



ASSESSING PADDY FARMERS' MOST PREFERRED PRODUCT QUALITY ATTRIBUTES FOR A POTENTIAL ECO-FRIENDLY FERTILIZER PACKAGE IN ANURADHAPURA AND KURUNEGALA DISTRICT, SRI LANKA

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INTRODUCTION

Health, economic and food safety issues are on the increase in Sri Lanka due to the use of more than the recommended amount of chemical fertilizer (CF) in paddy farming. The majority of agrochemicals imported into Sri Lanka are used for rice farming, accounting for more than 70% of total fertilizer use (Herath *et al.*, 2014). However, extreme use of CF, as well as unsustainable and unhealthy farming practices, pollute the soil and water, and contaminate the human food chain. Contamination of soil and water with CF is a major concern. These contaminants in water generally are in small quantities, and thus, cannot be seen or tasted. Therefore, their negative consequences do not appear in humans for several years (Wimalawansa and Wimalawansa, 2014). Each of this information highlights the drive to convert farming to an "organic environment".

As a solution for this situation, the National Research Council of Sri Lanka has proposed to develop Eco Friendly Technology (EFT) that could reduce chemical fertilizer usage while safeguarding food security and environmental health in Sri Lanka. Accordingly, Bio-Fertilizer (Plant Growth Promoting Rhizobacteria to stimulate nutrient accumulation) and Bio-Char (slow release Nitrogen fertilizer to improve soil fertility) will be produced as Eco Friendly Fertilizer. Experts perceive that EFTs can play a significant role towards reduction of CF use in Sri Lankan paddy cultivations (Chandrasiri *et al.*, 2019). There is good potential for the spread of EFT in Sri Lanka and it should be done in a manner that does not harm the ecosystem. As a result, these EFTs are expected to be introduced to market and the main objective of this study is to identify the product quality attributes that paddy farmers prefer the most when purchasing Eco friendly fertilizer package.

METHODOLOGY

Identification of quality attributes

According to Darby and Karni (1973), there is a common method to classify product quality attributes into three categories, 'Search', 'Experience' and 'Credence'. Search qualities are those that can be revealed in the search process prior to purchase of a product (*e.g.* price); Experience qualities are those that can be only discovered after purchase as the product is used (*e.g.* keep ability); Credence qualities cannot be identified by either search or experience; hence consumers get information by third party (*e.g.* certification). In turn, each of these three categories were used to categorise selected product quality attributes in this study and those three categories were strengthened by adding 22 "quality attributes" and these 22 quality attributes consist of 9 Search attributes, 8 Experience attributes and 5 credence attributes. A set of most suitable quality attributes (22) were selected by examining the international organic fertilizer standards (FOA, 2019), expert views and series of focus group discussions. These statements were incorporated in a semi structured questionnaire.

Data Collection

The data for this study were gathered from paddy farmers (n=85) who were registered under the project of ‘developing eco-friendly technologies’ for paddy farming. The survey was carried out extensively in the geographical areas of Kurunegala and Anuradhapura districts. Questionnaire-based face-to-face interviews were used to obtain the primary data of farmers’ preferences on quality attributes of selected package of EFT. Previously identified 22 quality attributes were evaluated against a -5 to +5 point likert scale ranging from ‘extremely unimportant’ to ‘extremely important’ respectively. Based on the values given by farmers, a relative value was taken considering ‘0’ as a ‘no difference’ point.

Data analysis

Relative Importance Index (RII) analysis was selected in this study to rank the quality attributes according to their relative importance. RII method was used to determine the preference of the farmers in the above mentioned EFT package attributes in order. According to Akadiri (2011) RII values were transformed into, five importance levels, High (H: $0.8 \leq RI \leq 1$), High-Medium (H-M: $0.6 \leq RI \leq 0.8$), Medium (M: $0.4 \leq RI \leq 0.6$), Medium-Low (M-L: $0.2 \leq RI \leq 0.4$), Low (L: $0 \leq RI \leq 0.2$). It was calculated manually as in equation,

$$RII = \frac{\sum w}{A * N}$$

where,

- RII= Relative Importance Index,
- A = Highest weight,
- N = Total number of respondents,
- W= Weights given to each factor by respondent.

A -5 to +5 likert scale range is used to evaluate the farmer’s response values and its +5 value is considered to be the highest weight.

RESULTS AND DISCUSSION

Descriptive statistics of sample

Figure 1 explains socio-demographic characteristics of the sample. In Anuradhapura and Kurunegala Districts, most of the demographics were almost the same except the education level and monthly income. In Kurunegala district, 12% of the farmers were Degree/Diploma holders. In contrast, Anuradhapura did not have that much of educated farmers, where 24% of them had only primary education. In both the districts, the majority of the farmers were males (82%). In Anuradhapura, a higher portion of farmers (83%) had over 20 years of farming experience and in Kurunegala 69% of the farmers had farming experience of more than 20 years.

