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Analysis of Farmers' Characteristics and Satisfaction with the Use of PT XYZ's Organic Fertilizer in Losari Subdistrict, Brebes Regency

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ABSTRACT

The adoption of organic fertilizer among Indonesian farmers remains relatively limited despite its potential to support sustainable agriculture and improve long-term soil productivity. This study aimed to identify the characteristics of farmers using PT XYZ's organic fertilizer and assess their satisfaction with the product and supporting services in Losari Subdistrict, Brebes Regency. The study employed a quantitative descriptive approach involving 38 rice farmers selected through purposive sampling from a population of 50 users. Primary data were collected through structured questionnaire interviews and analyzed using descriptive analysis, Importance Performance Analysis (IPA), and the Customer Satisfaction Index (CSI). The results showed that organic fertilizer users represented only 0.69% of the 5,504 rice farmers in Losari Subdistrict, indicating substantial potential for market expansion. Respondents were predominantly male farmers aged 40–60 years, with extensive farming experience and small- to medium-sized farms. The IPA results identified product guarantees, reusable and varied packaging sizes, conformity of results with product claims, and product accessibility as priority areas for improvement. The CSI score reached 67.88%, placing farmers in the satisfied category, although most attributes showed negative performance–expectation gaps. The study concludes that farmer satisfaction is generally positive but not optimal, requiring improvements in distribution, packaging, quality assurance, demonstration plots, and technical assistance.

INTRODUCTION

Singh (2012) stated that a combination of organic and inorganic fertilizers can increase crop productivity in the long term, so organic fertilizers should be an integral part of sustainable farming systems. This is in line with the growing interest in organic fertilizers in various countries. However, the adoption of organic fertilizer in Indonesia remains low. According to the Central Statistics Agency (BPS), 2019), only around 13.5% of farmers in Indonesia have used organic fertilizer, while the majority still rely on inorganic fertilizer.

The organic fertilizer industry in Indonesia has shown quite rapid growth. Nasution (2022) reported that in 2022, 143 organic fertilizer factories were officially registered. This growth has been accompanied by increasing competition among producers, requiring businesses to produce products with consistent quality and competitive prices. Competitive prices, as well as technical assistance services tailored to farmers' needs. In addition to commercial products, some farmers also produce organic fertilizer independently to meet their farming needs. This condition also influences the demand dynamics and competitive structure

in the organic fertilizer market. Meanwhile, more than 1,000 organic fertilizer brands were registered in 2022 (Directorate General of PSP 2022). The large number of registered organic fertilizer products demonstrates industry development and reflects increasingly fierce competition among business actors.

The Indonesian government has implemented various policies to support the use and development of organic fertilizers, including through extension programs, farmer training, product quality regulations, and subsidized fertilizer policies. In terms of product quality and distribution, the Regulation of the Minister of Agriculture Number 01 of 2019 concerning the registration of organic fertilizers become the legal basis for guaranteeing the quality, effectiveness, safety and certainty of product formulas circulating in the market. (Tempo.co 2019).

PT XYZ is a company that produces and markets organic fertilizers. Their products have been applied to various agricultural commodities, including food crops like rice and corn, horticultural crops and fruits, and plantations like oil palm and sugar cane (Lim et al., 2023; Millati et al., 2019; Ogwu et al., 2024; Shah et al., 2025; Syuaib, 2016). Furthermore, PT XYZ's organic fertilizers are also used in non-agricultural areas, such as golf courses and home gardens.

As part of its marketing expansion, PT XYZ has designated Losari District as a market development area. The company has established a partnership with Second-tier retailers (R2) serve as product distribution channels to farmers. Interviews with R2 revealed an estimated 50 farmers using PT XYZ's organic fertilizer.

