International Journal of Technology and Education Research

https://e-journal.citakonsultindo.or.id/index.php/IJETER

E-ISSN: 2986-0733

Analysis of Farming Risks in the Integration of Corn and Peanuts in Laimpi Village, Kabawo Subdistrict, Muna Regency

Salmiati[1], Ilma Sarimustaqiyma Rianse[2], Weka Gusmiarty Abdullah[3]

[1] Alumnus of Agribusiness, Faculty of Agriculture, Halu Oleo University, Kendari City, Indonesia
[2] Lecturer, Faculty of Agriculture, Halu Oleo University, Kendari City, Indonesia

Corresponding Author: salmiatiramadan@gmail.com

Abstract

This study aims to describe the farming system applied in the integration of corn and peanuts, identify the types and sources of risks, analyze the magnitude of risks, and examine the efforts made by farmers to manage these risks in Laimpi Village, Kabawo District, Muna Regency. The population consisted of 20 farmers practicing integrated farming, and due to the small size, a census method was used, meaning all farmers were included as respondents. The variables observed include risk events, sources, types, impacts, levels, and risk management efforts before and after risks occur. Data were analyzed using descriptive methods, where the first analysis described the farming system, the second identified risks at each stage of farming activities such as land preparation, planting, maintenance, and harvesting along with their causes and impacts, and the third examined farmers' risk management strategies. The results show that risks occur at all stages of farming, with land preparation and planting categorized as moderate risk, maintenance as moderate to high risk, and harvesting as low risk. Farmers manage these risks through better farm management, pest and disease control, and the use of quality seeds to reduce losses and sustain productivity

Keyword: ***Corn and Peanut Integration, Risk, Farming***

INTRODUCTION

Southeast Sulawesi Province, particularly Muna Regency, is a region with significant potential for producing corn and groundnuts (*Arachis hypogaea L.*). These two cash crops make a significant contribution to farmers' household income and to meeting the community's food needs. Corn is even the second most important local staple food after rice (Saediman, 2015;

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

Saediman et al., 2016; 2019). Data from the Central Statistics Agency (BPS, 2023) show that corn production in Muna Regency reached 29,436 tons, while peanut production amounted to 4,900 tons, or approximately 16.3%. This indicates that both commodities have good prospects for continued development.

One area with significant potential for the development of these crops is Kabawo Subdistrict. This area has approximately 3,660 hectares of farmland dedicated to corn and peanuts, with favorable agroclimatic conditions, such as annual rainfall reaching 2,500 mm. These conditions are highly suitable for the growth of corn and peanuts. Specifically, Laimpi Village serves as a production hub with a land area of 1,000 hectares, accounting for approximately 27.2% of the total agricultural land area in Kabawo Subdistrict (BPS, 2023). Additionally, easy market access and varied topographic conditions further support agricultural development in this region.

In practice, farmers in Laimpi Village generally employ an integrated farming system combining corn and peanuts. An integrated system involves growing two or more crops on the same plot of land to improve the efficiency of resource use, such as land, labor, and capital. According to Remison and Onelemhemhen (1999), integrated farming systems can improve efficiency and reduce income variability compared to monoculture systems. Furthermore, crop integration can also enhance food security and mitigate the risk of crop failure, particularly amid increasingly unpredictable climate change (Soediman et al., 2020).

Nevertheless, farming is not immune to various risks and uncertainties. Risks in corn and peanut farming can stem from various factors, such as climate change, pest and disease outbreaks, the use of low-quality seeds, and fluctuations in input and output prices. According to Mubarokah et al. (2017), production risks are influenced by weather, pests, diseases, and seed quality, while income risks are influenced by land area, fertilizer prices, and crop selling prices. These risks can lead to reduced production and farmer income, necessitating appropriate risk management efforts through the implementation of risk management strategies (Darmawi, 2006).

