AGRISOCIONOMICS
Jurnal Sosial Ekonomi dan Kebijakan Pertanian
ISSN 2580-0566; E-ISSN 2621-9778
http://ejournal2.undip.ac.id/index.php/agrisocionomics
Vol 7 (3): 599-609, November 2023

RISK ANALYSIS OF BLACK TEA PRODUCTION AT PTPN IV BAH BUTONG SIMALUNGUN REGENCY

Yohana Christy*, Wiludjeng Roessali, and Suryani Nurfadillah
Agribusiness, Faculty of Animal and Agricultural Sciences, Diponegoro University, Semarang, Central Java, Indonesia

*Correspondence Email: yohanachristys01@gmail.com

Submitted 05 January 2023; Approved 22 March 2023

ABSTRACT

Tea production in Indonesia is experiencing fluctuations. These conditions cause losses, so the company needs to handle the risks that occur. This study aims to analyze the risk level of black tea production, the incidence and risk agents as well as the risk management strategy of black tea production. This research was conducted in September-October 2021 at PTPN IV Bah Butong, Simalungun Regency. Location determination is carried out purposively with consideration as a producer of tea production. The research method used is a case study. The sampling method uses judgement sampling. Observation and interview data collection techniques. Data analysis using the Coefficient of Variation (CV) and the House of Risk (HoR) method. The results showed that the risk at PTPN IV Bah Butong was relatively high with a CV of 22.46% and fluctuating. The identification results found 8 risk events, namely fluctuation of tea production, quantity and quality tea leaves is low, tea leaves are scattered, low quantity and quality dry tea, delays in the production process, there are weeds and twigs, as well as 16 sources of risk, namely extreme weather, leaves attacked by pests, attacks of smallpox and helopeltis, pest management diseases are less than optimal, less attention to the picking cycle, limited fertilizer and application delays, non-uniform harvesting, less clean leaf sorting, insufficient withering, human error, scattered dry tea, malfunctions of the hauling machine, picking and transportation. The identification results found 8 handling strategies to minimize losses due to emerging risks.

***Keywords**: coefficient of variation, house of risk, risk agent, risk events*

BACKGROUND

The agricultural sector in Indonesia has a variety of subsectors that support the country's foreign exchange growth consisting of plantation, forestry, livestock and fisheries subsectors. The contribution made to the plantation subsector in 2019 is illustrated through the value of Gross Domestic Product (GDP) of 3.27% (BPS, 2019). Tea is known to the public as one of the high-demand beverages in the world, the superiority in consuming makes tea a mainstay commodity for exports (Zakariyah et al., 2014). Indonesia is a country ranked 7th as a tea producer in the world. In 2016 Indonesia's tea production of 138,935 tons increased to 146,251 tons in 2017. Tea production in 2018-2020 decreased sequentially, namely 140,236 tons, 129,832 tons and 128,016 tons (Ditjenbun, 2020).

The center of tea development in Indonesia is in West Java with a contribution of 69.15%, which is then followed by Central Java 9.06%, North Sumatra 6.20%, West Sumatra 5.70% and Jambi 2.59% (BPS, 2018). North Sumatra tea production increased by 7,111 tons in 2016 to 8,017 tons in

ISSN 2580-0566; E-ISSN 2621-9778
http://ejournal2.undip.ac.id/index.php/agrisocionomics
Vol 7 (3): 599-609, November 2023

2017, but decreased in the following year, namely 7,943 tons in 2018 and 7,800 tons in 2019 (Ditjenbun, 2020). North Sumatra is one of the provinces that contributes to the national production of tea produced only by state plantation companies. Simalungun Regency is the only tea producing regency in North Sumatra with a total land area of 6,373 ha, production of 8,017 tons in 2017 (Ditjenbun, 2018).

Fluctuations of production are a problem faced by the tea plantation subsector nowaday. This is indicated by the uncertainty of a circumstance or event that gives a different result from expectations called risk ((Nurfadillah et al., 2020). The decline in tea production in Indonesia can occur due to several factors that affect the amount and quality of tea produced such as climatic conditions, land use change, pest attacks and pruning activities. (Brilliantina et al., 2018) also argue that there is a decline in Indonesian tea production from year to year due to the condition of old plants, limited use of technology, and the use of superior seeds.

