



## BIONEENSIS BIOLOGICAL FERTILIZER DISTRIBUTION ANALYSIS IN THE SUMATERA ISLAND REGION

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### Abstract

*The title of this study is "Analysis of Bioneensis Biofertilizer Distribution in the Sumatra Island Region". This type of research is a qualitative analytical research with a case study design. The number of informants in this study was 27 informants. The results of the research that has been conducted indicate that the distribution process of biofertilizers in the Sumatra Island Region has been carried out in accordance with the distribution procedures that have been set by the company which is done by increasing the number of Marketing Partners in each Province that are legally registered so that their legality is clear which will be used to facilitate or bring the distribution of Bioneensis biofertilizers closer to users. The problem concerning the smooth distribution process of Bioneensis biofertilizers in the Sumatra Island Region at the distributor is the limited transportation to distribute Bioneensis biofertilizers to resellers where limited transportation or transportation results in expensive shipping costs and also shipping times that take quite a long time, and there are also obstacles regarding errors in reporting verification results and validation as well as in the payment system that uses cashless. For the obstacles faced by resellers in the process of distributing Bioneensis biofertilizer to farmers in the Sumatra Island Region, it also lies in shipping where shipping costs from distributors are expensive, competition between resellers is increasing, and also in the shipping process where there are still many areas that are still difficult to access by couriers which will cause limited fertilizer stock among resellers to be distributed to farmers. Suggestions for further researchers It is suggested to further develop the research model, add discussion topics such as obstacles in carrying out distribution and also how to overcome them so that in the future research on the distribution of Bioneensis biofertilizer can be more varied and better.*

**Keywords : Bioneensis biofertilizer, Distribution, Constraints, Process**

### 1. INTRODUCTION

Currently, the development of oil palm in Indonesia has experienced a significant increase. The area of oil palm plantations in Indonesia has grown rapidly from only 387 thousand ha in 1984 to 16 million ha in 2019. Oil palm is mostly planted on marginal lands that have several factors limiting plant growth and productivity. The increasingly limited availability of land encourages efforts to increase oil palm productivity through agricultural intensification activities. One effort that can be made is to increase the effectiveness and efficiency of fertilization. This is very important to do because the cost of fertilizing oil palm plants is a very large cost component, which is around 50-70% of maintenance costs and 25% of total production costs.(Fairhust et al., 2006).

One effort that can be made to increase fertilization efficiency is through the application of biofertilizers that contain active ingredients in the form of microbes that are beneficial for nutrient absorption by plants. Several research results state that the application of biofertilizers can increase plant growth and productivity and reduce the use of inorganic fertilizers by 25-30% (Hidayat et al., 2018). However, the acceptance of biofertilizers in the market is still very low. This is due to consumer doubts regarding the activity and adaptability of microbes when applied. One type of biofertilizer is Bioneensis biofertilizer as one of the superior products of the Palm Oil Research Center (PPKS).PPKS has succeeded in formulating the Bioneensis biofertilizer with active ingredients of superior isolates from oil palm roots (rhizosphere). This product has the advantage of increasing

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fertilization efficiency by up to 25%, improving soil health, and increasing plant productivity. Bioneensis is formulated in powder form with active ingredients in the form of nitrogen-fixing bacteria, phosphate-solubilizing bacteria, and indole acetic acid (IAA)-producing bacteria with a total of bacteria > 108 cfu/gram. The composition of this product formula has also met the minimum technical requirements for compound biofertilizers as stated in the Decree of the Minister of Agriculture No. 261/KPTS/SR.310/M/4/2019. In addition, the composition of the Bioneensis formula also has a C-organic content (17%) and pH (7.37) with a water content (22%) which can play a role in increasing soil fertility.

This product has been proven to increase the efficiency of fertilizer costs by up to 25% in oil palm plants. Currently, increasing the quality and quantity of Bioneensis production on an industrial scale is a top priority in order to meet demand and commercialize the product. The use of this product can have social, economic, and cultural impacts on the community. The resulting socio-cultural impact is a change in the community's mindset about the importance of maintaining the sustainability and health of the soil to support the sustainability of agricultural businesses. Furthermore, the use of Bioneensis is expected to increase the acceptance of palm oil products and other Indonesian agricultural products by the international community. Meanwhile, the positive impact on the economic aspect is the increase in farmers' income both directly (through the imposition of fertilizer costs) and the sustainability of farming businesses (sustainability).