Several previous studies have examined risk analysis in the agricultural sector. Rianse (2015) found that in the palm sugar processing industry in Kolaka Regency, there are various types of risks at the production and marketing stages, with raw material risk being the highest. Fausayana (2018) identified risks in the marketing of coconut products in Kendari City, including risks related to storage, processing, and sales. Meanwhile, Afifuddin et al. (2018) demonstrated that the integration of corn farming and cattle raising in North Lombok Regency can increase income and improve production cost efficiency. Another study by Beding et al. (2019) also

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

demonstrated that an integrated rice and cattle farming system can significantly increase farmers' income compared to a non-integrated system.

Although various studies have examined the risks and integration of farming systems, research on risk analysis in maize-peanut integration systems remains relatively limited, particularly in Laimpi Village, Kabawo Subdistrict, Muna Regency. This study differs from previous research in terms of its focus on specific commodities, the study location, and an analytical approach that places greater emphasis on the identification and management of risks within cash crop integration systems.

Based on the above discussion, this study is important to analyze the risks faced by farmers in integrated corn and peanut farming, as well as to identify the risk management strategies employed by farmers. The results of this study are expected to contribute to the advancement of knowledge, particularly in the field of agricultural economics, and to serve as a basis for consideration by farmers and policymakers in enhancing the sustainability and well-being of farming operations in the study area.

METHOD

This study was conducted in Laimpi Village, Kabawo Subdistrict, Muna Regency from January to July 2024, with a purposive selection of the study location. The population in this study consisted of all 20 farmers practicing corn and groundnut integration; therefore, the sampling method employed a census approach, including the entire population as respondents, in accordance with the recommendations of Rianse and Abdi (2008) and Arikunto (2008). Data collection was conducted through direct observation at the research site and in-depth interviews with respondents to obtain information relevant to the research objectives.

Data analysis in this study was conducted descriptively to address each research problem. The farming system for corn and groundnut integration was analyzed descriptively to comprehensively describe the processes and management patterns. Furthermore, risk identification and risk magnitude analysis also employed descriptive techniques, covering risk occurrences at every stage of farming activities—from land preparation, planting, and maintenance through to harvest—as well as encompassing the sources of risk, the frequency of risk occurrence, and the qualitative impacts caused. Additionally, an analysis was conducted to identify various efforts made by farmers in managing risks—before, during, and after risk occurrence—thereby providing a comprehensive overview of risk management strategies in integrated corn and groundnut farming.

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

International Journal of Technology and Education Research

https://e-journal.citakonsultindo.or.id/index.php/IJETER

E-ISSN: 2986-0733

RESULTS AND DISCUSSION

Risks in Corn and Peanut Integration Farming

The risks of integrated corn and groundnut farming begin with identifying all risks at each stage of the integrated corn and groundnut farming process . The risks at each stage of integrated corn and groundnut farming in Laimpi Village are shown in Table 1.

Table 1. Farming Risks in Corn and Peanut Integration in Laimpi Village

No	Cultivation Stage	Risk Occurrence	Source of Risk
1	Preparation	Many thorny and sharp weeds	(Internal) Farmers rarely clear the land
2	Planting	Crops do not grow	(Internal) Poor seed quality
		Stunted plants	(External) Poor soil quality
3	Maintenance	Armyworms, leaf blight, pig pests	(Internal) Insufficient fertilization (Internal) Weak or poorly maintained fences or garden boundaries
		Blight	(Internal) Insufficient fertilization
4	Harvesting	Labor shortage	(Internal) Some members of the community migrate to cities in search of work.

Based on Table 1 above, the risks of farming in the corn and groundnut rotation system can be explained as follows;

1. Risks during the land preparation stage include the presence of numerous thorny and sharp weeds in corn and peanut crops. These risks stem from internal factors, specifically the farmers' failure to adequately clear the land. Farmers in Laimpi Village often neglect to clear the fields after harvesting, and this practice may persist throughout the land preparation process.
2. Risks during the planting stage include the failure of corn and peanut plants to grow. Internal risk factors include poor seed quality and poor soil fertility; another risk during the planting stage is stunted plant growth. External risk factors include poor soil fertility.
3. Risks during the Maintenance Stage are similar for both corn and peanut crops, including risks such as ant infestations, armyworms, leaf blight, wild boar damage, and downy mildew. Internal sources of risk include insufficient fertilization of the crops and weak or poorly maintained fences or field boundaries.

