

CHAPTER I INTRODUCTION

I.1. Background

PT Bandung Daya Sentosa (PT BDS) is a regional government-owned enterprise (BUMD) formed by the Bandung Regency Government in 2022. The corporation engages in three primary sectors: commerce, agribusiness, and agroindustry, with the goal of strengthening the local economy and ensuring food security. PT BDS's agribusiness section develops and manages a variety of agricultural industries, but in cultivation business, they are mainly focus on cultivating shallots, corn, and cabbage. However, PT BDS confronts several risks, including market, financial, people, and digital challenges.

PT BDS faces significant external risks that threaten its operations and long-term viability, particularly due to the influence of weather and climate change. Unpredictable weather patterns and catastrophic climatic events pose major risks to agricultural activities (Soz & Raza, 2024). Irregular rains can disrupt planting and harvesting schedules, while increasing temperatures not only impair crop quality and yields but also raise production costs. Temperature variations make crops more susceptible to insect infestations and diseases. Furthermore, catastrophic weather disasters can ruin crops, disrupt supply networks, and cause substantial financial losses (Zou et al., 2024).

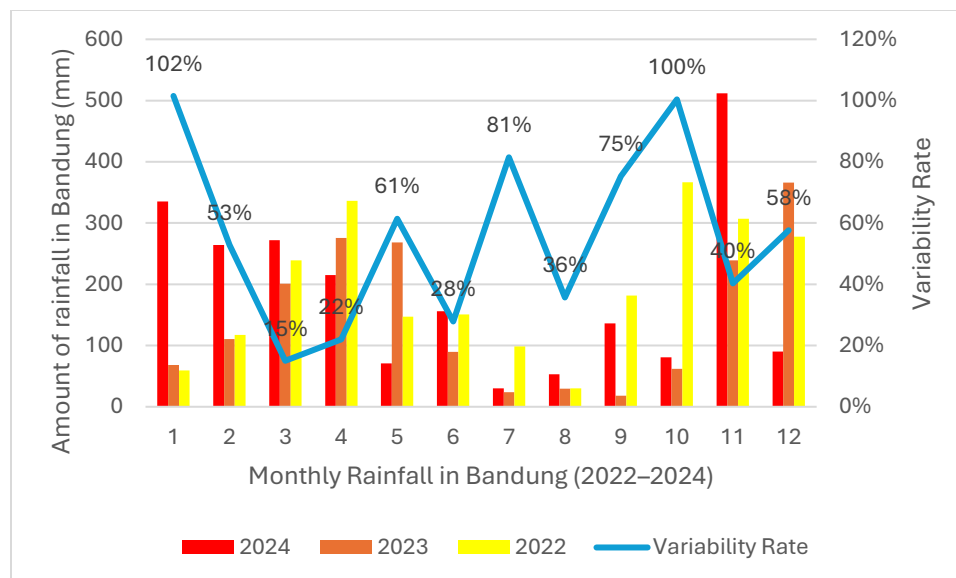


Figure I-1 Amount of Rainfall in Kabupaten Bandung from 2019-2024

Figure I-1 exhibit rainfall statistics for Kabupaten Bandung from 2022 to 2024 show considerable swings throughout each month, emphasizing the variety and unpredictability of weather patterns across time. For example, January and November, exhibiting sharp variations—January 2024 saw almost three times as much rainfall as January 2022. The variability rate, which peaks above 100% in some months and indicates extremely unpredictable weather behaviour, highlights this discrepancy even more. Rainfall is comparatively constant during mid-year months like March and April, but there is no discernible seasonal pattern in the overall trend. It appears that rainfall can no longer be accurately predicted using historical data alone, as even normally dry months like July and August show surprising variability. These results highlight the difficulties in planning in industries such as agriculture.

