



A SCALE TO MEASURE ATTITUDE OF FARMERS TOWARDS BIOFERTILIZERS

A Srinivas

*Ph.D Scholar, Department of Agricultural Extension
College of Agriculture, ANGRAU, Hyderabad*

V Sudha Rani

*Professor, Department of Agricultural Extension
College of Agriculture, ANGRAU, Hyderabad*

P Archana

*Ph.D Scholar, Department of Agricultural Extension
College of Agriculture, ANGRAU, Hyderabad*

G Manasa

*Ph.D Scholar, Department of Agricultural Extension
College of Agriculture, ANGRAU, Hyderabad*

Abstract

Due to the non-availability of a standardized scale to measure farmer's attitude towards biofertilizers, it was thought necessary to construct a scale for the purpose and an attempt has been made to develop a scale for measuring the attitude of farmers towards biofertilizers. Method of equal appearing intervals, developed by Thurstone and Chave (1929) was used. Twenty statements were finally selected from 40 statements for which scale (S) and Q values were worked out. The scale values of the statements on the psychological continuum were relatively equally spaced.

Key words: Farmer; Attitude scale; Biofertilizers

Introduction

The chemical fertilizers has played a significant role in increasing agricultural production in the country since 'Green Revolution' but the continuous use of chemical fertilizers however, has deteriorated the soil fertility, destroyed soil microbial activity, disturbed environmental balance and ecological soundness resulting in dire need to use such fertilizers that are eco-friendly, maintain soil fertility and increase crop production. Biofertilizers, most of which are nitrogen fixing microorganisms, are considered to be appropriate alternative source of plant nutrition.

The most prominent and contributing function of biofertilizers is substantial reduction in environmental pollution and improvement in agro ecological soundness. Biofertilizers are affordable to farmers because of low costs and they are very significant in making available nutrients like nitrogen and phosphorus to the crop plants. (Pandv and Pandev, 1995).

Despite having various potentials biofertilizers did not get farmers acceptance adequately. To promote use of biofertilizers by farmers it is essential to study their attitude towards biofertilizers, as attitude forms an essential component in adoption of bio fertilizer the innovative farming practice. Hence, in order to study the attitude of farmers towards biofertilizers, a scale has been developed.

Attitudes are acquired through experience and exert a directive influence on subsequent behavior and moreover, help individuals to interpret new information and to make decisions more efficiently than would otherwise be the case (Baron and Byrne 1991). Edwards (1957) defined attitude as the degree of positive or negative effect associated with some psychological object.

Attitude in the present study was operationally defined as the degree of positive or negative feeling of farmers towards biofertilizers.

The method of equal appearing interval scaling described by Thurston and chave (1927) was used to measure the attitude of farmers towards biofertilizers.

Methodology

Total of 100 statements representing attitude of farmers towards biofertilizers were written initially, by through reviewing from all possible sources and then edited on the basis of criteria suggested by Edwards (1969). Out of 100 statements, 40 statements were taken for final inclusion in construction of scale. Typed copies of all 40 statements together with 7 - point continuum were given to 50 judges and requested to sort out the statements in the 7 categories.

Calculations of Scale and Q Values

The scale i.e 'S' and 'Q' values judged on equal appearing interval by 50 judges were computed by calculating the median value and their inter quartile range (Q). The objective was to have small number of statements rather evenly placed on the continuum. The scale value was median value of the distribution of the subjects for each statements and it was calculated by using following formula.

$$S = l + \left[\frac{(0.50 - \sum P_b)}{P_w} \right] i$$

Where,

S = the median or scale value of the statement

l = the lower limit of the interval in which the median falls

Pb = the sum of the proportion below the interval in which the median falls

Q = inter quartile range

$$Q = C_{75} - C_{25}$$

C₇₅ = 75th centile

C₂₅ = 25th Centile

$$25\text{th centile} = C_{25} = l + \left[\frac{0.25 - \sum P_b}{P_w} \right] i$$

