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Optimizing the Subsidized Fertilizer Distribution from Line I Warehouse to Line IV Warehouse at PT Pupuksriwidjaya Palembang in Central Java

Indra Permata Kusuma[1], Erma Suryani [2], Nurhadi Siswanto[3]

Institut Sepuluh November, Surabaya, Indonesia

Abstract

This research aims to examine the optimization of subsidized fertilizer distribution in the context of PT Pusri Palembang's operations in Central Java. Distribution of subsidized fertilizer is an important chain that supports a sustainable agricultural sector. However, problems arise as demand for fertilizer increases and the complexity of its supply chain affects the availability and delivery time of fertilizer to farmers. The main findings in this research identify several main problems in the distribution of subsidized fertilizer, including empty fertilizer stocks, supply delays, technology and information constraints, high transportation costs, lack of supervision, non-uniform policies, limited storage facilities, unethical actions, lack of standard guidelines, and contract issues. This research produced several recommendations for improvement including improving business processes, utilizing information technology, stricter supervision, optimizing distribution contracts, and using the time charter method in transportation contracts. It is important to implement Dwell Time management to reduce fertilizer waiting time in distribution warehouses. The application of benchmarking to best distribution practices in the fertilizer industry is also a crucial strategy in efforts to improve. PT Pusri Palembang can improve the efficiency and quality of distribution services through identifying the best competitors and adopting their successful strategies. This research provides a comprehensive view of the problem of subsidized fertilizer distribution at PT Pusri Palembang in Central Java and offers concrete solutions to increase distribution availability and efficiency. Through the implementation of recommendations for improvement, researchers hope that the distribution of subsidized fertilizer will become more efficient, support sustainable agriculture, and offer greater benefits for farmers in Central Java.

Keywords*: Distribution; Efficiency; Optimization; Subsidized Fertilizer.*

1. Preface

Agriculture is the main key in meeting national food needs and is an economic pillar for the Indonesian state (Ragimun, Makmun, and Setiawan 2020). In this context, subsidized fertilizer is a key element in supporting agricultural productivity, especially for farmers with limited resources. However, the successful implementation of the subsidized fertilizer program is not only determined by the availability of fertilizer, but also efficiency through appropriate and effective distribution processes (Rangkuti 2012). Inefficiencies in the distribution of subsidized fertilizers can result in delays, supply shortages and higher costs, which in turn negatively impact the growth of the agricultural sector as a whole.

One of the important actors in the subsidized fertilizer distribution chain is PT Pusri Palembang (Setiawan 2016), as a manufacturer and distributor of subsidized fertilizer. Distribution of subsidized fertilizer from PT Pusri Palembang in the Central Java region has its own complexity, involving a series of processes from line I

warehouse to line IV warehouse (Sejati et al. 2023). The efficiency of this distribution process is the main key to ensuring that subsidized fertilizer can be available on time and at an affordable cost for farmers in Central Java. In this regard, this research will explore and analyze the optimization of subsidized fertilizer distribution through a case study of PT Pusri Palembang's operations in Central Java (Ayu 2023). The main objective of this research is mapping and in-depth analysis of the subsidized fertilizer distribution process from line I warehouses to line IV warehouses, to identify problems in the current distribution system.

This research adopts an approach of mapping existing distribution processes and identifying related problems. In an effort to improve, the research will refer to the reference model, although it identifies several weaknesses such as the lack of dwell time mapping and the use of benchmarking. To overcome this weakness, the research will integrate other models, including analysis of the fertilizer delivery business process, designing alternative proposals, and designing standard operational procedures (POB). The main objective is to produce more standard operational guidelines, with clear time limits, as well as more practical recommendations for improving the distribution of subsidized fertilizer. Through this approach, the research hopes to make a valuable contribution to developing more efficient distribution strategies in Indonesia and supporting the sustainable growth of the agricultural sector.

2. Literatur Review

Distribution of subsidized fertilizer is the process of providing fertilizer to farmers at affordable prices, which is taken from the government budget to increase agricultural productivity. Subsidized fertilizer is an important factor in supporting food security and farmer welfare (Chakim, Rifin, and Sanim 2019). This process involves planning, procurement, storage, transportation and distribution of subsidized fertilizer to farmers.

Efficiency in the distribution of subsidized fertilizer is influenced by several factors. Good transportation infrastructure is very important to overcome geographical challenges and ensure fertilizer arrives on time (Lestari 2017). In addition, coordination and accurate information between manufacturer, distributors and farmers helps avoid delays and excess inventory. These factors impact the speed, cost and availability of fertilizer for farmers.