One of the companies engaged in tea plantations and processing is PTPN IV Bah Butong. PTPN IV Bah Butong is one of the State-Owned Enterprises (BUMN) that manages orthodox black tea in Simalungun region. Orthodox black tea is a tea that is treated with a degree of heavy wilting and lighter leaf rolling properties. The processing of tea shoots at PTPN IV Bah Butong undergoes a long production process to produce black tea with export quality. PTPN IV Bah Butong has experienced several obstacles so that it has not been able to produce stable black tea production (fluctuations). Fluctuations in production indicate risks to ongoing business (Nadapdap and Saefudin, 2020). Some factors that influence the existence of production risks are weather / climate uncertainty, pests, diseases, raw materials, production equipment and human resources Aulia et al. (2022). According to Patimah and Trimo (2019), Azizah et al. (2019), Dahliani (2019) argues that the factors that affect production risk are production (raw materials), weather/climate, pests and diseases, production machinery and labor. These fluctuations are closely related to the production risks contained in each process activity so that the author is interested in conducting research at PTPN IV Bah Butong and the need for handling strategies to minimize losses arising from risks.

RESEARCH METHODS

This research was conducted in September-October 2021 in Simalungun Regency, North Sumatra. The location determination was chosen purposively with the consideration that Simalungun Regency is a producer of black tea production in North Sumatra. The sampling technique used is judgement sampling. Judgement sampling is a sampling technique by considering that the sample used has extensive information and is able to explain about the problem topic (Hidayanti et al., 2018). The data obtained were analyzed descriptively and quantitatively. Analyzing the level of risk using the calculation of the coefficient of variation (CV) according to Lawalata et al. (2017) as follows:

$$CV=\sigma/E$$

Information:
CV : Coefficient of variation
σ : Standard deviation (kg)
E : Average production value (kg)

ISSN 2580-0566; E-ISSN 2621-9778
http://ejournal2.undip.ac.id/index.php/agrisocionomics
Vol 7 (3): 599-609, November 2023

Method used to analyze risk events and risk agents uses the House of Risk (HoR) method. HoR is a method of applying the FMEA (Failure Mode and Effect Analysis) method for quantitative risk measurement and minimizing the possibility of risk agents/sources (Ulfa et al., 2016). HoR is divided into 2 stages, namely HoR stage 1 and HoR stage 2. The output of HoR phase 1 will be re-mapped in HoR stage 2. Phase 1 will identify risk events by providing a severity value on a scale of 1-10, a value of 10 indicates very dangerous.

Identified risk source will be assessed using the frequency of occurrence on a scale of 1-10. Correlation is carried out between risk sources with risk events with correlation values of 0 (no correlation), 1 (weak correlation), 3 (medium correlation), 9 (high correlation). The determination of priority sources of risk is assessed based on the aggregate value of potential risk (ARP).

$$APRj = Oj \Sigma Si \times Rij$$

Information:
APR : Aggregate potential risk
Oj : Opportunities for risk to occur
Si : Severity
Rij : Correlation value

HoR phase 2 begins by sorting risk sources from highest to lowest based on APR value with 80:20 pareto analysis. The next stage analyzes handling strategies that correlate with priority risk sources based on values of 0,1,3,9. According to Munawir and Krismiyanto (2016) Calculate the level of strategy effectiveness using the formula:

$$TEk = \sum APRj \times Ejk$$

Information:
Tek : Effectiveness Rate
Ejk : Correlation value

Following stages assess the level of difficulty of implementing a risk management strategy with a scale of 3 (easy to implement), 4 (somewhat difficult to implement), 5 (difficult to implement). The priority handling strategy is based on the value of the ratio of total effectiveness to difficulty (ETDk). The ETDk value in the opinion of Munawir and Krismiyanto (2016) is calculated using the following formula:

$$ETDk = TEk/Dk$$

Information:
ETDk : Handling effectivenes
TEk : The level of effectiveness of the strategy
Dk : Strategy difficulty level

ISSN 2580-0566; E-ISSN 2621-9778
http://ejournal2.undip.ac.id/index.php/agrisocionomics
Vol 7 (3): 599-609, November 2023

RESULT AND DISCUSSION

Assessing the reliability between the items of the constructs that make it up (Table 1) shows that all variables have a composite reliability of more than 0.70. Thus, all measurement models used in this study already have high reliability.

