Farmer's Preferences of Source Seed New Superior Varieties Character for Rice Seed Production

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Abstract. Increasing rice production can be achieved by applying technological innovations such as the use of new superior seed varieties that are easily adopted by farmers. Seed variety contributed the most to increasing rice production by 56,1% as a production component. This research was conducted in Belanti Siam Village, Pandih Batu District, and the Pulang Pisau Regency. The choice of location and respondents was purposive with the consideration that Belanti Siam Village is a rice farming center that use of various rice varieties every year. This study analyzed farmers' preference levels for potential seed sources to be produced, namely Inpari 32 Hewar Daun Bakteri and Inpari Padjajaran Agritan. The research was conducted from September 2021 to January 2022 through surveys and field observations of 20 seed breeders and four officers. Data were collected through direct interviews, using a questionnaire consisting of several parameters to determine farmers' preferences and responses. Secondary data were obtained from The Central Kalimantan BPS data. The results showed that the characteristics of resistance to pests and diseases were the most important factors for farmers in selecting varieties, followed by the production characteristics. Resistance to pests and diseases is the most important characteristic because this condition can lead to crop failure. In the vegetative phase, farmers preferred the Inpari Padjajaran Agritan variety (0.38), whereas in the generative phase, they preferred Inpari 32 Hewar Daun Bakteri (0.43 – 0.55). Farmers preferred the Inpari 32 Hewar Daun Bakteri variety (0.68) for resistance to pests and diseases.
Keywords: farmer's preferences, rice character

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1 Introduction

Technological innovation, including the use of new superior seed varieties, plays an important role in increasing rice production [1], [2]. New Superior Varieties of seeds are easily adopted by farmers [3]. As a production component, seed variety contributed the most to increasing rice production by 56,1% [4]. The quality of rice seeds is needed to increase production [5-8], therefore, the availability of seeds and quality is a concern for farmers for crop success [9]. Additionally, variety rotation can increase production yields and provide added economic value for farmers. Therefore, the spread of seeds of New Superior Varieties at the farmer level is required [10].

One effort to spread New Superior Varieties is to maintain seed production through participatory methods with farmers. One method is to introduce new superior varieties of rice to be produced through display. The display of New Superior Varieties is a method for disseminating new superior varieties. Farmers can directly observe plant performance through variety displays before choosing the most preferred variety [11], [12].

Preferences in selecting varieties of rice seeds to be planted have a bearing on the land to be managed, the use of fertilizers and pesticides, and cropping patterns [13]. In addition, rice breeders obtain an overview of the characteristics of rice that farmers like and can start their work to produce rice with characters that farmers like. On the other hand, producers can know which varieties will be produced in large and small quantities, so that they do not suffer losses due to unsold products. Seed assistance programs can be conducted effectively and efficiently because the varieties are suitable for the field (both agroecological and preferred by farmers) [11], [12].

In Central Kalimantan, rice seeds are generally produced by government seed companies, private seed producers, and seed producers at the farm level (breeder farmers). The seed classes produced by the government and the private sector are Breeder Seed (BS), Foundation Seed (FS), Stock Seed (SS), Stock Seed (SS), and Extension Seed (ES). Extention Seeds (ES) are also produced at the farmer–breeder level. Extension Seeds (ES) are widely available on the market as inbred or hybrid seeds. Farmers can easily get it. Pulang Pisau Regency is one of the regencies implemented in the Food Estate program. Since 2020, an area of 30,000 hectares (ha) has been developed for rice farming, horticulture, plantations, and animal husbandry. In 2021, the development will be expanded to 60,778 ha through land intensification and extensification activities. By 2022, the total area of Food Estate development is expected to reach 62,455 hectares. Therefore, every year, a large number of rice seeds is required for each planting season. As implementers of rice cultivation in the field, farmers need to be introduced to the characteristics of the rice they want to plant. The purpose of this study was to analyze farmers' preferences for potential seed sources to be produced through displays, so that they could see the advantages of these varieties.