This research adopts a business process analysis approach to analyze and improve the efficiency of subsidized fertilizer distribution. This approach involves mapping and in-depth analysis of existing distribution processes, as well as identifying problems that may arise in those operations. The model is the main frame of reference in this research (Vergidis 1996). This model has comprehensively examined aspects of fertilizer distribution. Even though it has significant benefits, this model has several weaknesses, such as not considering dwell time and unspecific time targets in the proposed alternatives. Therefore, this research will improve the model by considering factors that have not been accommodated.

Several previous studies have been conducted regarding subsidized fertilizer distribution systems. The research position of the authors regarding previous research is presented in table 1 below:

Table 1. Research Position

Author	Title	Research Focus	Tools utilized	Output
Agustina (2006)	Pengembangan Model IntegrasiSistemRayonisasi-DistribusidanSubsidi harga	Developing a mathematical model to reduce total logistics costs in subsidized fertilizer distribution	Linggo Software 8.0	Total logistics costs and subsidies

Author	Title	Research Focus	Tools utilized	Output
Amelya (2014)	Pengembangan Model PenentuanLokasiGudangPenyanggadanJaringanDistribusiPupuk Urea Bersubsididi Nanggroe Aceh Darussalam (NAD)	Develop a model for determining the location of support warehouses and distribution networks for subsidized urea fertilizer.	Linggo Software 11.0	Location of Support Warehouse and distribution network for subsidized urea fertilizer in Nanggroe Aceh Darussalam (NAD)
Valerian adkk (2010)	RekontruksiKelembagaandanUjiTeknologi Pemupukan : KebijakanStrategismengatasikelangkaanPupuk	Support rationalization and effectiveness of fertilizer utilization by farmers.	Integrated Crop Management (PTT)	Fertilizer recommendations according to plant needs and location potential. Farmers can make efficient use of fertilizer.
Rachman (2009)	KebijakanSubsidiPupuk: TinjauanTerhadapAspekTeknis, ManajemendanRegulasi	Improvements starting from the subsidy system, HET determination, fertilizer distribution and supervision, both in regulatory aspects, management aspects, to technical aspects	Policy Analysis	Policy improvements include technical, management and regulatory aspects.
Ahmed (2008)	Fertilizer Distribution, Subsidy, Marketing, Promotion and Agronomic Use Efficiency Scenario in Banglasdesh	Effectiveness of the Fertilizer distribution system	New marketing System (NMS): Fertilizer Distribution Improvement (FDI-I)	Timely supply and availability of fertilizer at reasonable prices at the farmer's location
Bonar (2006)	Kajiankebijakandistribusipupukbersubsidianusulanperbaikannyaberdasarkanatasstudikasus di Jawa Barat	Increase the performance of the national fertilizer distribution system.	Business Process Improvement (BPI), Cross Functional Flowchart , Anslysis Hierarchy Process (AHP)	The best alternative policy proposal for national fertilizer distribution.
Eliana (2021)	Analisispenataanulangstrukturjaringandistribusigudangpenyanggaran PT Petrokimiagresikwilayahjawatimur	Reduce logistics costs by determining the number and location of warehouses in East Java	P-median	Determining the number of support warehouses that will be the selected locations as intermediary warehouses is based on the lowest distribution costs consisting of warehouse rental costs,

Author	Title	Research Focus	Tools utilized	Output
				warehouse management, loading and unloading and land transportation
Iwan (2021)	Evaluation of the location and number of support warehouses in the Gresik petrochemical fertilizer distribution system in West Java and Central Java using mixed integer linear programming (MILP) modeling	Determine the number and location of support warehouses in Central Java and West Java provinces regarding changes in subsidy allocation policies	MILP &Forecasting	Location of Support Warehouse and subsidized fertilizer distribution network in West Java and East Java
Penelitia nini	KajianKebijakandan UsulanPerbaikanSiste mDistribusiPupukber subsidiberdasarkanstu dikasus di Jawa Tengah	Improving the performance of the subsidized fertilizer distribution system	Business Process Improvement (BPI), Cross Functional Flowchart, Benchmarking, Delphi Method	Alternative Policy Proposal for a more effective and efficient distribution system for subsidized fertilizer from line I warehouse to line IV warehouse.

This research presents: (1) Design for improvements to the subsidized fertilizer delivery system, especially from line I warehouses to line IV warehouses, (2) Proposals for improvements in the field of supervision, (3) Guidelines for the distribution of subsidized fertilizer at the Distributor and Retailer level. The general objective of this research is to design a more effective and efficient distribution of subsidized fertilizer from line I warehouses to line IV warehouses in Central Java Province. Detailed objectives as follows:

1. Mapping the current subsidized fertilizer distribution system.
2. Evaluate the current performance of subsidized fertilizer distribution.
3. Analyze problems and propose improvements to problems related to the current distribution of subsidized fertilizer.
4. Propose a good improvement plan in order to increase the quality of subsidized fertilizer availability when needed.

