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Determine Key Purchase Decision Factor Farmer in Rice Selective Herbicide

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Abstract: Rice yield potential in average still below achievement. Weed control process in rice cultivation one of key driver to increase yield and selective herbicide application adoption become main factor. There is indication rice farmer have low adoption to application rice selective herbicide. The purpose of this study to get clarifiy from farmer perspective regarding purchase decision factors for rice selective herbicide of farmers perspective. The method of this research use qualitative methods by study case approach with in-depth interview (IDI), focus group discussion (FGD) and composite performance index (CPI) among five rice key farmers as informants. The result of this study are price is main purchase decision factor of rice selective herbicide product compare quality, time and flexibility application. Promotion activity that conducted by private sector play important role in determining key buying decision factors in rice selective herbicide.

Keywords: Farmer, Rice, Selective Herbicide, Purchase Decision Factor, Composite Performance Index.

INTRODUCTION

Indonesia become 4th higher rice consumption country among the world. Rice is not only become staple food or political commodity, but also become part of culture for citizen and farmer. Indonesia rice yield average achievement 5.2 ton/ hectare from rice potential average 8 ton/ hectare in rice superior variety that released from Indonesia Rice Seed Institute (Marwanti 2022).

East Java, Central Java then West Java in 2018 become top 3 biggest contribution Province for rice production (Badan Pusat Statistik 2019). Central Java rice production in 2022 had been decline up to 150,79 thousand ton or equal with 2.73% compare rice production in 2021 (Badan Pusat Statistik 2023).

Sragen regency as part of top 3 biggest district contribution as rice production in Central Java after Grobogan and Cilacap (Badan Pusat Statistik Provinsi Jawa Tengah 2023). Sragen regency in 2022, has 6.5 ton/ hectare of rice productivity, which are 16% above than Central Java rice productivity on 5.6 ton/ hectare (Badan Pusat Statistik Kabupaten Sragen 2023).

Weed management in rice will contribute yield factor increase in range 15-20% instead quality and increasing cost production. Weed control in rice by using chemical proven simple, quick, easy, and become effective in time and cost (Ashraf et al. 2018). Weed control with herbicide can further reduce potential yield loss until 0.4 ton/ hectare compare than hand weeding (Rodenburg et al. 2019).

By understanding purchase decision factor rice farmer adoption of rice selective herbicide it will help to mitigate and further construct strategy. Meanwhile, the result will leverage rice yield average to achieve yield potential.

LITERATURE REVIEW

Most of the farmers in Gujarat have purchase decision factor with high satisfaction in the quality of herbicide, followed by moderately satisfied and satisfied with the price, brand image, quality, availability, and effectiveness of herbicide (Pravin, Lakhlani & Trivedi 2020). By understanding farmers perspective of purchase decision factor, it will provide positive relationship with marketing activities and selling procedur (Sharma and Jhamb 2021). Farmer will attract to adopt kind of simplicity technology as their peers experienced(Connor et al. 2021). Farmer have different reference buying factors for agrochemicals towards price, packaging, availability product in the shop, utility and quality (Kaliraj, Senthilnathan, and Vinothkumar 2020). The otherhand there are farmer purchase decision factors for fetilizer in India which are price, farmer land holding, kind of crop cultivate, influencer, and payment scheme (Patil and Gaikwad 2022).

Customer journey after COVID 19 pandemic already transform from individual to social business landscape orientation that rely on friend, family, fans/ Facebook and followers (Instagram or Youtube) (Kotler, Hermawan Kertajaya & Iwan Setiawan 2020). New technology adoption by farmer-to-farmer learning have significant increase confidence level and capability (Turner et al. 2021)

Figure 1 explain that by understanding key purchase decision factor rice farmer in selective herbicide, continue to review current strategy will get right approach strategy to increase rice selective herbicide adoption.

