IMPACT OF RISK OF LOSS AND HARVEST AREA ON PADDY PRODUCTION IN JENEPONTO REGENCY

Noer Ibrah Ibrahim[1,1]*, Ratnawati* Tahir[1], *Irma* Sribianti[1], *Akhmad*[1] and *Sri* Mardiyati[2]

[1] Department of Doctor Agribusiness, Universitas Muhammadiyah Makassar, Indonesia

[2] Department of Magister Agribusiness, Universitas Muhammadiyah Makassar, Indonesia

Abstract. The planting area, harvested area, production, and productivity of lowland rice have continued to be increased to support rice self-sufficiency in Indonesia. Rice is a strategic commodity because it is a staple food in Indonesia. This study aims to analyze the trend of harvested area, crop failed harvest, production, productivity, and production risk as well as the effect of harvested area and risk of loss (failed harvest) on lowland rice production in Jeneponto Regency. The type of data is secondary data of annual time series for the last 20 years (2005-2024), sourced from the Central Statistics Agency and the Department of Agriculture. The data analysis used trend analysis, coefficient of variation, and linear regression. The results of this study indicate that lowland rice farming in Jeneponto Regency during the last 20 years (2005-2024) experienced an increasing trend in harvested area of 893.82 hectares/year, crop failure area increased by 63.28 hectares/year, production increased by 4,839 tons/year, and productivity only increased by 0.0061 tons/ha/year. The average risk of lowland rice production is 35.09 percent, and the average area of crop failure is 99.32 hectares. The harvested area has a positive and significant effect on lowland rice production, if the harvested area is increased by one hectare, rice production will increase by 5.28 tons. The area of crop failure has a negative and significant effect on lowland rice production, if the area of crop failure is increased by one hectare, rice production will decrease by 6.22 tons. Risk management is important to be carried out so that the risk of loss can be minimized, so that production and productivity continue to increase sustainably.

Keywords: harvested area; lowland rice; production; risk of loss

1 Introduction

Rice farming in Indonesia has an important role not only as a staple food source for the community, but also as a driving force for the rural economy and social sustainability. The availability of rice as a staple food is highly dependent on rice farming activities, so national food security cannot be separated from the success of this sector. About 95 percent of Indonesia's population depends on rice as a staple food, making rice farming an integral part of people's social and economic life [1] ; [2].

Rice production as an important commodity in food security is often threatened by various risk factors that can trigger puso or crop failure. Puso refers to a situation where rice crops cannot be harvested due to natural disasters or other factors that result in losses [3]. This crop failure can be caused by various elements, including climate change, pest and disease attacks, as well as suboptimal management in cultivation practices [4].

One of the most significant factors is the change in rainfall patterns. Research shows that extreme rainfall variations can cause damage to rice crops [5]. Irregular rainfall not only causes flooding but can also lead to drought, both of which have the potential to lead to crop failure [6] ;[5]. Understanding and analyzing rainfall patterns is critical to mitigate these risks. The use of technology such as remote sensing to predict weather patterns plays a key role in planning rice production [6]. Risk mitigation strategies, including the development and implementation of efficient irrigation systems and the selection of seed varieties that are resistant to extreme conditions, can help reduce the risk impact of puso [7].

Drought is another major problem that affects crop area and directly contributes to the risk of crop failure. Research by Mamenun and Wati shows that extreme drought conditions can damage the productivity status of land and in severe situations can lead to crop failure [8]. Climate change that causes weather uncertainty also has the potential to exacerbate this situation, given that unexpected rainfall can affect planting and harvesting times [9].

The impact of crop failure not only has implications for farmers' incomes, but also on national food security. The productivity of rice farmland is closely related to household income and its contribution to the local economy [10]. A decline in crop yields due to puso can affect the supply of rice in the market and spread throughout the agricultural value chain. Research in areas that focus on economic substances such as rice production shows that farmers who experience crop failure directly feel the impact of significant income loss, causing systemic impacts on local and national economies [11].

Another key aspect emerging through the analysis of paddy production trends is the increasing variability induced by climate change. Recent studies project a range of impacts on paddy yields due to local climatic shifts, with climate models illustrating the potential disruptions to traditional cropping calendars [12]. The recognition of these changes necessitates adaptive strategies among farmers and policymakers alike, underscoring the role of climate-resilient technologies [13].