3. Research Method

This research uses a business process analysis approach to explore the information needed to optimize the distribution of subsidized fertilizer. This approach allows researchers to systematically map each stage in the fertilizer distribution process, from procurement to distribution, and identify problems that may arise at each stage. This approach provides a powerful framework for thoroughly analyzing how subsidized fertilizer distribution operations are implemented and potential improvements that can be implemented (Vergidis 1996). The location of this research is the Central Java region, which is the operational area of PT Pusri Palembang in the distribution of subsidized fertilizer. The selection of this location was based on relevance to the research objectives and the impact of the importance of the Central Java region in national agriculture. The required data

will be collected through two main techniques. First, interviews will be conducted with related parties at PT Pusri Palembang who are directly involved in the subsidized fertilizer distribution process. The interviews will provide in-depth insight into the operational aspects and problems that exist in fertilizer distribution. Second, direct observations will be carried out at various stages of fertilizer distribution, where researchers will directly observe the operation and identify problems that may not be revealed through interviews. Furthermore, the model used as the main reference model in this research is the Bonar (2006) model. The reason this model was chosen was because of the similarities in the topic of the study being carried out, namely discussing the distribution of subsidized fertilizer. Apart from that, the research conducted by Bonar (2006) is quite comprehensive because the proposed improvements have discussed fertilizer distribution starting from planning, procurement, distribution and control. The results of Bonar's (2006) research are alternative proposals for new policies in the subsidized fertilizer distribution process. The weaknesses of the Bonar Model (2006) are:

1. Not considering operational aspects related to dwell time or delay when discussing the fertilizer distribution business process from line I warehouse to line IV warehouse.
2. Benchmarking is not used when designing alternative proposals.
3. The proposed alternative does not yet specifically explain the time target or time limit for each fertilizer distribution operational activity.

The weaknesses of the Bonar (2006) model as a reference and supporting model for improvement can be seen in Figure 1 below.

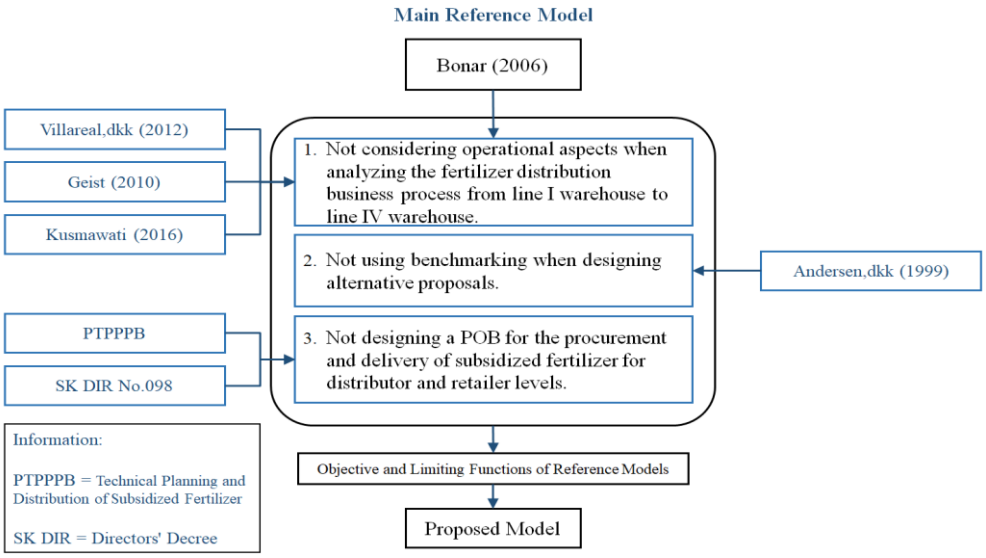

Figure 1. Weaknesses and Improvements to the Bonar Model (2006)

Based on the weaknesses in the main reference model, the researcher made several adjustments using other models that function as supporting models to obtain a model that is more appropriate to the object of this research. Additional reference models used are:

1. Fertilizer Delivery Business Process Analysis

In the analysis of the existing business process, we will look at it in more depth by detailing the delivery process from the line I warehouse to the line IV warehouse and this uses the models of Villareal et al (2012), Geist (2010), Iwan (2021), Eliana (2021) and Kusmawati (2016), Technical Guidelines for the Provision & Distribution of Subsidized Fertilizer (PTP3B) 2019 and Dir Decree No.098 concerning POB Distribution of Subsidized Fertilizer. The Villareal et al (2012) model is used to design a more efficient distribution design using a lean manufacturing approach through eliminating waste in the distribution process after mapping distribution channels. The Geist (2010) model is used to explore, compile and confirm time in distribution operations using the Delphi method. The Kusmawati (2016) model is used to compile and analyze existing

operational stages of product delivery. PTPPPB and Director's Decree No.098 POB Distribution of Subsidized Fertilizer are used to identify stages that were missed or not carried out when delivery activities were carried out as well as guidelines for preparing POB for Distributors and Retailers.