2 Methodology

New superior varieties will be held from September 2021 to January 2022 in Belanti Siam Village, Pandih Batu District, and Pulang Pisau Regency. The planted rice varieties were Inpari 32, Hewar Daun Bakteri, and Inpari Padjajaran Agritan in a demonstration plot of 2 (two) ha. The planting system used a logowo ratio of 2:1. The choice of location and respondents was purposive with the consideration that Belanti Siam Village is a rice farming center with the use of various rice varieties on every year. Data were collected through direct interviews using a questionnaire consisting of several parameters to

determine farmers' preferences and responses to New Superior Rice Variety Display Gardening. Secondary data were obtained from Central Kalimantan BPS data from 2012 to 2022 [14-24]. The respondents included 20 farmers of seed breeders and 4 officers. The data obtained were tabulated, presented, and descriptively analyzed.

The farmers' preference level for the characteristic attributes of rice plants was measured using the Perceived Quality (PQ) calculation technique of [25], [26]. This technique begins by determining the characteristic attributes of rice that are considered when choosing the preferred variety. Plant characteristics determined were plant height, number of productive tillers, panicle length, level of pest and disease attack, grain shape, and production. The calculation procedure for determining the level of farmer preference for the characteristic attributes of rice is as follows:

1. The level of importance (weight) of the characteristic attributes (BA) was determined by scoring using questions. Scores were given if the farmer's answer was very important (5), important (4), ordinary (3), unimportant (2), and very unimportant (1).
2. Attribute weight. The average characteristic per respondent (BAR) was obtained from the sum of the attribute weight scores (BA) of all farmer respondents divided by the number of respondents (n).
3. The attribute relative weight (BRA) is the BAR score per attribute divided by the total score of all attributes.
4. Preference level of respondent farmers for the attributes of the variety (TP). The TP value was measured by scoring by asking questions. The score is given if the answer is very like (5), like (4), ordinary (3), don't like (2), and really don't like (1).
5. The average preference level per respondent (TPR) was obtained by dividing the sum of the TP scores of all respondents by the number of respondents.
6. The average preference level per characteristic attribute of all varieties (TPRA) was calculated as the total TPR score per characteristic attribute of all varieties divided by the number of varieties.
7. The relative preference (TPRel) level was calculated by dividing the TPR score by the TPRA score.
8. The relative preference (TPRD) level was obtained by multiplying the BRA score by TPRel.
9. The Farmer's total preference level (TPT) for each variety is the sum of the TPRD scores of all the characteristic attributes possessed by the variety

3 Result and discussion

3.1 General state of display location

According to [27], the total area of The Pulang Pisau Regency is 9,650,864 square km and is located in the central part of Kalimantan Tengah Province. It is geographically positioned between 113°30'00″–114°15'00″ East Longitude and 1°32'00″–3°28'00″ S. The Regency is bordered by Palangkaraya City and Katingan Regency in the West, Kapuas Regency in the East, Gunung Mas Regency in the North, and the Java Sea in the South. Like other areas in Kalimantan Island that are crossed by rivers, Pulang Pisau Regency is also crossed by 5 main rivers that are Kahayan River, Sebangau River, Anjir Kalampan River, Anjir Basarang River, and Terusan Raya River. The Pulang Pisau Regency has a tropical climate, and the

relative humidity is quite high, with an average temperature of approximately 19.8 °C – 35.2 °C, and the air humidity is between 43.0 % – 100.0 %. Its location, which is close to latitude 0 °, makes this regency have hot weather with an average length of sun exposure ranging from 3.9-5.5 hours. The Pulang Pisau Regency has various topographies; the south side consists of coastal and peat swamps, while the north side consists of highlands.

