

## **EVALUATION OF MARKETING RISK AT THE PRODUCER LEVEL OF HYDROPONIC PRODUCTS IN BOGOR CITY**

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### **ABSTRACT**

Hydroponics is increasingly recognized and practiced by the community for various reasons such as the increasing need for vegetables, limited land and space, realizing food self-sufficient areas, efficiency in land use, and little weed growth. Bogor City is a city located in the central part of Bogor Regency which is very close to the national capital, making Bogor City has a very strategic potential for business development and growth, especially the hydroponic vegetable business. Along with the development of hydroponic methods, the marketing of hydroponic products is becoming increasingly complex and prone to risk. The purpose of this study is to analyze the level of risk of hydroponic product marketing at the producer level in Bogor City and to formulate strategies and actions for handling hydroponic product marketing risks in Bogor City. This research was conducted in Bogor City, West Java. The selection of this location was purposive. The data used in this research are primary and secondary data. The method of determining respondents in this study using the census method on all hydroponic vegetable producers in Bogor City. The analytical tool used is Enterprise Risk Management (ERM). The results showed that the marketing functions carried out by producers were exchange functions (sales), physical functions (transportation) and facility functions (standardization or sorting, financing, risk coverage and market information). The risks faced by producers identified 9 types of risks, namely the risk of errors in recording orders, the risk of excess inventory, the risk of running out of inventory stock, the risk of late delivery to customers, the risk of damaged products during delivery, the risk of disconnection of product weights, the risk of complaints from consumers, the risk of price fluctuations, and the risk of losing products in one marketing cycle.

**Keywords:** Producer, Hydroponics, Marketing, Risk, Enterprise Risk Management

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### **I. BACKGROUND**

Indonesia is an agricultural country with abundant natural resources of all kinds. The use and development of agricultural land in Indonesia is mostly only found in rural areas, while in urban areas land for agriculture is rarely found. One of the reasons is the increase in population which is not proportional to the availability of land in urban areas. This encourages innovation in technological development for agricultural efficiency on limited land. One solution is to change conventional farming to modern, namely hydroponic farming (Dewi et al., 2020).

Hydroponics is increasingly known and practiced by the public for various reasons such as increasing demand for vegetables, limited land and space, creating food independent areas, efficiency in land use, and little weed growth (Madusari et al., 2020). Vegetables produced using hydroponic technology have the advantage that the quality of the vegetables is fresher and cleaner compared to conventional vegetables. These advantages are an attraction for consumers to change their consumption patterns from conventional to hydroponic vegetables (Lubis, 2020).

Bogor City is a city located in the central part of Bogor Regency which is very close to the national capital with an area of approximately 11,850 square kilometers and Bogor City is a buffer area for the capital. This makes the city of Bogor have very strategic potential for business

development and growth, especially the hydroponic vegetable business. The existence of a hydroponic vegetable business in the city of Bogor is very suitable considering that vegetable commodities have perishable product characteristics so it takes a relatively fast time to reach the final consumer. Apart from that, the hydroponic vegetable production system is very suitable to be developed in the city of Bogor, considering the increasing trend of land conversion, which is converting agricultural land to non-agricultural land, especially in urban areas including the city of Bogor. The presence of cultivation technology using hydroponics can help provide vegetables sustainably for consumption, especially in urban areas or buffer areas close to cities.

Along with the development of hydroponic methods, marketing hydroponic products becomes increasingly complex and susceptible to risk. In the marketing process, various risks are encountered which can influence marketing not to run smoothly (Ulfah M, 2016), because agribusiness cannot be separated from risk factors and uncertainty caused by the characteristics of agricultural products which are seasonal, easily damaged, the harvest has different shapes and sizes. varies.

Risks in marketing result from one company in the marketing channel, or connections between organizations in the marketing channel which will cause overall financial losses or even result in the cessation of business activities (Karningsih 2007). Therefore, a comprehensive risk evaluation is needed to identify, measure and manage the risks that exist for each actor in marketing hydroponic products, as well as the need to control marketing risks in order to avoid sustainability consequences that can occur at any point in the marketing channel (Karningsih , 2007).

