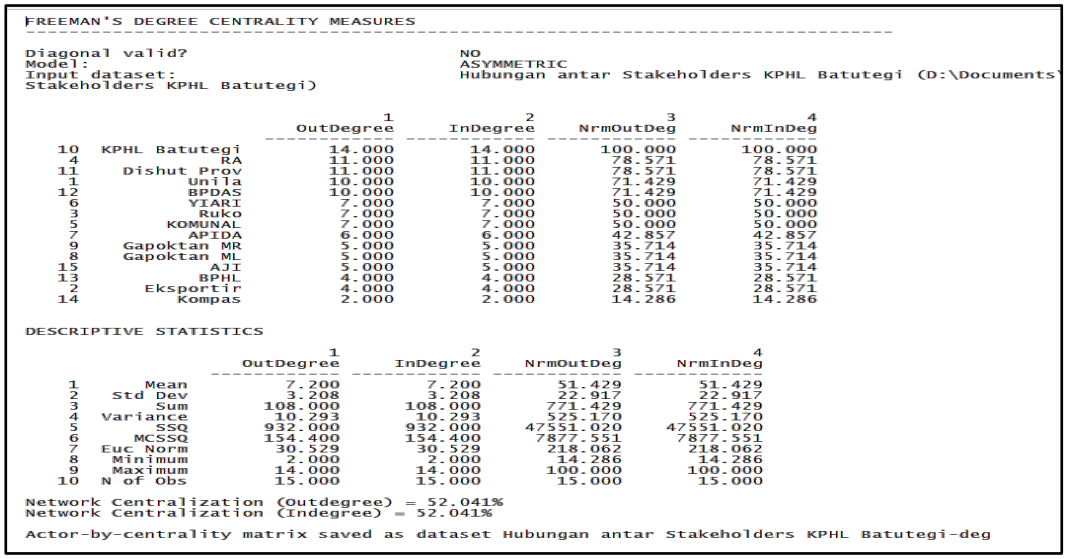
Bonacich Eigenvector Centralities

		1 Eigenvec	2 nEigenvec
1	Unila	0.328	46.395
2	Eksportir	0.167	23.571
3	Ruko	0.258	36.526
4	RA	0.346	48.975
5	KOMUNAL	0.261	36.897
6	YIARI	0.247	34.933
7	APIDA	0.228	32.283
8	Gapoktan ML	0.167	23.592
9	Gapoktan MR	0.181	25.587
10	KPHL Batutegi	0.389	55.011
11	Dishut Prov	0.347	49.134
12	BPDAS	0.328	46.395
13	BPHL	0.167	23.590
14	Kompas	0.065	9.239
15	AJI	0.156	22.123

Fig. 6. Eigenvector centrality in NTFP marketing at the FMU Batutegi.

3.4.3. Degree centrality

The degree of centrality is used as an indicator of stakeholder strength (Pelyukh et al. 2021) and is a measurement to show the degree of existence and position of stakeholders in the network. The largest outdegree and indegree values are the FMU Batutegi actors, with values of 14.000 and 14.000 with outdegree normality and indegree normality values of 100 and 100. The same is true with the research of Mohammedi et al. (2012), which has a degree value of 100 and shows the degree of stakeholders having the same value. FMU Batutegi has incoming and outgoing relationships with all stakeholders involved in NTFP marketing at FMU Batutegi. The outdegree and indegree values in **Fig. 7** have the same value because there is a reciprocal relationship between stakeholders in terms of cooperation, communication, and coordination.



FREEMAN'S DEGREE CENTRALITY MEASURES

Diagonal valid? NO
Model: ASYMMETRIC
Input dataset: Hubungan antar Stakeholders KPHL Batutegi (D:\Documents\
Stakeholders KPHL Batutegi)

		1 OutDegree	2 InDegree	3 NrmOutDeg	4 NrmInDeg
10	KPHL Batutegi	14.000	14.000	100.000	100.000
4	RA	11.000	11.000	78.571	78.571
11	Dishut Prov	11.000	11.000	78.571	78.571
1	Unila	10.000	10.000	71.429	71.429
12	BPDAS	10.000	10.000	71.429	71.429
6	YIARI	7.000	7.000	50.000	50.000
3	Ruko	7.000	7.000	50.000	50.000
5	KOMUNAL	7.000	7.000	50.000	50.000
7	APIDA	6.000	6.000	42.857	42.857
9	Gapoktan MR	5.000	5.000	35.714	35.714
8	Gapoktan ML	5.000	5.000	35.714	35.714
15	AJI	5.000	5.000	35.714	35.714
13	BPHL	4.000	4.000	28.571	28.571
2	Eksportir	4.000	4.000	28.571	28.571
14	Kompas	2.000	2.000	14.286	14.286

DESCRIPTIVE STATISTICS

		1 OutDegree	2 InDegree	3 NrmOutDeg	4 NrmInDeg
1	Mean	7.200	7.200	51.429	51.429
2	Std Dev	3.208	3.208	22.917	22.917
3	Sum	108.000	108.000	771.429	771.429
4	Variance	10.293	10.293	525.170	525.170
5	SSQ	932.000	932.000	47551.020	47551.020
6	MCSSQ	154.400	154.400	7877.551	7877.551
7	Euc Norm	30.529	30.529	218.062	218.062
8	Minimum	2.000	2.000	14.286	14.286
9	Maximum	14.000	14.000	100.000	100.000
10	N of Obs	15.000	15.000	15.000	15.000

Network Centralization (Outdegree) = 52.041%
Network Centralization (Indegree) = 52.041%

Actor-by-centrality matrix saved as dataset Hubungan antar Stakeholders KPHL Batutegi-deg

Fig. 7. Degree centrality in NTFP marketing at the FMU Batutegi.