Various activities are carried out to support promotion and education, one of which is through Demonstration Plots (demplots), which serve as a means of field proof, technology application, and promotion of organic fertilizer use. The demo plots carried out by PT XYZ are on rice plants. showed a 49.3 % increase in harvested dry grain (GKP) production compared to the average yield without organic fertilizer, based on preliminary survey results. This illustrates the product's effectiveness in increasing crop productivity in the region (Cao et al., 2021; Cui et al., 2018; Fixen et al., 2015; Timsina, 2018; Wu & Ma, 2015).

Losari District, Brebes Regency is an agrarian region, with the majority of the population relying on the agricultural sector for their livelihood. The main cultivated commodities include rice, corn, soybeans, and onions. The irrigation system in this region generally relies on rainwater, although some locations have been equipped with technical and conventional irrigation. Based on the 2023 Central Statistics Agency (BPS) Agricultural Census, there were 5,504 farmers with rice as a commodity. This condition shows a large market potential for organic fertilizer products, while also emphasizing the importance of understanding farmer characteristics and effective marketing strategies to increase organic fertilizer adoption in the region.

METHOD

Data collection

The research subjects were farmers who use organic fertilizer from PT XYZ for their rice crops in Losari District. Farmers were selected as respondents because they have direct experience in purchasing, applying, and evaluating the performance of PT XYZ's organic fertilizer.

The study population consisted of all 50 farmers using PT XYZ's organic fertilizer, identified through sales data from the company's kiosks or distributors in Losari District. The population was determined based on interviews with distributor R2 to estimate the number of farmers purchasing and using PT XYZ's organic fertilizer products. Respondents were determined based on the following criteria:

1. farmers domiciled or carrying out farming activities in Losari District;
2. have purchased and used PT XYZ organic fertilizer on rice commodities;
3. directly involved in decision making on fertilizer use;
4. able to provide information regarding product usage experience; and
5. willing to be a research respondent.

The number of research samples (n) was calculated using the *Slovin formula* with *a margin of error* of 10% (Umar, 2013), as follows:

$$n = \frac{N}{1 + Ne^2}$$

Where, n = number of samples, N = population size, and e = sampling error limit, so the minimum sample size based on the *Slovin formula* is 34 respondents.

The sampling technique was carried out *purposively. Sampling*, which selects respondents based on their suitability to the research criteria. This technique was used because not all farmers in Losari District use PT XYZ's organic fertilizer.

The data used in this study consisted of primary and secondary data. Primary data were obtained through structured questionnaire interviews with farmer respondents, company data, and distribution kiosk data. The questionnaire instrument was developed based on the consumer characteristics approach according to Sumarwan (2011) and the consumer satisfaction approach according to Kotler and Keller (2016). Secondary data were obtained from previous research and other sources relevant to the research topic.

Descriptive Analysis

Farmer characteristics are analyzed based on five aspects, namely demographics, geography, psychographics, preferences and behavior, as well as socio-cultural, referring to the consumer characteristics approach proposed by Sumarwan (2011). The results of the descriptive analysis provide an overview of the profile of farmers who use organic fertilizer at PT XYZ, so that it can be used as a basis for understanding consumer behavior in the use of organic fertilizer and supporting the interpretation of the results of the satisfaction analysis and the preparation of managerial implications. The percentage of each category is calculated using the formula:

$$P_i = \frac{f_i}{n} \times 100\%$$

Where, Pi = percentage of category I, fi = number of respondents in category I, and n = total number of respondents.

***Importance Performance Analysis* (IPA)**

Importance Performance Analysis (IPA) is used to compare the level of importance or expectations of farmers with the level of product and service performance perceived by farmers through the SERVQUAL (*service quality) concept. quality*) proposed by Parasuraman et *al.*, namely tangible evidence, reliability, responsiveness, assurance, and empathy, referring to the

consumer satisfaction approach proposed by Kotler and Keller (2016). Measurements were made using a 4-point *Likert scale, with* scores given sequentially from 1 to 4 as in Table 1.

