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Development of an Index on Progressiveness of Farmers using Bore well Irrigation

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Abstract

A large population in India is dependent on agriculture. Surface water provides irrigation to the extent of 45 per cent of the total irrigation and ground water accounts for 55 per cent. Open and bore wells form the prime source of ground water irrigation. On bore well farmers an attempt has been made to develop an index to assess progressiveness of farmers. Based on the review of literature and discussion with experts, seven components of progressiveness were identified. The relevancy rating was obtained from 40 judges in the concerned area. Based on the relevancy percentage of the components with the relevancy coefficient of 0.75 and above were components selected for the inclusion in the progressiveness index. To compute the scale values for each of the identified components, their relative importance in the progressiveness was worked out by adopting normalized ranking method recommended by Guilford (1954).

A large population in India is dependent on Agriculture. But, agriculture in many parts of the country is rainfed. This excessive dependence on rainfall may adversely affect crop production in case the rainfall is deficit. It is therefore imperative to fully exploit the ground and surface water potential for irrigation purpose so that gambling with rainfall can be avoided. Open and bore wells form the prime source of ground water irrigation. Surface water provides irrigation to the extent of 45 percent of the total irrigation and ground water accouns for 55 per cent. The groundwater available for irrigation is around 36.08 mhm. The first bore well of India was sunk in Uttar Pradesh during 1930. Till 1951 India had just 2,500 bore wells.

Today, there are more than 27 million wells and bore wells operating in different parts of India. Uttar Pradesh has the largest number of bore wells in the country. Bore wells are generally popular with big and medium farmers. Bore well farming helps to increase productivity and production, mean while there will be negative impact on farmers' progressiveness because of continuous failure of bore wells and crop losses. In the light of above, there is a need to quantify progressiveness of farmers.

Progressiveness of farmers is a complex concept and there is no common viewpoint among scholars about its components. Seven components should be constructed within the context of the contemporary socio-economic and ecological situation. Hence, the present study is taken up with the specific objective to develop and standardize an index to measure the progressiveness of farmers.

Operationalisation of progressiveness of farmers : Progressiveness of farmers is characterized by change in education, income of family members, land holding, food habits, socio-political participation and possession of assets (it includes agricultural implements, livestock and house hold appliances) due to adoption of bore well irrigation.

The present index was developed by following the procedure as given below:

Step1: Identification of components : The progressiveness of farmers was identified as a dependent variable. Based on a thorough review of literature related to progressiveness, seven components *viz.,* education, land holding, annual family income, food habit, innovativeness, socio-political participation and possession were identified.

Step 2: Relevancy weightage : The components were mailed to 100 experts in the agricultural extension and other related fields to critically evaluate the relevancy of each component in the four point continuum *viz.,* Most Relevant (MR), Relevant (R), Somewhat Relevant (SWR) and Not Relevant (NR)

with the score of 4, 3, 2 and 1 respectively. A total of 40 judges returned the questionnaires duly completed and they were considered for further processing. From the data gathered, relevancy weightage were worked out for all the components by using the formula:

$$R.W. = \frac{MR \ X \ 4 + R \ X \ 3 + SWR \ X \ 2 + NR \ X \ 1}{\text{No. of judges responded} \times \text{Maximum score}}$$

Components rated as relevant with a relevancy weightage (RW) of 0.75 and more were considered and retained for the next step. The seven components have passed the above criteria, are presented below (Table I).

TABLE I

Relevancy weightage on Progressiveness index components.

(n=40)

Components	Relevancy weightage
Education	0.91
Land holding	0.90
Annual family income	0.97
Food habit	0.90
Socio-political participation	0.95
Innovativeness	0.96
Possession of assets	0.96

Step 3:Computation of Scale Values: In order to compute the scale values for each of the identified components based on the relevancy percentage, the progressiveness of framers was worked out by adopting normalized ranking method recommended by Guilford (1954).

A list of 40 experts was prepared and considered for seeking opinion. The judges were requested to give rank order based on the relative importance of the component. After receiving ratings from the judges, they were used in calculation of scale values.

$$P = \frac{(Ri - 0.5)100}{n}$$

Ranking the components based on their relative importance. Ranks were converted to rank values using the formula:

$R_i = (n\text{-}r_i+1)$

Where, Ri = Rank values

n = Number of components

ri = Ranks given by judges to seven components

The calculation of scale values consisted of working out the 'p' based on the formula recommended by Guilford (1954), working out 'c' scale values based on hull table (Hull, 1928), calculating 'R_j' value and finally determining the scale values (R_c) (Table I and II) as below.