Bioneensis biofertilizer is a biofertilizer whose active ingredient is beneficial bacteria isolated from oil palm roots, with high adaptability and association with plants. Bioneensis biofertilizer has advantages over other products, namely high adaptability to various soil pH conditions, longer shelf life, environmentally friendly because it utilizes oil palm and sugarcane waste, and is safe to use. The composition of bacteria found in Bioneensis biofertilizer is bacteria that produce *Azospirillum* sp, *Azotobacter* sp, *Pseudomonas* sp, *Bacillus* sp and Indole Acetic Acid (IAA). The benefits of using Bioneensis biofertilizer on plants are as an N fixer, increasing the availability of P nutrients, increasing fertilization efficiency, improving soil quality and health, and stimulating plant growth and production (PPKS, 2020). Bioneensis biofertilizer is one of the commercial fertilizers which can be obtained from wholesale distributors and also small traders or retailers. The number of distributors and retailers or resellers of Bioneensis biological fertilizer for the 2021-2023 period is 730 with 10 distributors (PPKS, 2020).

The use of Bioneensis biofertilizer has been proven to increase the efficiency of fertilization costs and income where data obtained from the application of the Dawas PPKS-South Sumatra garden demonstration plot for 2 years showed that the total benefit reached 19-46% in the first year and 35-60% in the second year came from fertilization costs (12-43%) and increased income (6-17%), the B/C ratio of the Bioneensis application ranged from 1.67-2.24 where the achievement of fertilization cost efficiency was highly dependent on the dose of inorganic fertilizer and the application of technical culture. North Sumatra Province is in fifth place as the province in Indonesia with the largest oil palm plantation area in Indonesia. In the 11-year period (2011-2022), the area of oil palm plantations in North Sumatra increased by 10.4%. The total area of oil palm plantations in North Sumatra as of 2022 reached 1.4 million hectares, with a FFB production of 24 million tons per year (GAPKI).

Currently, the use of environmentally friendly fertilizers is needed to reduce the impact of environmental damage, Bioneensis biofertilizer is one of the environmentally friendly fertilizers that has great potential in North Sumatra because the market for Bioneensis biofertilizers, apart from being used for palm oil, is currently also starting to penetrate other commodities such as sugar cane, tea, food crops and horticulture. The problem of distribution of Bioneensis biofertilizers in the Sumatra Island Region reflects the various challenges faced by the community in accessing and utilizing biofertilizers optimally. Although this biofertilizer has great potential to increase soil fertility and agricultural productivity, its distribution is still limited and uneven. Many farmers in remote areas have difficulty obtaining Bioneensis biofertilizers because the distribution network is inadequate and transportation infrastructure is poor. In addition, limited information and socialization regarding the



benefits and how to use Bioneensis biofertilizers have caused low adoption of this technology among local farmers.

## 2. LITERATURE REVIEW

### 2.1 Distribution Theory

Distribution is a group of traders and company agents who combine physical transfer and name of a product to create a certain (Angipora, 2002). Distribution channels are a group of traders and company agents who combine physical company of a product to create utility for a certain market (Swaatha, 2003). Distribution channels are a path that must be passed by the flow of goods from producers to agents or intermediaries or wholesalers to users, in this case consumers. Distribution channels are very important in company activities. Because this will affect the decisions made by the chairman of the cooperative (Fitriyani, 2022).

#### 2.1.2 Factors Affecting Distribution

According to Tjiptono (2018), the factors in selecting distribution include:

##### 1. Market Considerations

Distribution channels are greatly influenced by consumer purchasing patterns, so this market condition is a determining factor in channel selection. Some market factors that must be considered are consumers or industrial markets, the number of potential buyers, geographic market concentration, the number of orders, and purchasing habits.