The purpose of this research is to analyze the level of marketing risk of hydroponic products at the producer level in Bogor City and formulate strategies and actions for handling the marketing risk of hydroponic products in Bogor City.

## II. RESEARCH METHODOLOGY

### 2.1. Time and Place of Research

This research was conducted in Bogor City, West Java. The selection of this location was determined purposively because Bogor City is part of West Java Province which has many business actors and hydroponic vegetable producers who sell their products in various places in Bogor City. This research was conducted in August - September 2023.

### 2.2. Data Sources and Types

The data used in this research are primary and secondary data. Primary data was obtained through direct observation of the implementation of hydroponic product marketing and interviews with informants related to hydroponic product marketing. Then primary data is used next to obtain information regarding the risks and sources of risk in marketing hydroponic products at the producer level in Bogor City. Secondary data was obtained from literature studies and literature sources that support the theory as the basis for this research.

### 2.3. Method of Determining Respondents

The method for determining respondents in this research used the census method for all hydroponic vegetable producers in Bogor City. The research was conducted by selecting the entire population of hydroponic vegetable producing business units in Bogor City as respondents. so 20 respondents were selected including: ABN Farm, KTD Barokah, Smart Greenhouse Polbangtan Bogor, Kujang Hydroponics, Rasaki Hydrofarm, Hanponic Farm, Berkah Farm, RH Farm, Pagi Farm (PT Pagi Berkah Berjamaah), BSI Farm, Healthy Nutrition Hydroponic Green Garden, QhiaFarm Bogor, Sahabat Farm Hydroponics, Hydromamma Bogor, BKM Urban Hydroponics, Kampung Baru Hydroponics, Noor Agri Hydroponics, Pasirkuda 1001 Hydroponics, Bogor Hydroponics and QM Hydroponics, producers of hydroponic vegetables in Bogor City.

### 2.4. Data analysis method

The analytical methods used in this research are descriptive analysis and quantitative analysis methods. The descriptive analysis method is used to analyze risk measurements at the hydroponic product producer level in Bogor City. And quantitative analysis methods are used to

analyze strategies and actions for handling marketing risks of hydroponic products in Bogor City and also to analyze the level of risk in marketing hydroponic products at the producer level in Bogor City. The analytical tool used is Enterprise Risk Management (ERM).

### III. RESULT AND DISCUSSION

#### 3.1. Marketing Function at the Producer Level

Hydroponic vegetable producers in Bogor City perform the exchange function only in sales activities because farmers are producers. In general, the sale of hydroponic vegetables is done freely by farmers to other marketing institutions because this transaction is based on mutual trust that has been established for a long time between marketing institutions. All hydroponic vegetable sales functions are routinely carried out by producers because they have contracts or supply quotas that must be adhered to. However, some producers have not yet received education on planting patterns with the aim that the harvest can match the demands of intermediary traders, wholesalers and retailers.

The physical function carried out by producers is only carrying out transportation activities without carrying out processing or storage activities. Producers carry out transportation activities by bringing each harvest to the next marketing agency using a distributor's car or being picked up by the relevant marketing agency. Producers do not carry out processing because hydroponic vegetable crops are sold in whole or bulk form without changing their physical form. Apart from that, producers also do not carry out storage activities because every time they harvest, the harvest is immediately sold to the next marketing institution in each marketing channel.

The facility functions carried out by farmers include sorting activities, risk taking, financing and market information. Producers carry out sorting activities because it has become a company procedure, apart from that because of requests from collectors and wholesalers who want hydroponic vegetables that have the best quality in terms of good shape, have the same size and are in accordance with market desires.

Another facility function carried out by producers is risk bearing activities. All hydroponic vegetable producers will of course bear the risk of sales or marketing activities for hydroponic vegetables. The risks that must be borne by producers when marketing hydroponic vegetables are products damaged during shipping, product weight loss, product loss and so on. The function of facilities in financing activities carried out by producers is financing marketing activities and financing borne by the producers themselves in marketing hydroponic vegetables. The source of costs used by producers is personal funds which will be used for company operational funds.