Table 1. Likert Scale for Science Analysis

***Likert* Scale**	**Description**
1	Strongly Disagree (STS)
2	Disagree (TS)
3	Agree (S)
4	Strongly Agree (SS)

The next step is to organize the IPA matrix into four quadrants, as shown in Figure 1, based on the average performance and expected values for each attribute. After all attributes have been mapped onto the Cartesian diagram, each attribute is then interpreted according to its quadrant position. This interpretation is used to determine which attributes need to be prioritized for improvement, maintained, deprioritized, or reevaluated due to being deemed excessive.

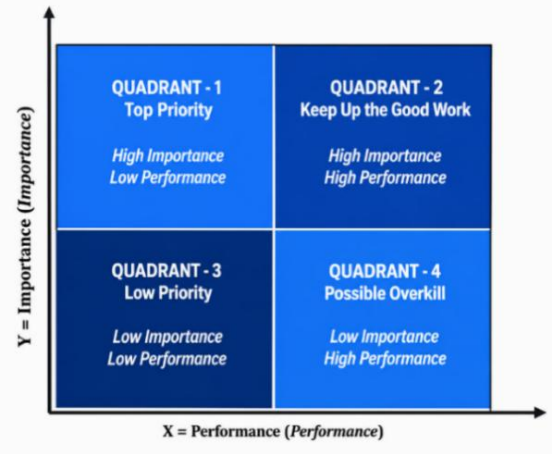

Figure 1. Division of quadrants of science analysis (Liow *et al.* 2013)

Customer Satisfaction Index (CSI)

Meanwhile, *the Customer Satisfaction Index* (CSI) is used to measure the overall level of farmer satisfaction by comparing the level of importance or expectations of farmers regarding the perceived performance of PT XYZ organic fertilizer. This analysis aims to determine the level of farmer satisfaction as users of PT XYZ organic fertilizer. According to A ritonang (2005), the CSI calculation is carried out through several stages, namely:

1. Stage 1, determine *the Mean Importance Score* (MIS) for each variable. MIS is the average value of the level of importance or customer expectations on a variable with the formula:

$$MIS = \frac{\sum_{i=1}^{n} Y_i}{n}$$

2. Stage 2, calculate the *Weight Factors* (WF) per variable. WF is percentage The MIS value of each attribute against the total MIS value of all attributes obtained using the formula:

$$WF_i = \frac{MIS_i}{\sum_{i=1}^{k} MIS_i} \times 100\%$$

3. Step 3: Determine *the Mean Satisfaction Score* (MSS) for each attribute. MSS is the average value of the attribute's performance/satisfaction level using the following formula:

$$MSS = \frac{\sum_{i=1}^{n} X_i}{n}$$

4. Step 4: Calculate the *Weight Score* (WS) for each variable. WS is the product of WF and MSS, obtained using the following formula:

$$WS_i = WF_i \times MSS_i$$

5. Stage 5, calculating *the Customer Satisfaction Index* (CSI). CSI is obtained by dividing the WS value by the scale Highest *Scale* (HS) used in research with the formula:

$$CSI = \frac{\sum WS}{HS}$$

Next, the value the obtained CSI was interpreted to determine the level of farmer satisfaction with PT XYZ's organic fertilizer. The CSI values were interpreted based on a range of satisfaction categories using a 5-point *Likert scale*, ranging from very dissatisfied to very satisfied, as shown in Table 2. In this study, CSI results are expressed as a percentage to show the overall level of farmer satisfaction.

Table 2. *Likert Scale* for CSI analysis

***Likert* Scale (%)**	**Description**
0 – 34.99	Very Dissatisfied
35% – 50.99	Not satisfied
51% – 65.99	Quite Satisfied
66% – 80.99	Satisfied
> 81	Very satisfied

RESULTS AND DISCUSSION

Based on the results of field data collection, the number of respondents successfully interviewed was 38 farmers out of 50 organic fertilizer users according to the results of interviews with kiosk R2. The distribution of farmers and addresses according to their Resident Identity Cards (KTP) can be seen in Table 3.