##### 2. Product Considerations

There are several factors that must be considered in terms of goods, including: unit value, size and weight of goods, perishability of goods, technical properties, standard and custom goods, and the breadth of the product line.

##### 3. Company Considerations

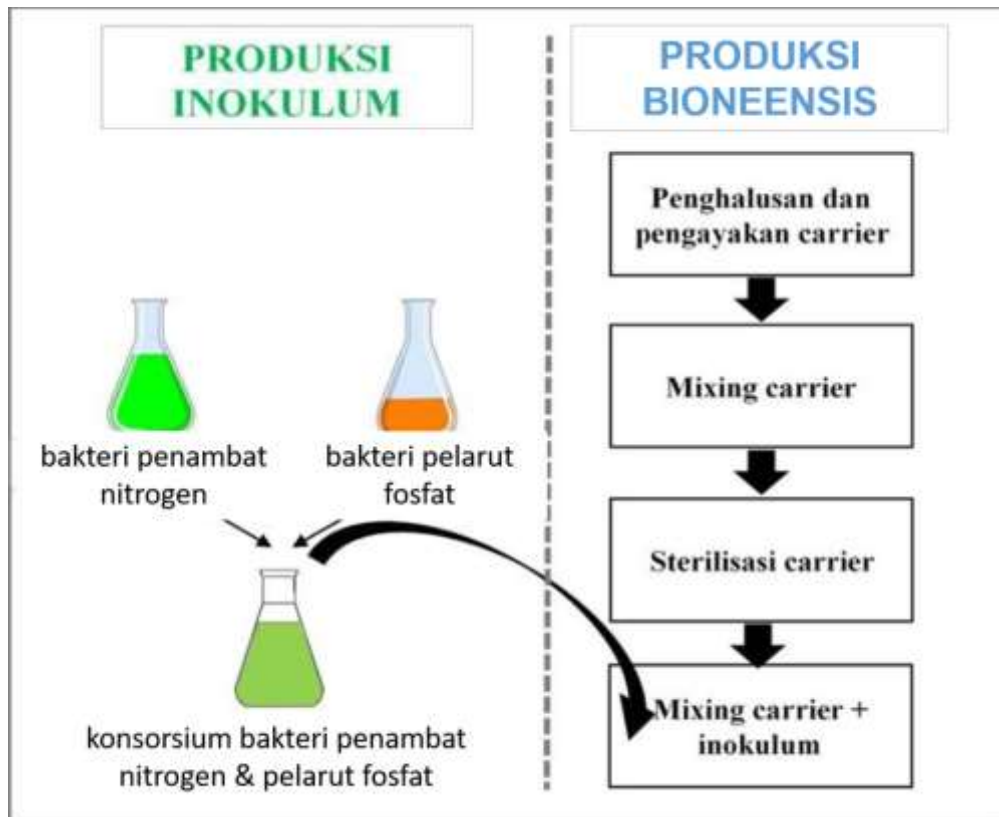
From a company perspective, several factors that need to be considered include: sources of funding, management experience and capabilities, channel supervision, and services provided by the seller.

##### 4. Intermediary Considerations

In terms of intermediaries, several factors that need to be considered include: services provided by intermediaries, the usefulness of intermediaries, the attitude of intermediaries towards producer policies, sales volume, and costs.

### 2.2 Bioneensis Biofertilizer

Bioneensis is the result of research innovation from PPKS researchers whose goal is to increase oil palm productivity sustainably. Bioneensis is a biofertilizer formulation from a consortium of indigenous bacteria in oil palm roots (rhizosphere). Bioneensis contains N-binding microorganisms, P solvents and IAA producers which function as plant growth promoting bacteria. The composition of Bioneensis biofertilizer consists of Azospirillum sp, Azotobacter sp, Bacillus sp, Pseudomonas sp and indole acetic acid producing bacteria (PPKS, 2020).