$R_c = 2.357 * R_j - 7.01$

Where, P= Centile position

C= Values determined to each centile value

Ri = Rank value

n = Number of indicators

Step 4: Schedule development, testing reliability and validity : For all the seven components, a questionnaire was prepared to elicit appropriate variability for progressiveness of farmers. A pilot study was conducted among 30 rsespondents in non-sample area comprising 7 components in progressiveness index to test the reliability and validity.

Testing for reliability: The coefficient of stability (test-retest method) and the coefficient of equivalence (split-half method) were employed to measure the reliability of the scale. The coefficient of stability is the correlation between scores on two administrations (A1and A2) of the same form of the test, separated by a time period. In the pilot analysis,

TABLE II

Calculation of scale values for dimensions of progressiveness of farmers based on the judges rating:

ri	Ri	C 1	C 2	C3	C4	C5	C6	C7	Total	P	C
1	7	8	6	8	0	5	10	3	40	92.85	7
2	6	9	8	6	1	9	5	2	40	78.57	6
3	5	4	8	13	7	1	3	4	40	64.28	6
4	4	11	3	1	12	6	4	3	40	50.00	5
5	3	3	7	3	5	3	6	13	40	35.71	4
6	2	2	8	5	3	7	6	9	40	21.42	4
7	1	3	0	4	12	9	6	6	40	7.14	3
Ófji		40	40	40	40	40	40	40			
Rj=ÓfjiC		218	213	219	176	192	204	178			
R=Rj/Ófji		5.45	5.325	5.475	4.4	4.8	5.1	4.45			
Rc		5.83	5.54	5.89	3.36	4.30	5.01	3.47			

TABLE III

Progressiveness of farmers and their respective scale values

(n=40)

Components of progressiveness	Final scale values	Ranks
Education	5.83	II
Land holding	5.54	III
Annual family income	5.89	I
Food habit	3.36	VII
Socio-political participation	4.30	V
Innovativeness	5.01	IV
Possession of assets	3.47	VI

the responses were obtained twice at an interval of 12-15 days from the respondents with the same questionnaire. The coefficient of correlation (r) was calculated between scores from two administrations.

$$r_{(A1)(A2)} = \frac{[(XA1)\ (XA2)]}{N} - \frac{[(XA1)\ (XA2)]}{(SA1)\ (SA2)}$$

Where, A1 and A2 are two different administrations of the scale, X is the score of variable and S is the variance.

The correlation coefficient (r) between two administrations with time gap was significantly higher (0.9607).

The coefficient of equivalence is the correlation between scores on parallel forms (P and Q) of the test, administered with a minimal time lag between testing. The responses for the odd (P) and even numbered items (Q) were obtained and the scores of both sets were used to calculate coefficient of correlation (r).

$$r_{(P)(Q)} = \frac{(XP)\ (XQ)}{N} - \frac{(X\,P)\,(X\,Q)}{(SP)\ (SQ)N}$$

Where P and Q are two different forms of the scale, X - score of variable and S- variance.

The correlation value for split-half method was 0.974. Further, Spearman-Brown Prophecy formula was employed to know the reliability of the test of the original length from the values of split-half reliability.

$$r_{xx} = \frac{2rhh}{1+rhh}$$

Where, rhh is the split-half reliability coefficient and rxx is the estimate of the reliability of a test of the full length. The rxx value of 0.9415 suggested high reliability of the scale.

Testing for validity : Validity of the index was ensured by analysing content validity and criterion validity. Looking at the extensive literature and the nature of progressiveness of farmers, 7 components were finalized and were sent for relevancy analysis. Then the ranking for each of the components was obtained from 40 judges to calculate scale values. Hence, the content validity was ascertained.

The association of scores between progressiveness and the criterion score was 0.9801, indicating very high criterion validity.

An index consisting seven components will serve as a handy tool to assess the progressiveness of farmers and it will enable researches to take up studies on progressiveness of farmers in different zones. The scale values will be used to identify the level of progressiveness for each farmer.

Reference

Guilford, J. P., 1954, Psychometric methods. Tata McGraw-Hill Publishing Co Ltd.New Delhi.

Hull, C. L., 1928, Aptitude testing. Yonkers, NY; world,1928.

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