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RESEARCH ARTICLE

A Measurement Tool for Impact Assessment of Group Farming on its Members

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ABSTRACT

Group farming is a collective approach wherein farmers pool their land, labour, capital and share costs and profits. It helps to improve farmers' access to markets and credit, by improving their knowledge, economies of scale, and bargaining power. It is important to study the impact of group farming towards economic, social, participatory, market linkage and technological point of view as it is one of the strong interpreters to boost productivity of smallholder agriculture. The summated rating method proposed by Likart (1932) was used to develop the scale to quantify the impact of group farming. Initially 72 statements were selected relating to review of literature and 31 being finalized for the final construction of the scale. The precision and consistency of the data were determined by calculating the reliability and validity of the scale. This scale will help the policy makers, academicians and researchers interested in studying the impact of group farming on its participants.

Key words : Measurement scale; Group farming; Economic impact; Social impact; Market linkage.

Small holdings agriculture is important for raising agriculture growth, food security and livelihoods in India (Altieri et al. 2012). Indian agriculture is the home of small and marginal farmers, which constituted about 86.08 per cent of total farm holdings (Agriculture census 2015-16). The average size of operational holding in agriculture according to agriculture census 2015-16 was 1.08 hectares against 1.15 hectares in 2010-11. Small farms play important role in development and poverty reduction (Lipton, 2006). Therefore, the future of sustainable agriculture growth and food security in India determined by small and marginal farmers. Small and marginal farmers are frequently at a disadvantage compared to bigger commercial farms who can offer higher volumes of quality-assured goods, have greater negotiating power, and have better access to information, services, technology, and finance. Due to their limited physical and financial resources, small farmers are unable to develop and invest in technologies that improve efficiency and add value to primary output. (Kruijssen, Keizer, and Giuliani, 2009). Individual small farmers'

restricted market surplus inflates marketing expenses, raising transaction costs and per-unit assembly, handling, and shipping costs. Small farmers also lack the fundamental marketing expertise, as well as up-to-date price and market information.

To improve the prospects of small and marginal farmers various approaches have been proposed, including collective action through farmer organizations and cooperatives (Shepherd 2007). Group farming is one of the the best strategy that could be adopted where small and marginal farmers voluntarily pool their resources like land, labour, capital and skills to form a larger enterprise. Compared to individual farmers, the strength of community-based farming groups lie in production cost advantages. Their predominant advantage in production arises from avoiding the excessive machinery investment that is common to individual farmers, as well as the effective use of heavy machinery by means of the consolidation of fragmented farms (Katsura, 2006). As a result, an attempt has been undertaken in this work to create a reliable and accurate scale to

measure the impact of group farming in order to boost productivity of smallholder agriculture.

METHODOLOGY

Impact Assessment is a means of measuring the effectiveness of group activities and judging the significance of changes brought about by those activities. Impact is seen as the positive and negative, intended or unintended long-term results produced by an activity either directly or indirectly. Impact should be seen as the contribution of the intervention to the overall goal. The summated rating method proposed by *Likart (1932)*, *Edwards (1957)*, and *Patil et al. (1996)* was used to develop the tool.

Dimensions related to group farming and its impact on its members has been assembled from available secondary sources such as internet, journals, newspapers, books, magazines, and subject experts. At the beginning, the selected dimensions such as economy, social life, poverty status, lifestyle of farmers, participatory features, technological gains were sent to panel of subject experts. Their response has been collected on a three-point continuum viz., most relevant, relevant and least relevant. Total 32 experts responded; the score given by 32 experts was considered for the calculation. After the computation of Relevancy Percentage (RP), Mean Relevancy Weightage (MRW) and Mean Relevancy Score (MRS) four dimensions such as (economy, social life, participatory features and technological gain) were found most relevant and one more dimension were added as per the suggestions of the experts i.e (market linkage).

A provisional list of 72 items arranged after consultation subject experts, researchers and farmers. These, items were edited as per fourteen criteria given by (*Edward, 1957*). The identified items were grouped in five dimensions, which were found most relevant by experts. The relevancy test of these 72 items carried out by careful examination by panel of 90 judges who have expertise in the area. The judges were requested to read and analyze each item for its relevancy measurement and to give their response on a three-point continuum viz., most relevant, relevant, and least relevant with scores 3, 2, and 1, respectively. Out of 90 judges, 52 judges mailed the questionnaire back out of which 4 responses were rejected due to ambiguity. Their responses were considered for item analysis after the computation of relevancy percentage,

mean relevancy weightage and mean relevancy score. Subsequently, items having relevancy percent greater than 70, relevancy weightage greater than 0.70, and mean relevancy score greater or equal to overall mean relevancy score i.e. 2.23 were considered for final selection (*Raghuvanshi and Ansari, 2019*). With the help of this process, in the first stage, 45 statements were sorted (Table 2) which were further rewritten and modified as per the suggestions given by experts.