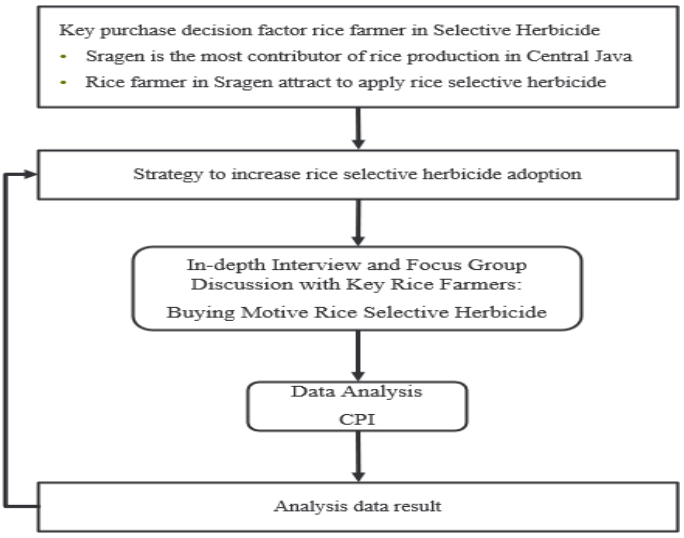

Figure 1. Framerwork Purchase Decision Rice Farmer in Selective Herbicide

METHODS

This study conduct in Kebakramat, Sragen, Central Java on January 11th, 2023 use qualitative methods with case study approach. Primarly data source from semistructure interview with five keys rice farmer as representative Kebakramat sub district.

Yin (2018) explain that study case approach have main purpose to enhance and generalization theory (generalization analytic) not to generalization probability (generalization statistic). Gerring (2017) mentioned that it is mandatory that case study reseacrh should use qualitative methods (with limited number of case), longitudinal analysis instead of the casde can be use quantitative of qualitative method. This is mean that case analyis have open characteristic and basically linked with social science methodology.

Semi structure interviews were conducted in the field where discussion, occurrence and observations were documented in field notes (Anjala 2018). Key informants in-depth interview have main purpose cross-cutting methods to triangulate different sources and validate data ((Leta et al. 2018). In-depth interviews quality data rely on questionnaire that provide by researcher with open and closed questions (van Dijk et al. 2022).

The next process to test the validity and reliability of th so that the data can be analyzed further continue with Focus Group Discussion among those informants.Creswell (2017, pp. 267-270) explain that qualitative interview conducted with face-to-face or focus group interview that allows researcher to control the flow of questions and answers.

There is 5 informants targetted for participate in in-depth interview and focus group discussion from rice key farmer that become role model within their own communities. Focus group interview allowed the researcher to probe face- to-face interview findings previously in more detail and actual reason behind .(Hayden, Mattimoe, and Jack 2022). Focus group dicussion purpose to have deep understanding and information need with farmers (Seenuankaew et al. 2018). Mahindarathne & Min (2018) study finding explain that by use focus group discussion with farmers, it can generate information needs and seek their behaviour.

Soeleman et al. (2014)study finding that CPI show consistent to support multi-criteria decision making. CPI will support to solve unequal valuation criteria and alternative scale matrix. CPI can be addressed as one of Multi- Attribute Decision Making (MADM) problems (Pandian, Jawahar & Nachiappan 2013).

RESULT AND DISCUSSION

Informants Profile

Gender	Man		Man		Man		Man		Man
Age (Years Old)	52		65		58		60		56
Land Holder & Status	1.5 Hectares - Rent		2 Hectares - Rent		1 Hectares - Rent		1.5 Hectares - Rent		2 Hectares - Rent
Level of Education	Senior High School		Junior High School		Senior High School		Junior High School		Senior High School
Organization & Title	Chief of Irrigation		Secretary of Farmer Group		Chief of Farmer Group		Chief of Farmer Group		Chief of Farmer Group
Number of Family	4		3		4		4		6
Income Level/ Month	Rp	1,110,000	Rp	1,480,000	Rp	740,000	Rp	1,110,000	Rp 1,480,000
Rent Rice Field/ Season/ Hectare	Rp	14,000,000	Rp	14,000,000	Rp	14,000,000	Rp	14,000,000	Rp 14,000,000
Agriculture Input	**Product/ Remark**		**Unit**		**Price (IDR)**		**Total (IDR)**		**% Cost Contribution**
Seed	Inpari 32 Seed		20	Rp	14,000	**Rp**	**280,000**		**1%**
Fertilizer	Urea+NPK Phonska + Phonska Plus		1	Rp	3,970,000	**Rp**	**3,970,000**		**15%**
Land Preparation by Machine	2 Days of Work		2	Rp	900,000	**Rp**	**1,800,000**		**7%**
Labor: Transplanting, Fertilizer Application, Spray Agro-Chemical, Irrigation Repair, Irrigation Fee	35 Days of Work		1	Rp	5,300,000	**Rp**	**5,300,000**		**20%**
Agrochemical Spend Total						**Rp**	**1,690,000**		**6%**
									% AgChem Spend
Land Preparation	Contact Herbicide		3	Rp	110,000	Rp	330,000		20%
Seed Treatment	Systemic Insecticide		4	Rp	20,000	Rp	80,000		5%
Selective Herbicide			2	Rp	155,000	Rp	310,000		18%
Fungicide	All Fungicide Products		1	Rp	650,000	Rp	650,000		38%
Insecticide	All Insecticide Products		1	Rp	320,000	Rp	320,000		19%
Total Cost/ Season/ Hectare						**Rp**	**27,040,000**		
Yield / Season/ Hectare			7,500	Rp	4,000	**Rp**	**30,000,000**		
Profit/ Season						**Rp**	**2,960,000**		