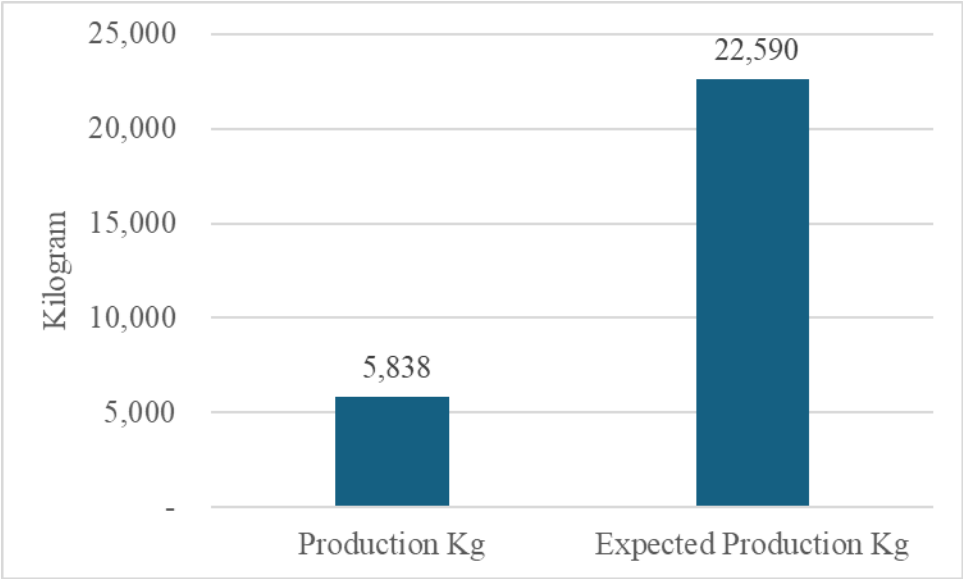


Figure I-2 Cabbage Production and Expected Comparison

Figure I-2 explains how erratic and unpredictable rainfall patterns have been affecting PT BDS’s plantation operation. One case is the company’s venture into cabbage farming, which has hardly lived up to expectations. On the day of harvest, the yield of the crop fell far short of the projected 22.59 tons/ha of the crop at 5.838 tons/ha. Most of the cabbage was dry and rotted, with no usable volume - a direct result of such inconsistent weather throughout growing.

Not only is PT BDS exposed to weather conditions issues, but they are also too confronted by the uncertain commodity price. With a struggle to keep the price stable, it has to do with supply and demand in the market worldwide, speculation and markets full of trade regulations. A number of

these drivers include the Renewable Fuel Standard, and a complex and lengthy multi-step supply chain that add to the volatility and dilute margins as well as financial planning (Farida & Singagerda, 2020). Price movements are typically driven by a combination of changing demand among big importing countries, delays in shipments due to lack of normal rains and weather extremes. What’s more, speculation on commodity markets make it even harder for agribusinesses like PT BDS to forecast future prices. This volatility makes it difficult for the company to predict its revenue and control its costs, leaving it exposed to financial ruin when prices surge or plummet.