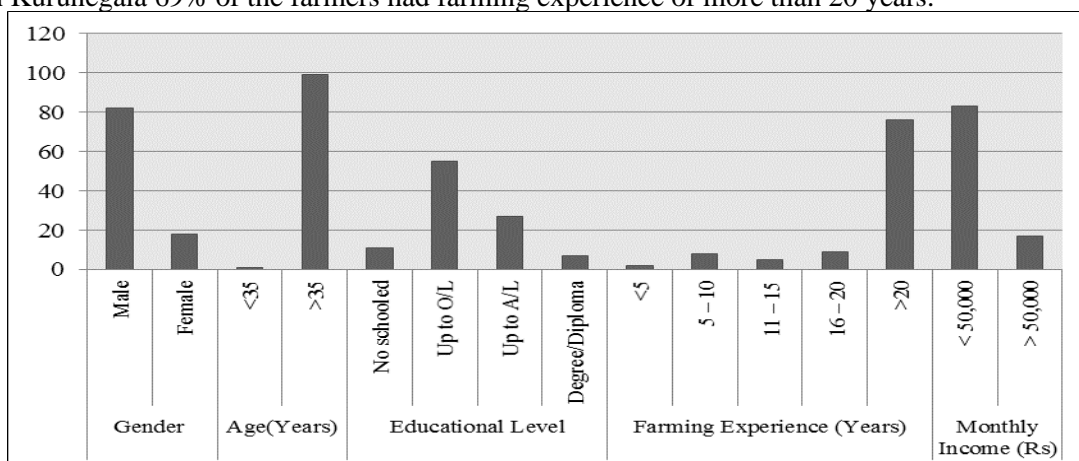


Figure 1. Socio Demographic characteristics of the sample

Outcomes of RII analysis



The RII values obtained based on the personal preferences of the farmers were sorted according to their importance. As per Table 1, the overall attribute ranking ranges from No. 1 to No. 22. The overall result shows that ‘Experience’ attributes had the highest ranking when compared to other two attributes category. Here, Sustainability in market (0.88), Availability of technical guidelines (0.85), Easiness of handling (0.83), Possibility to improve productivity (0.82) and Keepability (0.80) were the Highest (H) importance level attributes that the farmer considered when purchasing an EFT package. According to the RII values, these five highest importance attributes were ranked respectively 1 to 5. Most importantly, four attributes from the top five ones belonged to the experience category. According to the farmers’ preference, higher solubility in water (0.09), liquid form (0.03) and package size < 1kg (0.02) were ranked with the lowest relative importance. It is noteworthy to remark that none of the attributes falls into the lower importance level under ‘Credence’ category. However, the attribute with low RII did not mean that they were not important for selecting EFT fertilizer package, but they were relatively less important when considering from the farmers’ point of view.

Table 1. Relative importance index values and levels for each attribute

No	Attribute	RII	Rank by Category	Overall Rank	Importance Level
SR1	Package size >1kg	0.76	1	07	H - M
SR2	Pebbles form	0.74	2	10	H - M
SR3	Labelling	0.73	3	11	H - M
SR4	Package material	0.49	4	14	M
SR5	Brand	0.47	5	15	M
SR6	Price	0.35	6	18	M - L
SR7	Powder form	0.29	7	19	M - L
SR8	Liquid form	0.03	8	21	L
SR9	Package size <1kg	0.02	9	22	L
EX1	Availability of technical guidelines	0.85	1	02	H
EX2	Easiness of handling	0.83	2	03	H
EX3	Higher possibility to improve productivity	0.82	3	04	H
EX4	Keepability	0.80	4	05	H
EX5	Higher ability to mix with new technology	0.76	5	08	H - M
EX6	Disposal after usage	0.71	6	12	H - M
EX7	Environment damage	0.68	7	13	H - M
EX8	Higher solubility in water	0.09	8	20	L
CR1	Sustainability in market	0.88	1	01	H
CR2	Certification	0.79	2	06	H - M
CR3	Fortification	0.75	3	09	H - M
CR4	Speed of nutrient release	0.43	4	16	M
CR5	Advertising	0.42	5	17	M

Note: RII – Relative Importance Index, H – High Importance level, H –M - High to Medium Importance level, M – Medium Importance level, M – L- Medium to Low Importance level, L – Low Importance level, SR – Search attribute, CR – Credence attribute, EX – Experience attribute

CONCLUSIONS / RECOMMENDATIONS

This study revealed that paddy farmers in dry zone, Sri Lanka highly preferred on ‘Experience’ related quality attributes when selecting EFT fertilizer products. The result from this study can



be used by the fertilizer producers and local authorities in introducing the customized fertilizer packages according to farmers' preferences. It is possible to convert those 'Experience' attributes into 'Search' attributes by making the information regarding the experience attributes accessible for farmers by implementing a proper labelling and certification system from a reliable third party.

This highlights the phenomenon that if action was taken to convert those seemingly experience attributes associated with EFTs into largely searchable attributes by way of proper labelling, packaging, branding and promotional activities supported by a standard certification system, it would really facilitate achieving the government objective of transforming into an "organic agriculture" as this would minimize the possibility of highlighting potential market and public policy failures of organic fertilizer by those in the "well-established" chemical marketing channels.

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ABBREVIATIONS & ACRONYMS

- CF – Chemical Fertilizer
EFT – Eco-Friendly Technology
RII – Relative Importance Index