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Development and Standardization of a Scale to Study the Attitude of Coconut Growers towards Coconut based Farming Systems

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Abstract

Coconut Based Farming System (CBFS) consists of mono-cropping, inter-cropping, mixed cropping, multi-storeyed cropping and mixed farming. An attempt has been made to develop and standardize a scale to measure the attitude of coconut growers towards different CBFS. The items related to the attitude of coconut growers towards CBFS were exhaustively collected under five major dimensions *viz*., crop diversification, resource management, economic benefits, social benefits and ecological benefits. The selected items were edited according to the criteria and finally 55 statements were selected. The 't' value was calculated for each statement to determine its ability to differentiate between the high and low groups. Statements with a 't' value of 1.75 or higher were included in the scale, resulting in 33 significant items. The reliability test was performed using the split-half method and the correlation coefficient was 0.684. The scale also demonstrated a validity coefficient of 0.869. The final scale consisted of 33 statements and respondents will be asked to indicate their agreement or disagreement on a five-point continuum were administered to the 40 farmer of Dakshina Kannada and Udupi. The findings revealed that most of the farmers exhibited a favourable attitude towards CBFS, reflecting a generally positive perception of integrated and diversified coconut farming practices. Correlation analysis demonstrated that farming commitment, economic motivation, market orientation, innovative proneness and scientific orientation were significantly and positively associated with the attitude towards CBFS.

Keywords : Attitude scale, Coconut growers, Standardization, Validity, Reliability & Multidimensional scale

Coconut, a traditional plantation crop in India, has evolved into a high-value commercial crop with global significance. In 2022, worldwide coconut production reached 62.41 million metric tons, cultivated over approximately 12.30 million hectares, with a global productivity of about 5,076 nuts/ha. In India, coconut cultivation spans around 2.328 million hectares, yielding approximately 22.28 billion nuts (or about 19.25 million metric tonnes), at a national productivity of 9,123 nuts/ha. The crop remains predominantly concentrated in the southern states of Kerala, Tamil Nadu, Karnataka and Andhra Pradesh, accounting for over 89 per cent of area under cultivation and 90 per cent of production. Despite its economic importance, coconut cultivation faces challenges, especially among small farmers, who comprise over 90 per cent of holdings in India. The average holding size is just 0.22 hectares, which results in insufficient income for many small families (Coconut Development Board, 2022).

Coconut Based Farming Systems (CBFS) have

evolved into a diversified and sustainable approach to enhance productivity and optimize land utilization through practices like inter-cropping, mixed cropping, mixed farming and multi-storeyed cropping (Maheswarappa *et. al.,* 2010). Coconut based farming systems consist of coconut cultivation and diverse cropping systems, including monocropping, inter-cropping (Basavaraju and Nanjappa, 2010), mixed cropping, mixed farming and multi-storeyed cropping. As globally agriculture faces the issues of food security, resource conservation and environmental resilience, the integration of Coconut Based Farming Systems offers an avenue for addressing these challenges. By understanding the crop diversification, resource management, ecological, economic and social dimensions of these systems, this study not only enriches our theoretical understanding but also lays the foundation for informed policy and practice, emphasizing the role of coconut cultivation in fostering sustainable and resilient agricultural futures (Chengappa *et. al.,* 2015). The attitudes of coconut growers towards CBFS significantly influence their adoption and success of CBFS. The article helps to bridge the gap in understanding coconut growers' perspective and aims to develop a comprehensive scale for assessing their attitudes towards CBFS. By examining factors such as crop diversification, resource management, economic benefits, social advantages and ecological impacts, this scale seeks to provide valuable insights for informed decision-making and policy formulation.

Methodology

The development of a scale to assess the attitude of coconut growers towards Coconut Based Farming Systems involved a multi-step process to ensure its robustness and reliability. The method of summated rating of scale developed by Likert (1932) was used and the stepwise procedure for the same is explained below. Identification of the dimensions and editing the items: Initially, an extensive collection of items related to coconut growers' attitudes towards CBFS was undertaken. These items were then categorized into five major dimensions: crop diversification, resource management, economic benefits, social benefits and ecological benefits. A meticulous editing process was applied to refine the collected statements, resulting in a set of 55 statements.