Table 1. Composite Reliability Results

	Cronbach's Alpha	Composite Reliability	AVE	Results
Breeders (X1)	0.643	0.811	0.596	Reliable
Inseminators (X2)	0.927	0.945	0.776	Reliable
Supporting Factors (Z)	0.736	0.824	0.500	Reliable
Livestock (Y1)	0.868	0.912	0.725	Reliable
Programme Success (Y2)	0.773	0.872	0.702	Reliable

Black Tea Production

Tea is a product that is in demand by the people of Indonesia and abroad. Demanding Zakariyah et al. (2014) tea is known by the public as one of the beverages with high demand in the world, excellence in consumption makes tea a mainstay commodity for export. Although tea is in demand by various groups of Indonesian people, tea consumption in Indonesia according to Khadijah et al. (2016) is still relatively low at around 190 grams / capita / year and tea production in Indonesia has fluctuated. Based on research that has been done, it is known that black tea production at PTPN IV Bah Butong as follows:

Table 2. Black Tea Production PTPN IV Bah Butong

Year	Black Tea Production (kg)
2016	2,970,540
2017	3,677,005
2018	2,880,541
2019	3,498,821
2020	4,890,240
Total	**17,917,147**

Source: Primary Data Processed, 2021

Based on Table 2, it is known that PTPN IV Bah Butong's black tea production has fluctuated production from 2016-2020. In 2016 the production of black tea produced was 2,970,540 kg, in 2017 3,677,005 kg, in 2018 2,880,541 kg, in 2019 3,498,821 kg and in 2020 it was 4,890,240 kg. The lowest black tea production is known in 2018, this is due to the low amounts of raw materials. Low raw materials are caused by labor less caution when inserting young leaves/shoots into the holding net or exceeding capacity (27 kg). This is in line with the opinion of Kusumawati & Triaji (2017) which states that the lack of rigor or skill of the workforce when carrying out their duties will affect the decrease in the amounts of raw materials processed. According to Sucipto (2015) the amount of low raw material inventory will cause problems in a business with low production results.

ISSN 2580-0566; E-ISSN 2621-9778
http://ejournal2.undip.ac.id/index.php/agrisocionomics
Vol 7 (3): 599-609, November 2023

In 2020 tea production increased to 4,890,240 kg. The increase in production occurs due to pest spraying carried out before harvesting using delta chemical pesticides 0.05 liters/ha and pruning branches or leaves affected by pests that function to break the chain of spread. According to Safitri &; Junaedi (2018), the benefits of pruning can cut off the source of pests in the garden so that they do not spread and produce new productive branches.

Production Risks

Based on the research that has been done, it can be known that the level of production risk is as follows:

Table 3. Calculation of Production Risk 2016-2020

Description	Value Risk
Average (kg)	3,583,429
Standard Deviation	805,194.76
Coefficient of Variation (CV)	0.2246995
CV (%)	22.46

Source: Primary Data Processed, 2021

Based on Table 3, it can be seen that the average black tea production of PTPN IV Bah Butong per year can reach 3,583,429 kg of the total production for 5 years (2016-2020) reaching 17,917,147 kg. The CV calculation results obtained amounting to 0.22 this value also shows the percent of risk received by PTPN IV Bah Butong of 22.46%, which means that the overall black tea production produced has production fluctuations and the level of risk received is high. The risk is classified as high will provide a chance of loss in tea yields so that the company's production is unstable which will have an impact on the company not being able to meet demand. This is also in accordance with the opinion of Ula et al. (2019) which states that the amount of risk received is directly proportional to the value of CV received, the higher the CV value, the indication of the risk faced will be high. CV value of more than 9% will indicate that businesses experience risks that cause high or unstable fluctuations (Ministry of Trade of the Republic of Indonesia, 2015). Jumiana et al. (2018) argue that the CV value in the range of 5-9% is classified as a stable business.