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Bioneensis quality test was conducted at the Agricultural Microbiology Laboratory, Department of Agricultural Microbiology, Faculty of Agriculture, Gadjah Mada University. The test parameters followed the minimum technical requirements (PTM) of the Ministry of Agriculture Decree No. 261/KPTS/SR.310/M/4/2019. The results of the quality test showed that Bioneensis contained four bacterial strains that positively acted as nitrogen fixers, phosphate solvents, and phytohormone producers with the number of live bacterial cells >10<sup>7</sup>. In addition, the results of the quality test also showed that all quality test parameters met the minimum technical requirements of the Ministry of Agriculture.

### 2.3 Supply Chain Management

Supply chain management is a series of activities that include coordination, scheduling, and control of the procurement of production, inventory, and delivery of products or services to customers, including daily administration, logistics operations, and information management from customers to suppliers (Heizer et al., 2017).

#### 2.3.1 Supply Chain Management Stages

Supply chain management is divided into 3 types of stages, namely:

1. Goods will be shipped from upstream to downstream
2. Goods will be sent from downstream to upstream
3. Information can be distributed from upstream to downstream or from downstream to upstream.

In the world of logistics, a series of functional activities that have the aim of changing raw materials into finished goods (Ballou, 2004).



### 3. IMPLEMENTATION METHOD

#### 3.1 Types and Research Designs

This type of research is qualitative analytical research with a case study design. Analytical according to The Last Supper (2019) namely a method that functions to describe or provide an overview of an object being studied through data or samples that have been collected as they are without conducting analysis to make conclusions that apply to the general public. According to The Moleong (2018) Qualitative is research that aims to understand the phenomena of what is experienced by the research subject holistically and by means of description in the form of words and language, in a specific natural context by utilizing various natural methods. Qualitative research according to Hendryadi et al., (2019) is a naturalistic inquiry process that seeks a deep understanding of social phenomena in nature. A case study is a comprehensive description and explanation of various aspects of an individual, a group, an organization, or a program, or a social situation. Case studies are used to provide an understanding of something that attracts attention, a concrete event, a social process (Unika, 2018).

#### 3.2 Location and Time of Research

This research was conducted in the Sumatra Island Region, which includes several districts and cities. Research respondents are spread across various regions that reflect the geographical and agronomic diversity of the province. This research has been conducted since the author conducted a preliminary survey in March 2024.

#### 3.3. Subjects and Objects of Research

##### 3.3.1. Research Subjects

In qualitative research, it basically uses research subjects because qualitative research starts from the case of the existence of individuals or groups in certain social situations and the results only apply to social situations. In research that uses a qualitative approach, it is not known as a population and sample as in quantitative research because the research starts from the case of the existence of individuals or groups in certain social situations and the results only apply to that social situation.

In a study, the research subject has a very strategic role because in the research subject, that is the data about the variables that the researcher observes. In qualitative research, the research subject is called an informant, namely a person who is used to provide information about the situation and conditions of the research background and is a person who really knows the problems that will be studied. (Moleong, 2019).

The informants in this study are as follows.

**Table 3. Research Informants**

No	Informant	Method	Amount
1	Management of PPKS Medan	Interview	2 persons
2	Fertilizer Distributor Biological Biology	Interview	5 People
3	Fertilizer Reseller Biological Biology	Interview	10 People
4	Farmer	Interview	10 People
<b>Total</b>			<b>27 People</b>

##### 3.3.2. Research Object

The object of this study is the analysis of the distribution of Bioneensis biological fertilizer in the Sumatra Island Region.

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**3.4. Types of Data and Methods of Research Data Collection**

**3.4.1. Data Types**

The types of data in this study consist of 2 types of data, namely primary data and secondary data, where the main data used in this study is primary data.

**1. Primary Data**

According to The Last Supper (2020), primary data is data obtained directly by researchers or is also known as original data or new data. According to The Last Supper (2019), primary data is data obtained directly by researchers or is also known as original data or new data. Data is collected by the researcher directly from the first source or the place where the research object is conducted. The researcher uses the results of interviews and observations obtained from informants regarding the research topic as primary data.

**2. Secondary Data**

According to The Last Supper (2019) secondary data is a data source that does not directly provide data to the data collector, for example through other people or through documents. According to The Last Supper (2020), secondary data is data obtained from notes, books and others, secondary data is usually called supporting data obtained from 2nd parties. In this study, the sources of secondary data are books, journals, articles related to what is directly related to the research topic with other reference sources.