2. Design of Proposed Alternatives

For the process of designing alternative proposals, researchers used Andersen et al (1999) as a benchmarking step, and an additional benchmarking reference model from PT Pertamina as a product delivery operation from the manufacturer's warehouse to the consumer's warehouse.

3. Design of Standard Operational Procedures (POB)

For POB design, researchers also used the Priyatna (2019) model and based on Minister of Trade Regulation No. 15 of 2013, PTP3B, and Director's Decree No. 098 for PSO Distribution.This research approach was carried out by first mapping existing business processes, especially regarding the fertilizer delivery process (freight logistics) from line I warehouses at the Producer level to line IV warehouses at the Retailer level. Then look for the root of the problem in the existing business process which causes delays in the goods delivery process. The next step is that when the source of the problem is known, analysis and improvements will be carried out using the selected reference model, where deficiencies in the reference model will be supported by an additional reference model. It is hoped that the combination of the reference model and supporting model will be in accordance with the studies carried out in this research.

4. Analysis And Discussion

4.1 Mapping the Subsidized Fertilizer Distribution Process

In the context of problem analysis and improvement efforts at the Distributor level in the distribution of subsidized fertilizer, several main problems emerged. First, the Distributor's lack of its own transportation mode is a serious obstacle. Taking fertilizer from producers is hampered by dependence on the availability of transportation modes, resulting in delays in supply to distributors and then to retailers. Second, the issue of storage capacity and quality is a concern. Inadequate warehouses encourage Distributors to avoid storage and send fertilizer directly to Retailers, which has an impact on logistics costs. Third, limited funds also appear as an obstacle in redeeming fertilizer during the planting season, which can disrupt the availability of necessary stocks. Fourth, the lack of use of technology, such as computerization and information technology, makes accurate reporting and monitoring difficult. This results in fertilizer stock information not being available in real-time, affecting decision making and reducing operational efficiency. Furthermore, transportation problems related to poor road conditions can encourage Distributors to increase the selling price of subsidized fertilizer to Retailers to compensate for high transportation costs.

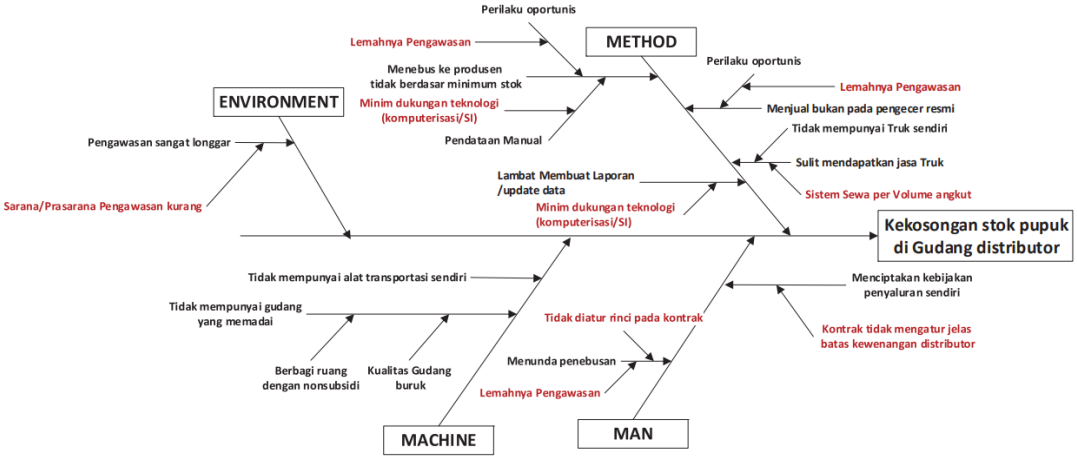

Figure 2. Fishbone Empty Stock of Subsidized Fertilizer in Distributor Warehouse

(Phillips and Simmonds 2013)

This problem is also related to inadequate supervision from the authorities, allowing some Distributors to carry out practices that do not comply with standards. Apart from that, the problem of unclear guidelines regarding the distribution of subsidized fertilizer at the Distributor level has an impact on inconsistent policies between Distributors. This results in each Distributor making their own decisions regarding redemption and distribution mechanisms, reducing the overall consistency and efficiency of subsidized fertilizer distribution. Through the fishbone analysis method, the root of this problem can be clearly identified, paving the way for more effective and efficient improvement efforts at the Distributor level.