Risk Event and Risk Agent of Black Tea

Black tea produced by PTPN IV Bah Butong, Simalungun Regency, identified 8 possible risk events. According to Sari et al. (2016) and Tammah et al. (2017) weather uncertainty, raw materials (tea leaves and tea shoots), pest diseases, labor and production machinery will affect the final result. Risk events are identified using the House of Risk (HoR) phase 1 method in Table 4.

ISSN 2580-0566; E-ISSN 2621-9778
http://ejournal2.undip.ac.id/index.php/agrisocionomics
Vol 7 (3): 599-609, November 2023

Table 4. Risk Event Identification

Code	Risk Event	Severity
E1	Black tea production fluctuates	5.14
E2	Low amount of tea leaves	4.28
E3	Young leaves/shoots are scattered during transport	2.57
E4	The quality of the picked tea leaves is low	4.57
E5	Low amount of dry tea	6.85
E6	Low quality dry tea	6.17
E7	Delay in the production process	3.14
E8	There are weed chips and old twigs	3.14

Source: Primary Data Processed, 2021

The highest risk event experienced by PTPN IV Bah Butong was the low amount of dry tea 6.85. The low amount of dry tea is due to the low amount of raw materials. This is in accordance with Sucipto (2015) that the amount of low raw material inventory will cause problems in a business with low production results. Another cause of low dry tea is improper black tea processing process such as there are still fragments of old twigs, old leaves and weeds during processing. Lack of careful labor when inserting shoots into the storage net causes tea shoots to be scattered so that the raw materials used for the production process are low. Mutia and Trimo et al. (2019) argue that non-conformity of transport procedures will lead to many splattered shoots. Assessment of risk events based on severity, the greater the perceived impact, the higher the value of severity. According to Pedekawati et al. (2017) the impact felt is large, the value on severity will be high. After the risk event is known in the company, for risk handling, the risk agent is then identified.

Table 5. Identification Risk Agent

Code	Risk Agent	Occurrence
A1	Extreme weather changes	7.42
A2	Leaves/shoots attacked by disease pests	5.71
A3	Attack of smallpox leaf disease	4.00
A4	Helopeltis pest infestation	6.28
A5	Less than optimal pest management	5.71
A6	Pay less attention to the picking cycle	2.42
A7	Limited fertilizer availability	4.42
A8	Delay in fertilizer application	4.00
A9	Harvesting of young leaves/shoots is not uniform	5.57
A10	Sorting tea leaves is less clean	7.14
A11	Breakdown of the picking machine	7.42
A12	Leaf withering is not maximal	6.00
A13	Malfunction of the withering machine	6.42
A14	Human error	3.00
A15	Damage to modes of transport	5.00
A16	Scattered dry tea	8.42

Source: Primary Data Processed, 2021

ISSN 2580-0566; E-ISSN 2621-9778
http://ejournal2.undip.ac.id/index.php/agrisocionomics
Vol 7 (3): 599-609, November 2023

Based on the table above, 16 sources of risk are identified based on the occurrence value or chance of occurrence frequency. The risk source of scattered dry tea has the highest value of 8.42. The chance of scattered dry tea often occurs every week during tea drying activities so that it will be contaminated with dirt and reduce quality. Scattered dry tea is only accommodated by a small bucket so it cannot hold all dry tea. The emergence of risk in each activity as well as risk events will be given a value of 1-10 based on the level of occurrence or emergence of the source of risk (risk agent) (Munawir and Krismiyanto, 2016). The next stage identifies risk events and risk sources in HoR stage 1 to determine the APR value using the correlation value between risk sources and risk events (Punjawa and Geraldine, 2009)