Where,

l = the lower limit of the interval in which the 25th centile falls

Pb = the sum of the proportion below the interval in which 25th centile falls

Pw = the proportion within the interval in which the 25th centile falls

i = the width of the interval which is assumed to be equal to 1.00

$$75\text{th centile} = C_{75} = l + \left[\frac{0.50 - \sum P_b}{P_w} \right] i$$

Where,

l = the lower limit of the interval in which the 75th centile falls

Pb = the sum of the proportion below the interval in which the 75th centile falls

Pw = the proportion within the interval in which the 75th centile falls

i = the width of the interval which is assumed to be equal to 1.00

When there is good agreement among the subjects in judging the degree of favorableness of a statement, Q value will be small. A large Q value indicates disagreement among the judges as to the degree of attribute possessed by a statement and it is, therefore, taken as an indication that there is something wrong with the statement. Thurstone and chave (1929) regard large Q values primarily as an indication that a statement is ambiguous. It is also may be due to the fact that statement is interpreted in more than one way by the subjects. The scale and Q values for all the 44 statements were calculated by following the above procedure.

Final Selection of the Attitude Statements

20 statements were selected from 40 statements for which we had calculated scale and Q values in such a way that the scale values of the statements on the psychological continuum are relatively equally spaced and such that the Q values are relatively small. These statements were then arranged in order and presented to subjects with instructions to indicate those that they are willing to accept or agree with and those that they reject or disagree with. Taking only the statements with which the subject has agreed, an attitude score was obtained from the scale values of these statements that were regarded as an indication of the location of the subject on the psychological continuum on which the statements have been coded. The attitude score

When there was good agreement among the judges in judging the degree of favourableness or unfavourableness of a statement, Q value was small as compared with the value obtained when there was relatively little agreement among the judges. Based on the following criteria, 20 statements were finally selected for attitude scale. Representation of the universe of the opinion about the programme.

- The scale values should have equal appearing intervals and equal distribution of favourable and unfavourable attitude statements.
- The scale values of the selected statements ranged from 1.4 to 6.2 and Q values from 1 to 3.3 with seven class intervals. The scale and Q values of attitude statements are given in table 1.

Scoring Procedure and Final Format of the Scale

Out of twenty selected statements ten statements were the indicators of favourable attitude towards the programme and remaining ten statements were indicating unfavourable attitude. These finally selected twenty statements were randomly arranged to avoid response bias. Against each of these statements, thus arranged, there were seven columns representing a 7 point continuum as very strongly agree, strongly agree, agree, undecided, disagree, strongly disagree and very strongly disagree with weightage of 7, 6, 5, 4, 3, 2 and 1 respectively for favourable statements and weightage of 1, 2, 3, 4, 5, 6 and 7 for unfavourable statements.

Final attitude scores are obtained.

Reliability of Attitude Scale

According to Kerlinger (1967) "Reliability is the accuracy or precision of measuring instrument". To know the reliability of the scale split half method was used.

The Split Half Method

Total 20 statements in the scale were divided into two equal halves by putting the odd numbered items on one side and even numbered items on the other side. Both halves were considered as separate schedule with 10 statements each. Each set of half part of a schedule was administered on the same group of 30 respondents alternatively. To find out the agreement between two sets of statements of the schedule, correlation coefficient was calculated and put to Spearman Brown prophecy formula as given here

$$r_{11} = \frac{2 (roe)}{1 + roe}$$

Where roe is the coefficient of reliability of two half test i.e. odd and even and 11 is coefficient of the entire test. Reliability coefficient for attitude scale was 0.85.

Table 1: Summary table for judgements obtained by method of equal appearing intervals and scale and Q values of statements