Figure 2. Informants Profile

According to **Figure 2**, rice farmer income range in Kebakramat, Sragen, Central Java are Rp 1,184,000/ month. 52% of their rice farming spending for rent the field, labor cost for their farming activity and fertilizer. Rice farmer have common opinion that their cost become double increases more than previous year causes lack of fertilizer subsidy availability, it also impact price will rise as impact unbalancing demand and supply within 2022.

Pesticide spending contribute 6% rice farming spending. The top 3 of the biggest contribution spending, fungicide 38% contribute as the biggest agrochemical spending, herbicide for land preparation 20% contribution and then insecticide contribute 19% from total of pesticide spending.

Rice selective herbicide contribute 18% of agrochemical spending which is slightly close to insecticide. If follow recommendation dose use, rice herbicide should be more than their current the spending for. But farmer prefer use two-thirds recommendation dose mixed with another cheaper one for efficient their spending. The main reason with maintain spending in insectide and fungicide, it will impact with their crop health.

Indepth Interview and Focus Group Discussion Result

1. Informants Profile

All informants of the stake holder rice farmer mainly males, which is explained men are involved in agriculture in Kebakramat sub district. All the them range age was in between 45 – 60 years old. There are 3 informants have senior high school and 2 informants have junior high school as education background.

Rice farmer profitability in Kebakramat, Sragen, Central Java equal with 10% compare with their gross income. Their income per month range Rp 740,000 to Rp 1,1480,000. Expected the income per month divide with number of family members, range average of rice farmer will be Rp 148,000 to Rp 148,000/ kapita. It is mean that rice farmer with 1 hectare land holding categorized as low income class in Sragen regency use low income standard Rp 389,265./ kapita ((Badan Pusat Statistik Kabupaten Sragen 2023).

Average capability purchase of rice selective herbicide per hectar per season Rp 310,000 equal with US$ 20 - 21 (April 11th, 2023 rate per 1 US$ = Rp 14,916). It is explained by farmers that if the price of rice selective herbicide more than Rp100,000 per hectar per season, they will considered to not choose. Rice farmer will spend the price gap for manual weeding by themselves. Because its season have different pressure for fungi disease or pest disease. In rice farmers perspective, rice selective herbicide replaceable compare with preventive or currative chemical action for rice crop performance and health purpose.

Rice farmer attract more spending for higher price of new technology with main condition if achieve yield increase more than 0.5 ton per hectare in previous season. The yield will equal with 6% yield increase per season or the grain price increase from Rp 4.000/ kilogram to become Rp 4.400/ kilogram equal with 10%. This assumption will spend also to improve their daily meal nutrient for themselve. Meaning that farmer will prefer to select best quality of rice selective herbicide. The main requirement for best quality of rice selective herbicide product measure with time and flexibility application then followed by brand image and availability as shown on Figure 3.

2. Trusted Farmer Source Information of Agriculture Solution

Lack supply of fertilizer subsidy, unconsistent rain season causes climate change with impact higher disease pressurey, increasing price for agrochemical product with stagnant rice grain price at farmer level were reflected on previous two years, and those are become difficult situation including limitation access on COVID 19 pandemic.