Based on the results of the 2023 Agricultural Census, in Jeneponto Regency, South Sulawesi Province, the number of households that have food crop farming, especially rice, is 53,676 households, most of which only have a rice field area between 0.2-0.49 hectares. According to data from the Central Statistics Agency (BPS) in 2024 in Jeneponto Regency, the rice planting area will reach 34,520 hectares, harvest area 34,421, rice production will reach 181,580.78 tons, and productivity will reach 5.28 tons per hectare, and with a total rice field

---

[1] Corresponding author: noeribrah.ibrahims3@gmail.com

area of 25,995 hectares. This study aims to analyze the trend of crop area, puso area (crop failure), production, productivity, and production risk, as well as the influence of harvest area and risk of loss (crop failure) on paddy rice production in Jeneponto Regency, South Sulawesi Province, Indonesia.

2 Research method

This research was conducted in Jeneponto Regency, South Sulawesi Province. This study uses a quantitative descriptive analysis method. The data collected in this study are annual *time series secondary data* from 2005 to 2024 (the last 20 years). Secondary data sources were obtained from the Central Statistics Agency (BPS) and the Agriculture Office.

The data analysis in this study includes trend analysis, *coefficient variation* (CV) analysis, and multiple linear regression analysis. To analyze the trend of rice harvest area, puso area (crop failure), production, and rice productivity, linear trend analysis was used. The formula used to analyze the data is as follows.

Trend Analysis:

$Y = a + bX$

Y   = harvest area; heart area; production; productivity
X   = Time Period (Annual)
a   = intercept
b   = coefficient

To analyze production risk, the coefficient variation (CV) formula is used, as follows.

$$CV = \frac{\sigma}{\overline{X}} x100\%$$

CV   = coefficient of variation
σ   = standard deviation
$\overline{X}$ = average rice production

To analyze the impact of risk of loss and harvest area on rice production, a multiple linear regression formula was used, as follows.

Y   = $\beta_0 + \beta_1 X_1 + \beta_2 X_2$
Y   = rice production
X_1 = harvest area (ha)
X_2 = crop failure area (ha)
β_0 = intercept
$\beta_1 - \beta_2$ = regression coefficient

3 Results and discussion

3.1 Trend of Harvest Area, Crop Failure Area, Production, and Productivity of Rice

Rice plants (Oryza sativa) are the main commodity in the agricultural sector in Indonesia. Rice not only serves as the main food source for the majority of the population, but also as an economic driver in many regions. To better understand the harvest area, crop failure area, production, and productivity of rice crops in Indonesia, it is important to analyze the data and factors that affect these aspects.

The harvest area of rice farming in Jeneponto Regency over the last 20 years (2005-2024) has experienced an upward trend of 893.82 hectares per year (Figure 1). This indicates that in general, rice farmers in Jeneponto Regency have been able to manage rice farming more advanced and efficiently.
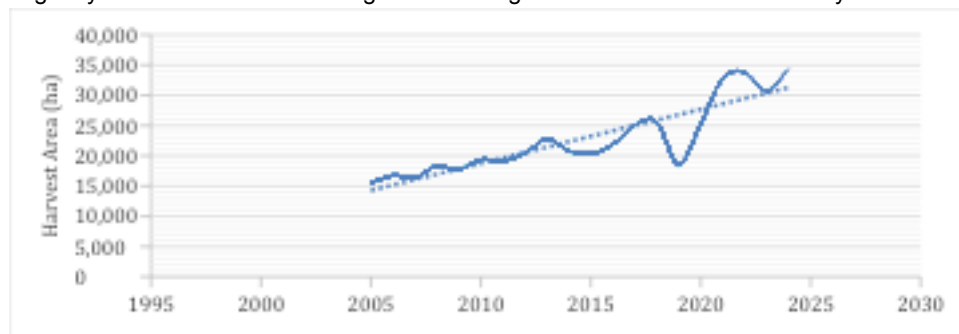
Figure 1. The Trend of Rice Harvest Area in Jeneponto Regency in 2005-2024

Government policies continue to strive to support agricultural development through programs that increase production capacity and ensure the availability of agricultural facilities and infrastructure. The availability of irrigation and support for the appropriate use of fertilizers, as well as training for farmers are strategic steps that need to be implemented   [14]. However, another challenge faced is climate change which can lead to a decrease in rice harvest area, especially if no mitigation measures are taken holistically [15].