Table 3. Number of farmers using PT XYZ organic fertilizer who were successfully interviewed

Village/Sub-district	**Number of Farmers (people)**	**Percentage (%)**
Bojongsari	17	44.74
Dukuhsalam	6	15.79

Village/Sub-district	Number of Farmers (people)	Percentage (%)
Karangjunti	1	2.63
Kedungneng	12	31.58
Rungkang	2	5.26
Total	**38**	**100**

Results of field data collection (from January to December 2025).

Based on the respondent criteria, PT XYZ organic fertilizer has been used by 38 farmers for rice cultivation or around 0.69 %. Of the total 5,504 rice farmers in Losari District, as shown in Table 4, this percentage indicates that the company's market penetration rate is still relatively low, so market development opportunities are still very large.

Table 4. Number of rice farmers in Losari District in 2023

Village /Sub-district	Number of Rice Farmers (people)
Bojongsari	331
Dukuhsalam	240
Karangjunti	363
Kedungneng	535
Rungkang	626
Total Losari District	**5,504**

Source: BPS (2023).

In total, Losari District covers 22 villages.

The table only displays the villages where the respondents are located.

The land locations of farmers using PT XYZ organic fertilizer are spread across five villages in Losari District, namely Bojongsari, Dukuhsalam, Karangjunti, Kedungneng, and Rungkang. The predominance of respondents from Bojongsari and Kedungneng villages indicates that the use of PT XYZ's organic fertilizer is more prevalent in areas with high rice cultivation activity. This distribution of respondents indicates that PT XYZ's market is still concentrated in certain villages and has not yet reached the full potential market.

Characteristics of Farmers Using PT XYZ Organic Fertilizer in Losari District

The respondent profile was compiled to provide an overview of the characteristics of farmers using PT XYZ organic fertilizer in Losari District. Characteristics based on geographic, demographic, preferences and behavior, psychographic, and socio-cultural aspects of respondents using PT XYZ organic fertilizer can be seen in Table 5. In general, respondents were dominated by male farmers of productive age, have extensive farming experience, basic education, and manage land on a small to medium scale.

Table 5. Profile of farmer respondents using PT XYZ organic fertilizer

Aspect	Dominant Profile	Percentage (%)
Demographics		
Gender	Man	84.21
Age	40–60 years	73.68

Aspect	Dominant Profile	Percentage (%)
Education	Elementary School	55.26
Farming experience	10–30 years	50.00
Side job	daily laborer	44.74
Gross income from rice cultivation	Rp. 75–100 million/ha/year	57.89
Geography		
Land conditions	Fertile	76.32
Irrigation system	Conventional irrigation	57.89
Land area	0.7–1.4 ha	55.26
Preferences and Behavior		
Duration of use of organic fertilizer	More than 1 year	57.89
Purpose of use	Increase productivity	57.89
Place of purchase	Kiosk (R2)	100.00
Psychographics		
Acceptance of innovation	Not actively trying out new agricultural innovations or technologies	86.84
Repurchase	Make repeat purchases consistently	63. 1 6
Ease of obtaining products	Stating that organic fertilizer is not yet easy to obtain	55. 26
Reduction of chemical fertilizers	Not sure if organic fertilizer can reduce the use of chemical fertilizers	73. 68
Socio-cultural		
Influence of field officers	The use of organic fertilizer is influenced by field officers' company	100. 00
Influence of friends or community	Influenced by colleagues or fellow farmer communities	89. 47

Farmers using PT XYZ's organic fertilizer tend to be cautious about adopting innovations, as 86.84% of respondents are not actively trying new agricultural technologies. Decisions about product use are more rational and pragmatic, based on tangible benefits, yields, and direct experience, rather than brand popularity, company scale, government subsidies, or the desire for social recognition.