No. STATEMENTS	Least favourable							Neutral							Most favourable							
	A	B	C	D	E	F	G	S	Q	Selected/Rejected	A	B	C	D	E	F	G	S	Q	Selected/Rejected		
1. I believe that biofertilizers can substitute the use of chemical fertilizers	f	5	6	9	5	11	8	6	4	3	Rejected	f	5	6	9	5	11	8	6	4	3	Rejected
2. Biofertilizers application involves complex methods	cp	0.1	0.12	0.18	0.1	0.22	0.16	0.12	1	0	Rejected	f	11	8	17	4	8	2	2.3	2.1	Rejected	
3. In my field, soil was deteriorated due to continuous use of chemical fertilizers so i prefer to use biofertilizers	f	0	0	0	4	5	26	11	4.7	1	Selected	cp	0.06	0.16	0.42	0.6	0.88	0.96	1	0.04	2.2	Rejected
4. In my view biofertilizers will enhance the soil fertility	f	0	0	0	4	5	26	11	4.7	1	Selected	cp	0.06	0.16	0.42	0.6	0.88	0.96	1	0.04	2.2	Rejected
5. In my view, chemical fertilizers will give more yield when compare to biofertilizers	f	1	4	24	13	4	2	2	2.8	1.4	Selected	p	0.02	0.08	0.48	0.26	0.08	0.04	0.04	0.04	1.4	Selected
6. I strongly feel that the use of biofertilizers is eco friendly.	f	0	0	0	1	6	24	18	5.7	1.1	Selected	cp	0.02	0.08	0.48	0.26	0.08	0.04	0.04	0.04	1.1	Selected
7. If i want to improve my crop yield chemical fertilizers are the only source	f	7	15	24	0.3	0.48	0.04	0	0	0	Selected	cp	0	0	0.02	0.04	0.16	0.64	1	3.2	Selected	
	cp	0.14	0.44	0.92	0.96	1	1	1	1	1	Selected	p	0.14	0.3	0.48	0.04	0	0	0	0	1.9	Selected

No. STATEMENTS	Least favourable							Neutral							Most favourable								
	A	B	C	D	E	F	G	S	Q	Selected/Rejected	A	B	C	D	E	F	G	S	Q	Selected/Rejected			
1. Biofertilizers are cost effective	f	0	2	4	6	11	19	8	5.1	Selected	f	0	0	4	0.08	0.12	0.22	0.38	0.16	3	4.3	Rejected	
2. Biofertilizers will not improve soil fertility up to required level	f	4	3	9	6	9	11	8	4.3	Rejected	f	0	0	0.04	0.1	0.16	0.4	0.84	1	1	1.7	Selected	
3. Biofertilizers will help the plant to grow in a healthy environment	f	0	3	4	7	11	18	7	5	Selected	f	0	0	0.06	0.08	0.14	0.22	0.36	0.14	1	2.8	Rejected	
4. Products from biofertilizers used fields will be healthier than chemical fertilizers used one	f	4	7	3	8	10	13	5	4.3	Rejected	f	0	0.06	0.14	0.28	0.5	0.86	1	1	1.4	Selected		
5. Long term usage of chemical fertilizers will affect the soil health	f	2	5	4	16	19	2	2	3.8	Selected	f	0	0.08	0.22	0.28	0.44	0.64	0.9	1	2.5	Rejected		
6. In my view plants are less susceptible to pest and diseases with the use of biofertilizers	f	6	9	6	12	8	3	3	3.6	Rejected	f	0	0.04	0.16	0.22	0.16	0.16	0.08	0.08	1	1.5	Selected	
7. I have fear about the consideration of expiry date of biofertilizers	f	6	7	10	9	8	6	4	3.3	Rejected	f	0	0.04	0.14	0.26	0.46	0.64	0.80	0.92	1	1.04	Selected	
8. Cultivation of crops by using both chemical and biofertilizers will give good results	f	0	0	1	2	2	14	31	6.2	Selected	f	0	0.02	0.04	0.04	0.04	0.04	0.04	0.28	0.62	1	0.38	1