Another facility function is market information activities. The market information function is needed by producers to know the demand, supply, price and quality of hydroponic vegetables desired by the market. Exchange of market information is carried out between collecting traders and wholesalers and with producers. Information exchange is carried out when traders meet each other or use cellphones. Apart from that, several producers take part in training and counseling from the agricultural service regarding information regarding the price of hydroponic vegetables according to quality and quantity. The goal is that producers do not sell hydroponic vegetables below market prices, which will actually be detrimental to producers.

#### 3.2. Risk Analysis of Marketing Hydroponic Vegetables

The first stage in this research is identifying the risks of marketing hydroponic vegetables at the producer level in Bogor City through three components, namely internal environment, objective setting, event identification.

##### A. ERM 1: Internal Environment (Identification of Hydroponic Vegetable Producers in Bogor City)

In this modern era, hydroponic planting media is very helpful for households with limited land to grow vegetables such as kale, spinach, mustard greens, pak choy, caisim, kale, tomatoes and chilies. The success of plants in hydroponics ensures more guaranteed growth and production,

encouraging the development of this cultivation system, especially in the city of Bogor, both as a livelihood, training and hobby.

The development of hydroponic farming in Bogor City can be seen from the many hydroponic communities, such as KOHIBORA, Bogor City Hydroponics, Bogor Hydroponics, Hydroponic Hobbyists, Hydroponic Observers, and others. These communities, including Bogor City Hydroponics and Bogor Hydroponics, are centers for the community in developing hydroponic cultivation with the best vegetable yields.

Hydroponic businesses in Bogor City continue to grow both inside and outside the city because of the high profit potential, attracting consumers from the middle to upper scale. The Bogor City Hydroponic Community has 65 members, some of whom are resellers of hydroponic production, indicating good development in hydroponic marketing and production in Bogor City.

### **B. ERM 2: Objective Setting**

Hydroponic vegetable producers develop their marketing by building good facilities and maintaining the quality of vegetables to attract consumers to buy hydroponic vegetables that have been produced by producers, as well as developing efficiency and effectiveness in operations and marketing to reduce losses.

Hydroponic vegetable producers will carry out improvements and evaluations on each management system, and in carrying out their operations, marketing actors will follow the rules that have been made by each marketing actor.

In reporting activities, producers have provided reports using systems and reports that can be viewed transparently. However, currently hydroponic vegetable producers have not repaired and upgraded the system that is used as a report storage place which causes discrepancies between the data entered and the actual data. Hydroponic vegetable producers in carrying out their activities follow applicable government regulations.

### **C. ERM 3: Event Identification (Risk Identification)**

Risk identification in this research focuses on hydroponic vegetable marketing activities with writing limitations, namely marketing risks that have occurred in the form of the risk of errors in recording orders, the risk of excess inventory, the risk of running out of stock, the risk of delays in delivery to customers, the risk of products being damaged during delivery, risk of product weight reduction, risk of complaints from consumers, risk of price fluctuations, and risk of product loss in one marketing cycle.

In several marketing activities carried out by producers, 9 types of risk were identified, namely the risk of errors in recording orders, the risk of excess inventory, the risk of running out of stock, the risk of delays in delivery to customers, the risk of products being damaged during delivery, the risk of reducing product weight, the risk the occurrence of complaints from consumers, the risk of price fluctuations, and the risk of losing products in one marketing cycle.

### **Marketing Risks at the Hydroponic Vegetable Producer Level in Bogor City**

Marketing risks accepted by producers in Bogor City during hydroponic vegetable marketing activities consist of the risk of recording errors that occur during the order recording process caused by human error, namely employees who are not careful in carrying out the order process, resulting in errors in recording. The risk of excess inventory is caused when producers miscalculate or inaccurately estimate market demand, resulting in hydroponic vegetable production that exceeds market needs. The risk of running out of vegetable supplies occurs when producers miscalculate or inaccurately estimate market demand which causes out of stock, producers cannot predict market demand correctly, producers may produce less so producers order sufficient supplies from partners to meet demand. The risk of delivery delays occurring due to bad weather conditions, natural disasters, or other environmental factors that can disrupt the delivery process, resulting in transportation being disrupted or production facilities being affected.