4.2 Process from Warehouse Line I to Warehouse Line IV

The fertilizer distribution process from Warehouse Line I to Warehouse Line IV is a series of stages involving a number of entities in the subsidized fertilizer supply chain in Central Java. The initial stage begins at the Line I Warehouse, which functions as the main fertilizer producer facility, as is done by PT Pusri Palembang. Here, fertilizer is produced according to market demand and agricultural needs. The distribution process continues with the collection of fertilizer from the Line I Warehouse to the Line II Warehouse, which acts as an initial storage place before the fertilizer is distributed to wider areas.

Then, at GudangLini III, the role of regional distributors becomes key, where they receive fertilizer from GudangLini II and manage it for distribution to certain areas in Central Java. These regional distributors must plan deliveries, monitor fertilizer stocks, and ensure timely supply to the regions they serve. Line IV warehouses are the next stage, often located closer to the farmer. This warehouse functions as a storage center before the subsidized fertilizer is finally distributed directly to farmers. At this stage, farmers can buy fertilizer to use on their farms with the hope that distribution runs smoothly so they can access fertilizer easily.

This process involves close collaboration and coordination between producers, regional distributors, local distributors and farmers. Efficiency in each stage of distribution is very important because timely distribution of fertilizer and affordable costs will support agricultural productivity and the welfare of farmers in Central Java.

4.3 Identify Problems at Each Stage

Identification of problems in the distribution stage of subsidized fertilizer from Warehouse Line I to Warehouse Line IV is very important to increase the efficiency and effectiveness of distribution. In Line I (Manufacturer) Warehouses, problems arise in production that does not match demand fluctuations, resulting in stock shortages or excesses. Product quality and production efficiency are also a concern. At the Line II Warehouse (Collection) stage, limited warehouse capacity causes storage that is not ideal, affecting the quality and availability of fertilizer. In Line III Warehouses (Regional Distributors), logistics and transportation constraints as well as lack of coordination hamper fertilizer deliveries. In Line IV Warehouses (Local Distributors/Farmers), ineffective stock management and price increases by local distributors are problems. Solutions include increasing warehouse capacity, improving transportation infrastructure, using technology for stock monitoring, and improving coordination between stakeholders. These steps are necessary to ensure subsidized fertilizer is available on time and affordably to farmers, supporting sustainable agriculture.

The current condition of subsidized fertilizer distribution in Indonesia has advantages such as supporting farmers and food security, as well as cooperation between stakeholders. However, there are weaknesses such as distribution delays, product quality problems, unaffordable prices, and lack of warehouse stock monitoring. Improvements require better infrastructure and coordination, efficient stock monitoring, and stable prices. With this, the distribution of subsidized fertilizer can be more effective and support sustainable agricultural growth. The need to adapt the distribution of PT Pusri's subsidized fertilizer is important in facing environmental changes. This involves adjusting production capacity, improving warehouse infrastructure, optimizing distribution routes, and using information technology. With flexible production capacity, good warehouse infrastructure, efficient distribution routes and information technology, PT Pusri can support sustainable agriculture through efficient and responsive distribution of subsidized fertilizer to changes in demand and market needs.

4.4 Designing Alternative Solutions

Designing an alternative solution for the distribution of PT Pusri's subsidized fertilizer involves several key steps. This includes improving distribution infrastructure by building larger storage warehouses, applying information technology for inventory management and coordination, optimizing distribution routes, human resource training, using accurate analytical models, and improving coordination with regional distributors as well as creating standard operational standards. The aim is to improve distribution efficiency, ensure timely and affordable supplies for farmers, and support the sustainable growth of the agricultural sector.

4.5 Supporting Model Integration

The integration of supporting models in the context of PT Pusri's subsidized fertilizer distribution is a strategic step that combines various analytical methods and tools to increase operational efficiency and effectiveness. First of all, business process modeling is a central part of this integration, enabling in-depth mapping of each stage in the fertilizer distribution chain, including the identification of possible problems. The results of this modeling provide a strong foundation for understanding how the distribution process works and where improvements can be implemented.