**3.4.2. Data Collection Methods**

In this study, researchers collected data using observation, interview and documentation techniques.

**1. Observation Technique**

One of the techniques that can be used to find out or investigate non-verbal behavior is by using observation techniques. According to The Last Supper (2018) observation is a systematic observation and recording of the symptoms being studied. Observation techniques are systematic observations and recording of the phenomena being investigated. Through observation activities, researchers can learn about the behavior and meaning of that behavior. Observation in this study is by conducting direct observations in the field to determine the distribution conditions of Bioneensis biofertilizer in the Sumatra Island Region.

**2. Interview Techniques**

According to The Curse (2020) Interviews in qualitative research can also be called in-depth interviews or intensive interviews and are mostly unstructured. According to The Last Supper (2019) Interview is a data collection technique when researchers want to conduct preliminary studies to find problems that must be studied, and also when researchers want to know things in more depth and the number of respondents is small. Interviews in qualitative research are conducted with the aim of obtaining in-depth qualitative data in this interview technique, researchers conduct questions and answers to informants who are the subjects in this study.

**3. Documentation Techniques**

According to The Last Supper (2019) Documentation is a method used to obtain data and information in the form of books, archives, documents, written figures and images in the form of reports and information that can support research. This documentation records all interview results and information provided by informants.

Documentation studies are a complement to the use of observation or interview methods and will be more reliable or have high credibility if supported by existing photographs or academic papers.

**3.5. Research Instruments**

The main instruments in this study are the researchers themselves and interview guidelines in the form of interview questions around the research topics that have been provided by the researchers



previously. The supporting informants in this study are recording devices, documentation devices, writing instruments and other supporting tools.

### 3.6. Research Procedures

#### 3.6.1. Qualitative Research Procedures

This research procedure was carried out in 3 stages, namely:

##### 1. Preparation Stage

At the preparation stage, the researcher prepared interview guidelines as the main instrument in this research.

##### 2. Qualitative Research Implementation Stage

At the implementation stage what is carried out is:

- a. Determining research informants.
- b. Researchers request permission to apply to become informants
- c. Basic data collection using interview guidelines
- d. Researchers conduct data grouping, data processing and data analysis from the data that has been collected.
- e. Taking documentation as evidence of research implementation

##### 3. Evaluation Stage of Implementation Results

At the evaluation stage, qualitative research data is processed.

### 3.7. Data Accuracy in Qualitative Research

The accuracy of data in qualitative research is obtained from various sources, using various data collection techniques (triangulation), and is carried out continuously until the data is saturated. With continuous observation, it results in very high data variation. (Hardani et al, 2020).

Based on the data obtained, the study will conduct data validity testing using the source and theory triangulation method. The source triangulation method is to obtain data from different sources with the same semi-structured interview technique. For theory triangulation, it will be carried out after source triangulation is complete. Source triangulation testing is carried out by comparing data obtained from various sources to determine whether the data obtained is extensive, inconsistent or contradictory. The next stage is to test theory triangulation, namely by comparing data from various sources with the theories used as the basis for this study. (Bandur, 2019). The purpose of testing theory triangulation is to avoid bias in drawing conclusions from research results.

### 3.8. Data Analysis Techniques

According to The Last Supper (2019) Data analysis is the process of searching and compiling data obtained from interviews, field notes and documentation systematically, by organizing data into categories, describing them into units, synthesizing, compiling them into patterns, choosing what is important and will be studied, and making conclusions so that they are easily understood by oneself and others. In this phase, researchers analyze data collected from informants and have been transcribed and recapitulated. Examination of the validity of the data is basically used not only to refute accusations against qualitative research that say it is unscientific, but also as an inseparable element of the body of knowledge of qualitative research. (Moleong, 2018). Data validity is carried out to prove whether the research conducted is truly scientific research as well as to test the data obtained. Data validity tests in qualitative research include tests, credibility, transferability, dependability, and confirmability. (Sugiyono, 2019).