The risk of physical damage occurs during delivery transportation to collecting traders because hydroponic vegetables are stacked in cars, which causes many vegetables to be damaged. Long distribution distances also result in hydroponic vegetables sitting in the car for too long in

a pile. The risk of weight loss occurs when hydroponic vegetables are shipped from the producer's location to the collecting trader's location, because this process is usually carried out during the day so that the hydroponic vegetables are exposed to direct sunlight. Respiration occurs more quickly at high temperatures. Weight loss can also occur during shipping transportation because hydroponic vegetables are stacked in cars and covered for long periods of time.

The risk of complaints from consumers and returns of goods is caused by unsuitable vegetables or products that have been sent by producers being returned by consumers because of unsuitable vegetables. The risk of price fluctuations in hydroponic vegetables can be caused by fluctuating market demand, which affects the price of hydroponic vegetables. Unbalanced supply and demand can also cause significant price fluctuations. Price fluctuations that occur according to producers do not experience significant losses because the price of hydroponic vegetables tends to be stable. The risk of loss, although it happens sometimes or even rarely, is not a big risk because the producer never leaves the greenhouse without employees.

#### **D. Risk Assessment (Risk Measurement and Mapping)**

In assessing previously identified risks, measurement standards are determined which become indicators of risk size. Indicators regarding the possibility of risk occurring can be seen in Table 1.

Table 1 Indicators of Risk Occurrence, 2023

| <b>Category</b>   | <b>Information</b>           | <b>Probability</b> | <b>Score</b> |
|-------------------|------------------------------|--------------------|--------------|
| <i>Improbable</i> | Almost impossible to happen  | < 5 times per year | 1            |
| <i>Remote</i>     | Sometimes it happens         | 5 – 10 per year    | 2            |
| <i>Occasional</i> | Might happen                 | 11 – 20 per year   | 3            |
| <i>Probable</i>   | Very possible                | 21 – 50 per year   | 4            |
| <i>Frequent</i>   | Almost certainly will happen | > 50 per year      | 5            |

Source: Processed from Goodfrey (2023)

Table 1 shows that the possibility of risk occurring can be divided into 5 scales. The probability value is determined based on interviews with business actors so that it can be used as an indicator for measuring the possibility of risk occurring. Furthermore, indicators regarding the impact of risk can be seen in Table 2.

Table 2 Impact of Risk Occurrence, 2023

| <b>Category</b>   | <b>Information</b>   | <b>Score</b> |
|-------------------|--|--------------|
| <i>Negligible</i> | The impact can be handled at the routine activity stage. (The loss is less material and does not affect the business actor)                        | 1            |
| <i>Marginal</i>   | Threatens the efficiency and effectiveness of several aspects of the company. (Losses are less material and have little impact on business actors) | 2            |
| <i>Seriously</i>  | Disrupting company administration. (Financial and production losses are quite large)   | 3            |

|                     |  |   |
|---------------------|--|---|
| <i>Critical</i>     | Threatens the effective functioning of programs and organizations. (Large losses for business actors in terms of finance and production).            | 4 |
| <i>Catastrophic</i> | Threatening programs and organizations as well as business actors (Very large losses for business actors from a financial and political perspective) | 5 |

Source: Processed from Goodfrey (2023)

Risk measurement and mapping is calculated by converting risk probabilities and risk impacts into scores based on indicators of the chance of risk occurring. The respective probability scores and impact scores for each risk are multiplied to get a total score. The risk scores that have been obtained, each score is grouped based on risk level. The results of risk score calculations and risk impacts at the producer level can be seen in Table 3.