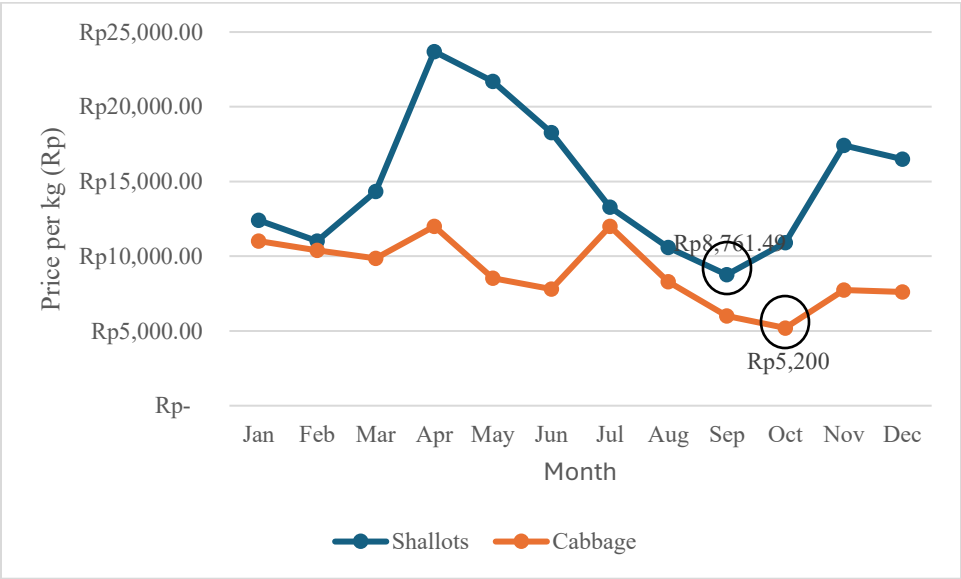


Figure I-3 Profit Margin Trends of Shallots and Cabbage in 2024

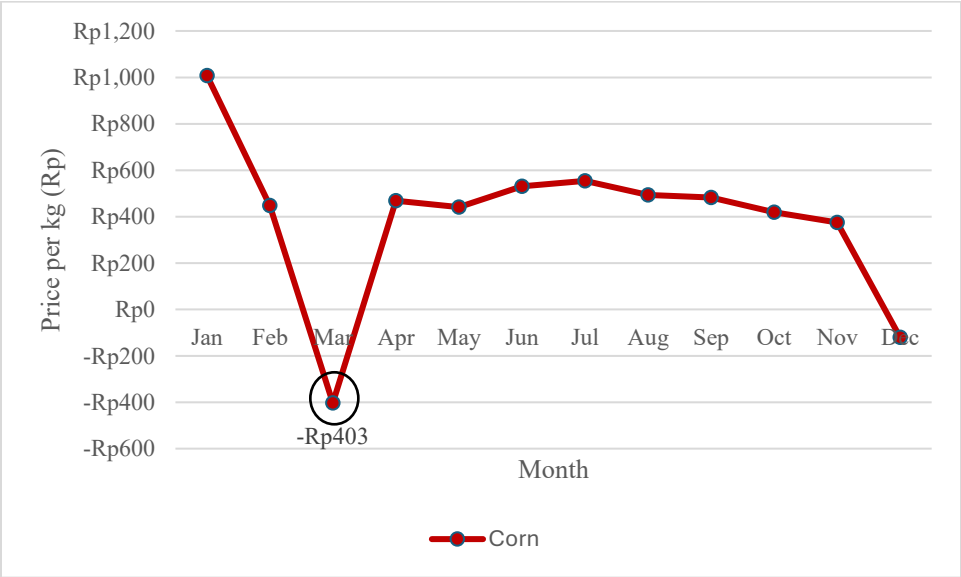


Figure I-4 Profit Margin Trends of Corn in 2024

The volatile and profitably nature of shallots versus sweet corn through the 2024 year is shown in figure I-3 and figure I-4. Data illustration reveals that shallot (blue line) fluctuated dramatically where the ratio of profit peaked in May, i.e. around Rp25,000.00. The spike can be attributed probably because of season factors – increased demand/limited supply. However, profitability slowly fell following May and reached its nadir in September. There was a slight revival in October and November, but December saw another sharp decline, possibly because the market was oversaturated or competition was becoming tougher. Price fluctuations are estimated by the coefficient of variation (CV); a CV = 0: not critical fluctuations; CV < 10 percent: low; 10 percent ≤ CV < 20 percent: moderate; 20 percent ≤ CV < 30 percent: high; and over 30 percent: very high. (Suganda et al., 2024). The CV of shallots is 30%, indicating “very high fluctuations” and confirming the fact that the profit margins become less stable at any time of the year. Sweet corn, on the other hand, even though it appears clearer, has a CV of 40%, showing the same level of volatility. Its margins are relatively consistent and centered at around Rp500 for much of the year but there is a short spell of negative margins in March. This drop might reflect temporary issues such as increased production costs or a short-term decline in market demand. Meanwhile, cabbage (orange line) shows a more stable pattern, with fewer dramatic changes in profitability over the same period. April and July see the first two price peaks, followed by a sharp drop from August to October. November sees a little improvement, while December sees a slight stabilization. Cabbages are classified as having "high fluctuations" with a CV of 24%. Although nevertheless volatile, the price trend of cabbage is less unpredictable than that of sweet corn and shallots, suggesting that it is susceptible to significant, but not severe, environmental and market fluctuations.