Although 63.16% of respondents have begun to show a tendency to make repeat purchases, product access remains a barrier, with 55.26% stating that organic fertilizer is not readily available. All respondents purchase products through kiosks or R2 retailers, while farmer groups and cooperatives have not been utilized as purchasing channels. Farmers' confidence in the benefits of organic fertilizer also needs to be strengthened. Most respondents remain sceptical that organic fertilizer can increase yields, improve soil fertility, support modern agriculture, and maintain environmental sustainability. In fact, 73.68% of respondents do not believe that organic fertilizer can reduce the use of chemical fertilizers.

The decision to use organic fertilizer is heavily influenced by interpersonal communication. All respondents were influenced by company field officers, while 89.47% were influenced by friends or fellow farmers. Conversely, the influence of model farmers, farmer group leaders, and Field Extension Officers (PPL) remained relatively low.

Analysis of Farmer Satisfaction Using PT XYZ Organic Fertilizer in Losari District

The performance assessment of PT XYZ's organic fertilizer shows that attributes related to the core quality of the product obtained relatively higher scores compared to other attributes as shown in Figure 2. This condition indicates that the company's performance weaknesses do not primarily lie in the core quality of organic fertilizer, but rather lie more in the supporting aspects of products and services, such as packaging, quality assurance, ease of use, and the company's social programs.

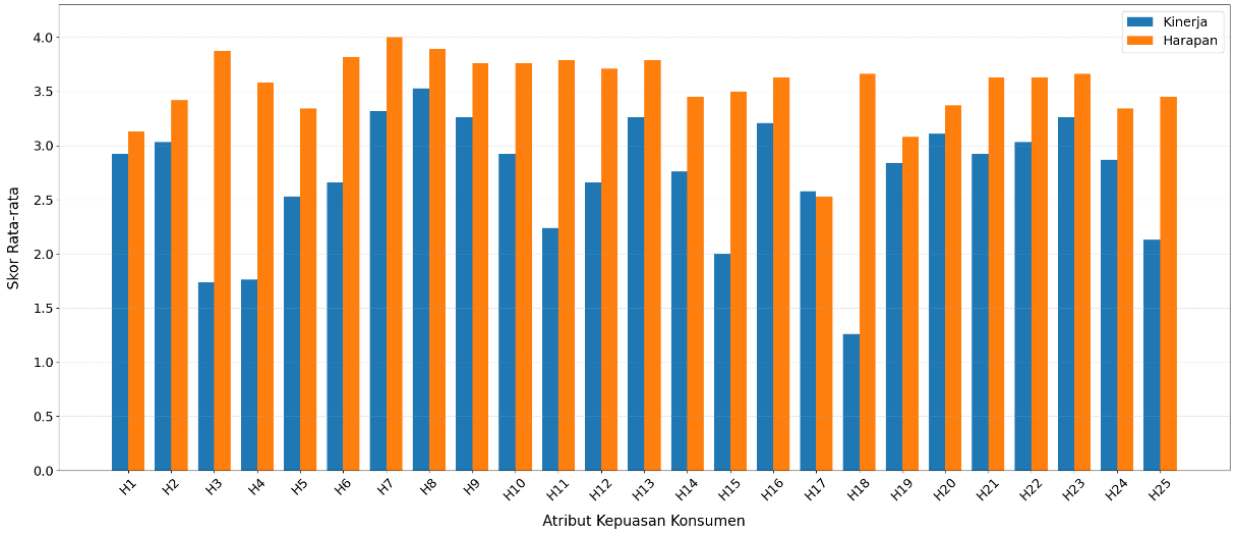

Figure 2. Comparison of average performance scores and farmers' expectations regarding PT XYZ organic fertilizer

Meanwhile, almost all attributes have a negative gap, as shown in Figure 3. This indicates that PT XYZ's organic fertilizer performance is generally still below farmers' expectations. This condition indicates that farmer satisfaction has not been fully achieved, both in terms of product quality and the company's support services. The more negative *the gap value*, the greater the gap between perceived performance and farmers' expectations, so this attribute needs to be a priority for improvement.