Table 3 Risk Scores and Impact at Producer Level, 2023

| Code | Risk Description   | Probability Score | Impact Score | Total Score |
|------|--|-------------------|--------------|-------------|
| R1   | Errors in recording orders                               | 1.3               | 1.7          | 2,2         |
| R2   | Excess inventory   | 1.6               | 2.7          | 4.3         |
| R3   | Out of stock   | 1.6               | 1.8          | 2.9         |
| R4   | Delay in delivery to customers                           | 1.9               | 2            | 3.8         |
| R5   | Products damaged during delivery                         | 2                 | 2.9          | 5.8         |
| R6   | Product weight loss                                      | 2,3               | 2            | 4.6         |
| R7   | There are complaints and returns of goods from customers | 1.7               | 1.5          | 2.6         |
| R8   | Price fluctuations                                       | 1,2               | 2            | 2,4         |
| R9   | Product loss   | 1.5               | 1.8          | 2.7         |

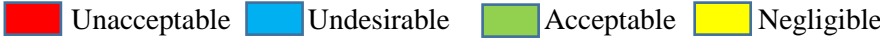
Source: Primary Data, 2023

The next stage after getting the total score is risk mapping. The scores that have been obtained are classified into 4 levels of risk, namely negligible, acceptable, uderisable and unacceptable (Godfrey, 1996). The results of risk mapping at the producer level can be seen in Figure 1.

|  |  |          |               |      |
|--|--|----------|---------------|------|
|  |  |          |               |      |
|  |  |          |               |      |
|  |  |          |               |      |
|  |  | (R2, R5) | (R3, R4, R6,) | (R7) |
|  |  |          | (R1, R8, R9)  |      |

Figure 1 Risk Mapping at Producer Level, 2023

Information:


 Unacceptable   Undesirable   Acceptable   Negligible

Based on the risk map in Figure 1, it shows that most of the marketing risks at the producer level are in the green column and yellow column with a risk score of 2 and an impact score of 2) and (risk score 1 and impact score 2). The green column consists of the risk of running out of inventory stock (R3), the risk of late delivery to customers (R4) and the risk of product weight shrinkage (R6). Meanwhile, the yellow column consists of the risk of recording errors in orders (R1), the risk of complaints and returning goods from consumers (R7), the risk of price fluctuations (R8) and the risk of product loss (R9).

*a. Negligible*

Risks that are negligible at the producer level are the risk of recording errors in orders (R1), the risk of price fluctuations (R8) and the risk of product loss (R9). The way that needs to be done to respond to this risk is by accepting and carrying out routine monitoring and paying attention to it because this risk does not result in financial losses for hydroponic vegetable producers.

*b. Acceptable*

Risks that fall into the acceptable level accepted by producers are the risk of running out of inventory stock (R3), the risk of late delivery to customers (R4) and the risk of product weight shrinkage (R6). If this risk occurs, the marketing activity process can still run even if it is somewhat hampered by the schedule and targets that have been set.

*c. Undesirable*

Undesirable risks that can be accepted by producers are the risk of excess inventory (R2) and the risk of products being damaged during delivery (R5). This can affect the financial stability and activities of producers if the risks posed to producers are high and not immediately addressed properly.

**E. ERM 5: Risk Response (Risk Mitigation Actions)**

Based on the identification results, appropriate mitigation for the risk of recording errors in orders is by reducing the risk. Risk can be reduced through actions that have been taken by marketing institutions, namely verifying and confirming orders before sending them to customers, in order to minimize the occurrence of recording errors made by employees.

The risk response to complaints from consumers is by accepting them, when there is a complaint it will be used as evaluation material for the company so that the incident does not happen again. The risk response when price fluctuations occur is by accepting these price changes. The risk response to product loss is by reducing the risk. The risk can be reduced by monitoring and guarding the greenhouse. This mitigation has been carried out by hydroponic vegetable producers to prevent loss of vegetables from their greenhouse.

Based on the identification results, the appropriate form of action to reduce weight loss of hydroponic vegetables is by reducing risks. Weight loss of hydroponic vegetables during shipping can be reduced by covering the vegetable container with a tarpaulin when exposed to direct sunlight, in order to protect the vegetables from direct sunlight and suppress the respiration process in vegetables.