4.6 Dwell Time Mapping in Distribution

Dwell time mapping in subsidized fertilizer distribution is an important step in understanding and overcoming problems in the distribution process (Hespanha and Morse 1999). Dwell time refers to the time required for fertilizer to remain at one stage in the distribution chain before being moved to the next stage (Kim et al. 2014). Dwell time mapping involves identifying how long fertilizer remains in a particular stage and identifying the reasons why fertilizer may be retained in that stage. One of the common problems that can be revealed through dwell time mapping is delays in fertilizer delivery. If fertilizer spends too much time in storage or other distribution stages, this can result in delays in providing fertilizer to farmers. This is a serious problem because it can affect agricultural productivity.

Dwell time mapping can also identify fertilizer quality problems. If fertilizer is stored for too long in inappropriate conditions, its quality can decrease, which in turn can affect agricultural yields. Therefore, understanding how long fertilizer remains in each distribution stage is important to maintain fertilizer quality. Dwell time mapping can reveal problems in stock management. If fertilizer spends too much time in one stage, this may indicate that fertilizer stocks are not being managed well. Stock that is too large or too small can disrupt the distribution flow. With a better understanding of dwell time, we can take steps to improve stock management.

Mapping dwell time in subsidized fertilizer distribution is an important tool in identifying problems in the distribution process and helping design more efficient solutions. By overcoming the dwell time problem, PT Pusri and related parties can ensure that subsidized fertilizer is available on time and in good condition for farmers, which supports sustainable agriculture.

4.7 Use of Benchmarking in Proposal Design

The use of benchmarking in designing proposals is an important strategy to improve PT Pusri's subsidized fertilizer distribution performance. By comparing performance with similar companies or those recognized as leaders in the fertilizer distribution industry, PT Pusri can identify valuable differences and comparisons in various operational aspects. Best practices discovered through benchmarking can provide inspiration for designing concrete improvements. This includes steps such as changes in distribution processes, investment in information technology, or increased HR training. Benchmarking results can also be used as parameters to measure progress once improvements are implemented, ensuring that distribution operations continue to improve to support farmers and Indonesian agriculture as a whole. Thus, benchmarking is an important tool in identifying, designing, and measuring the effectiveness of operational improvements in subsidized fertilizer distribution.

5. Results And Recommendations

5.1 Thematic Analysis Results

In this research report, which focuses on "Optimizing Subsidized Fertilizer Distribution: Case Overview of PT Pusri Palembang in Central Java," researchers have identified several main themes based on thematic analysis. These themes include problems in fertilizer transportation, stock and storage constraints, financial aspects, technology application, supervision, and problems that arise at the retail level. The analysis results show that the main issues include limited use of information technology, problems in transportation, and bureaucratic complexity.

Several recommendations have been put forward as solutions, including improving transportation management by involving reliable transportation services, improving stock management and storage facilities, utilizing information technology for real-time stock monitoring, stricter supervision, and making it easier for retailers to obtain subsidized fertilizer. It is hoped that implementation of these recommendations will increase the efficiency of subsidized fertilizer distribution in Central Java, which in turn will support agriculture and food security in the region. It is hoped that this report can provide guidance to PT Pusri Palembang and related government agencies to improve the subsidized fertilizer distribution process in the area.

5.2 Main Findings of Operational Problems

The following is a table of the main findings of operational problems in subsidized fertilizer distribution based on the research "Optimizing Subsidized Fertilizer Distribution: Case Study of PT Pusri Palembang Operations in Central Java":

Table 2. Main Findings of Operational Problems

No	Main Findings of Operational Problems
1	Empty Fertilizer Stock in Distributor and Retailer Warehouses
2	Delay in Subsidized Fertilizer Supply
3	Obstacles to Utilizing Technology and Information
4	High Transportation Costs
5	Lack of Supervision from Authorities
6	Non-Uniform Policies
7	Limited Fertilizer Storage Facilities
8	Unethical Actions in Distribution
9	Lack of Fertilizer Distribution Standard Guidelines
10	Fertilizer Distribution Contract Issues

5.3 Improvement Recommendations

Recommendations for improving the distribution of PT Pusri Palembang's subsidized fertilizer in Central Java involve strategic steps. First, optimizing transportation to overcome delays and shortages in fertilizer stocks. Second, development of an integrated information system for real-time stock monitoring. Third, strict supervision through audits and modern technology. Fourth, uniform operational guidelines for distributors. Fifth, replacing distribution contracts with time charters. Sixth, invest in larger storage facilities. Seventh, training and education for distributors. Lastly, close collaboration with authorities, government and farmer associations. By implementing these recommendations, it is hoped that there will be significant operational improvements in the distribution of subsidized fertilizers in Central Java.