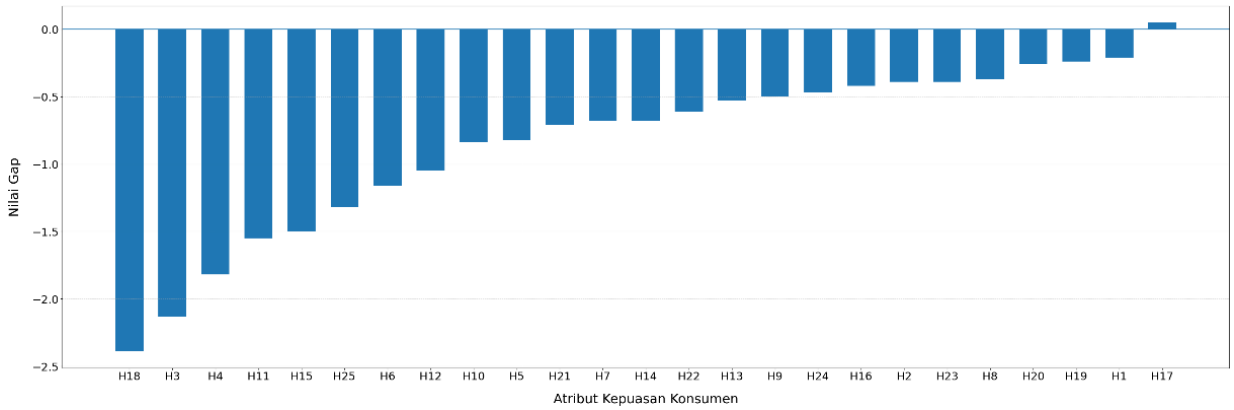

Figure 3. Difference (*gap*) between performance and farmers' expectations regarding PT XYZ organic fertilizer

Importance Performance Analysis (IPA)

The attributes of PT XYZ organic fertilizer are spread across the four quadrants with different compositions as shown in Figure 4. These results indicate that farmer satisfaction with PT XYZ organic fertilizer is not only determined by the physical quality of the product, but is also influenced by product accessibility, quality assurance, evidence of use results, and the company's service and communication support to farmers.

Quadrant I (top priority): H3 = product packaging that is easy to reuse; H4 = variety of packaging sizes; H6 = brochures, posters, and banners are easily available; H11 = results are in accordance with manufacturer claims; H12 = ease of obtaining the product at various sales points; and H18 = product guarantee if the quality is not appropriate.

Quadrant II (maintain performance): H7 = quality according to label; H8 = quality is stable and tested in the long term; H9 = quality according to applicable standards; H10 = price according to the quality obtained; H13 = availability of adequate stock; H16 = can be mixed with other fertilizers or pesticides; H21 = field officers are close to farmers and provide assistance; H22 = training and education facilities through demonstration plots; and H23 = provision of free samples for trials.

Quadrant III (low priority): H5 = product displays are placed in easily visible places; H15 = ease of application in the field; H17 = product does not have a strong odor; and H25 = social assistance or training for farming families.

Quadrant IV (relatively excessive performance): H1 = attractive and informative product packaging; H2 = sturdy and durable product packaging; H14 = fast response from field officers; H19 = certificate of analysis and quality assurance certificate; H20 = field officers are available and skilled; and H24 = regular farmer meetings are held.