3.2 Population conditions

The population of Central Kalimantan is increasing annually. The total population in 2012 was 2,283,687, increasing to 2,741,100 by 2022 (see Table 1). This means that during this period, the population of Central Kalimantan increased by between 10,700 and 101,012 per year. souls every year, with a men population higher than women. According to [28] some experts, changes in the age structure of the population are the result of demographic transition and have an impact on economic growth, in which the growth of the working-age population will have a positive relationship with the Gross Domestic Product (GDP) per capita. Changes in the population's age structure due to transition demography impact the following:1) an increase in the number of workers receiving productive employment opportunities will increase total output, 2) an increase in savings, and 3). Availability of Human Capital. Therefore, the demographic bonus can be utilized if the working-age population, which is very large, can provide productive job opportunities. Productive job opportunities are obtained if the quality of human resources is good to fill job opportunities which are available.

Table 1. Increasing Population of Central Kalimantan

Years	Population			Population Increase
	Men	Women	Total	
2012	1,191,086	1,092,602	2,283,688	
2013	1,243,800	1,140,900	2,384,700	101,012
2014	1,273,302	1,166,556	2,439,858	55,58
2015	1,302,796	1,192,239	2,495,035	55,177
2016	1,332,274	1,217,918	2,550,192	55,157
2017	1,361,715	1,243,559	2,605,274	55,082
2018	1,391,100	1,269,100	2,660,200	54,926
2019	1,396,300	1,274,600	2,670,900	10,700
2020	1,385,700	1,284,300	2,670,000	-900
2021	1,401,600	1,300,600	2,702,200	32,200
2022	1,420,900	1,320,200	2,741,100	38,900

Source: The Central Bureau of Statistics for the Province of Central Kalimantan 2013-2023 [14-24], processed data

3.3 Harvested area, production and productivity of rice plants

In 2022 [15], the rice harvest area in Central Kalimantan was 109,756.22 ha, with the largest harvested area in Kapuas Regency (47,724.13 ha) and the lowest in Palangka Raya City (7.94 ha), with production (tons) of 353,864.63 tons, and productivity (tons/ha) of 3,224 tons/ha. In Pulang Pisau district, the harvested area is 25,330.42 ha, and the production is 80,829.15 tons and 3.191 tons/ha. The complete details of the harvested area, production, and productivity data for 2022 are listed in Table 2. The results of the harvested area and productivity of rice produce rice production per hectare of land; therefore, the wider the harvested area per year and the higher the level of productivity, the more rice

production will also be [29]–[31]. The harvested area has an impact on the yields obtained and food availability. Less than the maximum productivity of rice yields also causes a decrease in production yields and affects the availability of food in an area alone [32].

Table 2. Harvested area (ha), production (tons) and productivity (ton/ha) of rice in Central Kalimantan for 2022.

Regency	Harvested area (ha)	Production (tons)	Productivity (ton/ha)
Kotawaringin Barat	115,20	332.44	2.868
Kotawaringin Timur	10,744.73	31,120.46	2.896
Kapuas	47,724.13	166,510.77	3.489
Barito Selatan	2,069.58	6,401.61	3.093
Barito Utara	2,875.11	8,235.38	2.864
Sukamara	577.61	2,068.34	3.581
Lamandau	371.32	892.27	2.404
Seruyan	2,779.36	7,278.15	2.619
Katingan	11,024.32	30,541.05	2.770
Pulang Pisau	25,330.42	80,829.15	3.191
Gunung Mas	226.52	568.90	2.511
Barito Timur	4,942.69	16,878.64	3.415
Murung Raya	967.29	2,184.04	2.258
Kota Palangka Raya	7,94	25	3.140
Total	109,756.22	353,866.63	3.224

Source: The Central Bureau of Statistics for the Province of Central Kalimantan 2023 [14], processed data

3.4 Identification of seed utility

Data related to the harvested area could be used to predict the need for rice seeds in the field (Table 2). Based on the harvested area of rice [15], the need for seeds (inbred rice) with spacing (± 30 kg/ha) required 3.292 tons of seeds, while the sow cropping system (± 40 kg/ha) required 4.390 tons of seeds. The need for hybrid seeds is 1.646 tons. Inbred rice seeds are more affordable in terms of price for farmers so that they can be purchased and meet the needs of seeds in their planting. However, hybrid rice seeds are expensive.