RESULTS AND DISCUSSION

Item analysis : Analysis of items is important to portray the reliability and validity of identified items (*Lal et al., 2014*). It helps to categorized the items on the basis of degree to which they can differ the respondents with high and low impact. For this a schedule composed of 45 items was administered on 31 respondents from the non-sampling area. The respondents were asked to rate every item on a five-point scale ranging from five for Strongly Agree, four for Agree, three for Undecided, two for Disagree and one for Strongly Disagree for positive items and reversed for negative items. At last impact score of each respondent was secured by computing scores of all items. The scores of each respondent were arranged in ascending order and two groups were formed i.e 25 per cent of respondents with highest score and 25 per cent with lowest score were selected. Eight respondents with the highest total score and eight respondents with lowest total score from non-sampled area were selected (*Shelar et al. 2022*).

Selection of statements for final scale : The t value for each statement was calculated as indication to differentiate between respondents with positive and negative impact. The formula for calculating 't' value was suggested by Edward is

$$t = \frac{X_H - X_L}{\sqrt{\frac{S_H^2}{n_H} - \frac{S_L^2}{n_L}}}$$

The statements having a t-value of 1.75 and above were selected for final impact scale, the t value for all statements is shown in Table 2.

Standardization of the scale : The validity and reliability of scale was established for standardization of the scale. The validity of this scale was confirmed through content validity and criterion validity. (*Priyadarshani et al. 2021*). The Cronbach's alpha method for testing reliability was employed. The scale

Table 1. Relevancy indices of identified items for measuring the impact of group farming on its members

Statements	RP	MRW	MRS
<i>Economic Impact</i>			
*Group farming leads to efficient use of scarce resources.	100	0.92	2.77
*It helps to overcome the high transaction costs that individual farmers face	97.91	0.91	2.75
Provide more funds for investing in machines and inputs.	91.66	0.81	2.45
Annual net returns per farm increased.	95.83	0.82	2.47
*Saving on hired labour.	95.83	0.86	2.58
It helps in securing Trademark.	79.16	0.71	2.14
*A group has more power to bargain with input suppliers, banks and other credit suppliers.	95.83	0.88	2.64
*It has advantage of bulk purchase of farm inputs.	100	0.93	2.81
*Helps to maintain common infrastructure.	95.83	0.86	2.60
*Develop self-profit maximization behaviour	95.83	0.88	2.64
Inadequate profit to individual members	87.50	0.77	2.33
Allows farmers to attract government and donor agencies attention.	95.83	0.84	2.54
Helps to address production and marketing issues effectively.	83.33	0.75	2.25
Membership of group farming is not beneficial to farmers	89.58	0.81	2.43
Reduced land leasing/sales	83.33	0.75	2.27
Regularity in loan repayment.	85.41	0.81	2.45
Strive against each other over benefit sharing	89.58	0.80	2.41
*Leads to upliftment of economically weak farmers.	93.75	0.875	2.625
*Cost of production can be reduced by procuring all necessary inputs using big transport.	89.58	0.875	2.625
*Access to fund without collateral with group as a guarantee.	95.83	0.85	2.56
*More funds can be gathered from the members if big plans are envisioned.	95.83	0.87	2.62
<i>Social Impact</i>			
*Provide Larger pull of knowledge and skills.	100	0.86	2.60
*Help farmers acquire the skills to manage bigger farms.	95.83	0.87	2.62
Very little or no role of members in decision making	64.58	0.65	1.95
*Help in recognizing and managing common interest.	95.83	0.95	2.875
*Enhancement of the livelihoods by providing employment and reducing migration.	100	0.90	2.72
*Provide opportunity to exchange beneficial experiences in order to integrate information.	97.91	0.89	2.68
*Build group cohesiveness, solidarity and promotes mutual support.	95.83	0.88	2.64
*Clash among members over activity selection	100	0.88	2.66
*Increased use of innovative communication tools such as social media applications.	93.75	0.86	2.58
Help to formulate their needs for assistance and propose appropriate solutions.	91.66	0.84	2.52
Improving quality of rural life through balanced diet and nutrition.	79.16	0.75	2.25
Some landless families who were earlier working as bonded labourers have now been able to produce their own harvest.	91.66	0.84	2.54
It provides a strong sense of stewardship and responsibility to the land.	95.83	0.84	2.52
*Provide a joint voice for communicating with or putting pressure on authorities.	97.91	0.86	2.60
Creating discrimination among members of society	87.50	0.81	2.43
*Provision of capacity building and training from the service providers.	91.66	0.85	2.56
<i>Market Linkage</i>			