Relevancy Test : To assess the relevance of each statement, a panel of 79 expert judges who are experts in the fields of Agricultural Extension, Agricultural Economics and Horticulture evaluated them on a five-point continuum: Most Relevant (MR), Relevant (R), Somewhat Relevant (SWR), Less Relevant (LR) and Not Relevant (NR) with respective corresponding scores of 5, 4, 3, 2, 1. The criteria-based evaluation led to the retention of 46 statements, meeting specific relevancy criteria. The judges' responses were quantified and relevancy percentage and mean relevancy score were computed for each statement. Based on pre-determined criteria, items with high relevancy indicators; weightage above 0.75, percentage above 75 per cent and mean score equal to or greater than 3.75, were selected for continued analysis, yielding a refined set of 46 attitude statements

The formula for Relevancy Percentage is as follows:

$$\text{Relevancy Percentage of ith factor } (RP_i) = \frac{(MR\times5) + (R\times4) + (SWR\ X3) + (LR\times2) + (NR\times1)}{\text{Maximum possible score}} \times 100$$

The formula for Mean Relevancy Score is as follows:

$$\text{Mean Relevancy Score of ith factor } (MRS_i) = \frac{(MR\times5) + (R\times4) + (SWR\ X3) + (LR\times2) + (NR\times1)}{\text{Number of judges responded}}$$

Item Analysis : Subsequently, a pretest was conducted in the non-sample area of Kasaragod district, Kerala, involving 40 coconut growers. The data collected from this pretest formed the basis for creating criterion groups (high and low) based on total scores. Based on their responses, two distinct groups - the top 25 per cent (high group) and bottom 25 per cent (low group) were established for each statement, allowing for the calculation of 't' values. The 't' values gauged the extent to which individual statements differed between the high and low attitude groups, aiding in the selection of discriminating items. For each statement, a 't' value was computed to

ascertain its ability to differentiate between the high and low criterion groups. Statements with a 't' value of 1.75 or higher were selected for inclusion in the final scale. This rigorous selection process yielded a refined set of 33 significant items. Ultimately, 33 statements were retained for the final scale, each selected based on a 't' value equal to or greater than 1.75, signifying their ability to effectively distinguish between differing attitudes. Reliability testing, conducted through the split-half method, yielded a high correlation coefficient of 0.784, subsequently enhanced using the Spearman Brown formula to attain a reliability coefficient of 0.839, indicative of the scale's robustness.

The formula to calculate reliability is as follows:

$$\text{Half test reliability formula} = r_{1/2} = \frac{N(\sum XY)-(\sum X)(\sum Y)}{\sqrt{(N\sum X^2 - (\sum X)^2)\,(N\sum Y^2 - (\sum Y)^2)}}$$

Where,

$\sum X$= Sum of the scores of the odd number items,

$\sum Y$ = Sum of the scores of the even number items,

$\sum X^2$= Sum of the squares of the odd number items,

$\sum Y^2$ = Sum of the squares of the even number items.

b) Whole test reliability formula

$$r_{11} = \frac{2\times r1/2}{1+r1/2}$$

Where, $r1/_2$= Half test reliability

The developed scale was also subjected to validity analysis, yielding a validity coefficient of 0.869, surpassing the established threshold of 0.70, thereby affirming the tool's accuracy in measuring attitudes.

Validity : It refers to how well a scale measures what it is supposed to measure. The validity of the scale was tested by content and statistical validity methods. The data was subjected to statistical validity.

$$\text{Validity formula} = \sqrt{r_{11}}$$

The resultant scale, encompassing 33 statements, was designed for administration using a five-point continuum, encompassing responses from 'Strongly Agree' to 'Strongly Disagree', with assigned scores reflecting varying levels of agreement or disagreement, encompassing both positive and negatively framed statements. This methodological framework ensures a comprehensive and reliable assessment of coconut growers' attitudes towards CBFS.

Administration of the Attitude Scale and Method of Scoring

Higher score on this scale indicates that the respondent has better attitude of coconut growers towards Coconut Based Farming Systems and the lower perception score indicates that the respondent has towards the attitude of coconut growers towards Coconut Based Farming Systems. The final scale consists of 33 statements for determining the attitude of coconut growers towards Coconut Based Farming Systems. The response could be collected on a five-point continuum, namely, strongly agree, agree, undecided, disagree and strongly disagree with assigned score of 5, 4, 3, 2 and 1, respectively. The attitude score of a respondent could be calculated by adding up the scores obtained by him / her on all the 33 statements. The attitude score of this scale ranges from a minimum of 33 to a maximum of 165 score. Based on the mean and half standard deviation, the respondents could be categorized into three attitude categories, *viz*., highly favourable, moderately favourable and unfavourable.