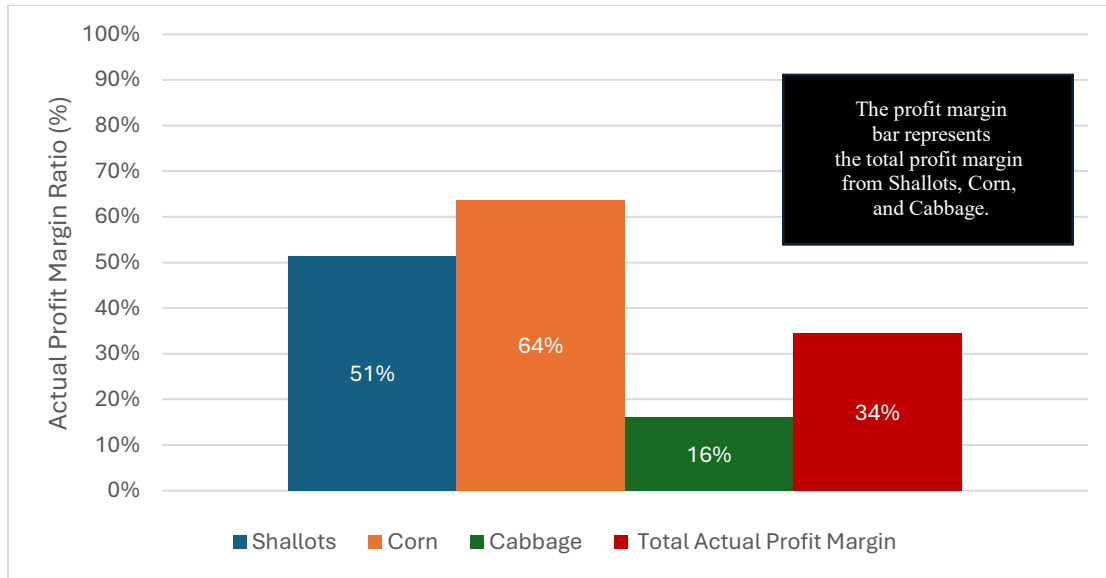


Figure I-5 Percentage of profit gained against targeted profit

Figure I-5 compares PT Bandung Daya Sentosa's actual earnings to its planned profit for three important commodities in 2024: shallots, corn, and cabbage. Corn achieves the most fulfilment, earning 64% of the desired profit, followed by shallots at 51%. In striking contrast, cabbage only made 16% of its planned profit, drastically underperforming the other commodities. Although corn output nearly surpassed its target and shallot production exceeded targets, PT BDS was unable to realize full profit potential owing to significant price fluctuation, with corn and shallots having coefficients of variation (CV) of 40% and 30%, respectively. Market price variations, rather than production volume, became a constraint in attaining profit targets. Meanwhile, cabbage not only suffered from price changes (CV = 24%), but also underperformed in production, reaching just 26% of its objective, resulting in a 16% profit realization. This combined setback exposes weaknesses in both production capacity and market circumstances. Research has shown that effective risk mitigation techniques are critical for navigating the complexities of global supply chains, such as supply interruptions, demand uncertainties, and material shortages (Dehdar et al., 2018). Without such tactics, PT BDS would struggle to maintain financial stability, defend profit margins, and keep its operations running.

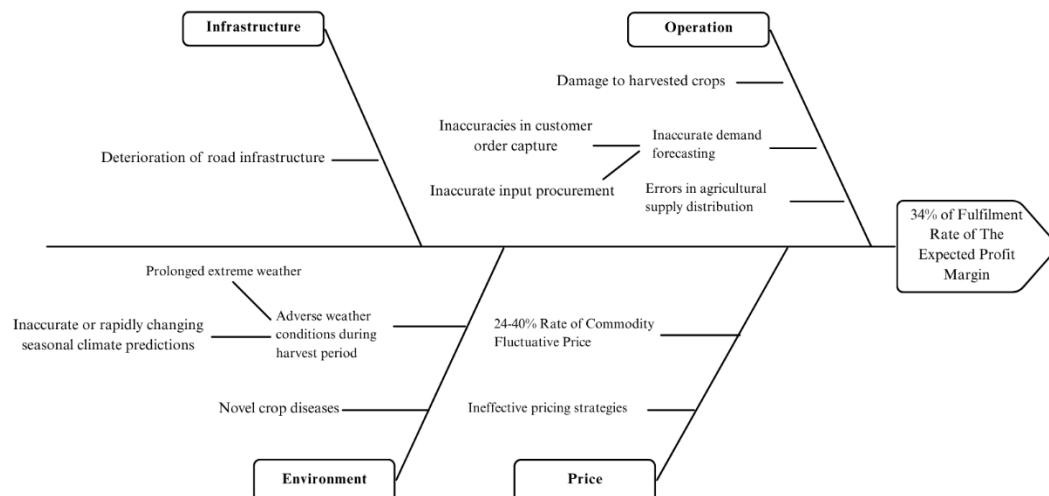


Figure I-6 Fishbone Diagram

Figure 1-6 identifies the underlying causes of the agriculture sector's poor fulfilment with only 34% of the predicted profit margin. This issue is influenced by four major categories: infrastructure, operations, the environment, and price. Road infrastructure deterioration hinders transportation efficiency, resulting in delays and harm to harvested crops. Inaccuracies in customer order capture, input procurement, and demand forecasting all contribute to the inability to balance supply and demand in the market. Furthermore, faults in agricultural supply distribution and crop damage during handling reduce the overall efficacy of the supply chain, lowering productivity and profitability.