*Able to undertake the processing, value additive marketing activities united.	100	0.92	2.77
Unable to eliminate the dominance of middlemen.	91.66	0.82	2.47
*It helps in enhancing marketing linkages and information channels.	100	0.90	2.70
*It Provides improved marketing of farm products through organised marketing.	97.91	0.90	2.72
*Helps to bulk up supplies so that traders' costs can be reduced.	93.75	0.88	2.64
Provide direct linkage to retailers such as supermarkets or fast food chains or can supply through intermediaries.	91.66	0.82	2.47
Provides links to export markets.	85.41	0.78	2.35
Able to respond quickly to market changes.	89.58	0.76	2.29
*Farmers can work together to assemble all their products at one location, for purchase by one or more traders	97.91	0.91	2.75
Only traders are benefited through group farming	97.91	0.84	2.54
*Access more distant and identified markets.	91.66	0.86	2.58
*Strengthen buying, selling and negotiating power through collective marketing.	100	0.91	2.75
*Reduction in exploitation by local traders.	97.91	0.90	2.70
*Collection in one place to bulking of produce so that volume of produce can be achieved and the traders will be attracted to visit the farmer's place.	100	0.92	2.77
*Regular supply of products is possible if proper planning and management is done by the group members.	95.83	0.875	2.625
<i>Participatory Features</i>			
*Improves participative decision making.	97.91	0.90	2.70
Personal gain is getting importance than the group goals	93.75	0.83	2.5
Emphasize freedom of expression.	87.50	0.75	2.27
*Promote more efficient use of resources in terms of greater farmer participation.	100	0.89	2.68
*By sharing responsibilities like labour and farm management activities, members can invest in other ventures.	100	0.87	2.62
*Each member tries to achieve key positions in the organisation	97.91	0.88	2.64
Farmers learn more through interactive reasoning and argument that occurs in group meetings.	93.75	0.84	2.54
*Acted as a vehicle to raised their voice and pursue for wider concerns.	95.83	0.86	2.58
*Helps in enhancing experimental capacities of the farmers so that farmers are trained in solving problem themselves.	97.91	0.86	2.58
<i>Technological gains</i>			
*Upgrade operational and technical knowledge of various farm activities.	95.83	0.90	2.72
*Farmers with limited means could modernize their farming techniques and organization.	100	0.92	2.77
*Leads to adoption of agricultural innovations.	100	0.90	2.70
Computer illiteracy which makes them unable to derive benefits of the ICT tools	100	0.84	2.54
*Improves awareness in modern farming technology.	95.83	0.85	2.56
*Helps to invest in larger capital-intensive machines.	89.58	0.86	2.58
*Leads to better utilization of farm machinery.	97.91	0.85	2.56
Able to experiment with new technologies that needed too much capital.	97.91	0.84	2.54
*Improves communication interaction with the technology generators or researchers.	93.75	0.85	2.56
*Easy in communication for dissemination of information about price, volume and others.	91.66	0.88	2.64
*It leads to Mechanization of small farms.	95.83	0.86	2.60

*Selected statements; RP=Relevancy Percentage; MRW=Mean Relevancy weightage; MRS=Mean relevancy Score

