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Cultivating Adaptation: A Study of FPO Farmer Preferences for Climate-Smart Training in the Western Zone of Tamil Nadu, India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The Tamil Nadu government actively supports farmer development through frequent training programs. These programs, incorporating both classroom sessions and field visits, are targeted towards farmer members of Farmer Producer Organizations (FPOs) and conducted at regular intervals. Recognizing the importance of understanding farmers' motivations and preferences, the training centers conducted a study involving 80 FPO farmer respondents from Coimbatore and

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Nilgiris districts. Using rank-based quotient (RBQ) analysis, the researchers explored the reasons behind farmers' participation in the training programs. Additionally, conjoint analysis revealed their preferred training mode. The study identified a two-day program, held once a year from 10 am to 5 pm and combining classroom training with field visits, as the most popular option. Interestingly, the number of days was the key deciding factor for program attendance, while having experienced farmers as trainers or guest speakers emerged as the primary reason for participating. This research offers valuable insights for optimizing future training programs to better cater to the needs and preferences of farmers, ultimately maximizing their benefits and fostering their development.

Keywords: Conjoint analysis; preference; training design; farmers producers company.

1. INTRODUCTION AND REVIEW

1.1 Rooted in Growth: Farmer Preferences Shape Training in the Western Zone

Farmers Producer Organizations (FPOs) are blossoming as vital pillars of rural development, playing a crucial role in supplying seeds, fertilizers, machinery, and even financial and technical advice. But their core aim remains the same: empowering farmers to boost their income through collective action. Recognizing this, the Tamil Nadu government has invested in training programs to equip farmers with the knowledge and skills they need to thrive.

These training centers, funded by the state, prioritize practical application over mere theoretical knowledge. Their mission is to not just improve farmers' technical skills, but also to cultivate a more agribusiness-oriented mindset. After all, effectively implementing new agricultural plans hinges on ensuring farmers are equipped and engaged. But simply offering training isn't enough. Understanding what farmers *want* from these programs is key to their success.

1.2 A Chorus of Research: Understanding Farmer Preferences

Previous research confirms a positive attitude towards training among farmers. But delving deeper, we discover that specific preferences exist. Lujan and DiCarlo [1]. highlight the importance of identifying "the trainees' preferred mode of training," emphasizing the need for diverse learning methods. Face-to-face interaction, for example, fosters valuable exchange of ideas and knowledge [2]. While interaction is crucial, balancing it with time constraints is essential.

Balamurugan [3] emphasizes the need for tailored training, noting that small sugarcane farmers have lower learning experiences. This suggests that diverse training formats like discussions, demonstrations, and field trips can be more effective than traditional classroom settings. Similarly, Salas et al. [4] point out that while longer training sessions may be less appealing, simulations offer a compelling alternative, allowing farmers to "collapse time and space" and maximize learning within a shorter timeframe.

The benefits of effective training extend far beyond individual farmers. Sharma et al. [5] link enhanced skills and knowledge to national economic growth, highlighting the broader impact of empowered farmers. Sajeev et al. [6] echo this sentiment, emphasizing the role of training in boosting farm productivity and rural development.

Ultimately, the success of any training program lies in its ability to resonate with the farmers it seeks to serve [7]. This research delves into the preferences of FPO farmers in the Western zone, aiming to develop a training model that is not just effective, but also tailored to their needs and learning styles. By listening to the voices of these farmers, we can cultivate a future where training programs become powerful tools for empowering rural communities and driving sustainable agricultural growth [8].

2. MATERIALS AND METHODS

A mixed-methods approach was employed to gather data on farmer training preferences and attendance motivations in the Western Zone of Tamil Nadu. The primary data source consisted of semi-structured questionnaires administered to a purposive sample of 80 farmer members of Farmer Producer Organizations (FPOs) who had participated in Tamil Nadu State Facilitation Centre (TNSFAC)-sponsored training programs.

These questionnaires were specifically designed to capture farmers' reasons for attending and their preferred training modes. Additionally, training records maintained by trainers in Coimbatore and Nilgiris districts were analyzed to provide contextual information and corroborate the questionnaire findings. This triangulation of data sources ensured a comprehensive and reliable understanding of farmer perspectives on TNSFAC training programs in the Western Zone.