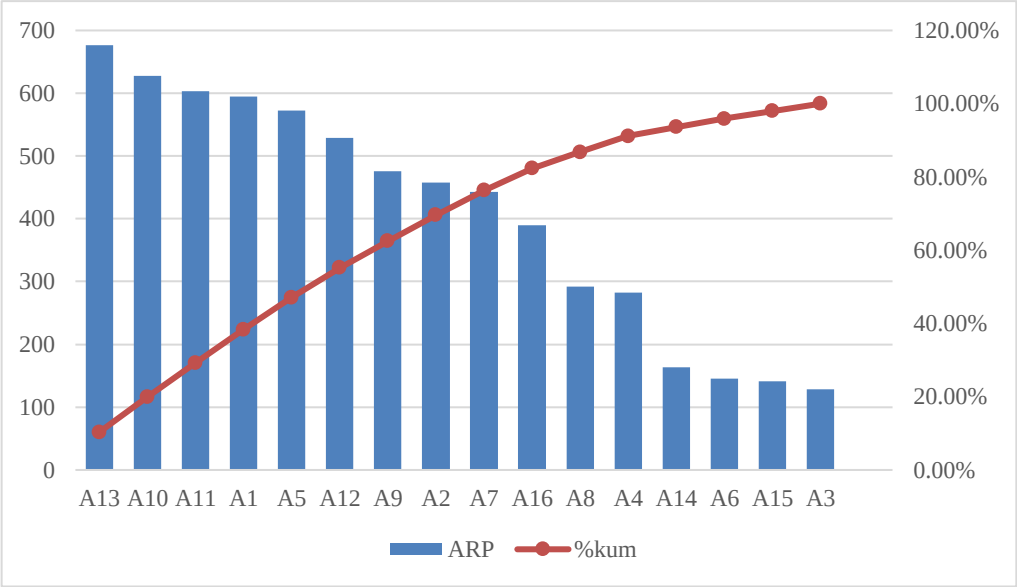

Figure 1. Diagram of Pareto Risk
Source: Primary Data Processed, 2021

Based on Figure 1, it is known that 9 sources of risk are priorities for handling, namely damage to the wiping machine (A13), less clean tea leaf sorting (A10), damage to the picking machine (A11), extreme weather changes (A1), less than optimal pest and disease management. (A5), withering is not optimal (A12), leaf harvest is not uniform (A9), shoot leaves are attacked by pests and diseases (A2), and limited fertilizer availability (A7). Sources of risk that fall into the priority category are risk agents whose percentage range is below 80%. Determining the risk source category is carried out according to Kountur (2008) using the Pareto law or 80:20 law, meaning that by handling 20% of crucial risks first, the company can avoid 80% of losses.

Risk Management Strategy in Tea

House of Risk in stage 2 is an evaluation stage on priority risk agents to provide handling in order to minimize these risks. The steps in HoR stage 2 begin with formulating an appropriate handling strategy and determining the level of difficulty by assigning scores on a scale of 3 (easy), 4 (somewhat difficult), 5 (difficult) and the value of strategy effectiveness.

ISSN 2580-0566; E-ISSN 2621-9778
http://ejournal2.undip.ac.id/index.php/agrisocionomics
Vol 7 (3): 599-609, November 2023

Table 6. Risk Management Strategy

Code	Risk Management Strategy	Dk	ETD	Rank
P1	Scheduling picking cycles	3.00	1,429.20	5
P2	Conduct workforce training	4.00	796.16	8
P3	Periodic maintenance of the machine	3.00	3,839.25	1
P4	Protective tree	3.25	3,443.10	2
P5	Performing pruning	3.25	1,267.67	6
P6	Scheduling fertilizer requests	3.50	1,138.50	7
P7	Pesticide spraying	4.00	2,317.30	3
P8	Labor supervision	3.00	2,212.86	4

Source: Primary Data Processed, 2021

Based on Table 5, 8 risk management strategies were obtained by PTPN IV Bah Butong in overcoming and preventing risks. The strategies obtained will be reviewed at the level of difficulty of implementation (Dk). The handling strategy will then be assessed by prioritizing the Effectiveness to Difficulty (ETD) that has the highest score so that it can help overcome the source of risk. This is in accordance with the opinion of Ramadina et al. (2019) that the ETD value with the highest score will be easier to apply than the ETD with a low score.

The handling strategy that takes precedence based on the order of the highest ETD value is periodic machine maintenance (P3) with an ETD value of 2,317.30 in the risk strategy. The company can carry out periodic machine maintenance a week both in the field and factory to avoid damage when used. But when the engine is damaged, then at that time corrective action will be taken. According to Prasetiyo et al. (2017) that periodic maintenance can maintain the smooth performance of machines and production processes. Production machines affect the level of production in the company because the more equipment used will optimize time in work and production. As said by Irawan et al. (2017) that one of the risk factors in producing a production will be disrupted if there is damage to equipment or production machinery at a certain time.