In order for data in qualitative research to be accountable as scientific research, data validity testing needs to be carried out. The data validity tests that can be carried out.

#### 1. Credibility

Credibility test or trust test of research data presented by researchers so that the research results carried out are not doubted as a scientific work carried out.

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a. Extension of Observation

Extension of observation can increase the credibility/trustworthiness of the data. Extension of observation means that the researcher returns to the field, makes observations, interviews again with the data sources encountered or newer data sources. Extension of observation means that the relationship between the researcher and the source will be increasingly established, more intimate, more open, mutual trust will arise, so that the information obtained is more abundant and complete.

Extension of observation to test the credibility of research data is focused on testing the data that has been obtained. The data obtained after being checked back in the field is correct or not, there are changes or it remains the same. After being checked back in the field, the data that has been obtained can be accounted for/correct, meaning credible, then the extension of observation needs to be ended.(Sugiyono, 2019).

b. Increasing Accuracy in Research

By continuously increasing accuracy or diligence, the certainty of data and chronological sequence of events can be recorded properly and systematically.

Increasing accuracy is one way to control the work whether the data that has been collected, created, and presented is correct or not. To increase the researcher's diligence, it can be done by reading various references, books, previous research results, and related documents by comparing the research results that have been obtained. In this way, researchers will be more careful in making reports which in the end the reports made will be of better quality.(Sugiyono, 2019).

c. Triangulation

Triangulation in credibility testing is defined as checking data from various sources at various times. Thus there is triangulation of sources, triangulation of data collection techniques, and time.(Sugiyono, 2019).

1) Source Triangulation

To test the credibility of the data is done by checking the data that has been obtained through several sources. The data obtained is analyzed by the researcher so that it produces a conclusion then an agreement (member check) is requested with three data sources.

2) Triangulation Technique

To test the credibility of the data is done by checking the data to the same source with different techniques. For example, to check the data can be done through interviews, observations, documentation. If the data credibility testing technique produces different data, then the researcher conducts further discussions with the relevant data source to ensure which data is considered correct.

3) Time Triangulation

Data collected by interview techniques in the morning when the source is still fresh, will provide more valid data so that it is more credible. Furthermore, it can be done by checking with interviews, observations or other techniques at different times or situations. If the test results produce different data, then it is done repeatedly until the certainty of the data is found.

d. Using Reference Materials

What is meant by reference is support to prove the data that has been found by the researcher. In the research report, the data presented should be equipped with authentic photos or documents, so that it becomes more reliable.

e. Conducting Membercheck

The purpose of member checking is to find out how far the data obtained is in accordance with what is given by the data provider. So the purpose of member checking is so that the information obtained and will be used in writing the report is in accordance with what is meant by the data source or informant.

2. Transferability

*Transferability* is external validity in qualitative research. External validity shows the degree of accuracy or applicability of research results to informants.(Sugiyono, 2019).





### 3. Dependability

Reliability or trustworthy research, in other words, several experiments conducted always get the same results. Research that is dependable or reliable is research if research conducted by other people with the same research process will get the same results.

Dependability testing is done by auditing the entire research process. By means of an independent auditor or independent supervisor auditing all activities carried out by the researcher in conducting the research. For example, it can start when the researcher begins to determine the problem, goes into the field, selects data sources, carries out data analysis, tests the validity of the data, to the preparation of the observation report. (Sugiyono, 2019).

### 4. Confirmability

The objectivity of qualitative testing is also called the research confirmability test. Research can be said to be objective if the research results have been agreed upon by more people. Qualitative research confirmability test means testing the research results that are associated with the process that has been carried out. If the research results are a function of the research process conducted, then the research has met the confirmability standard. Validity or validity of data is data that does not differ between the data obtained by the researcher and the data that actually occurs in the research object so that the validity of the data that has been presented can be accounted for. (Sugiyono, 2019).