5.3.1 Distribution Process Optimization

Recommendations for improvements in the distribution of PT Pusri Palembang's subsidized fertilizer in Central Java include the following strategic steps:

Table 3. Recommendations and KPIs

No	Improvement Recommendations	Key Performance Indicator (KPI)
1	Transportation Optimization	1. Average delivery time for subsidized fertilizer
		2. Percentage of transport mode availability
		3. Transportation costs per fertilizer
2	Development of Integrated Information Systems	1. Accurate real-time stock monitoring
		2. Percentage of providing correct information
		3. Speedy response to requests
3	Increased Oversight	1. Number of business ethics violations detected
		2. Audits and inspections frequency
		3. Violation resolution time
4	Creating Standard Guidelines	1. Uniformity of distribution procedures
		2. Distributor compliance with guidelines
5	Replace the Voyage Charter Contract with a Time Charter	1. Flexibility in transportation management
		2. Transportation management costs
6	Invest in Sufficient Storage Facilities	1. Storage warehouse capacity
		2. Quality of storage facilities
7	Training and Education for Distributors and Retailers	1. Distributor and retailer's level of understanding of business procedures and ethics
8	Close Cooperation with Authorities and Associations	1. Level of participation in coordination meetings
		2. Quick and effective problem resolution

5.3.2 Time Target Improvements

Improving the time target in optimizing the distribution of subsidized fertilizer in the Operation Case Study of PT Pusri Palembang in Central Java is an effort to reduce or eliminate delays that often occur in the entire distribution chain of subsidized fertilizer. The aim of improving time targets is to increase efficiency and ensure that subsidized fertilizer can reach farmers on time by identifying critical points in the distribution process. This time target improvement is divided into 3 parts, improving manufacturing level time target, improving distributor level time target, improving retailer time target, the details are explained as follows:

a. Improve Manufacturer's Time Target:

1. Operational business processes delivery planning stages
2. Line I warehouse distribution business process – Line II warehouse (loading)
3. Line II warehouse distribution business process – line III warehouse (via truck)

b. Improve Distributor Time Targets:

1. Distributor level fertilizer distribution business process (Purchase to Producer)

2. Distributor level fertilizer distribution business process (Distribution to Retailers)

c. Improve Retailer Time Target

1. Retailer level fertilizer distribution business process

5.3.3 Dwell Time Management

Dwell Time management plays an important role in optimizing the distribution of subsidized fertilizer at PT Pusri Palembang in Central Java. Dwell Time Management consists of a series of strategies and actions aimed at reducing the waiting time for subsidized fertilizer at various points in the distribution chain. One aspect that needs to be considered is the efficiency of the distributor's warehouse. This includes the process of receiving, storing and preparing fertilizer before distribution to retailers.

Table 4. Distribution Stages and Dwell Time

Distribution Stage	Steps for Implementing Dwell Time Management
Goods admission at the warehouse	1. Prepare efficient and quality goods admission facilities.
Distributor	2. Ensure that admissions officers are trained for a fast process.
	3. Real time bookkeeping of fertilizer stocks in the information system.
	4. Quality and quantity checking of fertilizer.
Warehouse Storage	1. Maintaining the warehouse so that it is in good condition and meets standards.
Distributor	2. Arrangement of fertilizer based on type and need.
	3. Regular stock monitoring to avoid shortages.
Transportation to Retailers	1. Use of efficient and scheduled modes of transportation.
	2. Optimal delivery route planning.
	3. Coordinate with retailers to avoid delays.
Retailer goods admission	1. Fast and accurate receipt of fertilizer admission.
	2. Verify the quantity and quality of fertilizer received.
	3. Real time bookkeeping of fertilizer stocks in the information system.
Evaluation and Improvement	1. Routine evaluation of distribution performance to identify high Dwell Time.
	2. Analyze the causes of Dwell Time and implement improvements.
	3. Training and development of distribution officers.

5.3.4 Penerapan Benchmarking

The implementation of benchmarking at PT Pusri Palembang in Central Java has become an important strategy for optimizing the distribution of subsidized fertilizer. In the first step, the company identifies the best competitors in the fertilizer distribution industry who have been successful in their distribution practices. This helps PT Pusri Palembang to understand what makes these companies superior in terms of fertilizer delivery

times, cost efficiency and service quality. Once identification is carried out, relevant benchmarking criteria are established, such as delivery time, use of information technology, and cost efficiency. Data related to distribution practices from competing or best companies is collected and analyzed carefully. The analysis results help PT Pusri Palembang to identify certain elements or practices that can be adopted or improved in their distribution operations. By implementing changes based on benchmarking results, PT Pusri Palembang can increase efficiency, reduce costs, and improve subsidized fertilizer distribution services to farmers in Central Java. Implementing benchmarking is an important step in the company's efforts to continue to innovate and maintain its competitiveness in the subsidized fertilizer distribution market.