Protective tree (P4) with an ETD value of 3,443.10. Planting protective trees is a solution that can be done by the company to overcome the decline in production and maintain the quantity of black tea. Planting protective trees does not require high costs so it is easy to carry out the strategy. Types of protective trees that can be planted in tea plantation areas are pine trees, acacia trees and silver oak (Haq and Karyudi, 2013). Planted protective trees are useful in minimizing pest attacks by manipulating the habitat of natural enemies and alternative hosts for natural enemies (BPTK, 2013).

Pest and disease attacks that occur require companies to carry out pesticide spraying measures (P7). The ETD value obtained was 2,317.30. The pesticides used can be chemical pesticides, and workers' knowledge about pests and diseases needs to be optimized so that workers are responsive in dealing with pests and diseases. The next strategy action is pruning (P5) with an ETD value of 1,267.67 Pruning is carried out on branches or parts of tea that are attacked by pests and diseases, this action is done so that there is no spread to healthy plants. Pruning action is also one of the garden management actions with the aim of guarding against pest attacks and increasing production (Safitri et al., 2018).

The next strategy with the highest ETD value of 4 is labor supervision (P8) of 2,212.68. Labor supervision includes sorting activities, pest and disease management and damage to picking machines. Supervision in gardens and factories is carried out by foremen when workers perform their

ISSN 2580-0566; E-ISSN 2621-9778
http://ejournal2.undip.ac.id/index.php/agrisocionomics
Vol 7 (3): 599-609, November 2023

duties, but workers pay less attention to problems that are considered harmless for the stability of tea raw materials. Supervision is also assisted by garden assistants so that workers remain disciplined and not lazy. Supervisory activities according to Sanjaya et al. (2016) that the foreman will carry out labor supervision to have a direct impact in maintaining the final result and guarding the occurrence of technical errors of workers.

Schedule fertilizer requests (P6) with an ETD value of 1,138.50. The lack of fertilizer availability requires companies to regulate fertilizer supplies by scheduling fertilizer demands. The next strategy is to conduct workforce training (P2). This action is a bit difficult to implement because the cost and time will be long, usually training is only given to workers with high positions. This is in accordance with Aulia et al. (2022) who stated that in identifying and controlling the risks of black tea production, it is necessary to conduct labor training on the use of machinery and production processing. The next strategy by scheduling a picking cycle (P1) with the lowest ETD of 1,429.20 by scheduling a picking cycle will minimize the risk of tea sorting where the harvested tea is no longer old shoots/leaves. Shoots that are not harvested according to the cycle make old shoots and reduce the quality of shoots Kusumawati and Triaji (2017).

CONCLUSION AND SUGGESTION

The risk level of black tea production at PTPN IV Bah Butong of 22.46% means that the production of black tea has a relatively high risk and fluctuates. There are 9 priority sources of risk assessed based on the Potential Risk Aggregate, namely damage to the drying machine, sorting of tea leaves that are not clean, damage to picking machines, extreme weather changes, less than optimal pest management, non-optimal withering, non-uniform leaf harvest, leaf shoots attacked by pests, and limited fertilizer availability. Priority risk management strategies identified 8 strategies. Based on the research that has been done, the researcher suggested that the company is able to implement risk handling strategies such as providing protective trees, conducting labor supervision, carrying out periodic machine maintenance, spraying pesticides, pruning, scheduling fertilizer requests, conducting labor training for all workers and scheduling picking cycles to minimize risks that are priority sources of risk.

REFERENCES

Aulia, R. M., Heryanto, M. A., Rachmawati, E., and Renaldi, E. 2022. Identifikasi dan pengendalian risiko produksi teh hitam orthodoks pada PT Perkebunan Nusantara VIII. Jurnal Agroindustri, 8(2): 167-177.

Azizah, F. U., S. Hamidah, and V. Dewantoro. 2019. Analisis pengendalian kualitas produk teh hitam di unit produksi pagilaran PT Pagilaran Keteleng Balado Batang Jawa Tengah. Jurnal Dinamika Sosial Ekonomi, 20(1): 65-80.

Ayun, Q., W. A. Saputro, and Y. Fidayani. 2020. Risiko usahatani kakao di Taman Teknologi Pertanian Nglanggeran Kecamatan Pathuk Kabupaten Gunung kidul. Jurnal Sintech, 1(1): 1-6.