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

4. Risks during the Harvesting Stage for corn and peanuts share a common issue: a shortage of labor during harvesting. The source of this risk is internal, as many community members have migrated to cities in search of work.

Table 1 shows that during the cultivation of corn and peanuts, there are various types and sources of agricultural risks associated with the integration of corn and peanuts in Laimpi Village, including:

1. Land preparation stage: Farmers in Laimpi Village prepare the land using hoes and machetes to loosen the soil, then burn the dried weeds as a control method, in accordance with Budiman (2013).
2. During the planting stage, risks include crops failing to grow due to the use of low-quality seeds, which can reduce growth and yield (Suwarno et al., 2017). Additionally, stunted plant growth is caused by poor soil fertility, which hinders growth and reduces production. In fact, corn and groundnuts require sufficient sunlight and balanced water availability during the growth period. Soil fertility plays a crucial role in providing the nutrients needed by plants (Beaton, 1995).
3. Maintenance Stage: The greatest risks during the maintenance stage of integrated corn and groundnut farming stem from pest and disease attacks, such as armyworms, leaf blight, leaf rot, and pig pests. These attacks have a significant impact on reduced crop yields. Symptoms of leaf spot disease are characterized by elongated pale yellow spots on the leaves, yellowing and wilting of the leaves, stunted plant growth, and the disease's tendency to spread easily to other plants. The most damaging pests are armyworms and root weevils because they can persist until harvest. These pest and disease disturbances greatly affect plant growth and have the potential to cause crop failure (Noormalahayati and Djuwendah, 2014).
4. Harvesting: Corn and peanuts are generally harvested three times a year, with a growing period of approximately 90 days for corn and 90–100 days for peanuts, depending on the variety. The optimal harvest time is when the plants have reached their optimal maturity. Based on interview results, a common risk during the harvesting stage in this integrated farming system is a shortage of labor, as some community members migrate to cities in search of work. Additionally, another risk—low profits—can also arise due to the impact of pest and disease outbreaks during the previous cultivation stage. This situation is linked to economic factors such as limited job opportunities in rural areas (Smith, 2015).

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

International Journal of Technology and Education Research

https://e-journal.citakonsultindo.or.id/index.php/IJETER

E-ISSN: 2986-0733

Table 2 Frequency and Impact of Risks in the Integrated Corn and Peanut Farming System in Laimpi Village

No	Cultivation Stages	Frequency	Impact
1	Land Preparation Stage	3 times a year	Farmer injured
2	Planting Stage	Twice a year	Uneven plant growth
		Twice a year	Reduced crop yield
3	Maintenance phase	4 times a year	Low production quality Decreased crop yield
		2 times a year	Decreased crop yield
4	Harvesting stage	4 times a year	Some crops begin to deteriorate due to not being harvested on time

Based on Table 2, the frequency and impact of risks in the integrated corn and groundnut farming system in Laimpi Village include:

1. Land preparation stage: Risks at this stage occur approximately three times a year, primarily due to the presence of thorny weeds that can injure farmers during land preparation using machetes and hoes (Setiawan et al., 2018).
2. Planting stage: Risks occur approximately four times a year, including crops failing to grow, uneven growth, and stunted development due to the use of low-quality seeds, thereby reducing harvest yields (Ilyas, 2012).
3. Maintenance stage: Risks occur approximately four times a year, including pest and disease outbreaks that cause uneven growth and reduced production, such as pig infestations that damage crops (Pakasi, 2011; Mulyani et al., 2018).
4. Harvesting stage: Risks at this stage include labor shortages, which occur approximately four times a year, leading to delayed harvests and resulting in crop damage.

Magnitude of Farming Risks in Corn and Peanut Integration

Yohana (2019) determines the magnitude of risk by assessing the consequences for the company if the risk materializes. These consequences are scored, for example, on a 1– –5 scale, where a score of 5 indicates the worst-case scenario and a score of 1 indicates minimal impact on the company.