Farmer peers become main trusted information source of rice farmer. Word of mouth that created among rice farmer community members will made interest to active participate lucky draw program, collaboration product application demonstration and field visit with stake holder from private or government. Those activities become most attractive activities at rice farmer point of view with increase their confidence level in term of product quality, product knowledge at the same time for pesticide company will impact on brand awareness.

Those mix factors make forces farmers to find ways to keep accessing information and solution related rice farming by increasing their capability digital technology, especially social media.

Farmer frequently spend for social media to watch traditional entertainment instead of agriculture technology solution in every evening arround 6 pm – 11 pm. They will spend for sleep in every afternoon before they will come back again to the field until before evening.

Facebook and Youtube are become main social media as well as information source accesed by rice farmer. They prefer to access Facebook for sharing their own or comment their peers success story in rice farming. Farmer also prefer access Youtube with short duration maximum 10 seconds in the beginning and 10 seconds conclusion, depend on the content. Duration take for Youtube not less than 1 minute in average. Hence, those of social media platform also have contribution in influence purchase decision rice farmer in selective herbicide as shown in Figure 3.

No	Key Purchase Decision	Influence Purchase Decision			Haver		Influence Purchase Decision			MPE	
		Stable Grain Price	On Farm Activity (Demonstration & Field Visit)	Social Media (Youtube & Facebook)	Alternative Score	Rank	Stable Grain Price	On Farm Activity (Demonstration & Field Visit)	Social Media (Youtube & Facebook)	Alternative Score	Rank
1	Price	8.6	9	9	8.82	1	139	145	145	142	1
2	Performance	7.2	8.8	7.4	7.8	2	116	142	119	126	2
3	Brand Image	6.6	7.4	8	7.16	4	106	119	129	115	4
4	Time & Application	7.4	7.4	8	7.53	3	119	119	129	121	3
5	Availability	6.2	7	7.2	6.68	5	100	113	116	108	5

Figure 3. CPI Key Purchase Decision Farmer Rice in Selective Herbicide

Discussion

1. Informants Profile

Wang et al. (2015) study finding mentioned in China and India condition which generally that rice farming manage by smallholder, and put them in low income group in both country. Xu et al. (2022) also explain that farmer wellfare level will effect on new technology adoption. This is also condition that become main factor low of rice agriculture technology adoption that impacted with yield achievement.

Men with _farmer‘ identities while women, who also undertake farm work, are seen as farm _helpers‘ and _labourers‘ (Carnegie et al. 2020). It is also happen with rice farmer in Kebakramat, Sragen, Central Java which reflected that total of rice informant gender are men. Farmers with limited education often prefer not to take up a new technology until its benefits have been proved or wait till their peers already successfully applied it, by provide farmers education with a first-mover advantage and making the new technology even more profitable and attractive (Ninh 2021).

2. Trusted Farmer Source Information of Agriculture Solution

Rice farmer in Central Java attract to acquire any technology that share directly based on their peers (Connor et al. 2021). Farmer‘s peer have influence to build behavior of puchase decision making reference become dominant factors (Bao et al. 2022). Anjala (2018) explained the findings of the study revealed that the agrochemical retailers act as the farmers' main source of information when making purchase decision of agrochemicals. This situation become main requirement for rice farmer shoud build strong collaboration with stake holder to provide appropriate solution increase yield program in every planting season (Diawara et al. 2018). There is farmer categorization for responsive with new adoption, depend on his need and other background education, social and economy (Hidayah, Wiyono & Karyanto 2021).

While mobile phone become an option as effective communication among farmer group members in any current condition (Abdul- Rahaman and Abdulai 2020). This is

explain that Facebook and Youtube play important role as information reference for rice farmers in including seed, fertilizer and agrochemicals.

3. Purchase decision factors

When there is labour cost increase, farmer tent to reduce their pesticide application than standard dose use rate (Sun, Rickaille & Xu 2018). Post harvest price will impact with adoption of agriculture input due to smallholder have behaviour need immediate need for money (Ruhinduka et al. 2020). Compare with a farmer purchase decision factor for tractor which is considered the brand, followed by power, price, and features, rice farmers have different purchase decision for new agrochemical technology adoption (Ruiz-Garcia and Sanchez-Guerrero 2022). It is suspected that behaviour of rice farmer depend on each planting season.