The developed scale was administered to coconut growers in two selected districts. From each district, 20 growers were randomly selected, making a total sample size of 40 respondents. A simple random sampling technique was employed to ensure unbiased representation. Data collection was carried out through personal interviews using a pre-tested structured schedule and scale, focusing on various aspects of their coconut-based farming practices.

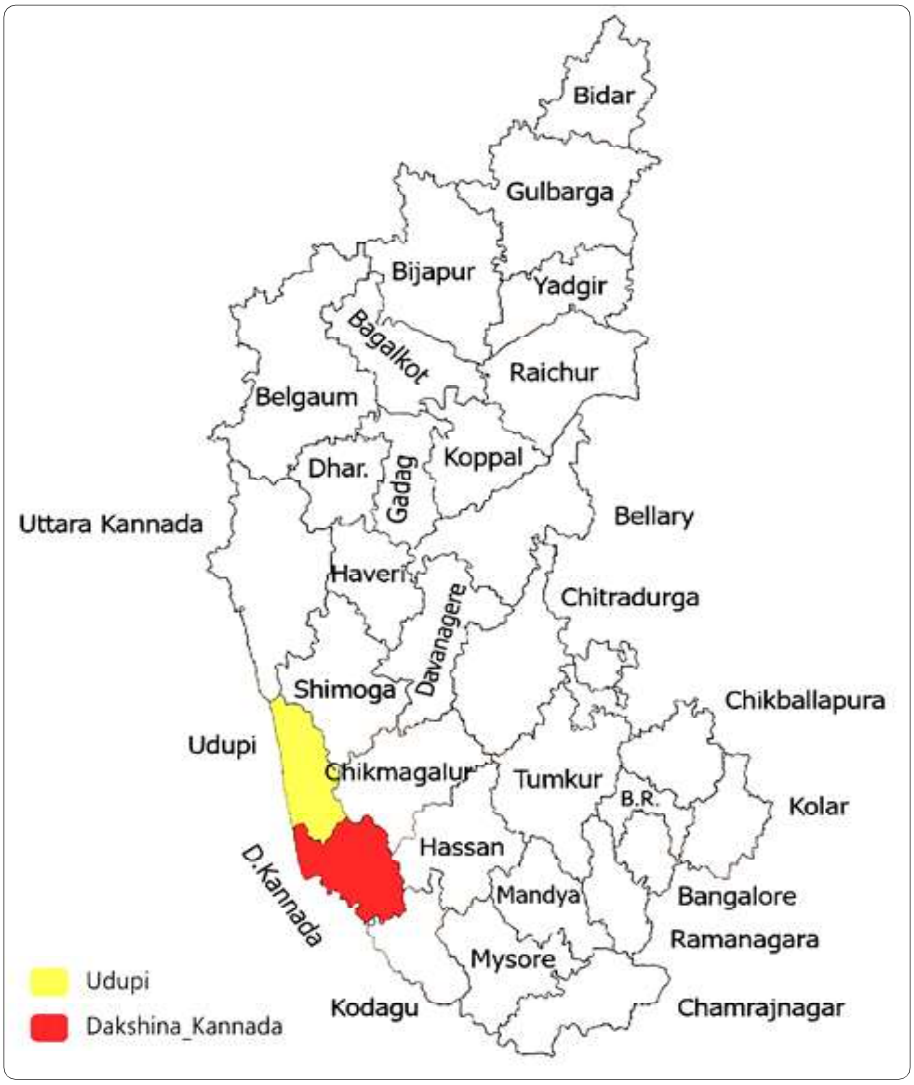

Fig. 1 : Map showing the selected study area

Results and Discussion

Development of Scale to Analyse the Attitude of Coconut Growers towards Coconut Based Farming Systems (CBFS)

Attitude of Coconut Growers towards Coconut Based Farming Systems is operationally defined in the present study as the 'psychological orientation and disposition towards various dimensions related to coconut based farming systems and integrating them into agricultural practices'. The method of summated rating scale suggested by Likert (1932) and Edwards (1969) were followed in the

Table 1

Summary of items in scale construction steps

Steps	Attitude towards CBFS	
	Statement considered	Statement retained
Collection of items	100	65
Editing of items	65	55
Relevancy analysis	55	46
Item analysis	46	33
Standardisation of scale	33	33
Administration of scale	33	33

development of the attitude scale by following five stages *viz*., (1) collection and editing of attitude statements, (2) relevancy test, (3) item analysis, (4) reliability and (5) validity.