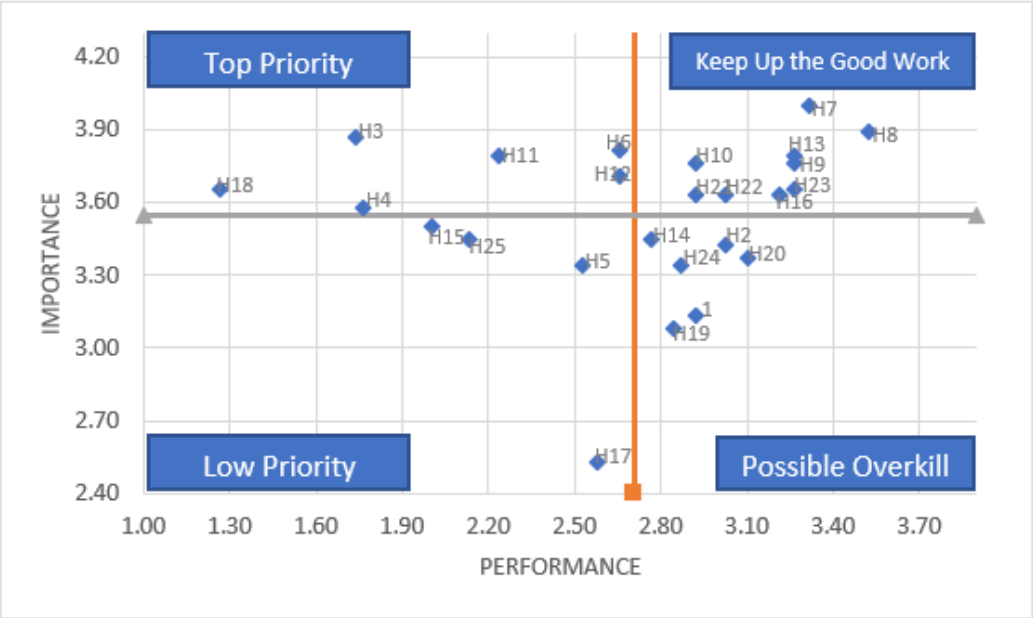

Figure 4. Results of science analysis

The results of the IPA analysis indicate that, according to farmers' perceptions, the company has been able to maintain sufficient product stock availability, resulting in a relatively low risk of stockouts. However, this stock availability has not been fully matched by easy access for farmers to obtain products at nearby and easily accessible sales locations. In other words, the main issue lies not in the *supply* or capacity of the product, but rather in the effectiveness of the distribution system down to the farmer level as the end user.

The company's educational approach has been appreciated by farmers and is considered an important part of supporting the use of organic fertilizers. Demonstration plot activities and the provision of free samples can be seen as a company strength that needs to be maintained and developed sustainably. The frequency of farmer meetings is not a top priority for farmers. Field officers who are closer to farmers personally allow for more intensive communication, understanding of farming conditions, and the provision of solutions tailored to farmers' needs, thereby increasing trust and satisfaction with the company. Farmers do not place a high priority on visual appearance or packaging sturdiness, but rather require packaging that has added value and is suited to farming needs. The company needs to consider diversifying packaging sizes.

Customer Satisfaction Index (CSI)

CSI Analysis used to measure the overall level of farmer satisfaction with the attributes of PT XYZ organic fertilizer as in Table 6. Calculation results provide an overview of the level of farmer satisfaction with the products and services received.

Table 6. CSI analysis results

Attribute	MIS (Hope)	WF (%)	MPS (Performance)	WS
H1	3.13	3.53	2.92	10.30
H2	3.42	3.85	3.03	11.66
H3	3.87	4.36	1.74	7.57

Attribute	MIS (Hope)	WF (%)	MPS (Performance)	WS
H4	3.58	4.03	1.76	7.11
H5	3.34	3.76	2.53	9.51
H6	3.82	4.30	2.66	11.42
H7	4.00	4.51	3.32	14.94
H8	3.89	4.39	3.53	15.47
H9	3.76	4.24	3.26	13.83
H10	3.76	4.24	2.92	12.38
H11	3.79	4.27	2.24	9.55
H12	3.71	4.18	2.66	11.11
H13	3.79	4.27	3.26	13.93
H14	3.45	3.88	2.76	10.73
H15	3.50	3.94	2.00	7.88
H16	3.63	4.09	3.21	13.13
H17	2.53	2.85	2.58	7.34
H18	3.66	4.12	1.26	5.20
H19	3.08	3.47	2.84	9.86
H20	3.37	3.79	3.11	11.78
H21	3.63	4.09	2.92	11.95
H22	3.63	4.09	3.03	12.38
H23	3.66	4.12	3.26	13.44
H24	3.34	3.76	2.87	10.80
H25	3.45	3.88	2.13	8.28
Total	**88.79**	**100.00**	**67.79**	**272.00**
			CSI (%)	**67.88 (Satisfied)**