The reduced area of rice farmland, as a result of various factors, including climate change, pest attacks, and ineffective irrigation management, poses a serious challenge for farmers in South Sulawesi [16] ; [17]. Research shows that climatic conditions have a strong effect on crop yields, where extreme weather factors such as drought or flooding have a significant impact on rice agricultural yields [18] ;[19].
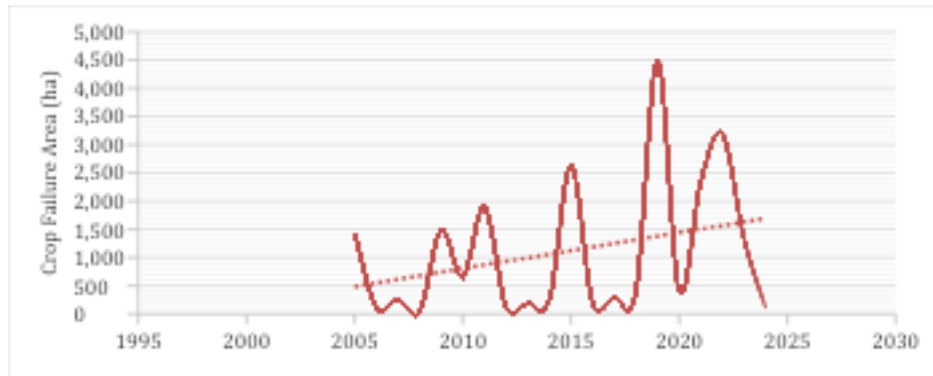
Figure 2. Trend of Area of Failed Rice Crops in Jeneponto Regency 2005-2024

The area of puso rice crops (crop failure) in Jeneponto Regency during 2005-2024 shows an increasing trend of 63,723 hectares per year. This shows that the increase in rice harvest failure is proven to be in line with the trend of increasing rice harvest area. The higher the crop failure rate, the higher the risk of losses borne by farmers.

One of the main causes of crop failure is increasingly uncertain weather changes, the impact of climate change that is increasingly worrying [20] ; [21]. In the latest study, weather fluctuations, such as irregular rainfall, greatly contribute to the presence of puso conditions am[22][23]. This uncertainty increases risks to rice production, results in financial losses for farmers, and hampers food sovereignty goals [24].
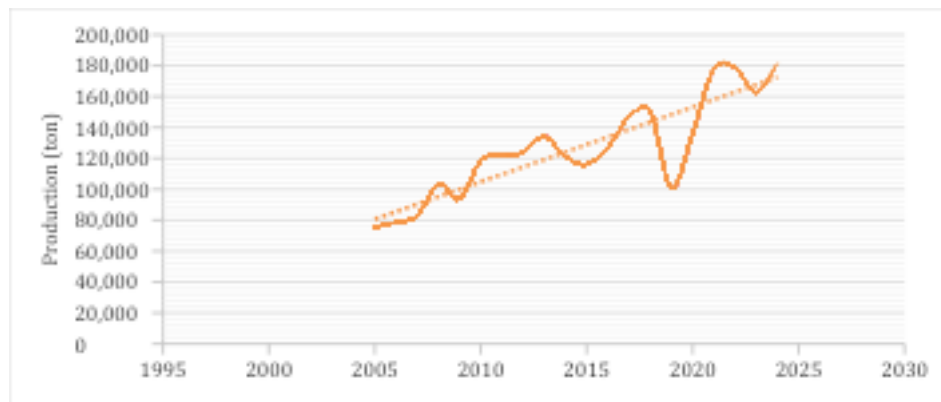
Figure 3. Rice Production Trends in Jeneponto Regency in 2005-2024

Rice production in Jeneponto Regency during 2005-2024 shows an upward trend of 4,839 tons per year. This shows that the trend of rice production is in line with the trend of increasing rice harvest area. Success in rice production is also influenced by government policies regarding the provision of subsidies for fertilizers and seeds, which can lower production costs and increase farmers' access to quality inputs. In their daily lives, farmers are often constrained by high input costs, and interventions such as subsidies can increase their motivation and production capacity [25]. This is reflected in studies that show that increased access to subsidized fertilizers is directly correlated with increased crop yields in several areas in South Sulawesi [26].