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

International Journal of Technology and Education Research

https://e-journal.citakonsultindo.or.id/index.php/IJETER

E-ISSN: 2986-0733

Table 3. Magnitude of Risk in Corn and Peanut Farming in Laimpi Village

No	Risk Event	Frequency of Occurrence (Score)	Impact (Score)		Risk Level	Category
			Corn	Peanuts		
1	Many thorny and sharp weeds	Occasionally (3)	Farmers injured (2)	Farmer injured (2)	6	Moderate
2	Crops not growing	Rare (2)	Uneven growth (3)	Uneven growth (2)	6	Moderate
	Dwarf plants	Occasionally (3)	Reduced yield (2)	Reduced yield (2)	6	Moderate
3	Armyworms and leaf blight	Frequent (2)	Reduced yield (3)	Low production quality (3)	6	Moderate
	Pig pests	Frequent (4)	Reduced yield (4)	Reduced crop yield (4)	16	High
	Powdery mildew	Occasionally (3)	Reduced yield (2)	Reduced yield (2)	6	Moderate
4	Labor shortage	Rare (2)	Crops damaged due to late harvest (2)	Crops damaged due to late harvest (2)	4	Low

Based on Table 3 above, the magnitude of risk in corn and peanut farming can be explained as follows:

1. The greatest risk in corn farming occurs during the maintenance stage, specifically from pig pest attacks, with a risk value of 16 per period, which often damages crops due to insufficient monitoring of field boundaries. Meanwhile, the lowest risk is during the harvesting stage, with a value of 4 per period, caused by labor shortages; however, this rarely occurs because farmers typically enlist the help of neighbors during harvest. The higher the risk value, the greater the level of risk faced (Abdullah et al., 2016).
2. The greatest risk in groundnut farming lies in the maintenance stage, specifically pig pest attacks with a risk value of 16 per period, which often damage crops due to insufficient monitoring of field boundaries. Meanwhile, the lowest risk is found in the harvesting

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

stage with a value of 4 per period, caused by labor shortages; however, this rarely occurs because farmers typically ask neighbors for help during harvest to speed up the process.

Risk Management in Corn and Peanut Integration Farming

Every risk that arises in integrated corn and groundnut farming is crucial to analyze for risk management. This must be done to avoid or minimize the risks faced, thereby ensuring the farm's survival and sustainability in the future. Risk management is an effort undertaken by farmers to address risks that arise during the cultivation process. Managing business risks is not limited to actions taken after a risk occurs (*ex post*); it can also be implemented before the risk materializes (*ex ante*) or during the occurrence of the risk (*interactive*). Several risk management approaches include *risk avoidance, risk transfer, risk deferral, risk retention, diversification, and risk funding.* The efforts made by farmers to reduce risks occurring during the integrated corn and groundnut cultivation stages are shown in Table 4.

Table 4. Risk management in integrated corn and groundnut farming

Risk Event	Risk Source	Risk Management		
		Ex-ante	Interactive	Ex-post
Many thorny and sharp weeds	Farmers rarely clear the land	Wearing protective gear	Wearing gloves, boots, and long pants	Using whatever protective gear is available
Plants do not grow	Poor soil quality (dry and hard)	Selecting high-quality seeds (corn ≥85%, peanuts ≥80%)	Inspecting the plants	Thinning at approximately 2 weeks of age
Stunted plants	Poor soil fertility	Selecting high-quality seeds	Pesticide application at the correct dosage (corn 50 kg/ha, peanuts 100 kg/ha)	Re-treatment of plants
Armyworms, leaf blight	Insufficient fertilization	Use of fertilizer according to nutrient requirements	Pesticide spraying according to dosage	Care for infected plants

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

Pig pests	Weak or poorly maintained garden fences	Checking the condition of the fence	Construction of a strong and sturdy fence	Repairing damaged fences
Powdery mildew	Lack of fertilization	Applying fertilizer at the correct dosage	Pesticide Spraying	Plant care to prevent spread
Labor shortage	Labor migration to cities	Continuing to harvest	Involving local labor	Timely harvesting to avoid reduced production