## 4. RESULTS AND DISCUSSION

### 4.1 Distribution Process of Bioneensis Biofertilizer in the Sumatra Island Region

In an effort to facilitate the flow of goods and services from producers to consumers, an important factor that should not be ignored is choosing the right distribution channel to use. The company's decision in choosing a distribution channel will determine how the products it makes can be reached by consumers. Companies develop strategies to ensure that products distributed to customers are in the right place. For this reason, it is necessary to understand the right distribution channel in a business. Distribution channels are channels used by producers to distribute products to consumers or various company activities that strive for products to reach consumers (Fuad, 2006). Fertilizer distribution is carried out by referring to Permendagri No.17/MDAG/PER/6/2011 concerning procurement and distribution of fertilizer for the agricultural sector. In this Permendagri, the government, producers, distributors and retailers are parties involved in the procurement and distribution of fertilizer and also play an important role in the implementation of fertilizer procurement and distribution. Fertilizer procurement and distribution must meet the principles of 6 (six) rights, namely the right type, right amount, right price, right place, right time and right quality.

Basically, to get Bioneensis organic fertilizer, farmers can buy it from resellers or distributors who are partners in ordering Bioneensis organic fertilizer, because the PPKS has created procedures related to the implementation of the distribution of Bioneensis organic fertilizer in the Sumatra Island Region, in the distribution process and the planning process to improve the quality of service from the distribution of Bioneensis organic fertilizer, there are parties who play an important role in it to maximize existing goals. So far, many are willing to become distributors and resellers of Bioneensis organic fertilizer because the quality of Bioneensis organic fertilizer is good and the profits obtained are quite large. Where the results of the study conducted by interviewing the informants in this study showed that the process or stages of the distribution of biofertilizer biofertilizer in the Sumatra Island Region have been carried out with the system and procedures that have been created by PPKS where biofertilizer biofertilizer can be obtained by farmers from distributors and also official resellers who sell biofertilizer biofertilizer in the Sumatra Island Region.

In the distribution process there are things that must be considered to maximize the distribution process such as market considerations where distribution channels are greatly influenced by consumer purchasing patterns, so this market condition is a determining factor in channel selection. Some market factors that must be considered are consumers or industrial markets, the

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number of potential buyers, geographic market concentration, the number of orders, and purchasing habits, then product considerations, namely unit value, size and weight of goods, perishability of goods, technical properties, standard goods and orders, and the breadth of the product line, company considerations in terms of the company, several factors that need to be considered include: sources of spending, experience and management capabilities, channel supervision, and services provided by the seller, and also intermediary considerations there are several factors that need to be considered including: services provided by intermediaries, the usefulness of intermediaries, intermediary attitudes towards producer policies, sales volume, and costs. From these considerations, PPKS in distributing Bioneensis biological fertilizers has gone through the stages of consideration which are proven by the existence of parties who play an important role in it to maximize the objectives of the distribution process of Bioneensis biological fertilizers in the Sumatra Island Region.

**4.2 Problems Concerning the Smooth Distribution of Bioneensis Biofertilizer in the Sumatra Island Region**

Distribution is an activity that is considered very important in a company. The distribution is used to distribute the results of its products to consumers. However, the distribution process often experiences obstacles due to transportation problems. The route in product delivery greatly influences minimizing transportation costs, companies can determine the shortest route taken by each truck to distribute products to agents. Distance is the main factor in determining the truck route, the smaller the total distance traveled during the distribution process, the smaller the costs and time used (Ramadhani et al., 2018). Distance and capacity are the main obstacles for companies to save costs incurred in distributing their products, which sometimes cause losses for the company (Rosta, 2012). This is also experienced in the distribution of Bioneensis biofertilizer to distributors and resellers, where the main obstacle faced is limited transportation to distribute Bioneensis organic fertilizer to resellers, which with limited transportation or freight results in expensive shipping costs and also shipping times that take quite a long time.

The transportation and distribution model is one of the most important things in carrying out activities and influencing the success of the distribution system, good distribution will result in more effective distribution of products to consumers. The increasing demand for product needs in an area is a transportation and distribution problem for company development (Yuli, 2019). Efforts to reduce costs and improve services to consumers in product distribution can be developed into distribution with a transshipment model (Muhammad et al., 2013). The transshipment model is a transportation problem where some or all of the goods transported from the source are not sent directly to the destination but through transit (Basriati et al., 2018). Determining the number of products to be sent from a source to the final destination via a transit location with the provision that the needs at the final destination are usually met at minimal cost is the main objective of the transshipment problem (Basriati et al., 2018).