No. STATEMENTS	Least favourable							Neutral							Most favourable								
	A	B	C	D	E	F	G	S	Q	Selected/Rejected	A	B	C	D	E	F	G	S	Q	Selected/Rejected			
1. Compost biofertilizers will help the plant to grow in a healthy environment	f	0	3	4	7	11	18	7	5	Selected	f	0	0.06	0.14	0.28	0.5	0.86	1	1	1.4	Selected		
2. Products from biofertilizers used fields will be healthier than chemical fertilizers used one	f	4	7	3	8	10	13	5	4.3	Rejected	f	0	0.08	0.22	0.28	0.44	0.64	0.9	1	2.5	Rejected		
3. Long term usage of chemical fertilizers will affect the soil health	f	2	5	4	16	19	2	2	3.8	Selected	f	0	0.04	0.16	0.22	0.16	0.16	0.08	0.08	1	1.5	Selected	
4. In my view plants are less susceptible to pest and diseases with the use of biofertilizers	f	6	9	6	12	8	3	3	3.6	Rejected	f	0	0.04	0.14	0.26	0.46	0.64	0.80	0.92	1	1.04	Selected	
5. I have fear about the consideration of expiry date of biofertilizers	f	6	7	10	9	8	6	4	3.3	Rejected	f	0	0.02	0.04	0.04	0.04	0.04	0.04	0.28	0.62	1	0.38	1
6. Cultivation of crops by using both chemical and biofertilizers will give good results	f	0	0	1	2	2	14	31	6.2	Selected	f	0	0.06	0.14	0.26	0.46	0.64	0.80	0.92	1	1.04	Selected	

Contd....

10. STATEMENTS	Least favourable							Neutral							Most favourable								
	A	B	C	D	E	F	G	S	Q	Selected/Rejected	A	B	C	D	E	F	G	S	Q	Selected/Rejected			
2. I believe that biofertilizers cannot survive under unfavourable conditions	f	2	5	6	4	14	12	7	4.6	2.6	Rejected	p	0.04	0.1	0.12	0.08	0.28	0.24	0.14	1	5.5	1.1	Selected
1. I feel that if i follow organic practices like biofertilizers i will get more price in the market	f	0	0	2	4	7	26	11	5.5	1.1	Selected	cp	0.04	0.14	0.26	0.34	0.62	0.86	1	1	5.5	1.1	Selected
4. Biofertilizers do maintain the soil fertility than chemical fertilizers in long run	f	0	0	4	5	24	13	4	4.8	1.2	Selected	p	0	0	0.04	0.12	0.26	0.78	1	1	4.8	1.2	Selected
5. I feel that conversion from chemical fertilizers to biofertilizers is of no use to farmers	f	2	6	8	4	12	11	7	4.4	2.9	Rejected	p	0.04	0.12	0.16	0.08	0.24	0.22	0.14	1	4.4	2.9	Rejected
6. Chemical fertilizers has to be supplied to supply nutrients in time	f	2	1	18	10	16	1	2	3.3	1.8	Selected	cp	0.04	0.16	0.32	0.40	0.64	0.86	1	2	3.3	1.8	Selected
7. There will be less risk of soil pollution if we use biofertilizers	f	1	2	4	11	24	6	2	4.4	1.3	Selected	p	0.02	0.04	0.08	0.22	0.48	0.12	0.04	1	4.4	1.3	Selected
28. I feel that chemical fertilizers will effects the soil microbial activity	f	2	6	4	8	13	10	7	4.3	2.2	Rejected	cp	0.02	0.06	0.14	0.36	0.84	0.96	1	7	4.3	2.2	Rejected

Contd....

10. STATEMENTS	Least favourable							Neutral							Most favourable								
	A	B	C	D	E	F	G	S	Q	Selected/Rejected	A	B	C	D	E	F	G	S	Q	Selected/Rejected			
As no adequate farm yard manure is available, the use of biofertilizers is essential	f	6	5	6	11	9	7	6	3.8	2.9	Rejected	p	0.12	0.1	0.12	0.22	0.18	0.14	0.12	1	3.9	1.7	Selected
I want more quick results to my crop so that i prefer chemical fertilizers	f	1	3	11	12	20	2	1	3.9	1.7	Selected	cp	0.12	0.22	0.34	0.56	0.74	0.88	1	1	3.9	1.7	Selected
I spent more money for chemical fertilizers, so i want a alternate like biofertilizers	f	4	6	12	7	7	6	8	3.5	2.7	Rejected	p	0.08	0.12	0.24	0.14	0.14	0.12	0.16	1	3.5	2.7	Rejected
I am satisfied with present chemical fertilizers no need for any alternate like biofertilizers	f	10	14	19	3	2	2	0	2.1	1.09	Selected	cp	0.08	0.2	0.44	0.58	0.72	0.84	1	0	2.1	1.09	Selected
I don't believe that biofertilizers used crop will become healthy	f	5	7	8	9	7	9	5	3.6	2.6	Rejected	p	0.1	0.14	0.16	0.18	0.14	0.18	0.1	1	3.6	2.6	Rejected
Biofertilizers will improve physical and chemical properties of soil	f	4	6	7	11	10	6	6	3.8	2.5	Rejected	cp	0.08	0.12	0.14	0.22	0.2	0.12	0.12	1	3.8	2.5	Rejected
Biofertilizers maintains the natural habitat of the soil.	f	0	0	1	2	2	16	29	6.1	1.42	Selected	p	0	0	0.02	0.04	0.04	0.32	0.58	1	6.1	1.42	Selected