Brilliantina, A., B. H. Purnomo, and I. B. Suryaningrat. Sistem dinamis penilaian kinerja produksi teh Kebun Bantaran PT Perkebunan Nusantara XII. Jurnal Agroteknologi, 12(1): 58-63.

Balai Pengkajian Teknologi Pertanian Jawa Barat. (2013). Budidaya Tanaman Teh Organik. Lembang: Kementerian Pertanian.

ISSN 2580-0566; E-ISSN 2621-9778
http://ejournal2.undip.ac.id/index.php/agrisocionomics
Vol 7 (3): 599-609, November 2023

Dahliani, L. 2019. Kapita Selekta Manajemen dan Agribisnis Perkebunan. Bogor: IPB Press.

Direktorat Jendral Perkebunan. 2018. Statistik Perkebunan Indonesia 2017-2019. Jakarta

Direktorat Jendral Perkebunan. 2020. Produksi Teh Menurut Provinsi di Indonesia 2016-2020. Jakarta

Fauziah, F., R. Wulansari, and E. Reazamela. 2018. Pengaruh pemberian pupuk mikro zn dan cu serta pupuk tanah terhadap perkembangan *Empoasca sp.* pada areal tanaman teh. Jurnal Agrikultura, 29(1): 26-34.

Hidayanti, A., H. Irianto, and Kusnandar. 2018. Strategi pengembangan rantai pasok kentang berkelanjutan di Kabupaten Magetan. Jurnal Agro Ekonomi, 36(2): 163-182.

Handryani, F., S. N. Wiyono, K. Kusno, and D. Rochdiani. 2021. Identifikasi risiko pada produksi paprika (Studi kasus di CV Cantigi Kabupaten Garut, Jawa Barat). Jurnal Forum Agribisnis, 11(1): 90–100.

Haq, M. S. and Karyudi. 2013. Upaya peningkatan produksi teh (*Camelia sinensis (L.) O.kuntze*) melalui penerapan kultur teknis. Jurnal Warta PPTK, 24(1): 71-84.

Irawan, J. P., I. Santoso, and A. S. Mustaniroh. 2017. Model analisis dan strategi mitigasi risiko produksi kripik tempe. Jurnal Teknologi dan Manajemen Agroindustri, 6(2): 88-96.

Jumiana, W., Azhar, and E. Marsudi. 2018. Analisis variasi harga dan integrasi pasar vertical cabai merah Kabupaten Gayo Lues. Jurnal Ilmiah Mahasiswa Pertanian Unsyiah, 3(4): 577-593

Kementerian Perdagangan Republik Indonesia. 2015. Rencana Strategi Kementrian Perdagangan Tahun 2015-2019. Kementerian Perdagangan Republik Indonesia. Jakarta.

Kountur, R. 2008. Mudah Memahami Manajemen Risiko Perusahaan. Jakarta: Penerbit PPM.

Kusumawati, A. and A. Triaji, 2017. Perbandingan penggunaan mesin petik dan petik tangan terhadap hasil produksi pucuk teh (*Camellia sinensis (L.) O. Kuntze*) di Perkebunan Kayu Aro PTPN VI Kabupaten Kerinci. Jurnal Agriteknose, 8(2): 36-44.

Lawalata, M., H. D. Darwanto, and S. Hartono. 2017. Risiko usahatani bawang merah di Kabupaten Bantul. Jurnal Agribisnis Sumatera Utara, 10(1): 56-73.

Munawir, H. and Krismiyanto. 2016. Analisis risiko dan strategi mitigasi risiko supply chain susu sapi (Studi kasus di Desa Singosari, Boyolali). Simposium Nasional Teknologi Terapan (SNTT), 1(1): 1-10.

Mutia, Y. and L. Trimo. 2019. Beberapa faktor penyebab ketidaksesuaian proses produksi teh hitam orthodox di pabrik xyz. Jurnal Agroindustri, 9(2): 83-93.

Nadapdap, H. J. and R. B. Saefudin. 2020. Risiko ushatani manga di Kecamatan Rembang Jawa Tengah. Jurnal Penelitian Pertanian Terapan, 20(2): 161-169.