Based on Table 4, the efforts made by farmers to prevent risks associated with corn and groundnut integration are as follows:

1. *Ex-ante* risk management in corn and groundnut integration farming is carried out through several key steps before cultivation begins. First, selecting the right location, where crops require sufficient rainfall, an optimal temperature of 20–30°C, and loose, fertile soil for maximum growth, while also using protective gear during land preparation to avoid the risk of injury from thorny weeds. Second, the selection of high-quality seeds with high germination rates—at least 85% for corn and 80% for groundnuts—as well as seeds that are intact, bright, and pest-free to ensure successful growth. Third, the use of urea fertilizer as a nitrogen source is carried out according to the recommended dosage—50 kg/ha for corn and 100 kg/ha for groundnuts—with proper fertilization techniques applied when the plants are approximately 21 days old. All these efforts constitute a *risk reduction* strategy aimed at minimizing potential risks from the outset and enhancing crop productivity.
2. *Interactive* risk management in the integrated corn and groundnut farming system is implemented at every stage of the process using *risk reduction* strategies. During land preparation, farmers use protective gear such as gloves, boots, and long pants to avoid injuries from thorny weeds. During planting, farmers perform replanting or reseeding of plants that have wilted or died due to poor seed quality. Next, during the maintenance stage, farmers apply fertilizer in appropriate amounts and spray pesticides at recommended doses to prevent pest and disease outbreaks. During the harvesting stage, farmers strive to harvest at the optimal time to avoid declines in yield quality and quantity, such as corn kernels becoming hard and peanuts drying out. All these efforts aim to minimize risks throughout the cultivation process.

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

3. *Ex-post* risk management in integrated corn and peanut farming is implemented after risks occur using *risk reduction* strategies. During land preparation, farmers use basic protective gear such as gloves and long pants to reduce the risk of cuts from weeds. During the planting stage, farmers replant dead or wilted plants and apply pesticides as recommended to treat diseased plants while continuing to care for other plants to prevent infection. During the maintenance phase, farmers tend to the replanted crops to prevent further damage from pests and diseases. Meanwhile, during the harvesting phase, farmers strive to harvest on time to prevent a decline in the quality and yield of the corn and groundnut crops.

CONCLUSION

Based on the results of a study analyzing agricultural risks in the integrated cultivation of corn and peanuts in Laimpi Village, Kabawo Subdistrict, Muna Regency, it was found that risks arise at every stage of agricultural activities. During the land preparation stage, risks include the presence of numerous thorny and sharp weeds. During the planting stage, risks include failure to germinate and stunted growth. Furthermore, during the maintenance stage, various pest and disease attacks occur, such as armyworms, leaf rot, downy mildew, and wild boar damage. Meanwhile, during the harvesting stage, the risk faced is a shortage of labor. The severity of risks varies across each stage: moderate risk during land preparation and planting, moderate to high risk during maintenance, and low risk during harvesting.

As for risk management practices employed by farmers in integrated corn and groundnut farming, they generally utilize *risk reduction* strategies. Efforts undertaken include implementing better farm management practices, proper pest and disease control, and using high-quality seeds to enhance production success. This strategy aims to minimize the impact of emerging risks, thereby maintaining farm productivity and sustainability.

Therefore, it is recommended that farmers enhance risk control efforts in integrated corn and groundnut farming, particularly by constructing and regularly inspecting sturdy garden fences to prevent wild boar attacks, using high-quality seeds to avoid stunted plants, and applying appropriate pesticides to address armyworms and leaf blight. Additionally, government support is needed through enhanced collaboration with farmers, particularly with the agricultural office in Laimpi Village, in managing agricultural risks. For future researchers, it is recommended to conduct a more in-depth risk analysis focused on risk management strategies to reduce the level of risk faced by farmers.