Collection and Editing of Attitude Statements : The first step in the construction of attitude scale was to collect statements pertaining to the attitude of coconut growers towards Coconut Based Farming Systems. A tentative list of 100 statements pertaining to the attitude of coconut growers towards Coconut Based Farming Systems were collected through extensive reviews of literature and by agricultural extensionists and horticulturists. These, 65 statements were edited as per the 14 criteria enunciated by Edwards (1969) and Thurstone and Chave (1929). Therefore, 10 statements were eliminated. The remaining 55 attitude statements were included for the study.

Relevancy Analysis : Statements were sent to 100 experts / judges in the field of Agricultural Extension, Agricultural Economics and Horticulture to critically evaluate the relevancy of each statement *viz*., Most Relevant (MR), Relevant (R), Somewhat Relevant (SWR), Less Relevant (LR) and Not Relevant (NR) with the assigned score of 5, 4, 3, 2 and 1, respectively. The experts / judges were also requested to make necessary modifications and additions or deletion of attitude statements, if they desired so. A total of 79 judges/experts returned the duly completed questionnaires and the attitude statements were considered for further processing. From Table 2. It can be observed that 'relevancy percentage (RP)' and 'mean relevancy score (MRS)' were worked out for all the 55 statements. Using these criteria's, individual attitude statements were screened for relevancies using the following formulae (Gowda *et. al.,* 2022).

Table 2

Relevancy per cent and Mean Relevancy Score of the statements of Attitude of coconut growers on Coconut Based Farming Systems

Statement	RP (n=79)	MRS (n=79)	t test score (n= 20)
Crop diversification in Coconut Based Farming Systems			
Intercropping, mixed cropping, multi-storeyed cropping and mixed farming in coconut can help to minimize the effects of natural disasters	85.55	4.27	4.58 *
Intercropping, mixed cropping, multi-storeyed cropping and mixed farming in coconuts prevents migration of growers to urban areas	81.01	4.05	2.57 *
Intercropping, mixed cropping, multi-storeyed cropping and mixed farming in coconuts can maximise land productivity in a small area due to farm diversification	83.29	4.16	1.85 *
Intensification of existing cropland is possible through crop diversification by intercropping, mixed cropping, multi-storeyed cropping and mixed farming in coconuts	81.01	4.05	0.23 NS
Crop diversification due to Intercropping, mixed cropping, multi-storeyed cropping and mixed farming in coconut ensures better growth and yield parameters in crops	80.75	4.03	5.40 *
Coconut based farming system mitigates high livestock feed demands due to higher biomass production	75.19	3.76	1.14 NS
Better crop residue management is possible due to multiple crops grown in coconut based farming system	84.55	4.22	1.48 NS

Continued....

TABLE 2 Continued....

Statement	RP (n=79)	MRS (n=79)	t test score (n= 20)
There is no symbiotic and complementary relations between the component crops in Intercroppng, mixed cropping, multi- storeyed cropping and mixed farming in coconuts	61.77	3.08	NA
Domestication of new crop varieties is possible through intercroppng, mixed cropping, multi- storeyed cropping and mixed farming in coconuts	75.00	3.75	2.45*
Coconut canopy prevents the air temperature and promotes growth of other crop species growing below the coconut canopy	75.18	3.75	3.65*
Resource Management In Coconut Based Farming Systems			
Practice of coconut based farming system reduces excessive run off of water and subsequent soil erosion	86.58	4.32	2.10*
Practice of coconut based farming system enhances the optimal use of soil water	84.55	4.22	1.29^{NS}
Crop straw mulching carried out in coconut based farming system is not a means of water and nutrient conservation	60.26	3.01	NA
Formation of root barriers in coconut based farming systems is an effective measure against water seepage	78.98	3.94	2.49*
Coconut based farming system does not provide nature based substitutes to chemicals	63.29	3.16	NA
Coconut based farming system prevents over use of ground water and aquifers	76.45	3.82	2.48*
Enhanced nutrient cycling is not possible through coconut based farming system	64.05	3.20	NA
Mulching of the stubble of the subsidiary crop on coconut farms can help to tide over soil borne pathogens and pests	77.46	3.87	6.55*
Allelopathic effect of the crops grown along with coconut based farming system does not help to prevent pest and diseases in coconut	65.82	3.29	NA
Other species grown along with coconut can be used as vegetative barriers against major pests like rhinoceros beetles	75.18	3.75	2.21*
Organic farming practices in coconut based farming system can protect the environment from the ill effects of chemicals	84.81	4.24	5.12*
Growing green manure crops like sun hemp, sesbania etc. in coconut basin can help to prevent root diseases	78.22	3.91	1.50^{NS}
Economic Benefits of Coconut Based Farming Systems			
Coconut based farming system provides insurance against crop failure	84.05	4.20	2.75*
Delays on repayment of loan can be prevented due to practice of coconut based farming system	81.51	4.07	3.35*
The total revenue accrued from coconut based farming system was significantly higher than monocrop	87.81	4.39	2.74*
Coconut based farming system reduces costs in procuring weedicides due to smother and border crops	78.73	3.93	0.51^{NS}