2.1 Ranking Based Quotient (RBQ)

Ranking Based Quotient (RBQ) was used to find the reason for attending the training programs by farmers. The rank given by the farmers were converted into RBQ score by using the formula. Rank based quotient was done in this study as outlined by Sabarathnam, 1988.

$$\mathbf{RBQ = 100 = \frac{\sum F_i (n+1-i)}{N \times n} \times 100}$$

RBQ-Rank Based Quotient

fi = frequency of attributes for the i^{th} promotional strategy

N = Number of respondents

n = Maximum number of ranks given by the farmers for encouraging factors

i= Rank of the attributes

The variables which encouraged farmers to participate in training programs are as follows

1. Providing financial incentives or subsidies
2. Networking and knowledge sharing
3. Offering training sessions at convenient times and locations
4. Providing hands-on learning opportunities
5. Inviting experienced farmers as trainers or guest speakers
6. Incorporating interesting activities and group discussions
7. Offering customized training based on individual needs

The statement with the highest RBQ score were consider as the top most variables which encouraged farmers to participate in training programs.

2.2 Conjoint Analysis

The Conjoint analysis was used to find the preference of training mode by the farmer members of FPO's. There were two major steps in designing a conjoint analysis study (1) identifying relevant attributes and possible values of attribute, and (2) designing the conjoint experiment.[9]

2.2.1 Identifying relevant attributes – a personal interview

The identification of the relevant attributes and attribute levels was an important stage in the conjoint study. Common methods for deriving the list of relevant attributes - also known as 'factors' - in conjoint studies include personal interviews, expert judgment, group interviews, or computerized methods. The personal interview method was selected to identify the relevant attributes and attribute level.[10]

Conjoint analysis had been widely used in examining preference for a wide range of attributes. In this research, the conjoint analysis did not include a large number of attributes because the respondents might find it difficult to evaluate many attributes at a time. A large number of attributes would also increase the number of possible hypothetical models, which might confuse the respondents. Taking into accounts academic experts and published literatures in reputed journals only four important attributes (training mode, frequency of training, no of days, duration of training) were selected for the experiment. Eighty-one combinations could be formed from these four attributes. Orthogonal design was used to simplify this combination in order for farmers to find it easy. [14] The attributes and attribute levels are given in the Table 1.

To test the correlation among the attributes, Pearson correlation coefficient and Kendall-tau was calculated. It was considered a strong correlation if the correlation coefficient was greater than 0.8 and a weak correlation if the correlation coefficient was less than 0.5.[11]

2.2.2 Experiment design

Since these four attributes will form eighty-one models (3*3*3*3=81) Orthogonal design was chosen to achieve the best model of main effects. The developed models from the orthogonal design were directly presented to respondents; and the respondents were asked to

Table 1. Details of training dimensions and its attributes

SI.NO	Attribute		Attribute levels
1	Training mode	a	Classroom training
		b	Field training
		c	Combination of both
2	Frequency of training	d	Once in 3 months
		e	Once in 6 months
		f	Annually
3	Number of Days	g	2 days
		h	3 days
		i	5 days
4	Duration of the training	j	9 am - 5 pm
		k	10 am - 4 pm
		l	10 am - 5 pm

express their strength of preference of each model according to their preference. The basic model of conjoint analysis assumed a linear relationship between utility and each attribute level as follows:

$$U(X) = \sum_{i=1}^{m} \sum_{j=1}^{k} a_{ij} x_{ij} \cdots\cdots \quad (1)$$

Where

U(X) = overall utility of a profile

αij =the part-worth contribution or utility associated with the

j th level (j = 1, 2, ... ki) of attribute

xjj = 1 if the jth level of the ith attribute is present; = 0 otherwise

ki = number of levels of attribute i

m = number of attributes

The importance of an attribute, i is defined in terms of the range of the part-worths, αij, across the levels of that attribute.

The attribute's importance is calculated to determine its importance relative to other attributes,

$W = \frac{I}{\sum_{i=1}^{n} I}$ so that $\sum_{i=1}^{m} W = 1$

OLS regression technique was applied to estimate the preference functions of each respondent. Dependent variable was the profile rating, and independent variables were formed by the coded attribute levels. The estimated regression coefficients were then interpreted as the part-worth utilities that made up overall ratings of the profiles. The attribute's importance was understood as the extent to which each attribute contributed to the determination of the utility, i.e., to the overall preference. At last, total utility of every model was computed and ranking was given and the best model was selected [12,13].

3. RESULTS AND DISCUSSION

3.1 Reasons of Farmer Members for Attending the Training Programs

To find the reasons of farmer members for attending the training programs, data were collected from the farmer respondents of FPO's who were participated in the training programs and analysed. The results are shown in the Table 2.

It could be concluded from the table that among the various services offered by the training centres, inviting experienced farmers as trainers or guest speakers were ranked first in RBQ with the score value of 73.39 followed by Providing financial incentives or subsidies ranked second with the score value of 68.03, Providing hands-on learning opportunities ranked third with the score value of 66.43. Networking and knowledge sharing ranked fourth with the score value of 62.86, followed by fifth rank were given for Offering training sessions at convenient times and locations with the score value of 59.46. Ranks of sixth and seventh in RBQ analysis were given for Offering customized training based on individual needs and incorporating interesting activities and group discussions respectively.