Table 5. Performance Analysis of PT PSP Subsidized Fertilizer Distribution Improvement Design

No.	Description	Existing Model	Planned Improvement	Advantages of Planned Improvement
1	Manufacturer Level Fertilizer Distribution	Not detailed and standardized	More detailed and standardized	-As a more detailed and more efficient guide -Clearly defined deadlines
2	Distributor Level Fertilizer Distribution	Not detailed and standardized	More detailed and standardized	-As a more detailed guideline -Have clear time rules
3	Retailer Level Distribution	Not detailed and standardized	More detailed and standardized	-As a more detailed guideline -Have clear time rules

The results of improving the subsidized fertilizer distribution business process from Warehouse Line I to Warehouse Line IV show improvements in the time required for subsidized fertilizer distribution activities from PT PSP to retailers.

Table 6. Analysis of Time Changes in Design for Improvements in Subsidized Fertilizer Distribution

No.	Process	Subsidized Fertilizer Distributor (Days)	
		Before	After
1	Manufacturer Level Fertilizer Distribution	19	6
2	Distributor Level Fertilizer Distribution	33	10-22
3	Retailer Level Distribution	8	5

Specifically for fertilizer distribution, namely loading at manufacturers, activities are carried out 24 hours and 7 days a week. Then delivery activities at Line II Warehouse and Line III Warehouse are only 6 days a week, namely Monday to Saturday. Also delivery activities to Distributors are also carried out Monday to Saturday. After streamlining, activities at the Line I Warehouse can be reduced to 6 days or around one week. Distribution activities for Distributors can be reduced to 10-22 days and for Retailers it can be reduced to 5 working days.

6. Conclusion And Suggestions

6.1 Conclusion

Penelitimenyimpulkanbahwadistribusipupuksubsidi PT Pusri Palembang di Jawa Tengah menghadapisejumlahpermasalahanoperasional yang

mempengaruhiketersediaandanwaktupengirimanpupukkepadapetani. Beberapa point kesimpulan yang didapatdaripenelitianadalah:

1. The culprit behind the inefficient and ineffective distribution of subsidized fertilizer from PT Pusri Palembang's line I warehouse to line IV warehouses in the Central Java area is the lack of standardized operational policies or guidelines for the distribution of subsidized fertilizer, contract policies with partners or third parties that do not support improving the quality of subsidized fertilizer delivery. , then weak supervision of subsidized fertilizer distribution activities, especially at the distributor and retailer level and a lack of technological support for administration and monitoring systems.

2. An improvement plan is needed for the subsidized fertilizer distribution business process, to overcome the problems mentioned previously. The improvement plan carried out is specifically for the business process of fertilizer distribution operational activities from line I warehouse to line IV warehouse which goes through several business process stages, namely at the Manufacturer, Distributor and Retailer levels.

3. Improvements include improving business processes, utilizing information technology, tighter supervision, optimizing distribution contracts, and implementing dwell time management. Benchmarking of best distribution practices can also help increase efficiency. The business process improvement design proposed by this research resulted in significant improvements in the distribution process, from the previous 60 days to just 10 - 33 days. The design process for improving the subsidized fertilizer distribution process has gone through a process of discussion and interviews with various parties who are competent in the operational field of subsidized fertilizer distribution. By implementing these recommendations, researchers hope that the distribution of subsidized fertilizer can be more efficient and support sustainable agriculture in Central Java.

6.2 Suggestions

This research highlights several important suggestions for optimizing the distribution of subsidized fertilizer at PT Pusri Palembang in Central Java. First, in-depth research is important to measure the impact of implementing the proposed improvement recommendations. This will ensure the effectiveness of improvements in increasing the distribution of subsidized fertilizer. Second, it is very important to carry out regular evaluations of the implementation of improvements. Companies need to monitor the results of recommendations that have been implemented to identify necessary changes. Cross-sector collaboration must also receive attention. It is important to increase collaboration between the public, private and farmer sectors to increase distribution efficiency and fertilizer availability.

It is very important to improve the capabilities of employees involved in the distribution of subsidized fertilizer through training and education. It is also important to increase the use of technology. The development of information technology and real-time stock monitoring systems requires more investment to increase response to changes in demand. Strict supervision from the authorities is paramount to negate unethical practices of subsidized fertilizer distribution. Having standard guidelines for distributing subsidized fertilizer will reduce uncertainty and non-uniformity in distribution. Researchers hope that these suggestions can help PT Pusri Palembang and related parties achieve the goal of optimizing the distribution of subsidized fertilizer to support sustainable agriculture in Central Java.

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