MIS = *Mean Importance Score* (Hope); MPS = *Mean Performance Score* (Performance); WF = *Weight Factor*; WS = *Weight Score*; WT = *Total Weight*; and CSI = *Customer Satisfaction Index*.

The CSI analysis results show that farmers' satisfaction with PT XYZ's organic fertilizers reached 67.88% and is categorized as satisfied based on the criteria in Table 3. This value indicates that, in aggregate, farmers have a fairly positive assessment of the company's products and supporting services. However, this result does not necessarily mean that all farmers' expectations have been met. The *gap analysis* shows that almost all attributes have a negative difference, indicating that the perceived performance value is still below farmers' expectations.

This difference occurs because the CSI reflects the overall level of satisfaction based on the weighting of all attributes, while the *gap analysis* shows the gaps in each attribute individually. Several attributes with relatively high-performance levels, such as product quality stability, conformity to label quality, compliance with standards, stock availability, and product

compatibility with other fertilizers, helped keep the CSI score in the satisfactory category. However, attributes with large negative *gaps indicate aspects of the product and service that have not met farmers' expectations.*

These results can be explained through the Expectancy Disconfirmation *Theory* paradigm. Oliver (1980) explains that consumer satisfaction is formed through a comparison process between expectations before using a product and perceived performance after use. Expectations serve as a standard of comparison, while performance reflects the consumer's actual experience. If perceived performance matches expectations, confirmation occurs, resulting in satisfaction. If performance exceeds expectations, positive disconfirmation occurs, which can increase satisfaction. Conversely, if performance falls short of expectations, negative disconfirmation occurs, potentially decreasing satisfaction.

Furthermore, Matzler *et al*. (2004) explain that the influence of attribute performance on overall satisfaction is not always uniform or linear. Attributes that are considered highly important can lead to greater dissatisfaction if their performance is low, while improvements in less important attributes do not necessarily significantly increase satisfaction.

Thus, the CSI value indicates that farmer satisfaction has reached a fairly good level, while a negative *gap* indicates that satisfaction is not optimal and still requires improvement. Top priorities need to be directed to attributes with a high level of importance and the largest gaps, such as those in quadrant I of the IPA results, namely product warranty, reusable packaging, variety of packaging sizes, conformity of results to claims, ease of product acquisition, and ease of application.

CONCLUSION

The use of PT XYZ's organic fertilizer in Losari District remains low, at around 0.69% of the 5,504 rice farmers, and its use remains concentrated in a few villages. Farmers using the fertilizer are generally aged 40–60, have a basic education, have more than 10 years of experience, and manage small- to medium-scale farms. They tend to be pragmatic, cautious about innovation, and rely more on field evidence, assistance from officers, and recommendations from fellow farmers. PT XYZ's organic fertilizer is considered relatively good according to the IPA analysis, but there are still weaknesses in the aspects of warranty, function and packaging variety, conformity of results to claims, ease of product acquisition, and ease of application. The CSI value of 67.88% indicates that farmers are in the satisfied category, although almost all attributes still have negative gaps so that satisfaction is not optimal. Marketing strategies need to focus on expanding distribution through R2 kiosks, strengthening demonstration plots and technical assistance, utilizing farmer testimonials, adjusting packaging sizes, and improving quality assurance and complaint handling.

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