Continued....

TABLE 2 Continued....

Statement	RP (n=79)	MRS (n=79)	t test score (n= 20)
Higher benefit cost ratio cannot be attained through coconut based farming system	69.11	3.45	NA
Farm operations are not cheaper to carry out while practicing coconut based farming system	75.69	3.78	2.09*
All year-round farm income can be obtained by practicing coconut based farming system	83.79	4.18	0.81^{NS}
Maximum returns from minimum resources is not possible through coconut based farming system	79.49	3.97	2.91*
By products from livestock impart additional income in a coconut based farming system	65.55	3.27	NA
Less reliance on loans due to practice of coconut based farming system is possible	83.54	4.17	1.55^{NS}
Coconut based farming system reduces the cost on availing inputs	75.44	3.77	5.19*
Social Benefits of Coconut Based Farming Systems			
Locally relevant farming practices can be implemented in coconut based farming systems	75.44	3.77	3.65*
Coconut based farming system is not guaranteed to procure food of good quality in a socially acceptable way	85.06	4.25	3.68*
Coconut based farming system helps in creating a synergic and supportive process of farmer-to-farmer communication	66.58	3.32	NA
Coconut based farming system promotes community development and coconut growers organizations	78.22	3.91	1.17^{NS}
Coconut based farming system ensures both collective and individual welfare of coconut growers	77.97	3.89	2.24*
Coconut based farming system considers consequences of coconut growers' actions on future generations	78.98	3.94	1.36^{NS}
Coconut based farming system helps in creation of social capital	76.45	3.82	3.91*
Practicing coconut based farming system creates better technical efficiency of coconut growers	76.70	3.83	3.48*
Coconut based farming system ensures food sovereignty to the farming community	77.72	3.88	2.86*
Coconut based farming system promotes self- help groups, farmer producer organizations, farm/youth clubs, charitable society and rural technology training centers	77.72	3.88	5.96*
Coconut based farming systems promote co- operation and leadership among coconut growers	78.73	3.93	1.35^{NS}
Coconut based farming system promotes coordination among the coconut growers	75.18	3.75	2.10*
Ecological Benefits of Coconut Based Farming Systems			
There is a reduced production of carbon dioxide and greenhouse gases due to practice of coconut based farming system	76.45	3.82	2.97*

Continued....

Table 2 Continued....

Statement	RP (n = 79)	MRS (n = 79)	t test score (n = 20)
Coconut based farming system stimulates biodiversity conservation	76.70	3.83	5.06*
Coconut based farming system helps in carbon reduction and neutralization	82.53	4.12	1.15^{NS}
Renewal of natural resources cannot be achieved through coconut based farming system	78.22	3.91	3.97*
Reduced dependence on fossil fuels can be achieved by coconut based farming systems	61.51	3.07	NA
Coconut based farming system provides a nature-based solution to environmental problems	74.93	3.74	3.82*
Organic recycling due to practice of coconut based farming systems helps in nutrient enhancement within the farm	78.22	3.91	3.34*
Maximization of waste into value added products is possible through coconut based farming systems 83.	79	4.19	1.61^{NS}
Coconut based farming system ensures welfare of natural pollinators like birds and bees	82.53	4.12	6.32*
Coconut based farming system helps in improving beneficial soil micro -organisms	81.01	4.05	3.28*

Accordingly, statements having 'relevancy percentage' of 75.00 per cent and above and mean relevancy score of 3.75 and above were considered for final selection. Accordingly, 46 attitude statements were retained after relevancy test and these statements were suitably modified and written as per the comments of the judges, wherever applicable (Table 3).