Table 3. Seed need for planting in Central Kalimantan.

Regency	Harvest area (ha)	Inbrida		Hybrid system (± 15 kg/ha)
		Planting system with spacing (± 30 kg/ha)	Sow cropping system (± 40 kg/ha)	
Kotawaringin Barat	115.20	3,456.00	4,608.00	1,728.00
Kotawaringin Timur	10,744.73	322,341.90	429,789.20	161,170.95
Kapuas	47,724.13	1,431,723.90	1,908,965.20	715,861.95
Barito Selatan	2,069.58	62,087.40	82,782.20	31,043.70
Barito Utara	2,875.11	86,253.30	115,004.40	43,126.65
Sukamara	577.61	17,328.30	23,104.40	8,664.15
Lamandau	371.32	11,139.60	14,852.80	5,569.80
Seruyan	2,779.36	83,380.80	111,174.40	41,690.40
Katingan	11,024.32	330,729.60	440,972.80	165,364.80
Pulang Pisau	25,330.42	759,912.60	1,013,216.80	379,956.30
Gunung Mas	226.52	6,795.60	9,060.80	3,397.80

Barito Timur	4,942.69	148,280.70	197,707.60	74,140.35
Murung Raya	967.29	29,018.70	38,691.60	14,509.35
Kota Palangka Raya	7.94	238.20	317.60	119.10
Total	109,756.22	3,292,686.60	4,390,248.80	1,646,343.30

Source: The Central Bureau of Statistics for the Province of Central Kalimantan 2023 and Primary data, [33], processed data

3.5 Farmer's preferences for variety characteristics

It is important to know farmers' preferences for the variety introduced through displays. Preference information can be used as a reference for developing new superior varieties and seed production. The preference test was conducted during a field meeting by directly observing the condition of the plantings during the generative phase. In general, farmers' assessments show that resistance to pests and diseases is an important plant characteristic, followed by the character of production. These two characteristics are followed by panicle length, tiller number, grain shape, and plant height.

According to farmers, resistance to pests and diseases is a characteristic that needs to be examined because uncertain climatic conditions have spurred their development of pests and diseases. If not controlled, this can result in crop failure or puso. The results of the calculations of the Average Attribute Weight (BAR) and Relative Attribute Weight (BRA) values for the characteristics of the varieties are listed in Table 4. The use of resistant varieties is an easy way to control pests and diseases effectively. According to [34], planting one variety resistant continuously in the long run length is not recommended because it can speed up the failure of variety resistance. The suitability of varieties planted in the field will increase the effectiveness of pest and disease control, minimize their development, extend the age of varietal resistance, and reduce yield losses. According to [35] healthy plants determine the level of yield to be obtained so that quality or quality seeds can determine the potential results that will be achieved.

Table 4. Average Attribute Weight (BAR) and Relative Attribute Weight (BRA) on Rice Characteristics

Characteristics	Average Attribute Weight (BAR)	Relative Attribute Weight (BRA)
Plant height	4,01	0,36
Number of rice tillers	4,43	0,40
Panicle length	5,43	0,49
Resistance of pests and disease	6,22	0,57
Grain shape	4,03	0,37
Production	6,10	0,55

Source: Primary data [33], processed data

The farmers' preference for new superior rice varieties began by calculating the average preference value per respondent (TPR) and the average preference level per characteristic attribute for all varieties (TPRA). Table 5 shows that the preference level for each variety is different. The average preference of farmers for new superior varieties ranged from a score of 5 (very like) to a score of 3 (ordinary). However, the preference level for each variety was higher or lower than the average value for all varieties. The Inpari Padjadjaran Agritan variety had the most characteristics, which were higher than the preference level of the Inpari 32 Hewar Daun Bakteri varieties. However, for characteristics such as a number of

tillers, resistance to pests and diseases, and production, the value of the Inpari 32 Hewar Daun Bakteri variety was higher than that of the Inpari Padjadjaran Agritan variety.