Another aspect that must be considered is the serious problem related to climate change and its impact on rice production. Several studies show that weather fluctuations, including drought and unpredictable rainfall, can harm both the quantity and quality of production [27] ;[28]. Therefore, the application of modern technology in agriculture, including the use of efficient irrigation systems and wise management of water resources, is essential to address these challenges.
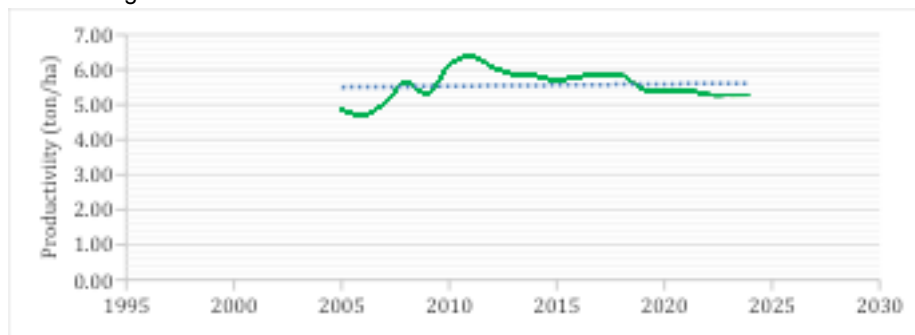
Figure 4. Rice Productivity Trends in Jeneponto Regency in 2005-2024

The productivity of rice plants in Jeneponto Regency during 2005-2024 shows an upward trend of 0.0061 hectares per year (Figure 4). This shows that the trend of rice crop productivity is in line with the trend of

increasing rice production. In addition to technical factors, the socio-economic aspect of farmers also plays an important role in rice productivity. High production costs, lack of access to agricultural credit, and low availability of quality seeds are significant challenges for farmers in South Sulawesi. Therefore, the development of a decision support system for the right seed selection and marketing strategies for agricultural products is also needed to improve farmers' welfare and rice productivity in this province [29].

3.2 Risks of Rice Production

Risk management in rice production involves many aspects, ranging from environmental, social, economic to technological factors. Involving farmers in capacity building and counseling programs will greatly assist them in understanding and managing the risks they face. Usually, the support of the government and related institutions is also an important factor in creating better food security at the level of farmers' households.

In areas with limited agricultural land area, such as in Barru Regency, research shows that resource use efficiency is key in managing production risks [30]. Optimizing the use of fertilizers and good farming techniques can contribute to better and more consistent crop yields. Furthermore, Yanuarti et al. emphasize the importance of identifying farmers' attitudes towards risk as this can be closely related to the decisions they make in managing their farming [31].

In Jeneponto Regency over the past 20 years, the average area of crop failure (puso) has reached 99.32 hectares, with the highest crop failure area in Bontoramba District of 185 hectares, while the lowest crop failure area in Tamalatea District is 24.3 hectares. On the other hand, the level of risk of rice farming production in Jeneponto Regency in the same period has an average of 35.09 percent. The lowest level of rice farming production risk was achieved by Batang District, which was 18.07 percent, while the highest production risk level was in Tarowang District, which reached 67.39 percent (Figure 5).
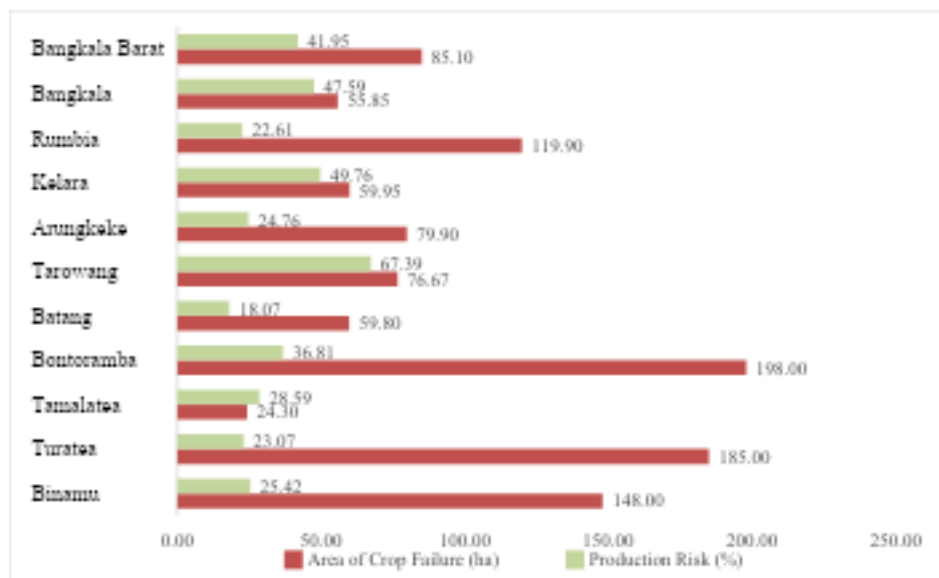
Figure 5. Risk of Rice Production and Crop Failure in Jeneponto Regency 2005-2024