Table 2. Selection of Statements for final scale

Statements	't' Value
<i>Economic Impact</i>	
*Group farming leads to efficient use of scarce resources.	7.171805
*It helps to overcome the high transaction costs that farmers face when acting individually.	2.688086
*Saving on hired labour.	3.34664
*A group has more power to bargain with input suppliers, banks and other credit suppliers.	5.15037
*It has advantage of bulk purchase of farm inputs.	3.05505
*Helps to maintain common infrastructure.	6.768913
*Develop self-profit maximization behaviour	4.91935
*Leads to upliftment of economically weak farmers.	3.900947
Cost of production can be reduced by procuring all necessary inputs using big transport.	0.966092
Access to fund without collateral with group as a guarantee.	0.509175
More funds can be gathered from the members if big plans are envisioned.	0
<i>Social Impact</i>	
Provide Larger pull of knowledge and skills.	0
Help farmers acquire the skills to manage bigger farms.	-1.12815
Help in recognizing and managing common interest.	0
*Enhancement of the livelihoods by providing employment and reducing migration.	6.768913
*Provide opportunity to exchange beneficial experiences in order to integrate information.	4.248839
*Build group cohesiveness, solidarity and promotes mutual support.	4.291975
*Clash among members over activity selection	5.462793
*Provide a joint voice for communicating with or putting pressure on authorities.	2.898275
*Provision of capacity building and training from the service providers.	4.291975
<i>Marketing Linkage</i>	
Able to undertake the processing, value additive marketing activities united.	0.68313
It helps in enhancing marketing linkages and information channels.	0.509175
*It Provides improved marketing of farm products through organised marketing.	2.545875
*Helps to bulk up supplies so that traders' costs can be reduced.	6.06845
*Farmers can work together to assemble all their products at one location, for purchase by one or more traders.	3.98862
*Access more distant and identified markets.	6.06845
Strengthen buying, selling and negotiating power through collective marketing.	1.440165
*Reduction in exploitation by local traders.	3.000000
*Collection in one place to bulking of produce so that volume of produce can be achieved and the traders will be attracted to visit the farmer's place.	7.514431
*Regular supply of products is possible if proper planning and management is done by the group members.	6.06845
<i>Participatory Features</i>	
*Improves participative decision making.	7.171805
*Promote more efficient use of resources in terms of greater farmer participation.	2.688086
*By sharing responsibilities like labour and farm management activities, members can invest in other ventures.	3.34664
*Each member tries to achieve key positions in the organization	5.15037
*Acted as a vehicle to raised their voice and pursue for wider concerns.	3.05505
*Helps in enhancing experimental capacities of the farmers so that farmers are trained in solving problem themselves.	6.768913
<i>Technological Gains</i>	
*Upgrade operational and technical knowledge of various farm activities.	4.91935
*Farmers with limited means could modernize their farming techniques and organization.	3.900947
*Leads to adoption of agricultural innovations.	2.256304
*Improves awareness in modern farming technology.	2.04939
Helps to invest in larger capital-intensive machines.	0
Leads to better utilization of farm machinery.	0
Improves communication interaction with the technology generators or researchers.	-1.12815
Easy in communication for dissemination of information about price, volume and others.	0
It leads to Mechanization of small farms.	0
* Selected statements	

Table 3. Reliability statistics between selected items

Cronbach's Alpha Value	Set 1 (Odd items)	0.866
	Set 2 (Even items)	0.890
Correlation between forms		0.898**
Spearman-Brown Coefficient		0.946**

was split into two halves on the basis of odd and even number of items and administered to 31 farmers from non-sampling area. Thus, two sets of scores were obtained as shown in Table 3. The cronbach's alpha value for set 1 i.e odd items found to be 0.866 and for even items 0.890, which reflects high reliability. The Pearson's product moment correlation coefficient was calculated 0.993 and this was further confirmed by using spearman's brown formula ($r = 0.946$) significant at 1 per cent level of probability.

The final scale which would measure the impact of group farming on its members consisted of 31 items. The scale can be administered on a five-point scale ranging from five for Strongly Agree, four for Agree, three for Undecided, two for Disagree and one for Strongly Disagree. Therefore, the overall possible impact score of the individual respondent towards group farming could range from 31 to 155. The high score of scale will represent the positive impact of group farming on its members.

CONCLUSION

Impact assessment is a method of determining the efficacy of group activities and assessing the significance of the changes induced by such activities. The impact of group farming plays important role in growth of small and marginal farmers. For accurate measurements, we need dependable and valid measuring instruments. This scale will aid in the evaluation of group farming's influence on altering economic, social, market linkage, participatory features, and technological gains. Since the scale's validity and reliability demonstrated that the results were highly precise and consistent, it will be beneficial to academicians and policymakers, and it may be modified to be utilized in other fields of research.

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