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

REFERENCE

Abdullah WG, Rianse U, Iswandi M, Taridala SAA, Aida S, Widayati W, Dirgantoro MA. (2015). The Risks of Aren Sugar Processing Business in Kolaka District South East Sulawesi. International Journal of Sustainable Tropical Agricultural Sciences. 2 (1), 45-52.

Astuti, Ari, Sri W, Masyhuri M 2017. Analisis resiko dan perilaku petani bawang putih di Kabupaten Bantul. Jurnal Agro Ekonomi. 4 (2) 69-80.

Anggela R, Refdinal M, Hariance R. 2019. Analisis Perbandingan Risiko Usaha Tani Padi Pada Musim Hujan dan Musim Kemarau di Nagari Mungo Kecamatan Luak Kabupaten Lima Puluh Kota. JOSETA: Journal of Socio-economics on Tropical Agriculture, 1(1), 36–44.

Annisa, R., Bambang, S. dan Farida, S. 2019. Faktor-Faktor Sosial Ekonomi Yang Mempengaruhi Risiko Produksi Usahatani Jagung (Zea mays Sp.) Di Desa Wonorejo Kecamatan Sumber Gempol Kabupaten Tulungagung. Jurnal Sosial Ekonomi Pertanian Dan Agribisnis. 7 (1), 1-11.

Barokah U, Rahayu W, Sundari MT. 2016. Analisis Biaya Dan Pendapatan Usahatani Padi Di Kabupaten Karanganyar. Agric, 26(1), 12.

Badan pusat Statistik. 2023. Luas panen jagung di Kabupaten Muna Tahun 2020-2023. Badan Pusat Statistik.2023.

Budiman, H. 2005. Pemberantasan Alang-Alang (Imperata Cylindrical L.,) Dengan Metode Mulsa (Mulching). Bogor. Prosiding Temu Teknis Nasional Tenaga Fungsional Pertanian Bogor. 16(5): 161-164

Dalimunthe AG, Safitri SA. (2023). Analisis faktor-faktor yang mempengaruhi produksi usahatani jagung (Zea mays L.). Agricola, 13(2), 86–90.

Darmansyah E, Ani M, Radian. 2017. Analisis Risiko Produksi Usahatani Jeruk Siam Pontianak (Citrus nobilis var. microcarpa) Di Kabupaten Sambas. Jurnal Social Economi of Agriculture. 6 (1) , 1-11.

Fausayana I, W G. Abdullah, LO Dawid. 2018 "Risk Analysis of Coconut Product Marketing." International Journal Of Research-Granthaalayah 6.5 : 138-148.

Kurniati D. 2012. Analisis Risiko produksi Dan Faktor-Faktor Yang Mempengaruhinya Pada Usahatani Jagung (Zea mays L.) Di Kecamatan Mempawah Hulu Kabupaten Landak. Jurnal Sosial Ekonomi Pertanian. 1 (3), 60-68.

Naftaliasari, T, Abidin Z , Kalsum U. 2015. Analisis Risiko Usahatani Kedelai Di Kecamatan Raman Utara Kabupaten Lampung Timur (Risk Analysis of Soybean Farming in Raman Utara Subdistrict of East Lampung Regency). Jiia, 3(2), 148–25.

Nadhwatunnaja, N. 2008. Analisis Pendapatan Usahatani Dan Faktor-Faktor Yang

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

Mempengaruhi Produksi Paprika Hidroponik di Desa Langu Kecamatan Cisarua. Skripsi. Fakultas Pertanian Bogor. (Akses tanggal 08 April 2019 jam 22:30).

Sari N, Pardian P. 2018. Analisis Risiko Usahatani Kopi Specialty Java Preanger. Jurnal AGRISEP, 17(1): 79–94.

Soekartawi, Rusmadi dan E. Damaijati., 1993. Risiko dan Ketidakpastian dalam Agribisnis. PT Rajawali. Jakarta.

Sondakh NE, Tangkere E and Laoh OEH 2019. Analisis Usahatani Kacang Tanah Dan Jagung Di Desa Kanonang Dua Kecamatan Kawangkoan Barat. Agri-Sosioekonomi, 15 (2), 341-346.

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.