External factors, such as climate change and price fluctuations, also have a significant impact on rice production. Ristianti et al. pointed out that the Rice Farmers Insurance program in Tirto District, Pekalongan Regency, is one of the government's strategies to protect farmers from the risks faced [32]. This program aims to provide financial guarantees for farmers in the event of crop failure due to natural disasters or adverse price fluctuations. Similar research by Joka et al. shows that agricultural extension workers also play an important role in increasing rice productivity, by providing information and guidance to farmers on effective agricultural practices [33].

3.3 The Influence of Crop Failure Risk and Harvest Area on Rice Production

The risk of crop failure is highly correlated with a variety of external factors, including climate change, pest infestation, and fluctuations in soil quality. Research shows that the risk of crop failure increases with the area of land planted, especially if it is not balanced with good management and the use of appropriate technology [32] ;[34] ;[35].

Large harvest areas attract farmers to increase production to get better yields, but if accompanied by a high risk of crop failure, such as during periods of extreme weather, the expected results cannot be achieved. Studies conducted in several districts show that variations in the handling and use of agricultural techniques have a significant effect on crop yields, showing that efficient land use can reduce the risk of crop failure faced by farmers [9] ; [36].

Table 1. The Influence of Crop Failure Risk and Harvest Area on Rice Production

Description	Coefficients	Standard Error	t Statistic	P-value
Intercept	7,199.2595	8,074.8892	0.8916	0.3851
Planted Area	5.2834***	0.3441	15.3564	0.0000
Crop Failure Area	-6.2235***	1.7030	-3.6544	0.0020
R Square				0.9332

F Statistic	118.6957***
Significance F	0.0000

Source : Secondary Data Analysis, 2025.

The risk of crop failure (risk of loss) and the harvest area of rice farming simultaneously had a significant effect on rice production by 93.32 percent. Through partial tests, the harvest area had a positive and significant effect on the level of 99 percent confidence in rice farming production in Jeneponto Regency. If the land area increases by one hectare, rice production will increase by 5.2834 tons. This can be interpreted that the wider the rice harvest, the more rice production increases. The risk of crop failure has a negative and significant effect on the level of 99 percent confidence in rice production, meaning that if the area of crop failure increases by one hectare, rice farming production will decrease by 6.2235 tons. This means that the higher the risk of crop failure, the more rice production will decrease.

When the risk of crop failure can be managed or minimized, such as through insurance or risk mitigation policies, then the negative impact of a higher crop area can be minimized, allowing farmers to focus more on increasing productivity. This shows that the adoption of sustainable agricultural practices and the appropriate use of technology are essential in optimizing agricultural yields [37] ;[6].

The risk of crop failure and harvest area have a significant impact on rice production, and effective management of these two factors is critical for the sustainability and improvement of the agricultural sector. Policies that support a combination of technology, education, and financial support will be crucial in improving food security and farmers' welfare [38] ;[39].