It is aligned with farmer will spend more if they get additional yield with estimate 0.5 ton/ hectare or 10% grain price increase. Level of education positively impact farmer‘s chemical fertilizer and pesticide application behaviour (Zhang, Yang & Li 2023). If the grain production price is less, will negative impact with farmer for spend more input (He et al. 2023).

Rice farmer in Kebakramat, Sragen, Central Java have most priority perceived price based on their own purchase power then followed by other attributes such as product knowledge and availability product. Because farmer put their peers as central trusted information prioritize, it assume that word of mouth from their enviroment, culture and family have strong influence for key buying decision. While promotional offers, discount and loan availability are include on economy category of influencing purchase decision factor (Sivakumar & Kaliyamoorthy 2014). Farmer purchase decision factor influencing with promotion activity that conduct by private sector such as lucky draw, application collaboration field demonstration and field visit. Smallholder farmers have more sensitive to the price and quality of agricultural services rather than large scale farmers (Qu et al. 2022).

Theoretical Implications

Rice farmer have particular factors that potential to change in every planting season for buying decision factor of selective herbicide. Rice grain comodity price fluqtuation as biggest contribute to change rice farmer buying decision factor. Especially when their income reduce by decline rice grain price and lack of fertilizer situation, farmer suspected change their preference of rice selective herbicide become lower price with acceptance quality followed (Kotler, Hermawan Kertajaya & Iwan Setiawan 2020).

Current situation where any information can ease to access due to high adoption of digital access after COVID-19 pandemic. Farmer still willing to access their trusted source information, which is their peers as their main preference. If farmer have ability chose complete information with attractive scheme and intensive persuade, it will potential change their key purchase decision for selective herbicide use. At this point of view farmers may realize that by disseminating and increasing the adoption of agricultural technologies to improve rural livelihoods (Rabé, Baoua, and Baributsa 2021).

Omni-marketing channel have important role to build rice farmer confidence level although on farm or digital activity. Through educate farmer event that always conduct by government or private company, the adoption will increase. So, price sensitive as most rice farmer concern will ease shift to value benefit of rice selective herbicide products.

Practical Implications

The findings of this study can be translated into key insights that can be used in marketing strategy for rice selective herbicide product or any stake holder related with rice farmer.

First, to justify theory of key purchase decision from informants of rice key farmer in Sragen, Central Java.

Affordable price are become priority pain point of rice farmer above quality, time application, flexibility application, promotion activities and social media information. It is part of main consideration before buying decision make. It is also explain that a rice selective herbicide with premium price did not have good efficacy causes under dossage application than recommendation. Engku et al. (2021) study finding in Malaysia, rice farmer willing to buy cheaper rice selective herbicide rather than expensive and not effective to control weed caused incorrect use.

Second, promotion activities have signicant contribution for key buying decision for rice selective herbicide. Lucky draw, field demonstration, field visit and media social activity are most of item farmer attract to follow. *Integrated Marketing Communication* (IMC) have urgently role in order to achieve customer targetting by persuade, informing and reminder (Tjiptono 2014).

Research Limitations

First limitation is the specific location with 5 rice key farmers representative of Kebakramat sub district. It have possibility different purchase decision factor compare with rice farmer in another sub district or Central Java province.

Second limitation the indepth interview and focus discussion participant selection as informants which potential bias due to each rice planting season have different income they get. So, purchase decision factor might have variation on that particular situation.

Suggestions for future researchers to be deep dive level adoption of digital information channel rice farmer‘s preference compare with wellfare improvement. This will useful to have integrated perspective all stake holder for rice farmer‘s bottleneck to achieve optimal potential yield.

CONCLUSION

The characteristic of rice farmer in Kebakramat, Sragen, Central Java belonging to the middle tier segment from they choose of rice selective herbicide product with price as main consideration prioritize then followed by quality product, time and flexibility application. Rice farmer in Kebakramat, Sragen, Central Java also categorized as low income class that need to pay attention from government to improve their wellfare, so it will leverage level of agriculture new technology adoption to fulfill food self sufficient program.

Lucky draw program, collaboration product application demonstration and field visit with stake holder from private or government become influencing purchase decision factor. All of informants also seek agriculture solution information including rice selective herbicide product by use social media such as Facebook and Youtube.

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