Table 5. The Averages value of farmers' preference per respondent (TPR) and the average preference level per characteristic attribute for all varieties (TPRA) Values Against New superior varieties of Rice.

Characteristics	Average Preference Value per respondent (TPR)		Average Preference Level per Characteristic Attribute for all varieties (TPRA)
	Inpari Padjadjaran Agritan	Inpari 32 Hewar Daun Bakteri	
Plant height	5,63	4,88	5,26
Number of rice tillers	4,22	4,93	4,58
Panicle length	5,71	5,10	5,41
Resistance of pests and disease	4,29	5,92	5,11
Grain shape	5,45	4,98	5,22
Production	5,41	5,54	5,48

Source: Primary data [33], processed data

The value of the TPR variety, which was above the TPRA value, was shaken because it was preferred by the farmers. Therefore, the Relative Preference Level (TPRel) was calculated to determine the superior characteristics of each variety (Table 6).

Table 6. Value of Farmers' the Relative Preference Level (TPRel) Against VUB Rice

Characteristics	TPRel	
	Inpari Padjadjaran Agritan	Inpari 32 Hewar Daun Bakteri
Plant height	1,07	0,93
Number of rice tillers	0,92	1,08
Panicle length	1,06	0,94
Resistance of pests and disease	0,84	1,19
Grain shape	1,04	0,95
Production	0,99	1,01

Source: Primary data [33], processed data

A TPRel value greater than 1 indicates that the farmer’s preference value for a characteristic attribute is higher than the average preference value of all varieties. For example, the plant height characteristic of the Inpari Padjadjaran Agritan variety had a value of 1.07, which is 7% higher than the average farmer’s preference level for all varieties. A TPRel value less than 1 indicates that the farmer's preference value for a characteristic attribute is lower than the average preference value for all varieties. For example, the number of offspring in the Inpari Padjadjaran Agritan variety has a value of 0.96, which is 6% lower than the average preference level for all varieties. In general, all varieties assessed have their respective advantages and disadvantages. The variety most preferred by farmers can be seen from the Total Preference Level (TPT) value obtained by adding the Relative Weighted Preference Level (TPRD) values. The TPRD and TPT values for rice VUB are listed in Table 7. The rice variety most preferred by farmers, based on the characteristics of the planting phase, was Inpari Padjadjaran Agritan followed by Inpari 32 Hewar Daun Bakteri. According to [11], knowing the varieties favoured by farmers can provide an overview for breeders to produce rice according to these preferred characteristics, as well as information for producers to know which varieties to produce in

large or small quantities. Table 7 shows that in the vegetative phase, farmers preferred the Inpari Padjadjaran Agritan variety (0.38), whereas in the generative phase, farmers preferred Inpari 32 Hewar Daun Bakteri (0.43 – 0.55), and for resistance to pests and diseases, farmers preferred the Inpari 32 Hewar Daun Bakteri variety (0.68).

Table 7. The Value of the Relative Weighted Preference Level (TPRD) and the Total Preference Level (TPT) of Farmers Against VUB Rice

Characteristics	The Value of the Relative Weighted Preference Level (TPRD)		The Total Preference Level (TPT)
	Inpari Padjadjaran Agritan	Inpari 32 Hewar Daun Bakteri	
Plant height	0,38	0,33	0,71
Number of rice tillers	0,37	0,43	0,80
Panicle length	0,52	0,46	0,98
Resistance of pests and disease	0,48	0,68	1,16
Grain shape	0,38	0,35	0,73
Production	0,54	0,55	1,09

Source: Primary data [33], processed data

4 Conclusion

The variety of plants that most respondents liked is Inpari 32 Hewar Daun Bakteri. Resistance to pests and diseases is an important characteristic of this species. Inpari Padjajaran Agritan is the most preferred form of vegetative phase and in the generative phase, farmers preferred Inpari 32 Hewar Daun Bakteri.