4 Conclusion and recommendation

In Jeneponto Regency over the last 20 years (2005-2024), paddy rice farming has experienced a trend of increasing harvest area by 893.82 hectares per year, crop failure area increasing by 63.28 hectares per year, production increasing by 4,839 tons per year, and productivity only increasing by 0.0061 tons per hectare per year. The level of production risk of paddy farming during this period was relatively high, which averaged 35.09 percent, with the lowest production risk in Batang District which was 18.07 percent, while the highest production risk level in Tarowang District reached 67.39 percent. Meanwhile, the average crop failure area (puso) reached 99.32 hectares, with the highest crop failure area in Bontoramba District of 185 hectares, while the lowest crop failure area in Tamalatea District was 24.3 hectares. The harvest area has a positive and significant effect on paddy rice production, if the harvest area is added to one hectare, paddy rice production will increase by 5.28 tons. The area of crop failure (risk of loss) has a negative and significant effect on rice field production, if the area of crop failure increases by one hectare, then rice production will decrease by 6.22 tons. Risk management is important to do so that the risk of loss can be minimized, so that production and productivity continue to increase continuously.

References

1. Wardani J, Yani F (2022) Pengaruh Biaya Produksi terhadap Pendapatan Petani Padi Sawah (*Oryza Sativa* L) di Kecamatan Gebang Kabupaten Langkat. J Agro Nusant 2:116–123. https://doi.org/10.32696/jan.v2i2.1501
2. Ahmad Z, Wibowo R (2021) Dampak Kebijakan Kartu Tani terhadap Produksi dan Efisiensi Usahatani Padi di Kabupaten Jember. J Pangan 30:107–116.
3. Kharismawati KHD, Dwi Karjati P (2021) Pengaruh Luas Lahan dan Jumlah Tenaga Kerja terhadap Produksi Padi di 10 Kabupaten Jawa Timur Tahun 2014-2018. Econ J Ilmu Ekon 3:50
4. Wilujeng ED, Fauziyah E (2021) Efisiensi Teknis Dan Faktor Yang Mempengaruhi Produksi Padi Di Kabupaten Lamongan. Agriscience 1:712–727
5. Azizah F, Suwarsito S, Sarjanti E (2021) Pengaruh Pola Curah Hujan Terhadap Produktivitas Padi di Kecamatan Bukateja Kabupaten Purbalingga. Sainteks 18:1
6. Feny Permatasari NK, Tambunan MP, Mandini Mannesa MD, Tambunan RP (2021) Pengaruh Kekeringan Pada Produksi Tanaman Padi Di Kabupaten Majalengka Dengan Penginderaan Jauh Metode Ndvi. J Geosaintek. https://doi.org/10.12962/j25023659.v7i1.8205
7. Prayuginingsih H, Muliasari RM, Aulia AN (2024) Mimbar Agribisnis : Jurnal Pemikiran Masyarakat Ilmiah Berwawasan Agribisnis Kearifan Lokal Petani Padi di Desa Klungkung , Kecamatan Sukorambi Kabupaten Jember dalam Menyikapi Kebijakan Pengurangan Subsidi Pupuk Local Wisdom of Paddy Farmer at Klungkung . 10:2447–2454
8. Pirsouw K, Sopamena JF, Palembang SP (2022) Dampak Pandemi Covid -19 Terhadap Pendapatan Petani Padi Sawah (Oryza sativa L.) di Desa Waihatu Kabupaten Seram Bagian Barat. J Pendidikan, Sains Sos dan Agama 8:514–525
9. Ependi Malau LR, Rambe KR, Ulya NA, Purba AG (2023) Dampak Perubahan Iklim Terhadap Produksi Tanaman Pangan Di Indonesia. J Penelit Pertan Terap. https://doi.org/10.25181/jppt.v23i1.2418
10. Sukmawati C (2023) Peramalan Jumlah Produksi Spare Part Mobil pada PT. Showa Katou Indonesia dengan Metode Regresi Linear. Techno Xplore J Ilmu Komput dan Teknol Inf 8:49–54
11. Aryncha GR, Mahbubah NA (2021) Analisis Pengelolaan Risiko Rantai Pasokan Produksi Palet Kayu Berbasis Pendekatan House Of Risk. PROFISIENSI J Progr Stud Tek Ind 9:37–46
12. Sreeni KR, Vasudevan N (2024) Impact of Climate Fluctuations on Paddy Yield: A Case Study in Kollengode Village, India. E3s Web Conf. https://doi.org/10.1051/e3sconf/202455901015
13. Alfred R, Obit JH, Chin CP-Y, Haviluddin H, Lim Y (2021) Towards Paddy Rice Smart Farming: A Review on Big Data, Machine Learning, and Rice Production Tasks. Ieee Access. https://doi.org/10.1109/access.2021.3069449
14. Rizal M, Ramli R, Nita Rianti Parawansa I, Pannyiwi T, Purwanto B (2024) Efektivitas Pupuk Organik Eco