Contd....

Validity of Attitude Scale

The validity of the test depends upon the fidelity with which it measures what is expected to measure. In intrinsic validity of attitude scale was calculated by taking the square root of the reliability coefficient. The final scale was administered to 40 respondents for the validity of the scale. The value of test was found to be significant. The coefficient of validity was found to be 0.86. Also the content, logical, construct and concurrent validity of the scale was ensured through jury validation and properly selecting the statements to cover the whole universe of the content with the help of literature.

The scale thus met the reliability and validity test satisfactorily and indicated, its ability as an instrument for measuring attitude of farmers towards biofertilizers.

Conclusion

Despite having various potential activities biofertilizers yet did not get farmers acceptance adequately. To promote biofertilizers it is essential to study the attitude of farmers towards biofertilizers. Due to the non-availability of a proper scale to measure farmer's attitude towards biofertilizers, it was thought necessary to construct a scale for the purpose. Keeping this in view, an attempt has been made to develop a scale for measuring the attitude of farmers towards biofertilizers. Method of equal appearing intervals was used. Twenty statements were selected from 40 statements for which scale (S) and Q values were worked out. The scale values of the statements on the psychological continuum were relatively equally spaced. The reliability and validity of the scale indicated the precision and consistency of the results. This scale can be used to measure the farmers' attitude towards biofertilizers.

REFERENCES

Edwards, A, L, (1969): *Techniques of Attitude Scale Construction*. Vakils, Feffer and Simons Private Ltd. Bombay.
 Jha, K, K, (2009): Scale for measuring attitude of farmers towards social forestry. *Indian Research Journal of Extension Education*, 9(3): 75-77. 6 ref.
 Kumar, P, G and Ratnakar, R, (2011): A scale to measure farmers' attitude towards ICT-based extension services. *Indian Research Journal of Extension Education*, 11(1): 109-112. 2 ref.
 Prasad, G, V and Siddaramaiah, B, S, (2000): A scale to measure attitude of farmers towards plant protection measures. *Karnataka Journal of Agricultural Sciences*, 13(4): 908-913. 2 ref.
 Siddu, H, C and Prakash Padakannaya, (2009): Development of scale to measure attitude of farmers towards improved agricultural practices. *Mysore Journal of*

STATEMENTS

Statements	A	B	C	D	E	F	G	S	Q
	Least favourable	Neutral	Most favourable						
Biofertilizers will die if they have been exposed to high temperature.	0	0	0	0	0	0	0	0.22	15
The use of biofertilizers requires more scientific knowledge	0	0	0	0	0	0	0	0.22	15
Use of biofertilizers will help to save the environment for future generations	0	0	0	0	0	0	0	0.22	15
If I think of soil/environmental welfare I can't do farming et al	0	0	0	0	0	0	0	0.22	15
I am bothering about soil health with continuous use of chemical fertilizers so I need an alternate like biofertilizers	0	0	0	0	0	0	0	0.22	15

* Selected statements, p = proportion, cp = cumulative proportion.

Subrahmanyeswari, B and Chander, M, (2008): A scale to measure attitude of registered organic farmers towards organic livestock farming. *Livestock Research for Rural Development*, 20(2): 20026. 3 ref.

Received on 13.2.2013 and revised accepted on 5.3.2013