Table 3

Psychological Profile characteristics of coconut growers

(n= 40)

Characteristics	Category	No	%
Farming Commitment	Low (<23.87)	5	12.50
Mean : 26.61	Medium (23.87-29.35)	30	75.00
SD : 8.56	High (>29.35)	5	12.50
Economic Motivation	Low (<22.78)	14	35.00
Mean : 24.46	Medium (22.78-26.14)	18	45.00
SD : 3.36	High (>26.14)	8	20.00
Market Orientation	Low (<23.97)	13	32.50
Mean : 25.54	Medium (23.97-27.10)	7	17.50
SD : 3.13	High (>27.10)	20	50.00
Risk Orientation	Low (<23.24)	25	62.50
Mean : 24.62	Medium (23.24-26.10)	8	20.00
SD : 2.96	High (>26.10)	7	17.50
Innovative Proneness	Low (<21.38)	1	0.00
Mean : 24.57	Medium (21.38-27.76)	31	80.00
SD : 6.38	High (>27.76)	8	20.00
Scientific Orientation	Low (<21.81)	8	20.00
Mean : 24.00	Medium (21.81-26.19)	22	55.00
SD : 4.38	High (>26.19)	10	25.00
Change Proneness	Low (<1.81)	8	20.00
Mean : 2.19	Medium (1.81-2.56)	16	40.00
SD : 0.75	High (>2.56)	16	40.00

Continued....

Table 3 Continued....

Item Analysis : The critical ratio, that is, the 't' value which analyses the extent to which a given statement differentiates between the better and poor groups of respondents for each statement, was calculated by using the following formula:

$$t = \frac{\bar{X}_H - \bar{X}_L}{\sqrt{\frac{\sum X_H^2 - \frac{(\sum X_H)^2}{n} \times \sum X_L^2 - \frac{(\sum X_L)^2}{n}}{n(n-1)}}}$$

Where,

X_H = The mean score on given statement of the high group,

X_L = The mean score on given statement of the low group,

$\sum X^2_H$ = Sum of squares of the individual score on a given statement for high group,

$\sum X^2_L$ = Sum of squares of the individual score on a given statement for low group,

n = Number of respondents in each group,

$\sum$ = Summation,

t = The extent to which a given statement differentiates between the high and low groups.

After computing the 't' value for all the 46 items, 33 attitude statements with 't' value equal to or greater than 1.69 were finally selected and included in the final perception scale (Table 3.).

Reliability : Reliability refers to precision of the scale constructed for any purpose. A test will be reliable when it gives the same repeated result under the same conditions. In any social science research, a newly constructed scale must be tested for its reliability before it is used. The split-half method was employed to test the reliability of the attitude scale. The value of correlation coefficient was 0.784 and this was further corrected by using Spearman Brown formula to obtain the reliability coefficient of the whole set. The 'r' value of the scale was 0.83, which was significant at one per cent level indicating the high reliability of the scale. It was concluded that the attitude scale constructed was reliable.

Validity : It refers to how well a scale analyses what it is purported to measure. The data was subjected to statistical validity, which was found to be 0.86 for scale which is greater than the standard requirement of 0.84. Hence, the validity coefficient was also found to be appropriate and suitable for the tool developed. Thus, the developed scale to analyze the attitude of coconut growers towards Coconut Based Farming Systems.

Psychological Profile Characteristics of Respondents : The results in Table 3 depict psychological characteristics of coconut growers that a majority (75.00%) exhibited a medium level of farming commitment, indicating a moderate degree of involvement in their farming activities. In terms of economic motivation, 45.00 per cent of the respondents belonged to the medium category, reflecting a balanced drive for financial gains. A significant proportion (50.00%) showed high market orientation, suggesting strong awareness and responsiveness to market trends and demands. Risk orientation was predominantly low among the farmers, with 62.50 per cent indicating a reluctance to engage in uncertain or risky ventures. Regarding innovative proneness, 80.00 per cent of the growers were in the medium category, implying a moderate inclination towards adopting new ideas and technologies. Similarly, 55.00 per cent had a medium level of scientific orientation, showing a fair tendency to utilize scientific approaches in their farming practices. Lastly, in terms of change proneness, both medium and high levels were equally represented (40.00% each), suggesting a substantial willingness among the farmers to embrace changes in agricultural systems and practices