Producers can reduce stock outs of vegetable supplies by establishing partnerships or contracts with partners as a backup if internal production is disrupted. This mitigation has been carried out by the producer so that when the producer receives an order and the company's stock is running out, the producer immediately contacts the partner to get the stock needed and the partner should always provide information regarding the availability of hydroponic vegetable stock to the producer. The risk of delays in delivery can be reduced by producers by allowing producers to make deliveries in the morning or evening. This mitigation can be done to avoid heavy traffic during delivery, thereby reducing delivery delays.

Based on the identification results, the appropriate form of mitigation or control action against physical damage during delivery is to reduce the risk by using layered packaging when shipping vegetables to protect vegetables from impact or pressure during transportation and producers can put vegetables in containers according to capacity. and not too much, so that damage to vegetables due to too much pressure on the vegetables in the container can be reduced.

The risk of excess vegetable inventory can be reduced by producers being more observant in predicting trends in demand for vegetables in the market and ensuring that customers order vegetables in advance by adjusting the number of orders to the demand trend in the market, so that producers can harvest vegetables according to demand, so that the risk of excess vegetables can be reduced.

#### **F. ERM 6: Control Activities**

A form of control that can be carried out by every hydroponic vegetable producer is participation in training and counseling activities on horticultural plant cultivation or hydroponic cultivation and post-harvest handling, especially on horticultural products and hydroponic products. Apart from that, each producer can also record business results starting from costs, losses and profits in detail, so that each producer can know the extent of the development of his business, so that producers can also analyze any risks that affect the development of his business and alternative actions. what needs to be done to control these risks so that they do not hinder the development of the business being run.

#### **G. ERM 7: Information and Communication**

Effective communication and information is an important component in carrying out mitigation or control activities for risks that have occurred or are predicted to occur. Risk mitigation actions must also be supported by effective and efficient communication and information flow, so that risks occurring now and in the future can be managed effectively or responded to, controlled and minimized or efforts to eliminate risk events. Effective communication between producers can produce relevant information such as information on price, quality, quantity of supply and other information, especially information regarding marketing risks to support the implementation of appropriate mitigation measures for each risk for hydroponic vegetable producers.

Based on the results of interviews, it indicated that the establishment of information and communication was only limited to purchasing and selling, such as the availability of hydroponic vegetables, prices and demand. There is no information and communication regarding risk mitigation measures for marketing hydroponic vegetables. Effective and efficient information and communication must be established in the internal environment of each producer as well as in the external environment.

#### **H. ERM 8: Monitoring**

Monitoring activities must be carried out because there is a fairly high risk which can result in large losses for every hydroponic vegetable producer. Monitoring can be done through ongoing management and regular observation by each producer. Monitoring activities can also be carried out by parties who are considered experts in the field of post-harvest handling and marketing of horticultural and hydroponic products to each producer, especially in the activity of distributing harvest results properly and correctly to avoid various risks that may occur.

### **IV. CONCLUSIONS AND NEWNESS**

The types of risks found in hydroponic vegetable producers are risks that occur during marketing activities. There are 9 types of marketing risks identified, namely the risk of errors in recording orders, the risk of excess inventory, the risk of running out of stock, the risk of delays in delivery to customers, the risk of products being damaged during delivery, the risk of reducing product weight, the risk of complaints from consumers, the risk price fluctuations, and the risk of product loss.



The strategy that needs to be developed for effective risk mitigation for each producer is to prioritize dealing with the highest risks first, then lower risks. Risk reduction strategies are the most widely used alternative if the risk cannot be avoided or transferred.

The suggestion from this research is that every producer must carry out appropriate risk mitigation in order to reduce the impact resulting from the risks they accept. Seeing that the risk that always occurs is excess inventory, the author's suggestion for risk mitigation that producers can do is to be more observant in predicting trends in demand for vegetables in the market and ensuring vegetable orders are given to each customer in advance by adjusting the number of orders to the demand trend. in the market. Mitigation - mitigation that has been carried out by producers must be carried out continuously, because based on interviews the mitigation that has been carried out is not always carried out.

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