3.4.4. Closeness centrality

Closeness centrality was measured by the closeness between stakeholders. If stakeholders are the center of the network or the main actor, they can interact more quickly and easily with other actors. Closeness centrality is a measurement to calculate how far the data can spread from one stakeholder to another. Closeness centrality refers to the degree of centrality measured by the closeness or the distance between nodes in the network (Ma et al. 2014). The results in Fig. 8 show that the stakeholders with the highest closeness centrality value in NTFP are the FMU Batutegi, with a score of 100. FMU Batutegi can easily interact and obtain information on working relations from other stakeholders.

```
CLOSENESS CENTRALITY
------------------------------------------------------------------------------

Input dataset:                          Hubungan antar Stakeholders KPHL Batutegi (D:\Documents\03. TESIS S
Stakeholders KPHL Batutegi)
Method:                                 Geodesic paths only (Freeman Closeness)
Output dataset:                         Hubungan antar Stakeholders KPHL Batutegi-clo (D:\Documents\UCINET

Closeness Centrality Measures

                                  1            2
                            Farness   nCloseness
                       ------------ ------------
 10  KPHL Batutegi           14.000      100.000
  4             RA           17.000       82.353
 11    Dishut Prov           17.000       82.353
  1          Unila           18.000       77.778
 12          BPDAS           18.000       77.778
  6          YIARI           21.000       66.667
  3           Ruko           21.000       66.667
  5        KOMUNAL           21.000       66.667
  7          APIDA           22.000       63.636
  9    Gapoktan MR           23.000       60.870
  8    Gapoktan ML           23.000       60.870
 15            AJI           23.000       60.870
 13           BPHL           24.000       58.333
  2      Eksportir           24.000       58.333
 14         Kompas           26.000       53.846
```

Fig. 8. Closeness centrality in NTFP marketing at the FMU Batutegi.

3.4.5. Betweenness centrality

Betweenness centrality is a measurement used to show how far stakeholders can control and control the flow of information among stakeholders in the network. Stakeholders with the highest betweenness centrality value are considered the most important stakeholders in controlling information and have the convenience of facilitating interactions with other stakeholders (Syahputra et al. 2019). The results shown in **Fig. 9** show that the stakeholders with the highest betweenness value were FMU Batutegi, with a value of 23.633 and between the normality of 25.971.

```
FREEMAN BETWEENNESS CENTRALITY
------------------------------------------------------------------------------

Input dataset:                          Hubungan antar Stakeholders KPHL Batutegi (D:\Documents\03.
Stakeholders KPHL Batutegi


Important note: This routine cannot handle valued data, so it binarizes your data automatically.
                It DOES handle directed (non-symmetric) data, so it does NOT symmetrize.

Un-normalized centralization: :         303.500

                                  1            2
                        Betweenness nBetweenness
                       ------------ ------------
 10  KPHL Batutegi           23.633       25.971
  4             RA            6.517        7.161
 11    Dishut Prov            5.967        6.557
  1          Unila            3.767        4.139
 12          BPDAS            3.767        4.139
  6          YIARI            1.950        2.143
 15            AJI            1.667        1.832
  3           Ruko            1.083        1.190
  5        KOMUNAL            0.750        0.824
  7          APIDA            0.700        0.769
  8    Gapoktan ML            0.667        0.733
  9    Gapoktan MR            0.533        0.586
 13           BPHL            0.000        0.000
 14         Kompas            0.000        0.000
  2      Eksportir            0.000        0.000

DESCRIPTIVE STATISTICS FOR EACH MEASURE

                           1            2
                 Betweenness nBetweenness
                ------------ ------------
  1       Mean         3.400        3.736
  2    Std Dev         5.780        6.352
  3        Sum        51.000       56.044
  4   Variance        33.408       40.342
  5        SSQ       674.513      814.531
  6      MCSSQ       501.113      605.136
  7   Euc Norm        25.971       28.540
  8    Minimum         0.000        0.000
  9    Maximum        23.633       25.971
 10   N of Obs        15.000       15.000

Network Centralization Index = 23.82%
```

Fig. 9. Betweenness centrality in NTFP marketing at the FMU Batutegi.

Stakeholders with a betweenness normality value above 0 indicate that these stakeholders have a high potential to interact with other stakeholders in the network. Haji et al. (2023) stated that the most central stakeholders are essential in linking the network because they mediate communication between other stakeholders. FMU Batutegi are stakeholders who have relations with important actors, have the most relationships in the network, have closeness to other stakeholders in the network, and can control the flow of information among other stakeholders. This result is in line with research by Tandio et al. (2023), where institutions as representatives of the government are key stakeholders that have the potential to influence the success of planting mangroves in DKI Jakarta.

4. Conclusions

This research has found fifteen parties as stakeholders in the marketing of NTFP in the FMU Batutegi. The diversification of the interest and influence of each stakeholder member is relatively not too large, which is indicated by two categories of interest and influence, namely the categories of high and relatively high and less high. Twelve stakeholders with high and relatively high interest can be a strategic force to improve the performance of NTFP marketing in the FMU Batutegi. The results revealed that those who act as key players are the right parties, namely the business actors, policy-making institutions, and non-governmental organizations. Fifty-three types of relationships between NTFP marketing stakeholders in FMU Batutegi consisting of cooperation, communication, and coordination are vital assets in realizing better NTFP marketing. The central role of the FMU Batutegi can guarantee the success of the NTFP marketing at the FMU Batutegi, provided that the institution is given adequate authority and budget.

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