Attitude of Coconut Growers towards Coconut Based Farming Systems

The attitude scale developed was administered to 40 farmers in Udupi and Dakshina Kannada districts of Karnataka state during 2023-2024. The attitude of farmers towards a farming system is a crucial indicator of its acceptability and potential for adoption. In this study, the overall attitude of coconut growers towards different CBFS was

Table 4

Overall attitude of coconut growers towards different Coconut-based Farming Systems

(n= 40)

Category	No	%
Less Favourable (<109.92)	15	37.50
Favourable(109.92-124.92)	23	57.50
More Favourable (>124.92)	02	05.00
Total	40	100.00
Mean = 115.47		
SD = 17.10		

measured and categorized into three levels: less favourable, favourable, and more favourable, as shown in Table 4.

The results reveal that a majority of the respondents (57.50%) had a favourable attitude towards different CBFS, indicating a generally positive perception among growers. However, 37.50 per cent of the growers fell under the less favourable category, which may reflect reservations or limited exposure to the benefits of CBFS. Only 5.00 per cent exhibited a more favourable attitude, suggesting that very few farmers had a highly optimistic view of these systems. These findings align with the notion that while awareness and exposure to diversified farming practices are increasing, a significant proportion of farmers still lack full conviction in their advantages. Factors such as risk aversion, lack of technical knowledge, market uncertainties or inadequate institutional support might contribute to the less favourable attitudes observed. This indicates the need for targeted extension interventions, on-farm demonstrations and training programs to enhance the understanding and perceived benefits of integrated and diversified coconut farming practices. Efforts should also be directed towards addressing the specific concerns of those with less favourable attitudes, to foster broader adoption of sustainable and resource-efficient farming systems.

Table 5, explains dimension wise analysis toward CBFS, that the majority of farmers (55.00%) expressed a favourable attitude towards crop diversification, suggesting they recognize the benefits of growing multiple crops alongside coconut for better resource utilization and risk reduction. About 25.00 per cent had a more favourable perception, indicating a progressive inclination toward diversified practices. In terms of resource management, 32.50 per cent of the growers had a more favourable attitude, while 40.00 per cent were moderately favourable. This suggests an increasing awareness among farmers about optimal use of land, water and labor, especially in diversified or integrated systems.

Table 5

Dimension wise distribution of farmers according to their attitude towards Coconut-based Farming Systems

(n= 40)

Particulars	Category	No	%
Crop Diversification Mean : 21.94 SD : 4.40	Less favourable (<19.74)	08	20.00
	Favourable (19.74 - 24.14)	22	55.00
	More favourable (>24.14)	10	25.00
Resource Management Mean : 19.13 SD : 5.54	Less favourable (>16.36)	11	27.50
	Favourable (16.36 - 21.90)	16	40.00
	More favourable (>21.90)	13	32.50
Economical- Benefits Mean : 22.40 SD : 4.33	Less favourable (<20.23)	18	45.00
	Favourable (20.23 - 24.57)	12	30.00
	More favourable (>24.57)	10	25.00
Social Benefits Mean : 27.51 SD : 5.55	Less favourable (>24.74)	16	40.00
	Favourable (24.74 - 30.28)	15	37.50
	More favourable (>30.28)	09	22.50
Ecological Benefits Mean : 23.01 SD : 6.54	Less favourable (<19.74)	18	45.00
	Favourable (19.74 - 27.28)	16	40.00
	More favourable (>26.28)	06	15.00

However, economic benefits revealed a relatively skewed pattern, with 45.00 per cent of respondents showing a less favourable attitude. This may indicate concerns regarding the profitability or immediate financial returns from CBFS, possibly due to market limitations or higher initial investment costs. The social benefits dimension showed that 40.00 per cent of farmers had a less favourable perception, possibly due to limited community-level adoption or inadequate cooperative support. Nevertheless, 22.50 per cent of respondents exhibited a more favourable attitude, reflecting recognition of CBFS in improving livelihood security and social status. Notably, ecological benefits were among the least recognized, with 45.00 per cent of respondents showing a less favourable attitude. This finding suggests a knowledge gap regarding the environmental advantages of CBFS such as improved biodiversity, soil conservation, and microclimate regulation. These dimension-wise findings point toward the need for targeted capacity-building programs, especially focusing on the economic and ecological benefits of CBFS. Demonstrations, farmer field schools and peer learning could be effective in enhancing farmers' understanding and positive attitude toward sustainable coconut-based farming practices.