Nurfadillah, S., K. Budiraharjo, and W. Roessali. 2020. Prioritas dan strategi penanganan risiko produksi pada industri tahu di Kabupaten Grobogan. Jurnal Agritech, 22(1): 40-48.

Patimah, L. and Trimo, L. 2019. Beberapa faktor penentu keberlanjutan usaha agroindustri teh rakyat. Jurnal Agro Industri Perkebunan, 7(1): 11-21.

Pedekawati, C., T. Karyani, and L. Sulistyowati. 2017. Implementasi house of risk (HOR) pada petani dalam agribisnis mangga gedong gincu. Jurnal Agribisnis Terpadu, 10(1): 97–112.

Prasetiyo, M. D., I. Santoso, A. S. Mustaniroh, and Purwadi. 2017. Penerapan metode FMEA dan AHP dalam perumusan strategi pengolaan risiko proses produksi yoghurt. Jurnal Teknologi Pertanian, 18(1): 1-10.

Punjawan, I. N. and L. H. Geraldin. 2009. House of risk: a model for proactive supply chain risk management. Journal Business Process Management, 15(6): 953-957.

ISSN 2580-0566; E-ISSN 2621-9778
http://ejournal2.undip.ac.id/index.php/agrisocionomics
Vol 7 (3): 599-609, November 2023

Safitri, I. A. and A. Junaedi. 2018. Manajemen pemangkasan tanaman teh (*Camellia sinensis (L.) O. Kuntze*) di Unit Perkebunan Tambi Jawa Tengah. Jurnal Buletin Agrohorti, 6(3): 344-353.

Sanjaya, B., M. M. Arwani, and S. H. Hanum. 2016. Relasi kerja mandor dengan buruh pemetik teh (Kasus di PT. Perkebunan Sarana Mandiri Mukti Kecamatan Kabawetan Kabupaten Kepahiang). Jurnal Sosiologi Nusantara, 2(2): 58-69.

Sari, I. N., R. E. Lestari, and R. Astuti. 2016. Analisis produktivitas sektor kebun menggunkan craig-harris productivity model (Studi kasus di PT Candi Loka Kebun Teh Jamus). Jurnal Teknologi dan Manajemen Agroindustri, 5(2): 75-83.

Sucipto, M. B. 2015. Analisis strategi manajemen persediaan bahan baku dalam upaya untuk mengoptimalkan volume produksi pada UD. Kuda Terbang. Jurnal Riset Mahasiswa Ekonomi, 2(3): 386-402.

Ramadina, F., I. Ayesha, and Amnilis. 2019. Mitigasi risiko rantai pasok agribisnis beras solok pada UD. Cahaya Makmur di Kecamatan Lubuk Sikarah Kota Solok. Jurnal Mahasiswa Pertanian, 3(2): 116-124.

Tammah, S. U., L. Patimah, and L. Trimo. 2017. Faktor pendorong dan penarik serta strategi pengembangan agroindustri teh rakyat studi kasus Kelompok Tani Barokah Ciwidey. Jurnal Penelitian Teh dan Kina, 20(2): 99-113.

Trimo, L. and S. Hidayat. 2019. Agroindustri berbasis teh rakyat sebagai usaha meningkatkan kesejahteraan petani teh. Jurnal Agribisnis dan Sosial ekonomi Pertanian Unpad, 4(1): 670-680.

Ula, L. H., M. N. Suyastiri, and H. H. Utami. 2019. Analisis risiko produksi daun teh basah berdasarkan pemetikan mekanik dan manual pada PT Perkebunan Nusantara IX Kebun Semugih Kabupaten Pemalang. Jurnal Dinamika Sosial Ekonomi, 20(1): 81-95.

Ulfa, M., Maarif, M. Sukardi, and S. Raharja. 2016. Analisis dan perbaikan manajemen risiko rantai pasok gula refina dengan pendekatan house of risk. Jurnal Teknologi Industri Pertanian, 26(1): 87-103.

Zakariyah, M. Y., R. Anindita, and N. Baladina. 2014. Analisis daya saing teh Indonesia di pasar internasional. Jurnal Pertanian Berbasis Keseimbangan Ekosistem, 4(8): 29-37.