Environmental and price variables have a substantial influence on performance. Inaccurate or fast changing seasonal climate forecasts, extended severe weather, and unfavourable harvest circumstances all pose major challenges to crop quality and output. The introduction of new crop diseases adds another layer of risk, increasing the unpredictability in output results. Meanwhile, a volatile price of commodities (varying from 24% to 40%) paired with inadequate pricing tactics makes it difficult to sustain consistent income. These pricing and environmental concerns, if not handled, significantly limit the organization's capacity to fulfil profit targets.

Given the multifaceted causes contributing to the low fulfilment of the expected profit margin, the implementation of comprehensive risk mitigation strategies is essential. Proactively addressing these challenges through improved forecasting, resilient infrastructure, adaptive pricing, and

robust operational planning will be critical to enhancing profitability and ensuring long-term sustainability in the agricultural sector.

With the risk that being mentioned before, the study proposes a phased approach to improve PT BDS's business processes, focusing on risk identification and assessment. This final project begins by using the Supply Chain Operations Reference (SCOR) 12.0 Racetrack model to map out PT BDS's current business processes, helping to build a clear and structured understanding of how operations are carried out. To identify points of risk, house of risk (HOR) model is used which enables the systematic study of potential vulnerabilities in those processes. HOR model is then revisited to assess and rank the developed strategies and seek to take the most feasible and efficient measures into practice. These approaches have demonstrated successful results across sectors and scenarios and have highlighted their potential to enhance risk management and operational resilience. Although other methods, such as the AHP, were evaluated, they were all rejected mostly due to the strong reliance on very accurate and consistent data. By this incremental process, PT BDS is now in a stronger position to enhance financial return, steady day-to-day progress and long-term and sustainable development, such as rectifying mistakes for lost options for shallot planting.

I.2. Problem Formulation

Based on the case of PT Bandung Daya Sentosa, including the background that has been obtained, the problem formulation of this proposal is how can PT Bandung Daya Sentosa (PT BDS) design supply chain risk mitigation assessments and strategies to address environmental and market volatility?

I.3. Purpose

Based on the case of PT Bandung Daya Sentosa, including the background and the problem formulation that has been obtained, the purpose of this proposal is to develop supply chain risk mitigation assessments template and obtain strategies for PT Bandung Daya Sentosa that address environmental and market volatility.

I.4. Benefit

Based on the purposes that are stated, the benefits that will be able to be implemented for the parties involved are:

PT Bandung Daya Sentosa:

1. Provides PT BDS with a structured risk mitigation strategy in the face of environmental and market volatility
2. By identifying and prioritizing the most critical risks, company can implement targeted preventive actions.
3. Risk Assessment Template that PT BDS can apply to other process and future planning cycles.

Author:

1. Through the process of identifying, assessing, and mitigating supply chain risks, the researcher gained hands-on experience
2. The project contributes a replicable methodology and a validated risk assessment tool that can be referenced in future research or applied in similar industries.

I.5. Limitations and Assumptions

In the process of research and preparation of the final project, research limitations and assumptions are made with the intention that the preparation and discussion can be directed in accordance with the research objectives. The research limitations are as follows:

1. The research is only conducted in PT Bandung Daya Sentosa.
2. The research only focuses on the environment and financial disruption that happens to PT BDS.
3. The analysis is only carried out until the design of supply chain risk mitigation strategies.
4. The research focuses exclusively on PT BDS and its supply chain operations.
5. The findings and recommendations are tailored to PT BDS's context.
6. Data updating is carried out during the cultivation season of PT BDS's.

I.6. Writing Systematics

This proposal writing systematics is as shown below.

Chapter I Background

The first chapter provides background information on the firm based on the case of prospective solutions, problem formulation, proposal aims, proposal benefits, and systematic writing on design objects.

Chapter II Theoretical Basis

The second chapter discusses theories and general concepts related to the linked problem. This comprises the theories and research findings from previous studies, which provide as a theoretical basis for the project.

Chapter III Methodology of Research

The third chapter discusses problem-solving approaches utilizing the conceptual model. This model connects project components to issue-solving phases and gives further insight into the systematic approach to problem solving.

Chapter IV Data Collection and Processing

The fourth chapter explains the methods of data collection and analysis data and adapting the proposed recommendations must be in accordance with the problem to be solved.

Chapter V Validation and Analysis

This chapter contains a description of the validation process and analysis of the results of the research conducted to solve the problem. Furthermore, in detail and step by step the research objectives are discussed and analysed in detail and sharply, using the methods given in the research methodology, until a research result is obtained.

Chapter VI Conclusions and Suggestions

The sixth chapter highlights the summary of conclusions from the analysis of the results of the problems carried out, as well as recommendations that can be considered for the company and for future research.