Table 2. Reasons for attending the training programs

S.NO	Statement	RBQ	Rank
1	Inviting experienced farmers as trainers or guest speakers	73.39	I
2	Providing financial incentives or subsidies	68.03	II
3	Providing hands-on learning opportunities	66.43	III
4	Networking and knowledge sharing	62.86`	IV
5	Offering training sessions at convenient times and locations	59.46	V
6	Offering customized training based on individual needs	55.00	VI
7	Incorporating interesting activities and group discussions	48.21	VII

From the result it could be concluded that inviting experienced farmers as trainers or guest speakers was the major reason of farmers for attending the training programs. So, the training centres should take care of conducting the training programs with experienced guest speakers or farmers as trainers followed by providing financial incentives or subsidies and providing hands-on learning opportunities to the farmer members.

3.2 Preference of Farmer Members of FPOs in Western Zone on the Training Design

The application of appropriate training design can help the farmer members of FPOs to maximize the benefits of training. Most of the time, the farmers were engaged with farming activities. It is highly important to find a suitable training design in terms of training mode, frequency of training, number of days and duration of training program. Hence, the preferences towards the training dimension were studied. The results of the analysis including correlation coefficients and estimation of part-worth scores, are presented Table 3.

The correlation between the observed and estimated preferences Pearson's R (0.636) and Kendall's tau (0.444) indicated that there was reasonably higher agreement between the averaged profile ratings and the predicted utility from the conjoint analysis. It could be concluded that the goodness-of-fit of the conjoint analysis is satisfactory.

Table 3. Utilities

		Utility Estimate	Std. Error
Training mode	Classroom training	-.003	1.484
	Field training	-.285	2.198
	Combination of both	.288	1.942
Frequency of training	Once in 3 months	-.283	1.484
	Once in 6 months	-.895	2.234
	Annually	1.178	2.234
Number of Days	2 days	1.657	1.470
	3 days	1.548	1.572
	5 days	-3.205	1.649
Duration of the training	9 am - 5 pm	.586	1.484
	10 am - 4 pm	-1.537	2.198
	10 am - 5 pm	.951	1.942
(Constant)		7.956	1.365

Correlations[a]

	Value	Sig.
Pearson's R	.636	.004
Kendall's tau	.444	.008

a. Correlations between observed and estimated preferences

Total utility: (0.288+1.178+1.657+0.951=4.074)

Table 4. Average importance values

Training mode	21.896
Frequency of training	21.465
Number of Days	36.709
Duration of the training (Hours)	19.931

Part worth utility was used to know the importance of each training design dimension which in turn provided information about the willingness of farmer members of FPOs for attending the training programmes. It could be inferred from the results that with respect to training mode, farmer members of FPOs preferred the combination of both classroom training and Field visit (0.288). The training mode such as classroom training alone (-0.003) and field visit alone (-0.285) had negative utility on the preference of training design. As most of the farmers who attended the training program were not literate, they preferred to have combination of both classroom training and Field visit.

In case of frequency of training program, farmer members of FPOs preferred to have annually (1.178). The respondents did not prefer to have training once in three month (-0.283) and once in six month (-0.895), as evidenced by the disutility among farmer members of FPOs on the preference of training design.

The sample respondents showed preference to have two days training (1.657) followed by three days (1.548) whereas farmer members of FPOs showed negative utility for five days training (-3.205). With respect to duration of the training program, the respondents preferred to have 10 am to 5 pm (1.942) followed by 9 am to 5 pm (1.484) time duration to attend the training program. The respondents showed negative utility for the time duration of 10 am to 4 pm (-0.1.537).

From the Table 2, number days (36.71) was most preferred attribute in designing the training program followed by training mode (21.896) and frequency of training (21.465). Among the four training design dimensions, duration of the training (19.931) got least influence on preference of farmer members of FPOs. Average importance of training duration, mode, frequency was found to be almost 80 per cent of the total importance score.

Further, it could be concluded from the discussion that farmer members of FPOs preferred to have annually one training program. The most preferred training mode was combination of both classroom training and Field visit for two days with the duration of 10 am to 5 pm. The total highest utility value arrived for this training design was 4.074.

4. CONCLUSION

The proposed initiative is to design an annual two-day training program, commencing from 10 am to 5 pm, comprising a blend of classroom sessions and field visits. The combination of classroom training and field visits would ensure that farmers have a solid understanding of the theoretical as well as the practical application of these concepts. During the program, experienced farmers will act as trainers and guest speakers. Through the expertise of seasoned farmers, attendees will gain valuable skills and practical knowledge that can significantly contribute to their growth and success in the realm of agribusiness.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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