Relationship between Psychological Characteristic of Coconut Growers and Attitude

The correlation analysis between the psychological characteristics of coconut growers and their attitude towards CBFS revealed that several variables had a significant positive relationship. Farming commitment (r = 0.355*), economic motivation (r=0.351*), market orientation (r=0.377*), innovative proneness (r=0.361*) and scientific orientation (r=0.367*) were all significantly and positively correlated with the growers' attitudes at a 5 per cent level of significance. This indicates that growers who are more committed, economically motivated, market-oriented, innovative and scientifically inclined tend to have a more favorable attitude towards CBFS.

On the other hand, risk orientation (r=0.112) and change proneness (r=0.218) showed a positive but non-significant relationship with attitude, suggesting that these variables do not have a statistically meaningful influence on the growers' attitude towards such farming systems in the present study.

Table 6

Relationship between Psychological Characteristics of Coconut Growers and Attitude towards Coconut-based Farming System

(n= 40)

Characteristics	Co-relation coefficient 'r' values
Farming commitment	0.355*
Economic motivation	0.351*
Market orientation	0.377*
Risk orientation	0.112^{NS}
Innovative proneness	0.361*
Scientific orientation	0.367*
Change proneness	0.218^{NS}

Extent of Contribution of Psychological Characteristics Towards Attitude

Table 7. Revealed that farming commitment, economic motivation, market orientation, innovative proneness, and scientific orientation significantly contributed to the attitude towards CBFS, with an R^2

Table 7

Extent of Contribution of Psychological Characteristics towards Attitude towards Coconut-based Farming System

(n= 40)

Characteristics	RC	SE	t value
Farming commitment	0.371	0.881	2.370*
Economic motivation	0.349	0.714	2.040*
Market orientation	0.235	0.610	2.590*
Risk orientation	0.641	0.896	1.480^{NS}
Innovative proneness	0.353	0.911	2.580*
Scientific orientation	0.177	0.410	2.316*
Change proneness	0.155	0.290	1.871NS
R^2		0.53	

value of 0.53. Risk orientation and change proneness were non-significant contributors.

The findings indicate that over half the variability in farmers' attitudes can be explained by their psychological traits, notably those reflecting motivation, innovation and scientific temperament. This underscores the need for behavior-focused interventions to foster positive attitudes and enhance the adoption of diversified coconut-based systems.

In conclusion, this study undertook a systematic methodological journey to develop a comprehensive attitude scale aimed at analyzing the attitude of coconut growers towards coconut-based farming systems. Through systematic analysis, a final set of 33 statements was identified, reliability testing, conducted using the split-half method and Spearman Brown formula, yielded consistently high coefficients, attesting to the scale's internal consistency and stability. The scale's validity was reaffirmed through statistical analysis, demonstrating its capacity to accurately measure attitudes with a coefficient surpassing the accepted standard. The analysis of administered scale to the coconut growers of Dakshina Kannada and Udupi revealed the coconut growers possessed moderate levels of psychological characteristics such as farming commitment, economic motivation, market orientation and scientific orientation, while risk orientation was generally low. The overall attitude of farmers towards CBFS was found to be favourable, with a notable proportion still holding less favourable views, particularly regarding the economic and ecological dimensions. Dimension-wise analysis showed that while crop diversification and resource management were relatively well - received, there were concerns and knowledge gaps related to the economic viability and environmental advantages of CBFS. These gaps highlight the need for focused extension efforts to build farmers' capacity in understanding the broader benefits of integrated coconut farming systems. The relationship analysis established that psychological traits like commitment, economic drive, innovation, and scientific orientation significantly influenced farmers' attitudes towards CBFS. These findings suggest that behavioural and motivational factors play a key role in shaping acceptance and adoption of sustainable farming systems. Therefore, targeted interventions that enhance these psychological traits, alongside practical demonstrations and peer learning platforms, can significantly improve the adoption of CBFS among growers.

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