Farming terhadap Pertumbuhan dan Produksi Tanaman Padi (Oryza sativa L.). J Agrisistem 20:31–36

15. Alfriany Salo L, Paliling F, Aldi A, Ramba D, Setiawan Salo E (2024) Analisa Ketahanan Pangan Di Kabupaten Toraja Utara Dengan Pemodelan Sistem Dinamis. Action Res Lit 8:772–778

16. Kaslam K (2023) Potensi Geografis Tanaman Pangan Sulawesi Selatan Dalam Mendukung Kedaulatan Pangan Nasional. Lageografia. https://doi.org/10.35580/lageografia.v21i2.41988

17. Heryani N, Kartiwa B, Hamdani A, Rahayu B (2020) Analisis Ketersediaan Dan Kebutuhan Air Irigasi Pada Lahan Sawah : Studi Kasus Di Provinsi Sulawesi Selatan. J Tanah Dan Iklim. https://doi.org/10.21082/jti.v41n2.2017.135-148

18. Evis Umi Rahmawati, Aries Dwi Indriyanti, Ahmad Heru Mujianto TK (2025) Penerapan Fuzzy Time Series-Markov Chain untuk Penjadwalan Tanam Padi Berdasarkan Peramalan Curah Hujan di Megaluh. Inov J Ilm Inov Teknol Inf 9:51–60

19. Sri Yuningsih, Embay Rohaeti YEF (2022) Pemodelan Hasil Panen Padi terhadap Ketergantungan Cuaca Ekstrem di Indonesia Menggunakan Copula Gaussian. J EurekaMatika 10:73–80

20. Andri A, Priantoro RD (2020) El Nino 2015: Asosiasinya Dengan Kekeringan dan Dampaknya Terhadap Curah Hujan, Luas Panen dan Produksi Padi di Kabupaten Subang. Geomedia Maj Ilm dan Inf Kegeografian 18:132–143

21. Hikmah AN, Sahabuddin A, Alwi M (2023) Strategi Nafkah Rumah Tangga Petani Padi Sawah dan Ladang Dalam Menghadapi Perubahan Iklim di Kecamatan Matakali, Kabupaten Polewali Mandar. AGROVITAL J Ilmu Pertan 8:153

22. Muttaqin MR, Ridho IN (2022) The Efforts of Government to Overcome Farmer Losses Due to Crop Failure in The Form of Protection for Farmers in Kwadungan District, Ngawi Regency Based on Laws. J Res Soc Sci Humanit 2:29–34

23. Syaipuddin S, Nurbaya S, Hasliani A, Rahmawati R (2022) Pengabdian Pada Masyarakat Melalui Kegiatan Implementasi Senam Kaki Pada Penderita Diabete Melitus Desa Panaikang Kecamatan Pattallassang Kabupaten Gowa. TRIDARMA Pengabdi Kpd Masy 5:384–388

24. Rahman A, Sangeran N (2022) Dampak Pertumbuhan Ekonomi, Inflasi, dan Luas Panen terhadap Nilai Tukar Petani di Provinsi Sulawesi Selatan. Bull Econ Stud 2:67–74

25. Arifin A, Syafiuddin S, Zulkifli Z, Nurdin N, Asriyani A, Megawati M (2024) Komparasi Risiko Produksi Dan Kelayakan Usahatani Padi Sawah Tadah Hujan Sulawesi Selatan. Mimb Agribisnis J Pemikir Masy Ilm Berwawasan Agribisnis. https://doi.org/10.25157/ma.v10i2.13912

26. Agfrianti SI, Budiraharjo K, Handayani M (2023) Analisis Pendapatan Usaha Tani Padi (Oryza Sativa L.) Dan Faktor-Faktor Yang Memengaruhinya. J Litbang Media Inf Penelit Pengemb Dan Iptek. https://doi.org/10.33658/jl.v19i1.334