The authors wish to acknowledge the assistance and encouragement of colleagues, Muhammad Dhani

References

[1] A. A. Darajat, "Program pemuliaan partisipatif pada tanaman padi: Konsep dan Realisasi," 2001.
[2] Suparwoto and Waluyo, "Inovasi Teknologi Varietas Unggul Baru (VUB) Meningkatkan Produktivitas Padi dan Pendaptan Petani di Lahan Rawa Lebak," J. Pembang. Mns., vol. 5, no. 1, pp. 1–12, 2011.
[3] T.E. Suhendrata, Kushartanti, and Widarto, "Preformasi varietas unggul baru dalam mendukung peningkatan produksi beras di Kabupaten Batang, Jawa Tengah," 2008.
[4] BPTP, "Deskripsi Varietas Unggul Padi," BPTP Sumatera Utara, 2011.
[5] E. Akpo, G. Muricho, G. A. Lukurugu, H. Opie, C. O. Ojiewo, and R. Varshney, "Legume seed production for sustainable seed supply and crop productivity: case of groundnut in Tanzania and Uganda," J. Crop Improv., vol. 34, no. 4, pp. 518–539, 2020, doi: 10.1080/15427528.2020.1740368.
[6] D. Alemu and Z. Bishaw, "Commercial behaviors of smallholder farmers in wheat seed use and its implication for demand assessment in Ethiopia," Dev. Pract., vol. 25, no. 6, pp. 798–814, 2015, doi: 10.1080/09614524.2015.1062469.
[7] N. P. Louwaars and W. S. De Boef, "Integrated seed sector development in Africa: A conceptual framework for creating coherence between practices, programs, and policies," J. Crop Improv., vol. 26, no. 1, pp. 39–59, 2012, doi: 10.1080/15427528.2011.611277.

[8] J. J. Okello et al., "Productivity and food security effects of using certified seed potato: The case of Kenya's potato farmers," Agric. Food Secur., vol. 6, no. 1, pp. 1–9, 2017, doi: 10.1186/s40066-017-0101-0.
[9] C. J. M. Almekinders and N. P. Louwaars, "The importance of the farmers' seed systems in a functional national seed sector," Seed Policy, Legis. Law Widening a Narrow Focus, no. December 2013, pp. 15–34, 2002, doi: 10.1201/b15695.
[10] A. Ruskandar, S. Mulya, S. Triny, P. Wardana, and I. Las, "Distribution of High Yielding Rice Varieties in Indonesia," in Rice Industry, Culture and Environment Book 2, I. Indonesian Center for Rice Research (ICRR), ICFORD, Ed. 2007.
[11] W. Ratna Rohaeni, A. Sinaga, and M. Iskandar Ishaq, "Preferensi Responden Terhadap Keragaan Tanaan Dan Kualitas Produk Beberapa Varietas Unggul Baru Padi (Studi kasus dalam mendukung penyebaran vub padi sawah di Kabupaten Karawang) Preferention of Respondens to Plant Peformance, Grains, Polished Rice, and Rice Of New Varieties," pp. 97–104, 2012.
[12] R. Sianipar, S. L. Mulijanti, and R. D. Jarwowati, "Preferensi Petani Terhadap Display Varietas Unggul Baru Di Kecamatan Ganeas Kabupaten Sumedang," pp. 1051–1058, 2015.
[13] A. Adimihardja, "Strategi Mempertahankan Multifungsi Pertanian Di Indonesia," J. Litbang Pertan., vol. 25, no. 3, pp. 99–105, 2006.