The transshipment method is an extension of the transportation model where in the transshipment model all distributors have the potential to become transit points for goods or transshipment points, in the transportation method, product delivery is carried out directly from factories with excess products to warehouses that need products with the aim of supplying products in the original factory in such a way that all needs are met at the destination (Aisyah et al., 2018). In this way, it can be applied in the distribution process of Bioneensis biofertilizer in the Sumatra Island Region which is expected to overcome common problems in the distribution process of biofertilizers Bioneensis in the Sumatra Island Region.

**5.1. Conclusion**

The following is the conclusion of this study entitled analysis of the distribution of Bioneensis biological fertilizer in the Sumatra Island Region:

1. The distribution pattern of Bioneensis biofertilizer in the Sumatra Island Region follows the principle of 6 right: right type, right amount, right price, right place, right time, and right quality. Distribution is carried out through resellers and distributors who have partnered with PPKS.



- Bioneensis biofertilizer can be accessed by farmers through distribution channels that have been well regulated by PPKS, ensuring product availability in various regions in North Sumatra.
2. The distribution channel of Bioneensis biofertilizer involves various parties such as the government, producers, distributors, and retailers. Distribution of products from PPKS to distributors and resellers is carried out by complying with established procedures. This marketing channel is effective because many parties are willing to become distributors and resellers, which shows that the distribution channel has succeeded in distributing products to end consumers well.
  3. Factors that influence distribution and market acceptance include market factors (consumer purchasing patterns, geographic market concentration), product factors (unit value, weight, technical properties), company factors (financing sources, management experience), and intermediary factors (intermediary services, sales volume, costs). PPKS has considered all of these factors in distributing Bioneensis biofertilizer, as evidenced by the existence of parties who play an important role in maximizing distribution goals.
  4. The right strategy for the distribution of Bioneensis biofertilizer in the Sumatra Island Region includes the use of a transshipment model to overcome transportation constraints and reduce distribution costs. With this model, products can be sent through transit points that can save time and shipping costs. The implementation of the transshipment model is expected to overcome existing transportation and distribution problems, as well as increase the effectiveness and efficiency of the distribution of Bioneensis biofertilizer to all regions in the Sumatra Island Region.

## 5.2. Suggestions

Based on the conclusions above, the researcher puts forward several suggestions, namely as follows:

### 1. For PPKS

For PPKS, with this research, it is suggested that in the future they can provide more education to farmers about the benefits and advantages of biological fertilizers. Bioneensis for agriculture so that in the future more farmers will use Bioneensis biological fertilizer, and PPKS is also advised to be able to supervise the distribution of Bioneensis biological fertilizer so that the distribution flow can continue to run according to existing provisions.

### 2. For Distributors

Suggestions for distributors to maximize distribution to resellers in the future so that resellers can maximize the availability of Bioneensis biofertilizer to farmers in villages.

### 3. For Resellers

For resellers of Bioneensis biological fertilizer, it is recommended that they sell Bioneensis biological fertilizer at an adjusted price so that farmers can buy Bioneensis biological fertilizer at the set price.

### 4. For Farmers

For farmers, it is recommended to always use Bioneensis biological fertilizer for agricultural purposes and it is also recommended that farmers can buy Bioneensis biological fertilizer from official distributors or resellers who sell Bioneensis biological fertilizer.

### 5. For Further Researchers

As for suggestions for further researchers who want to conduct the same research with this research title or research topic, it is suggested that they further develop the research model, add discussion topics such as obstacles in carrying out distribution and also methods. Overcome this so that in the future research on the distribution of Bioneensis biofertilizer can be more varied and better.

**ANALYSIS OF BIONEENSIS BIOLOGICAL FERTILIZER DISTRIBUTION IN SUMATERA ISLAND REGION***Fahri Putra Hafira<sup>1</sup>, Abdul Rauf<sup>2</sup>, Isfenti Sadalia<sup>3</sup>***REFERENCES**

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