27. Ismindarto A, Pudjiastuti AQ, Sumarno S (2023) Keputusan Petani Padi Tentang Penggunaan Pestisida Kimia Dan Faktor Penentunya. J Sos Ekon Pertan. https://doi.org/10.20956/jsep.v20i1.31614

28. Arifin A, Sumange L, Biba MA, Natsir M, Mardiyati S, Fattah MA (2023) Faktor Dan Risiko Produksi Usahatani Padi Sawah Tadah Hujan Sulawesi Selatan. Agrimor. https://doi.org/10.32938/ag.v8i2.1933

29. Sjamsir Z, Suhartina R (2023) Model Solusi Inovatif Pembiayaan Spesifik Perbankan Pada Agribisnis Komoditi Padi di Sulawesi Selatan Innovative Solution Model for Banking Specific Financing in Rice Commodity Agribusiness in South Sulawesi. J Galung Trop 12:17–24

30. Arifin A, Pata AA, Azizah A, Sadat MA (2023) Efisiensi Dan Kelayakan Usahatani Padi Sawah Tadah Hujan Kabupaten Barru. Mimb Agribisnis J Pemikir Masy Ilm Berwawasan Agribisnis. https://doi.org/10.25157/ma.v9i2.10137

31. Yanuarti R, Ibanah I, Lutfiyah L, Mutmainah L, Suwandari A, Rokhani R (2022) Korelasi Tingkat Penghindaran Risiko Dengan Economic Wellbeing Petani Padi. J Penelit Sains Dan Teknol Indones. https://doi.org/10.19184/jpsti.v1i2.166

32. Ristianti RF, Prayoga K, Mariyono J, Arifin A, Sumange L, Biba MA, Natsir M, Mardiyati S, Fattah MA (2022) Implementasi Program Asuransi Usahatani Padi (AUTP) Di Kecamatan Tirto Kabupaten Pekalongan. Agrimor. https://doi.org/10.22487/agrolandnasional.v29i2.1073

33. Joka U, Dahu B, Taena W (2022) Peranan Penyuluh Pertanian Terhadap Produktivitas Usahatani Padi Sawah Di Kecamatan Kobalima Kabupaten Malaka. J Penelit Pertan Terap. https://doi.org/10.25181/jppt.v22i1.2176

34. Ayesha I, Amnilis A, Saogo YE, Dewijanti II, Kusumawati E (2022) Analisis Faktor Utama Penyebab Involusi Pertanian Pada Petani Padi Sawah Di Di Desa Sidomakmur. J Soc Econ Res. https://doi.org/10.54783/jser.v3i2.32

35. Ramdoni Rasantaka MP, Ashshidiqi MF, Yulianti R, Zeinawaqi Z, Widodo E (2022) Implementasi Regresi Robust Untuk Mengetahui Faktor-Faktor Yang Mempengaruhi Produksi Padi Di Indonesia. J Stat Dan Apl. https://doi.org/10.21009/jsa.06209

36. Butaflika B (2022) Dampak Program Kartu Petani Berjaya Terhadap Produksi dan Pendapatan Usahatani Padi di Kabupaten Pringsewu. Inov Pembang J Kelitbangan. https://doi.org/10.35450/jip.v10i02.309

37. Kurniawan A, Mahmud M, Gusvita H (2024) Analisis Produksi Padi Sawah Di Kelurahan Sungai Sapih Kecamatan Kuranji Kota Padang. Jrip. https://doi.org/10.31933/sh9hqf77

38. Permatasari DN, Satriani R, Mandamdari AN (2024) Analisis Faktor-Faktor Yang Memengaruhi Pendapatan Usahatani Padi (Studi Kasus Gapoktan Lestari Desa Bulakpacing Kecamatan Dukuhwaru Kabupaten Tegal). Mimb Agribisnis J Pemikir Masy Ilm Berwawasan Agribisnis. https://doi.org/10.25157/ma.v10i2.13666

39. Wulandari MC, Ratnasari D, Avida FK (2023) Determinan Pembangunan Ekonomi Pertanian Di Jawa, Bali, Dan Nusa Tenggara. Natl Multidiscip Sci. https://doi.org/10.32528/nms.v2i3.290