[14] BPS, "Provinsi Kalimantan Tengah dalam Angka," Palangka Raya: Badan Pusat Statistik Provinsi Kalimantan Tengah, 2018.
[15] BPS Kalteng, "Provinsi Kalimantan Tengah Dalam Angka," Palangka Raya: BPS Kalimantan Tengah, 2023.
[16] BPS Kalteng, "Provinsi Kalimantan Tengah Dalam Angka," Palangka Raya: BPS Kalimantan Tengah, 2013.
[17] BPS Kalteng, "Provinsi Kalimantan Tengah Dalam Angka," Palangka Raya: BPS Kalimantan Tengah, 2022.
[18] BPS Kalteng, "Provinsi Kalimantan Tengah Dalam Angka," Palangka Raya: BPS Kalimantan Tengah, 2021.
[19] BPS Kalteng, "Provinsi Kalimatan Tegah Dlam Angka," Palangka Raya: BPS Kalimantan Tengah, 2020.
[20] BPS Kalteng, "Provinsi Kalimantan Tengah Dalam Angka," Palangka Raya: BPS Kalimantan Tengah, 2019.
[21] BPS Kalteng, "Provinsi Kalimantan Tengah Dalam Angka," Palangka Raya: BPS Kalimantan Tengah, 2017.
[22] BPS Kalteng, "Provinsi Kalimantan Tengah Dalam Angka," Palangka Raya: BPS Kalimantan Tengah, 2016.
[23] BPS Kalteng, "Provinsi Kalimantan Tengah Dalam Angka," Palangka Raya: BPS Kalimantan Tengah, 2015.
[24] BPS Kalteng, "Provinsi Kalimantan Tengah Dalam Angka," Palangka Raya: BPS Kalimantan Tengah, 2014.
[25] B. Simamora, "Panduan Riset Perilaku Konsumen," Surabaya: Pustaka Utama, 2002.
[26] R. S. Basuki, "Analisis Tingkat Preferensi Petani Brebes terhadap Karakterisitik Hasil dan Kualitas Bawang Merah Varietas Lokal Asal Dataran Medium dan Tinggi," J. Horti, vol. 19, no. 4, pp. 475–483, 2009.
[27] BPS Pulang Pisau, "Pulang Pisau Dalam Angka," Pulang Pisau: BPS Kabupaten Pulang Pisau, 2023.

[28] S. H. B. Harmadi, "Analisis Data Demografi," in Modul 1-6, Tangerang Selatan: Universitas Terbuka, 2016.
[29] K. Murty, "Food Security Eludes Tribals of Andhra Pradesh," Sage Journals, vol. 48, no. 2, 2018.
[30] N. Nigam and C. Gupta, "Correlation-based Diversification and Firm Performance: An Empirical Investigation of India," Sage Journals, vol. 22, no. 2, 2018.
[31] I. Noer and B. Unteawati, "Rice Marketing Systems Model to Strengthen Institutional of Rice Marketing in Lampung Province Indonesia," Asia Pacific J. Manag. Educ., vol. 5, no. 2, pp. 100–110, 2022, doi: 10.32535/apjme.v5i2.1636.
[32] J. Bobihoe, Jumakir, and Endrizal, "Improving rice productivity through the new superior varieties of rice in the irrigation land, Jambi Province," IOP Conf. Ser. Earth Environ. Sci., vol. 807, no. 4, pp. 3–9, 2021, doi: 10.1088/1755-1315/807/4/042001.
[33] T. Liana, "Perbenihan VUB Padi Adaptif Lahan Rawa," Palangka Raya: Badan Penelitian dan Pengembangan Pertanian Pusat Penelitian dan Pengembangan Tanaman Pangan, 2021.
[34] Sudir and D. Yuliani, "Composition and distribution of xanthomonas oryzae pv. Oryzae pathotypes, the pathogen of rice bacterial leaf blight in Indonesia," Agrivita, vol. 38, no. 2, pp. 174–185, 2016, doi: 10.17503/agrivita.v38i2.588.
[35] S. Suharsono, "Peranan varietas tahan hama dalam pengendalian hama terpadu pada tanaman kedelai," Bul. Palawija, vol. 0, no. 2, pp. 15–21, 2013.